

JOHN HOLLAND

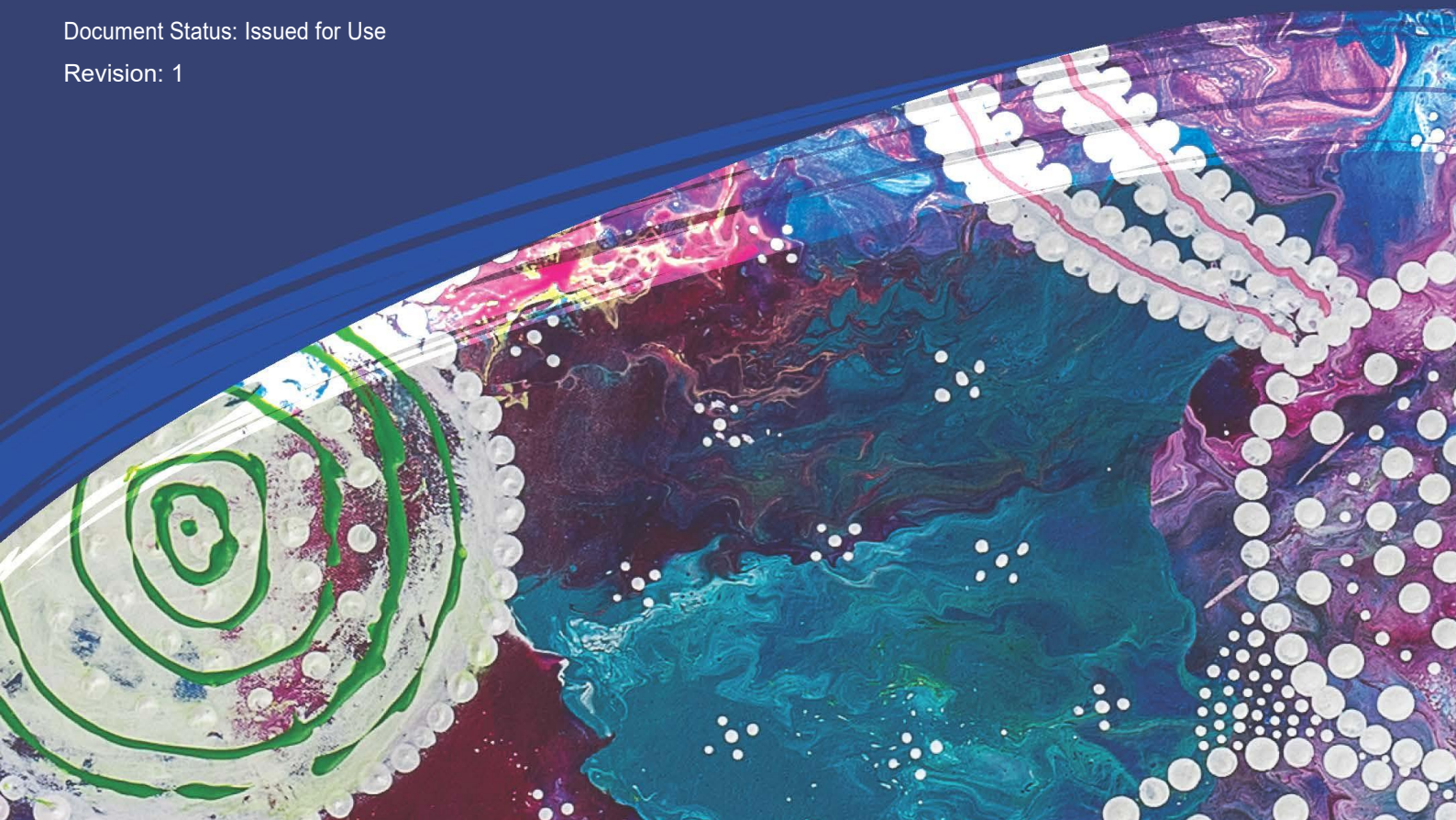
INLAND RAIL
ILLABO TO STOCKINBINGAL PROJECT

Sub Plan: Soil and Water Management

Document Number: 5-0019-220-PMA-00-PL-0058

Document Status: Issued for Use

Revision: 1



Document Control

Document Title	Sub Plan: Soil and Water Management	
IRPL Document No.	5-0019-220-PMA-00-PL-0058	
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Revision History

REVISION	DATE ISSUED	DESCRIPTION
A	19/12/2024	Issued for Review
B	21/03/2025	Issued for Review
C	05/05/2025	Issued for Review
D	18/06/2025	Issued for Review
E	1/10/2025	Issued for Review
0	10/11/2025	Issued for Use
1	27/05/2026	Issued for Use

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1 Revisions and Distribution

1.1 Revisions

Draft issues of this document are identified as Revision A, B, C etc. Following acceptance by the document approver, the first finalised revision will be Revision 0. Subsequent revisions will have an increase of “1” in the revision number (1, 2, 3 etc.).

1.2 Distribution

The controlled master version of this document is available for distribution as appropriate and maintained on the document management system being used on the project. All circulated hard copies of this document are deemed to be uncontrolled.

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2 References, Definitions and Abbreviations

2.1 Compliance Roadmap

The following section provides a tabular representation of the Project requirements as described in the Conditions of Approval (CoA) and a reference link to detail how Inland Rail – Illabo to Stockinbingal (I2S or Project) intend to comply.

This Soil and Water Management Sub-plan (SWMSP) provides a consistent approach to address the requirements of both the State and Federal approvals in a single document. The requirements of the Federal and State conditions relevant to the development of this SWMSP are shown in Section 2.1.1 and 2.1.2. The Revised Mitigation Measures (RMMs) from the Submissions Report and relevant Infrastructure Sustainability Council (ISC) are provided in Section 2.1.3 and 2.1.4 respectively. A cross reference is also included to indicate where each requirement is addressed in this SWMSP or other Project management documentation.

2.1.1 Federal Conditions of Approval

There are no soil and water specific CoA associated with the Commonwealth Approval (EPBC 2018/8233). Non-soil and water relevant conditions are detailed in the CEMP.

2.1.2 State Conditions of Approval

CoA associated with the Infrastructure Approval (SSI-9406) relevant to the Project and SWMSP under the NSW *Environmental Planning and Assessment Act 1979* are provided in Table 2-1.

Table 2-1 State CoA relevant to the SWMSP (SSI-9406)

CoA No.	Condition Requirements	Document Reference
A1	The Proponent must carry out the CSSI in accordance with the terms of approval and generally in accordance with the: a) Inland Rail – Illabo to Stockinbingal Environmental Impact Statement (ARTC 2022); b) Illabo to Stockinbingal Project Response to Submissions (ARTC 2023);I2S – Mitigation Measures (Inland Rail, April 2024);	Section 2 and 3
A2	The CSSI must be carried out in accordance with all procedures, commitments, preventative actions, performance criteria and mitigation measures set out in accordance with the documents listed in Condition A1 unless otherwise specified in, or required under, this approval.	Section 2, 4, 5 and 8
A3	In the event of an inconsistency between: a) the conditions of this approval and any document listed in Condition A1(a) to (f) inclusive, the conditions of this approval will prevail to the extent of the inconsistency; and b) any document listed in Condition A1(a) to (f) inclusive, the most recent document will prevail to the extent of the inconsistency. Note: For the purpose of this condition, there will be an inconsistency between a term of this approval and any document if it is not possible to comply with both the term and the document.	Noted
A4	The Proponent must comply with the written requirements or directions of the Planning Secretary, including in relation to: a) the environmental performance of the CSSI; b) any document or correspondence in relation to the CSSI; c) any notification given to the Planning Secretary under the terms of this approval;	CEMP

CoA No.	Condition Requirements	Document Reference
	d) any audit of the construction or operation of the CSSI; e) the terms of this approval and compliance with the terms of this approval (including anything required to be done under this approval); f) the carrying out of any additional monitoring or mitigation measures; and g) in respect of ongoing monitoring and management obligations, compliance with an updated or revised version of a guideline, protocol, Australian Standard or policy required to be complied with under this approval.	
A10	Where the terms of this approval require a document or monitoring program to be prepared or a review to be undertaken in consultation with identified parties, evidence of the consultation undertaken must be submitted with the corresponding documentation to the Planning Secretary and the Environmental Representative (as relevant) in accordance with the Post Approval Guidance: Defining Engagement Terms (DPIE, 2020). The evidence must include: a) documentation of the engagement with the party identified in the condition of approval that has occurred before submitting the document for approval; b) a log of the dates of engagement or attempted engagement with the identified party; c) documentation of the follow-up with the identified party where engagement has not occurred to confirm that they do not wish to engage or have not attempted to engage after repeated invitations; d) an outline of the issues raised by the identified party and how they have been addressed; and e) a description of the outstanding issues raised by the identified party and the reasons why they have not been addressed.	Appendix B
A26	For the duration of Work and for no less than twelve (12) months after the completion of construction of the CSSI, the approved ER must: (a) receive and respond to communication from the Planning Secretary in relation to the environmental performance of the CSSI; (b) consider and inform the Planning Secretary on matters specified in the terms of this approval; (c) consider and recommend to the Proponent any improvements that may be made to work practices to avoid or minimise adverse impact to the environment and to the community; (d) review documents identified in Conditions A11, A18, B1, C5, C12, C17, C27, and E109, and any other documents that are identified by the Planning Secretary, to ensure they are consistent with requirements in or under this approval and if so: (i) make a written statement to this effect before submission of such documents to the Planning Secretary (if those documents are required to be approved by the Planning Secretary); or (ii) make a written statement to this effect before the implementation of such documents (if those documents are required to be submitted to the Planning Secretary / Department or are not required to be submitted to the Planning Secretary / Department); (iii) provide a written statement / submission via the Major Projects portal to the Planning Secretary advising the documents have been endorsed by the ER; (e) regularly monitor the implementation of the documents listed in Conditions A11, A18, B1, C5, C12, C17, C27, and E109 to ensure implementation is being carried out in accordance with the document and the terms of this approval; (f) as may be requested by the Planning Secretary, help plan, attend or undertake audits of the CSSI commissioned by the Department including scoping audits,	Section 3.4.3

CoA No.	Condition Requirements	Document Reference
	programming audits, briefings and site visits, but not independent environmental audits required under Condition A28 of this approval; (g) as may be requested by the Planning Secretary, assist in the resolution of community complaints; (h) assess the impacts of minor ancillary facilities as required by Condition C9 of this approval; (i) consider any minor amendments to be made to the CEMP, CEMP Sub-plans and Construction Monitoring Programs that comprise updating or are of an administrative nature, and are consistent with the terms of this approval and the CEMP, CEMP Sub-plans and Construction Monitoring Programs approved by the Planning Secretary and, if satisfied such amendment is necessary, approve the amendment. This does not include any modifications to the terms of this approval; and (j) prepare and submit to the Planning Secretary and other relevant regulatory agencies, for information and make publicly available, an Environmental Representative Monthly Report providing the information set out in the Environmental Representative Protocol under the heading "Environmental Representative Monthly Reports." The Environmental Representative Monthly Report must be submitted within seven (7) calendar days following the end of each month for the duration of the ER's engagement for the CSSI.	
A34	The Planning Secretary must be notified via the Major Projects Website immediately after the Proponent becomes aware of an incident. The notification must identify the CSSI (including the application number and the name of the CSSI if it has one) and set out the location and nature of the incident.	Section 9.5
A35	Subsequent notification must be given and reports submitted in accordance with the requirements set out in APPENDIX A. The requirement to notify the Department under this condition excludes incidents which are solely required to be notified to the Office of the National Rail Safety Regulator.	Section 9.5
A36	The Planning Secretary must be notified via the Major Projects Website within seven days after the Proponent becomes aware of any non-compliance. The notification must identify the CSSI (including the project number and the name of the CSSI if it has one), set out the condition/s that is non-compliant, the nature of the breach; the reason for the non-compliance (if known) and what actions have been, or will be, undertaken to address the non-compliance.	Section 9.4
A37	A non-compliance which has been notified as an incident does not need to also be notified as a non-compliance.	Section 9.4
C15	Where a CEMP (and relevant CEMP sub-plans) requires the Planning Secretary's approval, the CEMP (and relevant CEMP sub-plans) must be endorsed by the ER and then submitted to the Planning Secretary for approval no later than one (1) month before the commencement of construction, or where construction is staged, no later than one (1) month before the commencement of each stage.	Section 3.4.3
C17	Except as provided by Condition C1, the following CEMP Sub-plans must be prepared in consultation with the relevant state agencies, relevant councils and RAPs identified for each CEMP Sub-plan. Evidence of consultation must be provided consistent with Condition A10.	Appendix A

	Required CEMP Sub-plan	Relevant authorities to be consulted for each CEMP Sub-plan

CoA No.	Condition Requirements	Document Reference
	(d) Soil and Water — Relevant Councils and BCS *Notes:* *1. CEMP Sub-plan(s) may reflect the staged construction of the project through geographical activities, temporal activities or activity-based contracting and staging.* *2. Nothing in this condition prevents the Proponent from combining any of the above CEMP Sub-plans.* *3. The Biodiversity CEMP Sub-Plan must be consistent with goals and objectives, mitigation measures and monitoring requirements of the Commonwealth approved conservation advice and any Recovery Plans for all Matters of National Environmental Significance.*	
C18	The CEMP Sub-plans listed in Condition C17 must state how: (a) the environmental performance outcomes identified in the documents listed in Condition A1, as modified by these conditions, will be achieved; (b) the mitigation measures identified in the documents listed in Condition A1, as modified by these conditions will be implemented; (c) the relevant terms of this approval will be complied with; and (d) issues requiring management during construction, as identified through ongoing environmental risk analysis, will be managed.	Section 4.2 Section 8 Section 4.1 Section 8 and 9
C22	The Soil and Water Management Sub-plan must include: (a) measures to avoid and minimise erosion and sedimentation impacts including to riparian, agricultural and forested land, and areas of high salinity and high erosion potential;	Section 8.2
	(b) a draft water balance for the project;	Section 8.6.1
	(c) information demonstrating that the required construction water resources are legally and physically available;	Section 8.6
	(d) procedures and protocols for the appropriate supply, transport and storage of water across the CSSI;	Section 8.6.2 Section 8.6.3
	(e) mitigation measures to address construction water resource shortages that arise;	Section 8.6.3
	(f) a protocol for avoiding, minimising and mitigating impacts in the event of interaction with groundwater;	Section 8.11 GMMP
	(g) a surface water monitoring framework as per Condition C29;	Appendix B
	(h) a dam dewatering protocol; and	Biodiversity Management Sub-plan (BMSP) – Appendix E Appendix D
	(i) a spill response procedure.	Appendix E
C27	Except as provided by Condition C1 the following Construction Monitoring Programs must be prepared in consultation with the relevant state agencies and relevant councils identified for the Construction Monitoring Programs to compare actual performance of construction of the CSSI against performance predicted in the documents specified in Condition A1.	Appendix B

CoA No.	Condition Requirements	Document Reference
	<table><tr><th></th><th>Required Construction Monitoring Programs</th><th>Relevant government authorities to be consulted for each Construction Monitoring Program</th></tr><tr><td>(b)</td><td>Surface water</td><td>DCCEEW Water, Crown Lands and relevant Councils</td></tr></table>	
C28	Each Construction Monitoring Program (CMP) must have consideration of SMART principles and provide: (a) details of baseline data available; (b) details of baseline data to be obtained and when; (c) details of all monitoring of the CSSI to be undertaken; (d) the parameters of the CSSI to be monitored; (e) the frequency of monitoring to be undertaken; (f) the location of monitoring and reasons for choosing the location; (g) the reporting of monitoring results and analysis results against relevant criteria; (h) details of the methods that will be used to analyse the monitoring data; (i) procedures to identify and implement additional mitigation measures where the results of the monitoring indicate unacceptable project impacts; (j) any consultation to be undertaken in relation to the monitoring programs; and (k) any specific requirements as required by Condition C29.	Section 4.1, Appendix B
C29	The Surface Water Monitoring Program must be prepared in accordance with the requirements of Condition E84 to E85.	Appendix B
C31	CMPs must be submitted to the Planning Secretary for approval except those permitted to be endorsed by others pursuant to a CEMF approved by the Planning Secretary under Condition C1.	Appendix B
C32	Where a CMP requires Planning Secretary's approval, the CMP must be endorsed by the ER and then submitted to the Planning Secretary for approval no later than one (1) month before the commencement of construction, or where construction is staged, no later than one (1) month before the commencement of each stage.	Section 3.4.3 Appendix B
C33	CMP(s) not requiring the Planning Secretary's approval, but requiring ER endorsement, must be submitted to the ER no later than one (1) month before the commencement of construction or where construction is staged no later than one (1) month before the commencement of that stage. The CMP(s) must be endorsed by the ER as being consistent with the conditions of this approval and all undertakings made in the documents listed in Condition A1.	Appendix B
C34	Construction must not commence until the relevant CMP(s) have been approved by the Planning Secretary or endorsed by the ER, (as applicable and as identified in the CEMF approved under Condition C1), and all relevant baseline data for the specific construction activity has been collected.	Section 3.4.3
C35	The CMP(s), as approved or endorsed (as relevant), including any minor amendments approved by the ER, must be implemented for the duration of construction and for any longer period set out in the monitoring program or specified by the Planning Secretary, whichever is the greater.	Noted
C36	The results of the CMP(s) must be made publicly available in the form of a Construction Monitoring Report at the frequency identified in the relevant CMP.	Appendix B

CoA No.	Condition Requirements	Document Reference
	Note: Where a relevant CEMP Sub-plan exists, the relevant Construction Monitoring Program may be incorporated into that CEMP Sub-plan.	
E76	The CSSI must be designed, constructed and operated so as to maintain the NSW Water Quality Objectives where they are being achieved as at the date of this approval, and contribute towards achievement of the NSW Water Quality Objectives over time where they are not being achieved as at the date of this approval, unless an EPL in force in respect of the CSSI contains different requirements in relation to the NSW Water Quality Objectives, in which case those requirements must be complied with. *Note: If it is proposed to discharge construction stormwater to waterways, a Water Pollution Impact Assessment will be required to inform licensing, consistent with section 45 of the POEO Act. Any such assessment must be prepared in consultation with the EPA and be consistent with the National Water Quality Guidelines, with the level of detail commensurate with the potential water pollution risk.*	Section 8.3, 8.4, 8.5, 8.14, 8.15, Appendix B and Appendix D
E77	The CSSI must be designed, constructed and operated to: (a) ensure all drainage feature crossings (permanent and temporary watercourse crossings and stream diversions) new or modified surface water drainage (including cess drains), depressions are designed and constructed and maintained in accordance with Guidelines for controlled activities on waterfront land: riparian corridors (Department of Industry, 2018) and Policy and Guidelines for Fish Habitat Conservation and Management (Department of Primary Industries, 2013); (b) locate all scour protection work associated with replacement culverts or the construction of new culverts within the rail corridor, or as agreed to by the relevant landowner in accordance with Condition E57; (c) ensure that there is no permanent interception of, and/or connection with, groundwater; (d) ensure all discharges from new or modified surface drainage (including cess drains) adjacent to the new and upgraded track are released at a controlled rate to prevent scour; and (e) ensure that any recycled wastewater (including recycled/treated water) proposed for use by the CSSI, considers risks to human health or the receiving environment and meets the relevant standards.	Section 8.7, 8.15 BMSP - Appendix D
E78	Unless an EPL is in force in respect to the CSSI and that licence specifies alternative criteria, discharges from construction water treatment plant(s), where required, to surface waters must not exceed: (a) the Australian and New Zealand Guidelines for Fresh and Marine Water Quality 2018 (ANZG 2018) default guideline values for toxicants at the 95 per cent species protection level; (b) for physical and chemical stressors, the guideline values set out in Tables 3.3.2 and 3.3.3 of the Australian and New Zealand Guidelines for Fresh and Marine Water Quality 2000; and (c) for bioaccumulative and persistent toxicants, the ANZG 2018 values at a minimum of 99 per cent species protection level. Where the ANZG 2018 does not provide a default guideline value for a particular pollutant, the approaches set out in the ANZG 2018 for deriving guideline values, using interim guideline values and/or using other lines of evidence such as international scientific literature or water quality guidelines from other countries, must be used.	Section 8.3, 8.4, 8.5 and 8.14 Appendix D
E79	Prior to construction impacting a landowner anywhere on the alignment, the Proponent must consult with the landowner and/or relevant roads authority that is located immediately adjacent to new or upgraded culverts to determine the potential for impacts on infrastructure, dwellings, property access, agricultural productivity, farm operations and farm dams (including changes in water supply yield, reliability of	Section 8.14 and 8.15

CoA No.	Condition Requirements	Document Reference
	supply, flood flows and embankment stability) due to the introduction or alteration of flows. Where potential adverse impacts are identified, the Proponent must consult with the affected landowner or relevant roads authority on the management measures that will be implemented to mitigate the impacts. The outcomes of the consultation with affected landowners or relevant roads authority must be documented.	
E80	In addition to the requirements of Condition E79, prior to construction, the Proponent must prepare a register (the Register) of all farm dams within 100m upstream and 500m downstream of the rail alignment. The Register must include: (a) property, location within property and owner; (b) approximate surface area, depth and volume; (c) alignment of dam inflow and outflow for 500m upstream and 100m downstream of the dam; (d) identification of all contour banks, drains or other water diverting structures that influence the water supply yield of existing farm dams; (e) catchment area feeding the dam; (f) identification of all surface water and groundwater sources supplying the dam; and (g) a map showing the items in (a) to (f) above. The components of the Register must be compiled in consultation with the landowner. Copies of parts of the register and supporting documentation that relate to a landowners' property must be provided to the landowner prior to construction. A copy of the Register must be provided to the Planning Secretary at the same time as submission of the Flood Design Verification Report.	Section 8.3.3
E81	The design of the Project including the longitudinal drainage and the cross drainage, is to be prepared to ensure there are no significant impacts to the farm dams in the Register and the other items listed in Condition E77. The hydrological modelling, calculations or other assessments demonstrating no significant impacts are to be documented.	Section 8.15
E82	Where culverts, bridge abutments and other cross drainage structures are designed to pass flood and surface water flows through the rail formation, the orientation of these structures is to be aligned with the existing flow direction to minimise disturbance of existing flow patterns around the entries and exits to these structures, or as otherwise agreed by the Secretary.	Section 8.15
E83	The construction of the CSSI must protect the integrity of riparian corridors in accordance with the Guidelines for controlled activities on waterfront land: Riparian Corridors (Department of Industry 2018) when carrying out Work within 40 metres of a watercourse.	Section 8.7 and 8.14 BMSP – Appendix D
E84	A Surface Water Monitoring Program must be prepared in consultation with DCCEEW Water for construction and for a minimum of two years from commencement of operation or as otherwise agreed with the Secretary. The Surface Water Monitoring Program must include, but not be limited to: (a) identify surface water monitoring locations, frequency and duration at discharge points and selected watercourses where works are being undertaken; (b) identify surface water monitoring parameters; (c) include water quality objectives, parameters and criteria from documents listed in Condition A1;	Appendix B

CoA No.	Condition Requirements	Document Reference
	(d) monitoring of operational meters installed, recording and reporting to Natural Resources Regulator, in accordance with the relevant requirements of the NSW Non-Urban Water Metering Policy (DPIE, 2020) and clause 21(6) of the Water Management (General) Regulation 2018. (e) monitoring to ensure water quality complies with relevant drinking water criteria from the National Water Quality Management Strategy Australian Drinking Water Guidelines 6 2011 (National health and Medical Research Council 2017) (f) monitoring geomorphological changes downstream of water treatment plant(s) (where required) and on watercourses' (at locations where the velocity QDL is exceeded or there is active erosion) physical structure on at least four cases of inundation to ensure mitigation measures are achieving desired outcomes; (g) trigger points for responding to any monitored changes which adversely impact on baseflows of creeks in the vicinity of the CSSI, including the implementation of additional protection measures to address these changes and their associated timing (trigger points must be defined and designed as part of the Program in consultation with DCCEEW Water); (h) methods for providing the data collected to the relevant water authority where discharges are directed to their assets; and (i) a method for providing the surface water monitoring data to DCCEEW Water every six months during construction and for a minimum period of two years from commencement of operation or as otherwise agreed with the Secretary. *Note: With regards to monitoring data to be provided to DCCEEW Water, the format of the dataset must be both in a tabulated and electronic quality-controlled data (.csv, Excel) ready to use format.*	
E85	The Surface Water Monitoring Program for construction must be submitted to and approved by the Planning Secretary before construction and the Surface Water Monitoring Program for operation must be submitted to and approved by the Planning Secretary prior to the completion of construction. The Surface Water Monitoring Programs for construction and operation must be implemented. *Note: Nothing in this condition prevents the Proponent from preparing separate or combined Surface Water Monitoring Programs for the construction and operational phases of the CSSI.*	Section 3.4.3 Appendix B
E123	Permanent spoil mounds are to be located: (a) within the rail corridor; (b) at least 50 metres from any watercourse or culvert or where there is a risk of erosion or flood impacts during any flood event ; (c) at least 500 metres from any residence; and (d) outside the drip lines of trees located on private property. Note: For the purpose of Condition E123(d), the Proponent must not affect trees outside of the rail corridor for the purpose of preventing those trees' driplines overhanging spoil mounds.	Section 8.2.2.2 and 8.15
E124	Permanent spoil mounds are to comply with the following requirements: (a) maximum height must not exceed the top height of the upgraded rail line directly parallel to the spoil mound or two metres (whichever is the lesser); (b) not result in the clearing or covering of native vegetation beyond that described in the documents listed in Condition A1; (c) not result in heritage impacts beyond that described in the documents listed in Condition A1; (d) not result in additional changes to the upstream flooding regime beyond those described in the documents listed in Condition A1;	Section 8.2.2.2 and 8.15

CoA No.	Condition Requirements	Document Reference
	(e) not affect the downstream flood regime; (f) not impede the flow of water through culverts; (g) not contain any contaminated soil classified as unsuitable for the proposed land use, acid sulphate soils or green waste; (h) are to be stabilised during construction of the CSSI; and (i) are to be stabilised following completion of construction of the CSSI.	
E149	A Water Reuse Strategy must be prepared, which sets out options for the reuse of collected stormwater and groundwater during construction. The Water Reuse Strategy must include, but not be limited to: (a) evaluation of reuse options; (b) details of the preferred reuse option(s), including volumes of water to be reused, proposed reuse locations and/or activities, proposed treatment (if required), and any additional licences or approvals that may be required; (c) measures to avoid misuse of recycled water as potable water; (d) consideration of the public health risks from water recycling; and (e) a time frame for the implementation of the preferred reuse option(s). The Water Reuse Strategy must be prepared based on best practice and advice sought from relevant agencies, as required. The Strategy must be applied during construction and operation. Justification must be provided to the Planning Secretary if it is concluded that no reuse options prevail. The Water Reuse Strategy must be implemented and published on the project website. Note: Nothing in this condition prevents the Proponent from preparing separate Water Reuse Strategies for the construction and operational phases of the CSSI.	Separate Water Reuse Strategy Document Briefly discussed under Section 8.6
E150	Erosion and sediment controls must be installed and maintained, as a minimum, in accordance with the publication Managing Urban Stormwater: Soils & Construction (4th edition, Landcom 2004) commonly referred to as the 'Blue Book'.	Section 8.2 and 8.14 Appendix C

2.1.3 Revised Mitigation Measures

This SWMSP and associated documents have been prepared to describe how the Project will meet the construction phase requirements of the RMMs required as part of the Environmental Assessment Documentation. Table 2-2 includes additional requirements to be incorporated into this SWMSP.

Table 2-2 RMMs relevant to the SWMSP

RMM No.	Issue	Mitigation Measure	Timing	Document Reference
HF-2	Construction water supply	Construction water supply options would continue to be explored during detailed design and would include: • ongoing consultation with Goldenfields Water (or an equivalent commercial water supply operator) to access the local reticulated network • investigation of options to utilise recycled water from sewage treatment plants	Design / Pre-construction	Section 8.6

RMM No.	Issue	Mitigation Measure	Timing	Document Reference
		• access to groundwater bores where it can be bought on-market • investigation into the use of farm dams for water harvesting and storage.		
HF-3	Retaining water flows	Detailed design would consider channelling of water around Ironbong Road level crossing and Burley Griffin Way realignment, and the potential formation of detention basins as a means of retaining flows in a similar manner to existing farm dams and flood levees.	Design / Pre-construction	Section 8.15
WQ-1	Water quality	The construction impact zone defined for the Project would allow sufficient room for provision of temporary and permanent erosion and sediment control measures/pollution control measures where required based on consideration of overland flow paths and flood risk. Water quality control measures would be designed to capture and treat the 80th percentile five-day rainfall event and any other requirements as outlined in the Blue Book.	Design / Pre-construction	Section 8.14 Appendix C
WQ-2	Surface water monitoring	A surface water monitoring framework would be developed and implemented as part of the soil and water management plan in the Construction Environmental Management Plan (CEMP). It would identify: • monitoring locations at discharge points and selected watercourses where works are being undertaken • monitoring parameters • frequency and duration of monitoring. The monitoring framework would include relevant water quality objectives (WQOs), parameters and criteria. It would be developed in consultation with the NSW Department of Planning and Environment and the NSW Environment Protection Authority.	Design / Pre-construction	Appendix B
SC-1	Structural integrity	Detailed design would include engineering measures to minimise operational risks from dispersive, saline and/or low strength soils, particularly through foundation and batter design.	Design / Pre-construction	Section 6.2 and 8.15
SC-5	Erosion and sedimentation control	Where practical, vegetation clearing and ground-disturbing works should be staged sequentially/across the project to minimise areas exposed to erosion and sediment risk.	Design / Pre-construction	Section 8.14 Appendix C
HF-6	Sedimentation and erosion management	A soil and water management plan would be prepared and implemented as part of the CEMP. The plan would include measures, processes and responsibilities to minimise the potential for soil and water impacts (including impacts to groundwater and geomorphology) during construction.	Construction	This SWMSP
HF-7	Dewatering of farm dams that require relocation and/or decommissioning	A dam dewatering protocol would be developed as part of the soil and water management plan. It would consider: • Options for reuse of water in the dam	Construction	Section 8.3.3 BMSP - Appendix E

RMM No.	Issue	Mitigation Measure	Timing	Document Reference
		• Licensing and approval requirements, where relevant • The quality and quantity of the water to be released, where relevant • Strategies to minimise impacts on native, threatened or protected species • Strategies to minimise spread of nuisance flora and fauna species.		
AHF-1	Hardstand areas	Minimising hard stand areas in the vicinity of camp buildings to minimise increases in runoff.	Construction	Section 8.14
AHF-2	Site drainage	Site drainage of the accommodation camp would be installed in accordance with the recommendations in Managing Urban Stormwater: Soils and construction - Volume 1 (Landcom, 2004)	Construction	Section 8.14
AHF-3	Stormwater management	Stormwater drainage infrastructure would be included under proposed access tracks and roads to maintain existing local overland flows to the farm dam to the north of the accommodation camp site	Construction	Section 8.14
AHF-4	Flood management	A stormwater detention basin would be constructed at the accommodation camp (indicative location would be in the northern portion of the lot) to capture stormwater runoff from the car park during the 10% Average Exceedance Probability (AEP) flood event and will be designed in accordance with the Soil and Water Management Plan (refer to WQ-3).	Construction	Section 8.14 TWAFMP
AHF-5	Wastewater management	Accommodation camp wastewater would be collected and removed off-site for treatment and disposal at a licenced wastewater treatment facility.	Construction	Section 8.14 TWAFMP
AHF-6	Reuse of rainwater	Capture of all rainwater from the roofs of camp buildings across the accommodation camp site for suitable reuse within the site.	Construction	Section 8.14 TWAFMP
WQ-3	Sedimentation and erosion management	A soil and water management plan would be prepared and implemented as part of the CEMP. The plan would include measures, processes and responsibilities to minimise the potential for soil and water impacts (including impacts to groundwater and geomorphology) during construction.	Construction	This SWMSP Appendix C
WQ-4	Dewatering of farm dams that require relocation and/or decommissioning	A dam dewatering protocol would be developed as part of the soil and water management plan. It would consider: • Options for reuse of water in the dam • Licensing and approval requirements, where relevant • The quality and quantity of the water to be released, where relevant • Strategies to minimise impacts on native, threatened or protected species • Strategies to minimise spread of nuisance flora and fauna species.	Construction	Section 8.3.3 Appendix D BMSP - Appendix E

RMM No.	Issue	Mitigation Measure	Timing	Document Reference
WQ-5	Disposal of wastewater (concrete batching plants)	All wastewater from concrete batching plants would be captured and would either be disposed of to an appropriately licensed facility or treated prior to discharge to surface water bodies. All discharge water would comply with the WQOs and the relevant EPL requirements: • Measures to prevent or minimise mud and dirt being tracked onto public roadways by trucks and any equipment leaving the site • Requirements for training, inspections, corrective actions, notification and classification of environmental incidents, record keeping, monitoring and performance objectives for handover on completion of construction • Any other requirements necessary to comply with CoA subsequent approvals or regulatory requirements • Erosion and sediment control plans and Soil and Water Management Plan (SWMP) will be signed off by a Suitably Qualified Person (e.g. Certified Professional in Erosion and Sediment Control (CPESC) in accordance with regulatory requirements.	Construction	Section 8.3.1, 8.5 Appendix C Appendix D
SC-6	General soil and erosion management	A soil and water management plan (SWMP) would be prepared as part of the CEMP. The SWMP would comply with the conditions of approval and be in accordance with best practice, reflected in Managing Urban Stormwater: Soils and construction - Volume 1 (Landcom, 2004), Volume 2C Unsealed roads (DECC, 2008) and Volume 2D, Main Road Construction (DECC, 2008) (collectively known as the Blue Book). The SWMP would include: • Water quality and soil/land conservation objectives for the Project • A progressive erosion and sediment control plan that allows for staging and site specific erosion and sediment controls at all work sites in accordance with the Blue Book. Physical controls may include sediment fences and basins; containment bunds; silt traps; turbidity barriers and diversions; dust suppression; and earth compaction around stockpiles and earthworks areas. The controls would aim to: • Divert water from upslope areas around the site • Reduce erosion from within the site • Intercept runoff and capture sediment from site • Protect watercourses, drainage lines and drain inlets down-gradient from the site. The plan would identify: • Monitoring locations at discharge points and selected watercourses where works are being	Construction	This SWMSP Appendix C

RMM No.	Issue	Mitigation Measure	Timing	Document Reference
		undertaken, monitoring parameters, and frequency and duration of monitoring.		

2.1.4 Sustainability

In accordance with CoA E148, JHG is required to achieve a minimum 'excellent' rating for both 'Design' and 'As built' civil works, under the ISC of Australia infrastructure rating tool, or through the use of an equivalent process or an equivalent level of performance using a demonstrated equivalent rating tool. John Holland Group (JHG) will be delivering the ISC rating using v1.2.

The implementation of ISC requirements is embedded across all relevant works and environmental management practices. Soil and water will be managed under the relevant credits including Wat-1, Wat-2, Dis-1, Lan-2 and Lan-4 and will be aligned with commitments made in the Project Sustainability Management Plan. Some key requirements, goals and measures relevant to soil and water management are provided in Table 2-3.

Table 2-3 ISC rating requirements for soil and water management

Credit	Credit Name	Benchmark	Must Statement	Where addressed
Wat-1	Water use monitoring and reduction	**Level 1** – Monitoring and modelling (reasonable estimates or predictions) of water use, is undertaken. **Level 1-3** – Monitoring and modelling demonstrates a reduction in water use compared to a base case footprint. For every reduction up to 20% for Level 3, fractions of Levels may be achieved on a sliding scale.	'For the As-Built rating, monitoring of water use must be undertaken during construction, and modelling of water use must be undertaken for the operation phase based on the as-built infrastructure to give a total footprint across the infrastructure lifecycle.	Section 8.6 Water Reuse Strategy Sustainability Management Plan
Wat-2	Replace potable water	**Level 1-3** – Monitoring and modelling demonstrates that some proportion of total water use is from non-potable sources (substituting for potable). Fractions of Levels may be achieved on a sliding scale up to 100% for Level 3.	Suitable justification and evidence must be provided to demonstrate that there are no negative impacts (environmental, social or economic) associated with the use of groundwater as an alternative water source.	Section 8.6 Water Reuse Strategy Sustainability Management Plan
Dis-1	Receiving water quality	**Level 1** – Measures to minimise adverse impacts to receiving water environmental values during construction and operation have been identified and implemented. AND Monitoring of water discharges and receiving waters is undertaken at appropriate intervals and at times of discharge during construction. **Level 2** –Monitoring and modelling of water discharges and receiving waters demonstrates no adverse impact on	Set water quality objectives that must be met to maintain the environmental values.	Section 8.3, Section 8.14 Appendix B and Appendix D GMMSP Appendix A

Credit	Credit Name	Benchmark	Must Statement	Where addressed
		local receiving water environmental values. AND The infrastructure does not increase peak stormwater flows for rainfall events of up to a 1.5 year ARI event discharge **Level 3** – Opportunities to improve local receiving water quality and/or provide environmental flows have been identified and implemented AND Monitoring and modelling demonstrates improvement of local receiving water environmental values		
Lan-2	Conservation of on-site resources	**Level 1** – Conservation of topsoils and subsoil has been considered **Level 2** – All subsoil and topsoil impacted by the project is separated and protected from degradation, erosion or mixing with fill or waste AND 95% of all topsoil (by volume) retains its productivity and is beneficially re-used on or nearby to the project **Level 3** – Opportunities to improve topsoil productivity of previously disturbed areas have been identified and incorporated into the project	Correct separation, handling and storage of topsoil and subsoil must be demonstrated. - It must be demonstrated that the integrity of the site's topsoil was not compromised during construction works and that at least 95% of it remains productive at completion of construction. - To remain productive, the topsoil must not be covered by permanent hard surfaces. - What represents 'nearby' must be judged in the context of the project and its location.	Section 8.2 and 8.14

2.2 Definitions and Abbreviations

Definition and abbreviations relevant to this SWMSP are provided in Table 2-4.

Table 2-4 Definitions and abbreviations relevant to this SWMSP

Term / Abbreviation	Definition / Expanded text
AECs	Areas of Environmental Concern
AEP	Annual Exceedance Probability
ARTC	Australian Rail Track Corporation
ASS	Acid Sulfate Soils
BC Act	*Biodiversity Conservation Act 2016*
BCS	Biodiversity, Conservation and Science Division of the Environment and Heritage Group of the NSW Department of Climate Change, Energy, the Environment and Water

Term / Abbreviation	Definition / Expanded text
BOD	Biological Oxygen Demand
CEMP	Construction Environmental Management Plan
CLHMMP	Contaminated Land and Hazardous Materials Management Plan
CLM Act	*Contaminated Land Management Act 1997*
CMP	Construction Monitoring Program
CoA	Conditions of Approval
CPESC	Certified Professional in Erosion and Sediment Control
CSIRO	Commonwealth Scientific and Industrial Research Organisation
CSSI	Critical State Significant Infrastructure
DCCEEW	Department of Climate Change, Energy, the Environment and Water
DPHI	Department of Planning, Housing and Infrastructure
EC	Electrical Conductivity
EHC Act	*Environmentally Hazardous Chemicals Act 1985*
EMS	Environmental Management System
Environmental Assessment Documentation	• Inland Rail – Illabo to Stockinbingal Environmental Impact Statement (ARTC 2022) • Illabo to Stockinbingal Project Response to Submissions (ARTC 2023) • Response to Submissions – Appendix E - Biodiversity Development Assessment Report version 12 (IRDJV, June 2024) • I2S – Mitigation Measures (Inland Rail, April 2024) • Illabo to Stockinbingal (SSI-9604) Additional and Appropriate Measures for Box Gum Woodland Impacts (Inland Rail, June 2024) • Technical and Approvals Consultancy Services: Illabo to Stockinbingal – Box Gum Woodland Gum Flat Rehabilitation Opportunity (IRDJV, June 2024)
EIS	Environmental Impact Statement
EPA	Environment Protection Authority
EP&A Act	*Environmental Planning and Assessment Act 1979*
EPBC Act	*Commonwealth Environment Protection and Biodiversity Conservation Act 1999*
EPL	Environment Protection Licence
ER	Environmental Representative
ERSED	Erosion and Sediment
ESCS	Erosion and Sediment Control Strategy
EWMS	Environmental Work Method Statement
FM Act	*Fisheries Management Act 1994*
GDE	Groundwater Dependant Ecosystem
GMMP	Groundwater Mitigation and Management Sub-Plan
GMRs	JHG's Global Mandatory Requirements
HSU	Hydrostratigraphic Units
IMS	Integrated Management System

Term / Abbreviation	Definition / Expanded text
Incident	An occurrence or set of circumstances that causes or threatens to cause material harm and which may or may not be or cause a non-compliance.
IRPL	Inland Rail Pty Ltd
I2S	Illabo to Stockinbingal
ISC	Infrastructure Sustainability Council
JHG	John Holland Group
LGA	Local Government Area
mAHD	Metres Australian Height Datum
Material Harm	is harm that: (a) involves actual or potential harm to the health or safety of human beings or to the environment that is not trivial; or (b) results in actual or potential loss or property damage of an amount, or amounts in aggregate, exceeding $10,000, (such loss includes the reasonable costs and expenses that would be incurred in taking all reasonable and practicable measures to prevent, mitigate or make good harm to the environment).
mBGL	Meters below ground level
NSW	New South Wales
PASS	Potential Acid Sulfate Soils
POEO Act	*Protection of Environmental Operations Act 1997*
PESCP	Progressive Erosion and Sediment Control Plan
RMMs	Revised Mitigation Measures
RUSLE	Revised Universal Soil Loss Equation
RtS Report	Response to Submissions or Submissions Report
SAP	Sensitive Area Plan
SDS	Safety Data Sheet
SEP	Site Environment Plan
SEARs	Secretary's Environmental Assessment Requirements
STP	Sewage Treatment Plant
SMART	Specific, Measurable, Achievable, Realistic, and Timely
SWMSP	Soil and Water Management Sub-Plan
SWMoP	Surface Water Monitoring Program
The Project	Inland Rail - Illabo to Stockinbingal Project
TDS	Total Dissolved Solids
TSS	Total Suspecnded Solids
WAL	Water Access Licence
WM Act	*Water Management Act 2000*
Work	Any physical work for the purpose of the CSSI including construction and low impact work but not including operational maintenance work

Term / Abbreviation	Definition / Expanded text
WPIA	Water Pollution Impact Assessment
WQOs	Water Quality Objectives

3 Introduction

3.1 Context

This SWMSP forms part of the Construction Environmental Management Plan (CEMP) for the Project.

This SWMSP has been prepared to address the requirements related to soil and water management associated with Infrastructure Approval (SSI-9406) and associated CoA, the measures listed in the Environmental Impact Statement (EIS) as amended by the Submissions Report (and associated RMMs), Environmental Protection License (EPL), Commonwealth Approval (EPBC 2018/8233) and all applicable legislation, guidelines, standards and specifications.

3.2 Background

3.2.1 The Project

The Project is located in south-western NSW in the Riverina region (Figure 3-1). Illabo is a small town located at the southern end of the alignment 16 kilometres (km) north-east of Junee in the Junee Local Government Area (LGA). Stockinbingal is situated at the northern end of the Project, approximately 20 km north-west of Cootamundra in the Cootamundra–Gundagai Regional LGA. The major towns surrounding the Project are Wagga Wagga, about 50 km to the south, Young to the north-east and Cootamundra to the east.

The Project comprises a new rail corridor that would connect Illabo to Stockinbingal (I2S). The alignment branches out from the existing rail line north-east of Illabo and travels north to join the Stockinbingal–Parkes Line west of Stockinbingal. The route will travel primarily through undeveloped land predominantly used for agriculture. The Project includes modifications to the tie-in points at Illabo and Stockinbingal to allow for trains to safely enter and exit the I2S section of Inland Rail. The alignment also crosses several local and private roads, watercourses and privately owned properties. Additionally, no major towns are located within the Project site between Illabo and Stockinbingal.

The Project will include a total extent of approximately 42.5 km, including 39 km of new, greenfield railway which will incorporate the following key features:

- Single track standard gauge on a combination of existing ground level embankments and within cuttings
- New bridges and road overpasses
- Crossing loop and maintenance siding
- New level crossings, stock crossings and upgrades to existing level crossings
- New major stormwater diversion and minor drainage works associated with installation and upgrades to culverts.

The Project will also include upgrades to approximately 3 km of existing track associated with tie-in works and construction of an additional 1.7 km of new track to maintain the existing rail network connections. Road upgrade works will also be undertaken to re-align approximately 1.4 km of Burley Griffin Way to provide a road-over-rail bridge at Stockinbingal. Re-alignment of Ironbong Road will also be completed to allow for safe sight lines. A temporary workforce accommodation camp will also be constructed to house the workforce for the duration of works.

Key features of the Project are shown on Figure 3-1. A detailed Project description is provided in Section 3 of the CEMP.



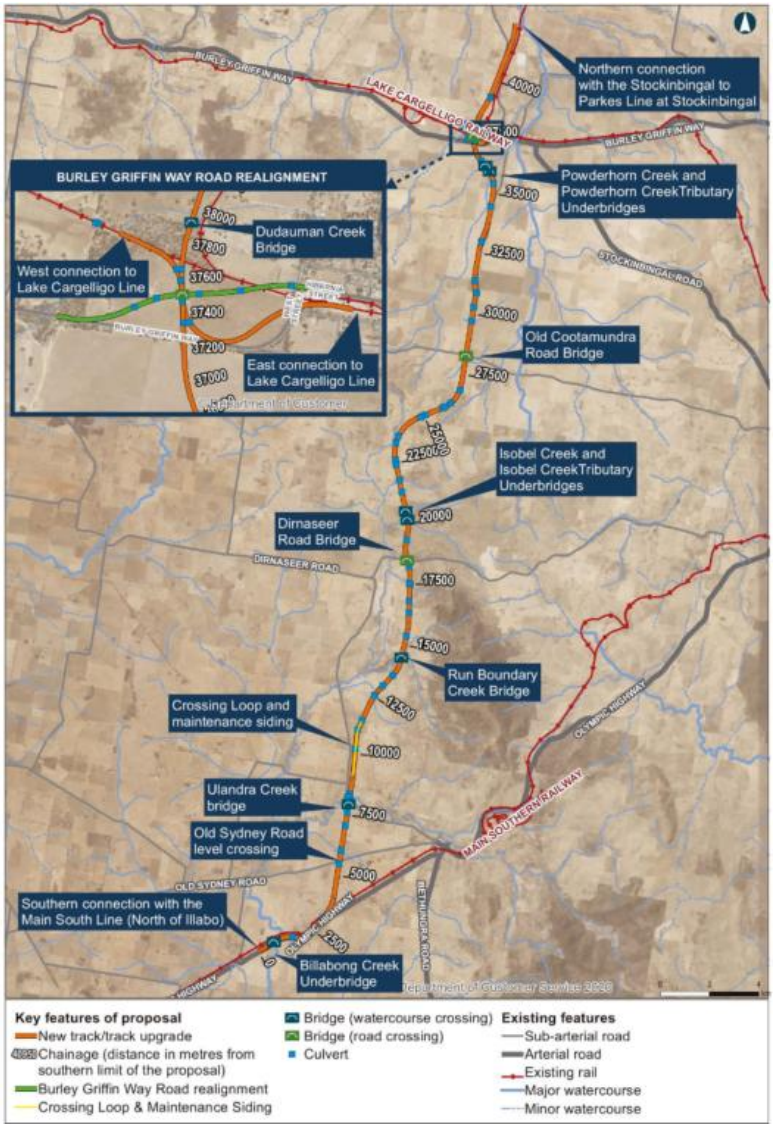


Figure 3-1 Project locality and key features

3.2.2 Statutory Context

The Project was declared to be Critical State Significant Infrastructure (CSSI) in 2021, requiring approval under Division 5.2 of the EP&A Act. In accordance with the Secretary's Environmental Assessment Requirements (SEARs) (dated 30 April 2021), an EIS was prepared by ARTC in August 2022. The EIS was exhibited by the Department of Planning, Housing and Infrastructure (DPHI) for a period of six (6) weeks, commencing on 14 September 2022 and concluding on 26 October 2022.

Following public exhibition of the EIS, ARTC prepared a Submissions Report to respond to submissions and describe Project design refinements.

Approval for the Project was granted on 4 September 2024 by the Minister for Planning (SSI-9406) and was subject to a number of CoAs. ARTC is the Proponent under the EP&A Act with ultimate responsibility for compliance with the Infrastructure Approval. Inland Rail (IRPL) is a subsidiary of ARTC which is responsible for the management and implementation of the Project to meet the obligations of the Infrastructure Approval.

As discussed in the EIS, under the *Commonwealth Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), proposed 'actions' that are likely to significantly impact on matters of national environmental significance or the environment on Commonwealth land, or that are being carried out by an Australian Government agency and are likely to significantly impact the environment, are 'controlled actions' and need the approval of the Australian Government Minister for the Environment under the EPBC Act. On 6 August 2018, the Project was determined to be a controlled action under the EPBC Act (EPBC Referral 2018/8233). The Project received controlled action approval from Department of Climate Change, Energy, the Environment and Water (DCCEEW) (EPBC Referral 2018/8233) on 28 October 2024.

3.3 Scope of the plan

The SWMSP will outline how the Project will minimise environmental risks and achieve environmental outcomes associated with soil and water management. This SWMSP:

- Provides a description of Project construction activities
- Details environmental obligations attached to the Project
- Identifies legislation and external licenses, permits and approvals required for the Project
- Describes objectives and targets
- Describes the existing environment in relation to topography, soil characteristics, geology, erosion risk, salinity, watercourses, water quality, flooding, etc.
- Outlines construction activities and the associated environmental aspects and impacts
- Details general mitigation measures to be implemented to minimise impacts to soil and water
- Describes how the Project will manage specific items including erosion and sediment (ERSED), sediment basins, stockpiles, water discharges, discharge criteria, tannins, water resource management, instream works, spill response, etc.
- Describes how soil and water will be considered in design of the Project
- Describes the surface water monitoring program, and other monitoring required for the Project
- Describes compliance management items including roles and responsibilities, training, monitoring and inspections, non-compliance protocols, incident response, auditing, reporting complaints management etc., and
- Describes review and improvement requirements for the Project.

3.4 Environmental Management Systems Overview

3.4.1 Environmental Management System

The Project Environmental Management System (EMS) is based on the ISO 14001 accredited JHG EMS, which itself forms part of the overall JHG Integrated Management System (IMS), tailored to satisfy Project-specific requirements. It provides a framework to ensure an integrated approach to meeting Project requirements and defines how the Project will minimise impacts to the environment. It comprises a combination of governance documentation, Project-specific management plans (including this SWMSP), procedures and tools.

The basis for the EMS is the concept of Plan-Do-Check-Act (PDCA), as shown in Figure 3-2.

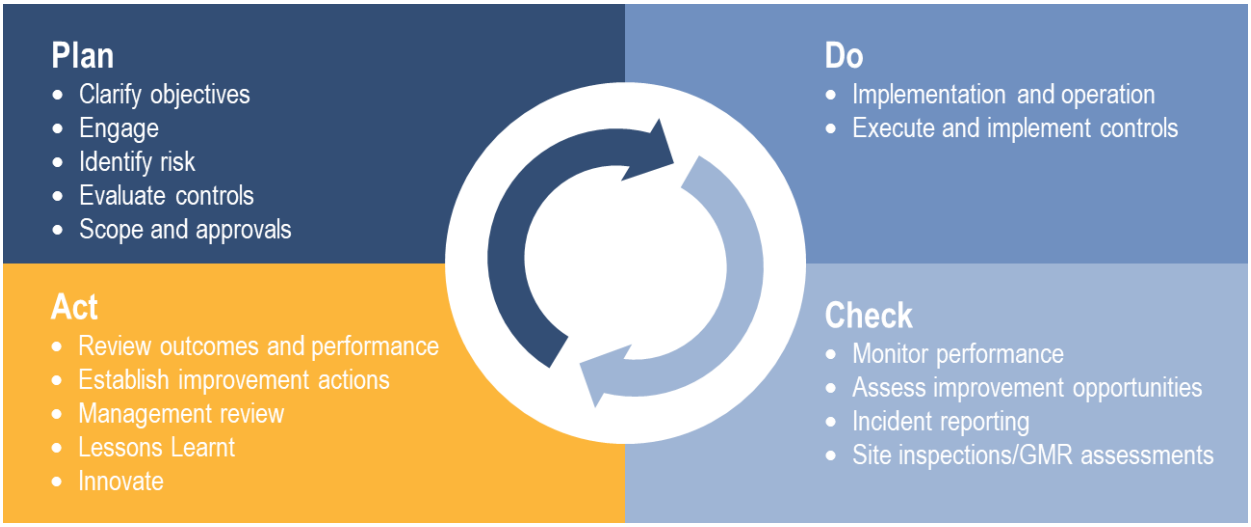


Figure 3-2 PDCA model

The PDCA model provides an iterative process to achieve continual improvement. As applied to the Project environmental processes, it can be briefly described as follows:

- **Plan**: Establish environmental objectives and processes necessary to deliver results in accordance with the JHG environmental policy.
- **Do**: Implement the environmental processes as planned.
- **Check**: Monitor and measure processes against the environmental policy, including its commitments, environmental objectives, and operating criteria, and report the results.
- **Act**: to continually improve the environmental processes.

The framework introduced in ISO14001 is integrated into a PDCA model within the EMS and in turn the Project CEMP and this SWMSP.

In accordance with the JHG Environmental Policy (refer to Appendix A5 of the CEMP), the Project will:

- Continually improve the EMS to enhance performance, through management review and CEMP and SWMSP revisions
- Maintain third party certification of the overarching EMS to ISO 14001 with independent verification of implementation and effectiveness.

The EMS provides structure to environmental management of the Project and covers areas such as training, record management, inspections, objectives, and policies. This SWMSP has been prepared as part of the EMS using JHG documentation as the basis for some documents (Figure 3-3).

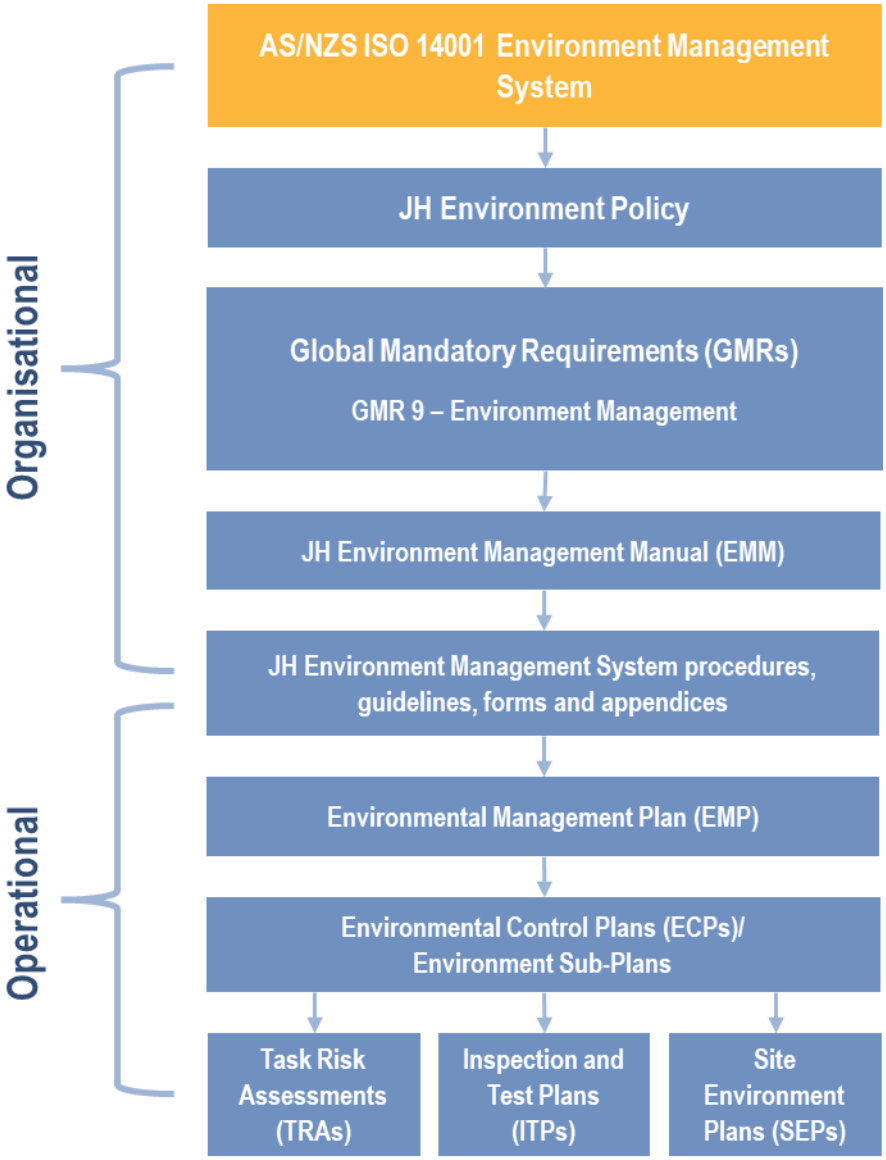


Figure 3-3 EMS structure

The EMS contains policies, standards, manuals, plans, procedures, processes, and other documents that enable the Project to achieve its objectives through planned and controlled processes.

3.4.2 Global Mandatory Requirements

JHG's Global Mandatory Requirements (GMRs) outline the control strategies and minimum standards for managing, and where possible, eliminating key risks across the Project. These standards have been developed to:

- Minimise the impact of our activities on the environment and communities.
- Reduce our use of natural resources and energy, and the generation of waste.
- Be a reliable and trustworthy partner to our customers, dedicated to providing environmentally sustainable solutions throughout our diverse business.

The GMR's form part of the Project EMS and are to be used as tools in development of planning documents for management of environmental risks / impacts.

GMR's which are relevant to this SWMSP and will be implemented include GMR 9 – Environmental Management.

3.4.3 Plan preparation, endorsement and approval

This SWMSP has been prepared by suitably qualified personnel from Inti Pty Ltd and JHG and has been endorsed by the Project Certified Professional in Erosion and Sediment Control (CPESC) Bradley Cole from Ochre Environmental Management. In accordance with CoA C15 and A26, this SWMSP will be endorsed by the Environmental Representative (ER) and then submitted to the Planning Secretary for approval no later than one month before the commencement of construction. In accordance with CoA 15, construction will not commence until the CEMP and all CEMP Sub-plans have been approved by the Planning Secretary.

In accordance with CoA C32, the Surface Water Monitoring Program (SWMoP) which is provided in Appendix B will be endorsed by the ER and then submitted to the Planning Secretary for approval no later than one (1) month before the commencement of construction, or where construction is staged, no later than one (1) month before the commencement of each stage. Refer to Appendix B for more details.

3.4.4 Interactions with other management plans and strategies

This SWMSP is a sub-plan to the CEMP. Groundwater and contaminated lands management are detailed in the Groundwater Mitigation and Management Plan (GMMP) and the Contaminated Land and Hazardous Materials Management Plan (CLHMMP). This SWMSP should also be read in conjunction with the Biodiversity Management Sub-Plan (BMSP).

3.5 Consultation

In accordance with CoA C17 of the Infrastructure Approval (SSI-9406), JHG is required to consult with the following agencies in relation to this SWMSP.

- Biodiversity, Conservation and Science Division of the Environment and Heritage Group of the NSW Department of Climate Change, Energy, the Environment and Water (BCS)
- Relevant councils, being:
    - Junee Shire Council
    - Cootamundra Gundagai Council.

In accordance with CoA C27 of the Infrastructure Approval (SSI-9406), JHG is required to consult with the following agencies in relation to this Surface Water Monitoring Program (SWMoP) which is provided in Appendix B.

- NSW DCCEEW – Water
- Crown Lands
- Relevant councils, being:
    - Junee Shire Council
    - Cootamundra Gundagai Council.

In accordance with CoA C10, a Consultation Summary Report which summarises the consultation with the above agencies has been prepared and provided in Appendix A.

In addition to the above, the following specific consultation with landowners is required and will be undertaken in relation to soil and water management.

- CoA E79 – Prior to construction impacting a landowner anywhere on the alignment, JHG will consult with the landowner and/or relevant roads authority that is located immediately adjacent to new or upgraded culverts to determine the potential for impacts on infrastructure, dwellings,

property access, agricultural productivity, farm operations and farm dams (including changes in water supply yield, reliability of supply, flood flows and embankment stability) due to the introduction or alteration of flows. Where potential adverse impacts are identified, JHG will consult with the affected landowner or relevant roads authority on the management measures that will be implemented to mitigate the impacts. The outcomes of the consultation with affected landowners or relevant roads authority will be documented.

- CoA E80 – consultation with landowners must be undertaken when compiling the register of all farm dams within 100m upstream and 500m downstream of the rail alignment. Copies of parts of the register and supporting documentation that relate to a landowners' property must be provided to the landowner prior to construction. See Section 8.3.3 for further details.

4 Purpose and Objectives

4.1 Purpose

The purpose of this SWMSP is to describe how construction impacts on surface water will be minimised and managed during the construction of the Project in accordance with Specific, Measurable, Achievable, Realistic and Timely (SMART) principles. These include:

- **S**pecific – water mitigation and management measures explored in Section 8 of this Plan specifically speak to JHG's approach to managing erosion and sediment impacts to waterways and other potential/cumulative surface water impacts during construction as identified within the EIS.
- **M**easurable – Inspection and monitoring requirements detailed in Section 9.3 of this Plan include specific measures or indicators for which inspection and monitoring requirements will be triggered. Provision of Project-specific inspection and monitoring requirements for surface water during construction are also included in the SWMoP (detailed in Appendix B).
- **A**chievable – Ongoing compliance with relevant Infrastructure Approval (SSI-9406), RMMs, EPL and Commonwealth Approval (EPBC 2018/8233) in Section 2 and 5, is achievable throughout the delivery of the Project and represents the minimum requirements to be implemented by JHG.
- **R**elevant - The management measures outlined in Section 8 of this Plan represent JHG's approach to monitoring and tracking against the objectives, targets and environmental performance outcomes (which are identified in Section 4.2.1 of this Plan).
- **T**ime-bound – On a broader scale, the management measures set out within Section 8 of this Plan are required to be implemented for the duration of construction, setting a clear and defined time frame and includes reference to other temporal applications, including during detailed design, pre-construction, post-construction and/or operation.

4.2 Objectives

The objective of this SWMSP is to ensure that all avoidance, mitigation and management measures relevant to soil and water matters within the following documents, are adopted and implemented.

- The EIS prepared for the Project
- The Submissions Report prepared for the Project, including the RMMs
- Infrastructure Approval (SSI-9409) and associated Minister's CoA
- Commonwealth Approval (EPBC 2018/8233)
- Relevant conditions of the Project's EPL
- Relevant requirements of the Water Access License (WAL), if required
- IRPL specifications and documents as detailed in Section 5.
- Legislative requirements detailed in Section 5 of this SWMSP

4.2.1 Performance Outcomes

Project design and construction will be prepared in consideration of the 'desired performance outcomes' provided in the SEARs. Project-specific performance outcomes are further defined in Chapter 27 (Table 27.7) of the EIS. The environmental performance outcomes related to soil and water for the Project are included in Table 4-1 below.

Table 4-1 Soil and water performance outcomes

Item	I2S Specific Environmental Performance Outcomes	Where addressed
Flooding, hydrology and geomorphology	• Construction is undertaken in a manner that minimises the potential for adverse flooding impacts as far as practicable, through staging of works and the implementation of mitigation measures • Structures are designed and located such that flows are not significantly impeded • The Project reduces the length of overtopping of the existing rail corridor • The Project reduces or does not significantly increase the area subject to flooding.	Section 8.8 and 8.15 Flood Emergency Response Plan (FERP) Flood Design Verification Report (FDVR)
Water—hydrology	• Opportunities to reuse water resources are considered during the design process in accordance with the Water Reuse Strategy. • The use of water during construction is minimised.	Section 8.6 Water Reuse Strategy GMMP BMSP
Water—quality	• The Project is designed and constructed such that changes to water flows in watercourses are minimised as far as practicable • Water discharged does not exceed relevant water quality discharge criteria as detailed in this SWMSP, Water Reuse Strategy and EPL. • Impacts to water quality during construction and operation are minimised as far as practicable.	Section 8.3, 8.4, 8.5, 8.7 and 8.14 Appendix B Appendix D Water Reuse Strategy EPL
Soils	• Site-specific soil, subsoil and landform characteristics are taken into consideration during detailed design and construction • Any contamination is managed in accordance with relevant regulatory requirements.	Section 8.2, 8.12 and 8.13

4.3 Targets

The following targets related to surface water have been identified for implementation during the Project:

- Ensure compliance with the relevant legislative requirements, Infrastructure Approval (SSI-9406), Commonwealth Approval (EPBC 2018/8233), Submissions Report and relevant RMMs, the Project EPL and WAL
- Site-specific soil, subsoil and landform characteristics will be taken into consideration during construction
- Manage downstream water quality impacts attributable to the Project i.e. maintain water waterway health by avoiding the introduction of nutrients, sediment and chemicals outside of that permitted by the EPL and/or ANZECC guidelines

- No significant and/or long-term degradation to waterways
- Ensure training on soil and water management is provided to all relevant construction personnel through site inductions, awareness training and toolboxes
- No contamination of surface water as a result of spillages or other impacts arising from construction activities
- Compliance with John Holland GMRs.

5 Environmental Requirements

5.1 Relevant legislation and Guidelines

The primary legislation, guidelines and standards relevant to soil and water management are presented in Table 5-1. Also refer to Appendix A1 of the CEMP for a full register of legal and other requirements for the Project.

Table 5-1 Relevant principal legislation and guidelines

Legislation	• *Environment Protection Biodiversity Conservation Act 1999 (*EPBC Act) • *Environmental Planning and Assessment Act 1979* (EP&A Act) • *Water Management Act 2000* (WM Act) • *Water Act 1912* • *Protection of the Environment Operations Act 1997* (POEO Act) • *Biodiversity Conservation Act 2016* (BC Act) • *Fisheries Management Act 1994* (FM Act) • *Contaminated Land Management Act 1997* (CLM Act) • *Environmentally Hazardous Chemicals Act 1985* (EHC Act) • *Pesticides Act 1999* • *Water Act 2007 (Commonwealth)* • *Water Amendment Act 2008 (Commonwealth)*

Guidelines and Specifications	• *Australian and New Zealand Guidelines for Fresh and Marine Water Quality* (ANZECC and ARMCANZ 2000).
	• *Australian and New Zealand Guidelines for Fresh and Marine Water Quality 2018* (ANZG 2018)
	• *Approved Methods for the Sampling and Analysis of Water Pollutants in NSW* (NSW EPA, 2004)
	• AS/NZS 5667.1.1988 (R2016) *Water quality Sampling Guidance on the design of sampling programs, sampling techniques and the preservation and handling of samples*
	• *Managing Urban Stormwater: Soils and Construction 4th Edition, Volumes 1 and 2* (the "Blue Book") (Landcom, 2004)
	  ○ *Volume 2A Installation of Services* (DECCW 2008).
	  ○ *Volume 2B Waste Landfills* (DECCW 2008).
	  ○ *Volume 2C Unsealed Roads* (DECCW 2008).
	  ○ *Volume 2D Main Roads Construction* (DECCW 2008).
	• *Best Practice Erosion and Sediment Control* (IECA, 2008)
	• *Handbook for Sediment Quality Assessment* (CSIRO, 2005)
	• *Why do Fish Need to Cross The Road? Fish Passage Requirements for Waterway Crossings* (Fairfull and Witheridge, 2003)
	• *Fishnote – Policy and Guidelines for Fish Friendly Waterway Crossings (*NSW Fisheries, 2003)
	• *Guidelines for vegetation management plans on waterfront land* (NSW Office of Water, 2012
	• *Guidelines for controlled activities on waterfront land – Riparian Corridors* (NRAR, 2018)
	• *Controlled activities on waterfront land – Guidelines for watercourse crossings on waterfront land* (NSW Office of Water, 2013)
	• *Policy and Guidelines for Fish Habitat Conservation and Management* (DPI Fisheries, 2013)
	• *Design Manual for Soil Conservation Earthworks – Technical Handbook No. 5* (NSW SCS, 1982)
	• *Bunding & Spill Management. Insert to the Environment Protection Manual for Authorised Officers - Technical section "Bu"* (DEC, 1997).
	• *Environmental Best Management Practice Guideline for Concreting Contractors* (DEC, 2004);

- *Bunding and Spill Management Guidelines contained within EPA Environmental Protection Manual for Authorised Officers* (NSW EPA, 1995)
- *NSW Aquifer Interference Policy* (NSW Office of Water, 2012)
- *Storage and Handling of Dangerous Goods Code of Practice* (WorkCover NSW, 2005)
- *Specification – Construction Environmental Management Framework (0-0000-900-EEC-00-SP-0002_2)*
- *ARTC Contamination, Spoil and Waste Strategy* (0-0000-900-EEC-00-ST-0002)
- *ARTC – Legislation, Guidelines and Policies -Soil and Water Guideline* (5-0000-902-EEC-00-GU-0006)

5.2 Environment Protection Licence

The Project will be required to apply and maintain an Environmental Protection License for rail construction for the duration of the Project. Once the Project has obtained an EPL, this section will be updated with the relevant soil and water related conditions.

6 Existing Environment

6.1 Key Reference Documents

The following key reference documents were used to determine the existing environment in relation to soil and water management.

- EIS Chapter 12 – Hydrology and Flooding
- EIS Chapter 13 – Water Quality
- EIS Chapter 20 – Soils and Contamination
- EIS Technical Paper 14 – Contaminated Land Assessment
- EIS Technical Paper 4 – Hydrology and Flooding
- EIS Technical Paper 4 – Water Quality Impact Assessment

6.2 Topography and Soil Characteristics

6.2.1 Topography

The township of Stockinbingal has an elevation of 295 metres Australian Height Datum (AHD) and the south end of the Project site near Illabo has an elevation of 280m AHD. The Project site is located on gently to moderately sloping terrain. The topography of the southern portion of the Project generally slopes to the south and east. This transitions to higher ground in the central portion, with moderate undulations cut by Run Boundary Creek and Isobel Creek, north of Old Cootamundra Road, the Project passes through flat to gently sloping farmland, before passing through a low hillslope around Dudauman Creek.

6.2.2 Geology and soils

Based on the Cootamundra 1:250,000 geological map (Series SI/55-11, 1996), the geology of the Project site varies from south to north as follows:

- The southern section is underlain by quaternary alluvium comprising gravel, sand, silt and clay. Small outcrops of the Junawarra Volcanics, comprising andesite, andesitic agglomerate, latite, sedimentary rocks and minor dacite and the Combaning Formation, comprising siltstone, sandstone, shale, conglomerate, and minor felsic volcanic rock are also present
- The central part of the Project site is underlain by the Frampton Volcanics, which comprise rhyolite, rhyodacite, dacite, quartz–feldspar sandstones, siltstone, conglomerate, numerous rhyolithic and rhyodacitic dykes, and limestone
- The northern part of the Project site passes through quaternary alluvium, comprising gravel, sand, silt and clay and north of Stockinbingal, passes through the Ironbong Dacite Member, comprising rhyolite, rhyodacite, and dacite.

A review of NSW DPHI land and soil information mapping (eSPADE) identified a number of soil landscapes within the Project site. These are summarised in Table 6-1, with their extent shown on Figure 6-1.

Table 6-1 Soil landscapes within the Project site

Soil Landscape	Soils	Recorded Limitations
Stoney Hill	Generally shallow (<50 cm) deep gravelly tenosols and rudosols (young soils with limited profiled development) some deeper red kandosols and dermosols.	• Shallow, rocky soils • Localised erosion hazard • Localised salinity hazard • Low fertility
Eurongilly	Generally deep (>100 cm) clay dominated soils including imperfectly drained red and brown chromosols, kurosols and dermosols. Some poorly drained sodosols on lower slopes and drainage lines.	• Sheet erosion hazard • Localised gully erosion • Localised salinity hazard • Poor drainage • Localised acidity • Localised sodicity and dispersive soils • Low fertility
Ironbong Creek	Moderately deep (>50 cm) brown imperfectly drained chromosols and red Kandosols, and mottled brown sodosols on flood plains. Young kandosols and rudosols are present along creek lines.	• Seasonal waterlogging • Sheet erosion • Localised gully erosion • Poor drainage • Localised flood hazard • Localised topsoil acidity
Oakville	Deep red and brown chromosols on upper slopes and red and brown sodosols on lower slopes and depressions.	• Sheet erosion • Localised gully erosion • Poor drainage • Localised topsoil acidity • Localised salinity hazard • Low fertility
Twin Range	Shallow (<25 cm) to deep (>100 cm) tenosols and chromosols on crests, deep red chromosols and kandosols and dermosols on slopes and brown clay dominated sodosols and sandy tenosols on lower slopes and flats.	• Localised salinity hazard • Rock outcropping • Sheet erosion hazard • Localised poor drainage • Acidity • Dispersive subsoils
Frampton	Shallow (<50 cm) sandy tenosols on upper slopes, imperfectly drained red chromosols, dermosols and kandosols on mid slopes and poorly drained brown chromosols in drainage depressions.	• Soil erosion hazard • Topsoil acidity • Hard setting surfaces
Narraburra	Deep (>100 cm) sandy rudosols and poorly drained clayey sodosols along creek floodplains and depressions. Deep red chromosols and kurosols, brown dermosols on adjacent levees and plains and occasional red vertosols on back plains.	• Poor drainage • Sheet erosion hazard • Localised flood hazard • Localised salinity hazard • Seasonal waterlogging • Shrink/swell

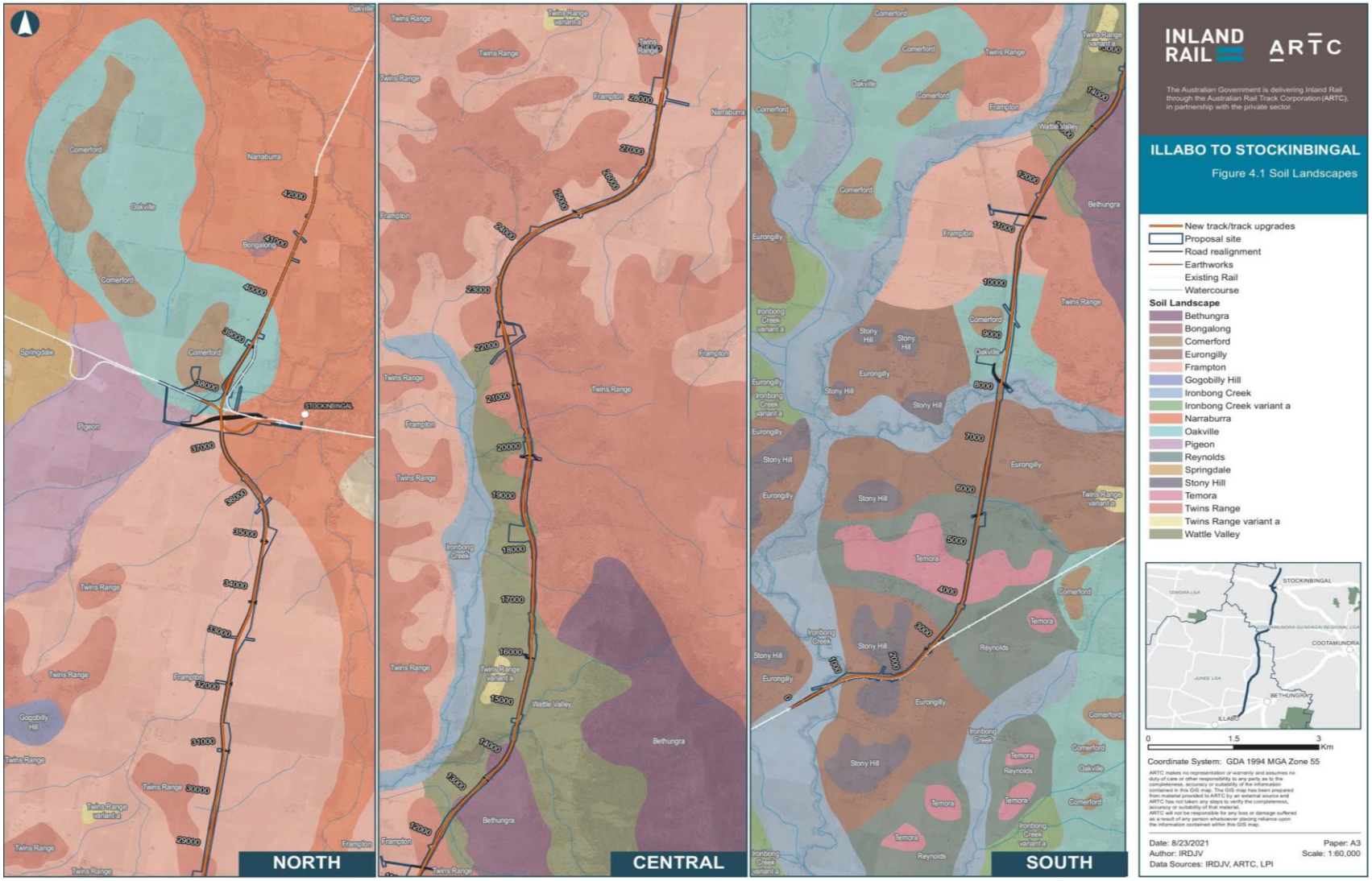


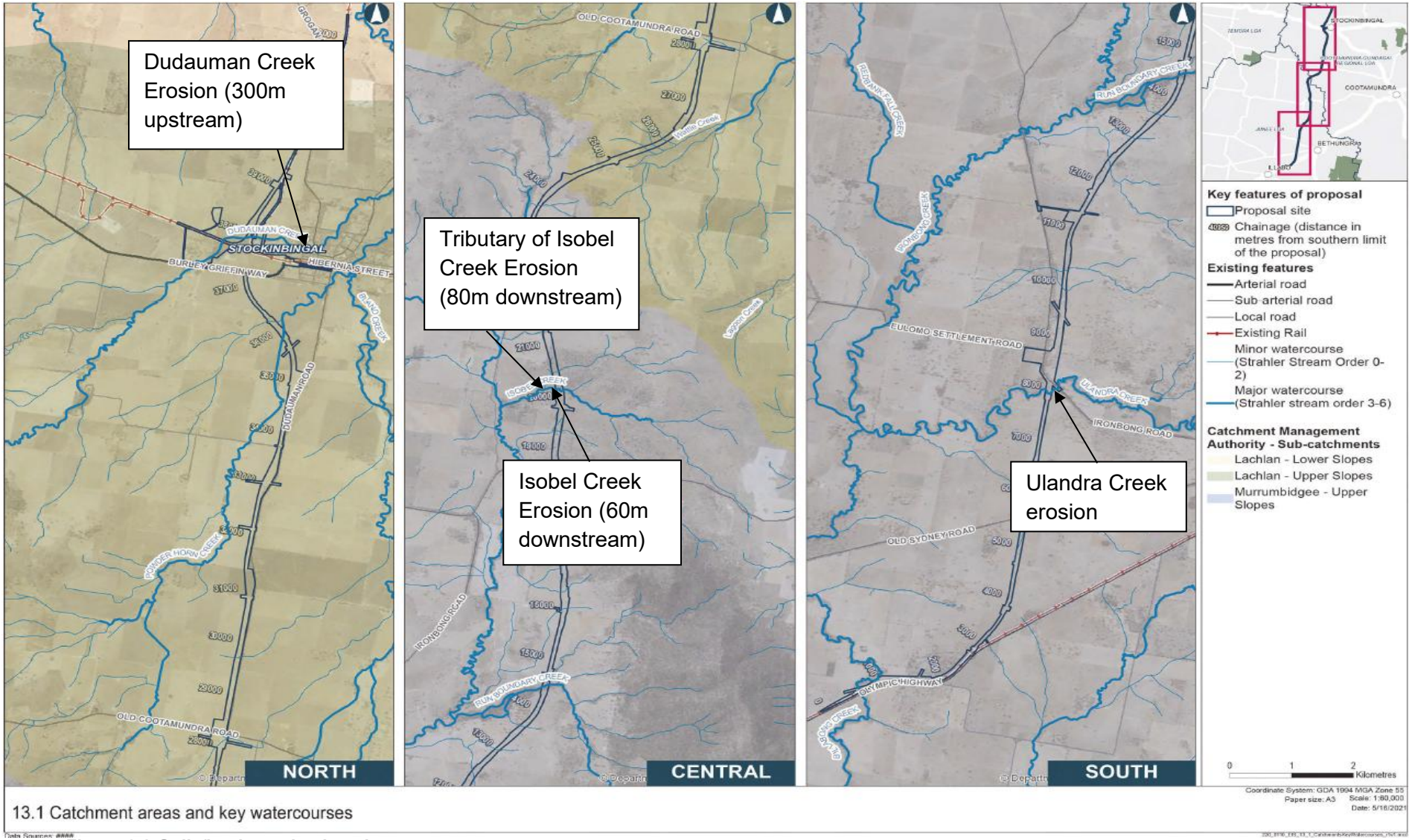
Figure 6-1 Soil landscapes in the Project area

6.2.2.1 Erosion Risk

Based on a review of available regional soil mapping for the Project site, the soil landscapes present within the Project site may contain erosion risk.

The results of the geotechnical investigations completed for the Project (including emersion tests for soil dispersion), indicate that soils present at the site are generally non-dispersive. Localised sodicity and dispersive soils may be present within the Eurongilly soil landscape as shown in Figure 6-1. The erosion potential of the soils across the Project site was assessed as low; however, evidence of significant soil erosion was identified in some areas of the Project site, including:

- Significant depths of gully/bank erosion within several incised drainage gullies and waterways, including the following which are also shown in Figure 6-2.
    - Ulandra Creek
    - Isobel Creek – 60m downstream of the Project site
    - Unnamed tributary of Isobel Creek – 80m downstream of the Project site
    - Dudauman Creek – 300m upstream of the Project site.
- Erosion on some crests and ridges to exposed bedrock.



13.1 Catchment areas and key watercourses

Figure 6-2 Gully/bank erosion locations

6.2.2.2 Acid Sulfate Soils

Acidity of the soil and rock may be generated by acid sulfate soils (ASS), naturally acidic soils, and from sulfidic rock.

ASS are naturally occurring sediments that contain iron sulfide minerals that, if drained, excavated or exposed to air, react with oxygen to form sulfuric acid. ASS are common to coastal regions (coastal ASS) and may also form inland (inland ASS) where sources of salinity and organic matter coincide with anaerobic conditions. Given the distance of the Project site from the coast and its elevation, no ASS are expected or known to occur. A review of the Australian Soil Resource Information System (ASRIS) undertaken on 13 May 2019 (Commonwealth Scientific and Industrial Research Organisation (CSIRO), 2018) identified that the Project site is located in an area of low probability of ASS, also including inland ASS.

Further details are provided in CLHMMP.

6.2.2.3 Salinity

The majority of soil landscapes identified within the Project site are identified to have localised salinity issues.

The NSW Soil and Land Information System contains data points identifying evidence of soil salinity where soils have been sampled previously. A review of the database was undertaken as part of the EIS which identified that generally no salting was evident at sample locations within the Project site.

There is generally no evidence of surface salt at sample locations in the vicinity of the Project site (within 1 km) and this indicates that the likelihood of salt scalds at the surface is low; however, salinity remains a potential hazard on the site and could develop in localised areas as a result of the Project if not managed appropriately, as salinity hazard is complex and relates to the soil type, landscape features, local hydrology and also the development on the land.

6.2.3 Contamination

Contaminated lands associated with the Project are addressed in detail in the CLHMMP. The results of previous site investigations documented in the EIS identified ten (10) Areas of Environmental Concern (AECs). Locations are depicted in EIS, Chapter 20, Section 20.3.2 and a summary is provided in the CLHMMP.

6.3 Surface Water

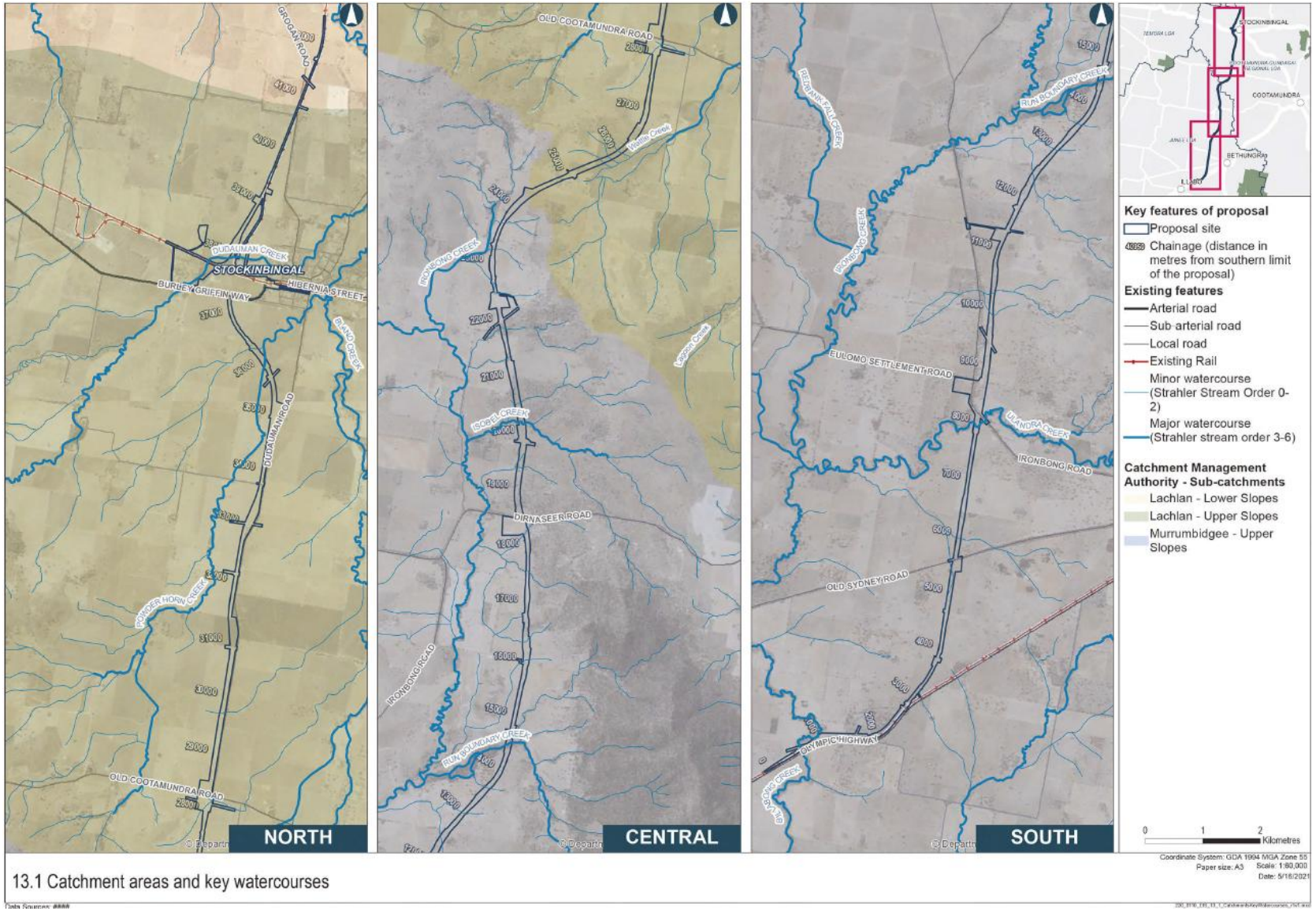
6.3.1 Watercourses

The Project is located within the Murrumbidgee River and Lachlan River catchments, which are sub-catchments of the Murray–Darling Basin. Surface water within the Project site is comprised of ephemeral watercourses. The watercourses in the Project site are generally in the headwaters of the catchments and are likely to only flow during rainfall events. Figure 6-2, Figure 6-3 and Table 6-2 show the catchment areas and the key watercourses within the Project site.

Table 6-2 Catchment areas and key watercourses

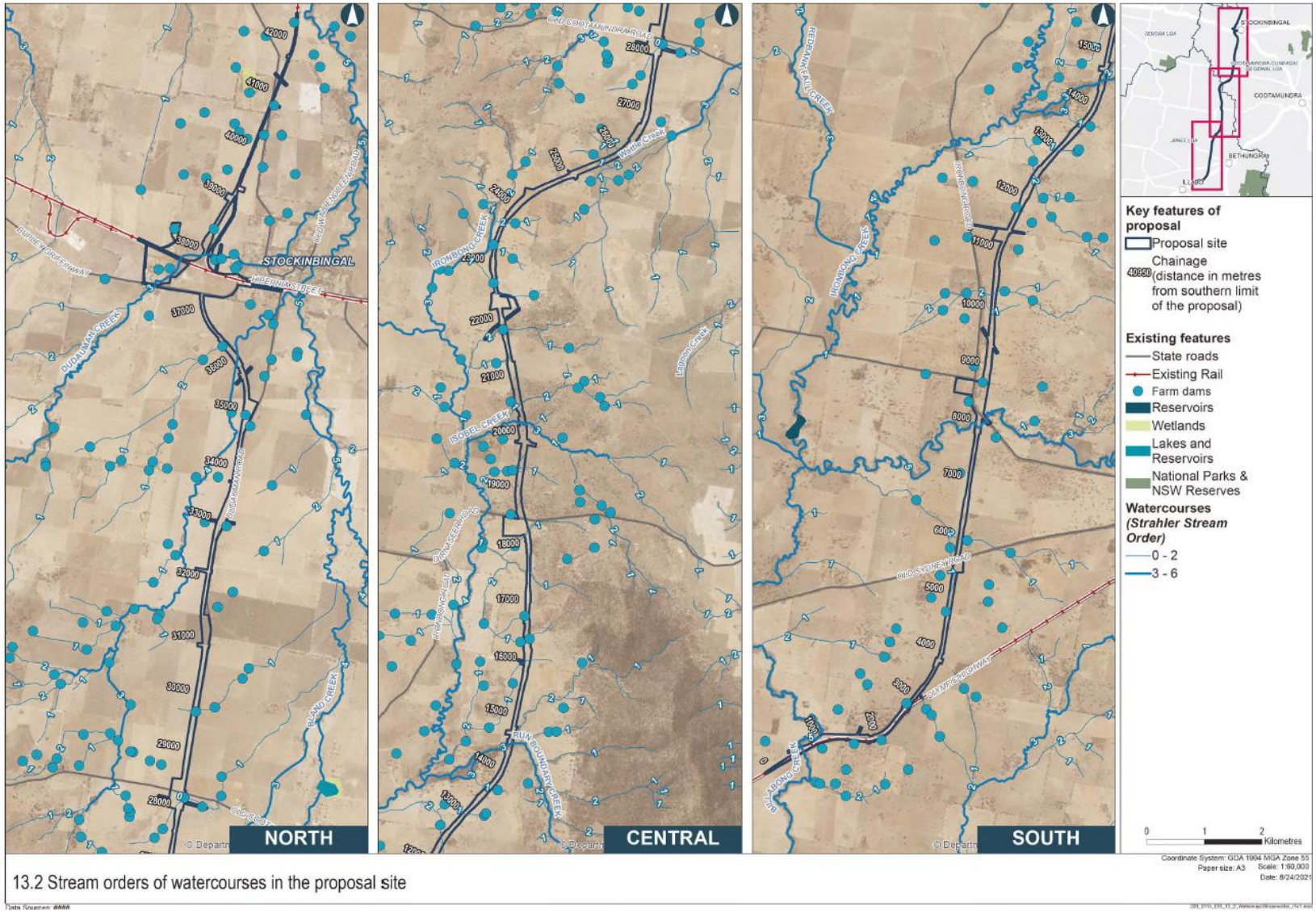
Watercourse	Catchment	Strahler stream order	Flow conditions	Proximity to Project	Comments
Dudauman Creek	Lachlan	3rd	Ephemeral	Intersected by the Project	Generally flows from south–north, turning east through Stockinbingal within the Project site and confluences Band Creek Flows are influenced by existing road and rail lines, and a number of levees identified near Stockinbingal. Dudauman Creek is intersected by the Project at two locations.
Powder Horn Creek	Lachlan	3rd	Ephemeral	Intersected by the Project	Generally flows from south–north and confluences with Bland Creek downstream of the Project site, and intersected by the Project site.
Bland Creek	Lachlan	5th	Ephemeral	Not intersected by the Project. Approximately 400m east of the Project Site at its closest point.	Generally flows from south to North. Dudauman Creek and Powder Horn Creek flow into Bland Creek.
Run Boundary Creek	Murrumbidgee	3rd	Ephemeral	Intersected by the Project	Flows in a north-westerly direction, before turning south east and confluencing with Ironbong Creek, and intersected by the Project site.
Isobel Creek	Murrumbidgee	3rd	Ephemeral	Intersected by the Project	Flows from east to west through the aProject site, confluencing with Ironbong Creek and intersected by the Project site.
Ulandra Creek	Murrumbidgee	5th	Ephemeral	Intersected by the Project	Generally, flows from east to west and confluences with Ironbong Creek and intersected by the Project site.
Billabong Creek	Murrumbidgee	6th	Ephemeral	Intersected by the Project	Flows from north to south and intersected by the Project site.
Ironbong Creek	Murrumbidgee	3rd	Ephemeral	Not intersected by the Project. Approximately 250m west of the Project Site at its closest point.	Generally flows in a north–south direction, confluencing with Billabong Creek.

There are 14 farm dams located within the Project site, and multiple farm dams within the vicinity of the Project site as shown in Figure 6-3. These dams intercept overland flow and may be used as water supply for stock throughout the area.



13.1 Catchment areas and key watercourses

Figure 6-3 Key watercourses within the Project site



13.2 Stream orders of watercourses in the proposal site

Figure 6-4 Farm dams within and adjacent to the Project site

6.3.2 Water Quality

Baseline water quality has been described for the Project as detailed in the EIS, Chapter 13 – Water Quality. While the samples provide information on the potential water quality of the existing environment, they do not cover an adequate time period or physical extent of monitoring to conclusively characterise the existing water quality environment of the Project site. Water quality information is described as follows.

- Existing (not Project-specific) water quality data from the Murrumbidgee River and Lachlan River catchments from the National Water Quality Assessment was reviewed to understand the general water quality of the watercourses within the Project site and then compared with the ANZG criteria for slightly disturbed ecosystems in south-east Australia. In the Murrumbidgee River catchment, values for turbidity, salinity and pH were generally 'Good' with 75% of samples compliant with the trigger values. Measured nutrients values exceeded the guidelines and generally had fair to poor compliance. Total nitrogen was rated 'Poor' and total phosphorus was rated 'Fair'. In the Lachlan River catchment, only the pH indicators were rated as 'Good'. Compliance for samples from the Lachlan River catchment for total nitrogen and total phosphorus were rated 'Very Poor' and 'Fair' respectively. Compliance for turbidity samples in the Lachlan River catchment was rated as 'Fair'. This is provided in Table 6-3.

Table 6-3 Existing water sample results

Catchment	Water quality item	Turbidity	Salinity	pH	Total nitrogen	Total phosphorous
Murrumbidgee catchment	Water quality sample compliance rating	Good	Good	Good	Poor	Fair
	% of samples compliant with trigger values	75%	75%	75%	26%	50%
Lachlan catchment	Water quality sample compliance rating	Fair	Fair	Good	Very poor	Poor
	% of samples compliant with trigger values	69%	50%	85%	4%	28%

* Compliance rating based on percentage of samples compliant with trigger values: very poor (0–24%), poor (25–49%), fair (50–74%), good (75–100%)

- Additional opportunistic post -rainfall water quality sampling was undertaken in May 2019 at Ironbong Creek, and in April 2021 at Ironbong Creek, Powder Horn Creek and Dudauman Creek. Field measurements are provided in Table 6-4 noting that all parameters except saturated dissolved oxygen and electrical conductivity were within the water quality trigger value range. Lab results are provided in Table 6-5 noting that samples were generally below trigger values for the environmental values (aquatic ecosystems, irrigation, primary and secondary contact, livestock and aquatic foods) for metals and nutrients apart from sodium, chloride and calcium. Electrical conductivity was outside the key water quality objective range.

Table 6-4 Post-rainfall water quality test results. Exceedances of trigger values are shown in red

Parameter	Trigger values	Sampling Results				
		Ironbong Creek – 2019	Ironbong Creek – 2019	Ironbong Creek – 2021	Powder Horn Creek – 2021	Dudauman Creek – 2021
Temperature (^{0}C)	N/A	19.2	15.3	22.84	23.6	22.9

Parameter	Trigger values	Sampling Results				
		Ironbong Creek – 2019	Ironbong Creek – 2019	Ironbong Creek – 2021	Powder Horn Creek – 2021	Dudauman Creek – 2021
Electrical conductivity (EC) (us/cm)	30-350	1600	1618	6970	195	130
Dissolved oxygen (% sat)	90-110	45	45.9	103.9	102.8	97.8
pH	7.0-8.0	7.85	7.81	7.85	7.44	7.06
Reduction-oxidation	N/A	220	257.2	180.7	127.8	179.0

Table 6-5 Water monitoring laboratory results. Exceedances of freshwater ecosystem trigger values are shown in red

Parameter	Water Quality Trigger Values					Sampling Results			
	Water quality	Fresh-water eco-systems[1]	Irrigation	Livestock	Aquatic foods	Ironbong Creek – 2019	Ironbong Creek – 2021	Powder Horn Creek – 2021	Dudauman Creek – 2021
EC (µS/cm)	30–350	30–350	-	2000–5000		1680	6930	187	129
TDS (mg/L)	-	-	-	-	-	1090	4500	122	84
TSS (mg/L)	40	-	-	-	-	21	44	50	15
Turbidity (NTU)	20	2–25	-	-	-	11.1	21.4	26.2	115
Total alkalinity as CaCO3 (mg/L)	-	-	-	-	-	196	339	84	51
Sulfate as SO4 (mg/L)	-	-	-	1000	-	37	274	3	<1
Arsenic (mg/L)	-	0.024	-	-	-	0.002	0.003	0.004	0.002
Arsenic (dissolved) (mg/L)	-	0.024	0.1	0.5	0.05	0.001	0.003	0.003	0.001
Cadmium (mg/L)	-	0.0002	-	-	-	0.0005	<0.0001	<0.0001	<0.0001
Cadmium (dissolved) (mg/L)	-	0.0002	0.01	0.01	0.0018	0.0001	<0.0001	<0.0001	<0.0001
Calcium (mg/L)	-	-	-	1000	-	60	237	17	6
Chloride (mg/L)	-	-	750	-	-	425	1860	9	13
Magnesium (mg/L)	-	-	-	2000	-	45	205	5	4
Nickel (mg/L)	-	0.011	-	-	-	0.003	0.003	0.003	0.008
Nickel (dissolved) (mg/L)	-	0.011	0.2	1	0.1	0.002	0.003	0.004	0.003
Nitrite (mg/L)	-	-	-	30	0.1	0.01	<0.01	<0.01	<0.01

Parameter	Water Quality Trigger Values					Sampling Results			
	Water quality	Fresh-water eco-systems[1]	Irrigation	Livestock	Aquatic foods	Ironbong Creek – 2019	Ironbong Creek – 2021	Powder Horn Creek – 2021	Dudauman Creek – 2021
Nitrate (mg/L)	-	0.7	-	400	50	0.01	0.02	<0.01	<0.01
Potassium (mg/L)	-	-	-	-	-	12	26	17	8
Sodium (mg/L)	-	-	460	-	-	190	965	9	14

1) ANZG value for toxicants at the 95% species protection level

It's noted that given the predominantly agricultural land uses and ephemeral nature of the watercourses in the Project site, it is unlikely that the watercourses within the Project site would achieve the water quality trigger values, particularly for nutrients. The sources of the high nutrient levels are likely to be diffuse and related to current and historical agricultural activities within the Project site.

6.3.3 Flooding

The Project site is located within the upper reaches of the Murrumbidgee River and Lachlan River catchments which are not subject to regional flooding. Isolated flooding occurs within the Project site within local catchments. Flood levees have been constructed to mitigate existing impacts of flooding from Dudauman Creek within the township of Stockinbingal. An understanding of the existing flood behaviour for the Project site is based on all available historic studies and data, anecdotal information, landowner discussions and design flood modelling.

A summary of the flooding behaviour (1% AEP) for the catchments assessed, including flooding extent, velocities and duration, within the Project site is provided in Table 6-6.

Table 6-6 Flood information for areas within the Project site

Catchment and watercourse	Flood levels and distribution	Velocity
Billabong Creek	Billabong Creek has a catchment of about 320 km2 and includes the tributaries of Ironbong Creek and Ulandra Creek. The existing Main South Line acts as a barrier for surface water flows. The floodplain upstream of this control point is up to 1.7 km wide, with depths ranging up to 1.1 m during the 1% AEP.	Up to 1.5 m/s within the channel and floodplain flows of less than 0.5 m/s.
Ulandra Creek	Flooding is generally confined to the channel for flood events up to the 1% AEP. At Ironbong Road the floodplain extends to 1 km in width for the 1% AEP, and depths of up to 3 m in the main channel. Ironbong Road acts as a barrier to surface water flows from east to west. Historical evidence suggests that floodwaters do break the banks and inundate land either sides of the main channel.	Up to 2 m/s within the channel and floodplain flows of less than 0.5 m/s.
Unnamed tributaries between Ulandra and Run Boundary Creek	Flooding is directed by overland flow paths to a number of farm dams. Depths between the farm dams are estimated to be less than 0.1 m for the 1% AEP.	Less than 0.5 m/s except immediately downstream of some farm dams.

Catchment and watercourse	Flood levels and distribution	Velocity
Run Boundary Creek	Flood modelling for Run Boundary Creek indicates that flows are predominantly confined to the channel for the 1% AEP. The width of the floodplain for Run Boundary Creek ranges from 170 m to 350 m at the confluence of Ironbong Creek. Water depths are up to 1.5 m within the channel and 0.7 m across the floodplain.	Up to 4 m/s within the channel and floodplain flows of less than 1 m/s.
Isobel Creek	A flood extent of Isobel Creek of generally less than 30 m was modelled during the 1% AEP, with depths up to 1.5 m within the channel.	Up to 4 m/s within the channel and floodplain flows lowering to 0.3 m/s.
Unnamed tributaries between Isobel and Powder Horn Creeks	The 1% AEP indicates that there is limited channel definition, with limited capacity, and a majority of the 1% AEP flood flow spreading across flat grazing and cropping land. Flood depths are 0.1 m across the majority of the extent, with depths of up to 0.5 m downstream of a farm dam.	Average of less than 0.2 m/s, with some sections peaking at 0.5 m/s.
Powder Horn Creek	A flood extent of up to 500 m is produced during the 1% AEP, with flood depths ranging from 2 m within the channel, and 0.1 m to 0.5 m at the edge of the floodplain. Flood modelling for Powder Horn Creek indicates it is not impacted by flooding from Bland Creek within the Project site.	Up to 1.5 m/s within the channel and floodplain flows of 0.8 m/s.
Dudauman Creek	Dudauman Creek has a relatively small channel, and modelling indicates that Burley Griffin Way and the Lake Cargelligo Line act as barriers for surface water flows and result in ponding upstream. Flood modelling indicates that flooding during 1% AEP events south of the Burley Griffin Way extends to about 500 m. Flooding extents of up to 750 m occur between the Burley Griffin Way and the Lake Cargelligo Line, which act as upstream and downstream constraints. This flooding results in water depths of up to 2 m within the channel and 0.5 m across the floodplain. Flood extents downstream of the Stockinbingal to Parkes Line is about 200 m and extends out to 500 m immediately upstream of Stockinbingal.	Up to 1.8 m/s within the channel and floodplain flows of less than 1 m/s.

6.4 Groundwater

Groundwater levels recorded in the groundwater Project site ranged from 1.72 metres below ground level (mBGL) to 20.47 mBGL. The groundwater sources are less productive alluvial and fractured rock aquifers based on the *NSW Aquifer Interference Policy* (DPI, 2012b) (AIP). There were also 55 registered groundwater bores (beneficial use mainly listed as monitoring) and eight Groundwater Dependant Ecosystems (GDEs) identified within the Project site. Further details are provided in the GMMP.

6.5 Climate

The climate of the South West Slopes of the Riverina region is classified as Hot Dry Zone (with cooler winters) climatic zone. The region experiences hot and dry summers, and cold to mild temperatures during the winter months. The nearest weather station (Wagga Wagga Research Centre, site number 074114) records mean daily maximum temperatures from 31.0°C in January to 12.4°C in July.

Rainfall data from the Stockinbingal (Sunnydale) (station number 73150) at the north of the Project site shows an average annual rainfall of 484.6 mm. Rainfall data from the Junee Treatment Works (station number 73019) at the south of the Project site shows an average annual rainfall of 525.4 mm. Rainfall is generally consistent across the year, with slightly higher rainfall from July to October.

Climate change is expected to have the following impacts to climate within the region.

- Increased temperature and solar radiation
- Decreased annual rainfall resulting prolonged periods of drought
- Increase in extreme rainfall with subsequent flooding of local waterways.

7 Environmental Aspects and Impacts

7.1 Construction Activities

Key aspects of the Project that could result in adverse impacts to soil and water include:

- Enabling works and establishment of construction compounds, ancillary facilities and accommodation facilities
- Vegetation clearing and topsoil stripping
- Bulk earthworks and rail construction
- Stockpiling of material/spoil
- Construction of culverts, bridges and drainage works in and around waterways
- Extraction of groundwater and surface water from watercourses
- Dewatering and discharging from sediment basins, farm dams and other construction sources
- Compounds operation including fuel and chemical storage, refuelling and chemical handling.

Refer also to the Aspects and Impacts Register included in Appendix A2 of the CEMP.

7.2 Impacts

The potential for impacts on soil and water will depend on a number of factors which will be dependent on the nature, extent and magnitude of construction activities and their interaction with the natural environment. Potential impacts attributable to construction are summarised in Table 7-1 and also detailed in Section 6.3 of the CEMP.

Table 7-1 Potential soil and water impacts associated with the Project

Construction Activity	Potential Impact
Clearance of vegetation, earthworks, and stockpiling	• Runoff of sediment-laden stormwater from stockpiled sites and cleared areas to receiving waterways resulting in sedimentation within adjoining or downstream watercourses • Increased loading of nutrients (dissolved and particulate-bound) from exposed surfaces and stockpiled materials into adjacent watercourses from site runoff. This process has the potential to simulate the growth of nuisance plants, algae and cyanobacteria • Tannin leachate from clearing and mulching discharging to near site drainage pathways resulting in eutrophication, altered water pH, reduced available oxygen and visual aesthetic issues • Mobilisation of contaminants, resulting in impacts to surface waters offsite. Indicators of contamination may include odour, discolouration, sheen, free phase liquids, foaming, stressed or dead flora and / fauna (for example, fish kills). • Interaction with groundwater during excavations resulting in inundation work area, water quality issues, groundwater drawdown and discharge/disposal related issues. • Spread of sediment via mud tracking (i.e. trucks carrying mud on their wheels and transporting it outside the construction area).
Water discharges from sediment basins, farm dams and other discharges from construction	• Release of poor quality water (turbidity, pH etc.) from sediment basins or farm dams causing impact to receiving waters • Discharges from sediment basins or any required dewatering activities (where water quality is proven acceptable for discharge) may mobilise sediments at the discharge point and increase the turbidity of the receiving waters • Water quality impacts to farm dams • Inundation of local farms and low lying areas from construction discharge

Construction Activity	Potential Impact
	• Potential for downstream flooding which may impact landowners.
Works within or adjacent to waterways	• Temporary obstruction and interference with normal drainage channels and subsequent ponding or damming of water upstream. • Obstruction of surface drainage from the contributory sub-catchments leading to unnatural dried channels downstream, if conducting works during periods when surface flow would usually be occurring. • Increases in sedimentation directly upstream from in-channel works as a result of ponding and associated decreases in flow velocity • Removal of riparian vegetation and topsoil during construction causing creek bank instability, increasing the risk of erosion and sedimentation of waterways • Deterioration in visual water quality due to trapping of coarse litter upstream from crossings • River flow events overtopping cofferdams, sending water into the construction works site of pipeline discharge structures may mobilise sediments and increase the turbidity of the receiving waters.
Leaks/spills: Spills of chemicals, heavy metals, oils, and petroleum hydrocarbons during the use and operation of machinery Storage, transport, use and handling of chemicals	• Potential to introduce surface contaminants to surface water runoff and impact the quality of surrounding surface waters through contaminated stormwater discharges and plant wash down routines • Acute impacts to ecosystems receiving surface water run-off • Leakage from construction worker ablution and toilet facilities or wastewater collection points with subsequent runoff into receiving watercourses.
Water demand and sourcing	• Drawdown of groundwater systems potentially impacting local users and groundwater dependant ecosystems.

8 Environmental Mitigation and Management Measures

8.1 Sensitive Area Plans

Sensitive Area Plans (SAPs) provide a simple but effective tool to identify key risk areas, assist in the planning and management of specific areas and promote ongoing communication with construction personnel for the duration of the Project. They consist of a series of plans that clearly show the overarching environmental and socially sensitive areas within and surrounding the Project site, including vegetation, heritage, sensitive receivers, waterways, contamination, etc. SAPs will be developed based on sensitive land use, ecological and other environmental data incorporated from publicly available sources, the EIS and/or as supplemented by technical investigations and studies undertaken as required by this CEMP and associated Sub-Plans (e.g. contamination risk). Further details are provided in Appendix A6 of the CEMP.

8.2 Erosion and Sediment Control

The guiding principles of the Blue Book (Managing Urban Stormwater, Soils and Construction, Volume 1, 4th Edition (Landcom 2004)) will be adopted in relation to ERSED control during construction works. To ensure ERSED is appropriately managed throughout the Project, JHG has engaged a CPESC for the purpose of overseeing ERSED control management throughout the Project. The nominated CPESC for the Project is Sarah Steele from Treestone Environmental (CPESC # 7317), with over 20 years' experience in soil conservation, environmental best practice in construction, land management and environmental protection.

An Erosion and Sediment Control Strategy (ESCS) has been developed for the Project to provide the overarching framework for the management of erosion, sediment and stormwater risks during construction. The ESCS establishes the general principles, requirements, processes and management measures to be implemented across the Project. Previous references to ESCP included in earlier revisions of this Plan have been removed, as they are no longer relevant. The Project CPESC is preparing and reviewing site-specific Progressive Erosion and Sediment Control Plans (PESCPs) on an ongoing basis to reflect current construction activities and site conditions.

PESCPs describe how erosion and sediment (ERSED) risks, including those affecting receiving catchments intersected by the Project, will be managed during construction. They are developed to suit the relevant work area, construction staging and active work fronts, and identify the required erosion and sediment controls, including their type, location and sizing. PESCPs are reviewed and updated as required throughout construction and must be approved by the CPESC and JHG Environment Management (or delegate) prior to implementation. PESCPs will be made available to IRPL and the ER upon request.

PESCPs will typically detail:

- An overview of construction activities and their locations if they have the potential to impact on soil disturbance, stormwater flows and groundwater
- Site-specific ERSED control measures for the site
- General ERSED principles and controls applicable for the entire Project
- Sediment basins and any design and operating requirements including any Revised Universal Soil Loss Equations (RUSLE) calculations
- Where applicable, staging of works to minimise disturbed catchment footprints
- Soil and stormwater management controls and site water capture/ filter points
- Details of temporary stockpiles, location and management
- Any instream works, creek diversions or other relevant waterway controls and procedures.

8.2.1 Sediment Basins

Construction Sediment Basins are structures designed to meet the sediment control requirements for the construction stage and are designed to ensure containment and treatment of runoff from exposed and active work areas for a design rainfall event. The following section outlines the general measures for sediment basin management. Detailed procedures for sediment basin construction and management are outlined in the ESCS (Appendix C).

The use of construction sediment basins will be considered throughout the Project for the management of site water prior to discharge. The number, location, type and size of sediment basins will be further refined progressively during construction in consultation with the CPESC and documented within PESCPs. Sediment basins will be designed, constructed and managed with consideration of the following.

- Guidelines in Managing Urban Stormwater: Soils and Construction (Landcom, 2004) (the Blue Book)
- Requirements of the Project EPL
- Temporary works designs for construction basins
- Permanent works designs for operational basins
- Environmental values of the downstream receiving waterway.

JHG will ensure that water within sediment basins are emptied/pumped out following rainfall to ensure storage capacity is reinstated in accordance with the Blue Book. This may involve reuse of the water for dust suppression, irrigation within the Project site or discharging it after appropriate treatment of the water so that it meets EPL-compliant discharge water quality requirements (refer to the Dewatering Procedure in Appendix D). Captured stormwater should be re-used for construction activities in accordance with the Water Reuse Strategy, whenever possible.

Sediment basins will be cleaned out whenever the accumulated sediment exceeds 60% of the sediment storage zone. Accumulated sediment from sediment basins and traps will be removed in such a manner as not to damage the structures. Sediment removed from sediment basins will be appropriately managed to reduce erosion and waste impacts. If sediment is disposed offsite, it must be classified and disposed of to an appropriately licensed facility to accept the designated waste category.

Temporary sediment basins will remain in place until the identified catchment areas have been vegetated or otherwise stabilised to an appropriate standard in accordance with the Blue Book (Landcom, 2004).

Farm dams along the alignment will also be used for the storage of site water following rainfall. Dewatering controls will be the same as that for sediment basins.

8.2.2 Stockpile Management

8.2.2.1 Temporary Stockpiles

This Section provides guidance on the planning, placement and management of temporary stockpiles within the Project. The implementation of the following will also be guided by advice received from the CPESC and risk profile of the works which will consider the stockpile size, length of stockpile storage time, material, surrounding environment etc.

8.2.2.1.1 Stockpile location criteria

The location of stockpiles within the Project will consider the following guidance criteria in consultation with the CPESC.

- Located 5m away from areas of concentrated water flow unless appropriate diversions have been installed.
- Located at least 10m away from a watercourse

- Above the 5% Annual Exceedance Probability (AEP) design flood levels
- On land that does not require the removal of threatened species, Endangered Ecological Communities, or roosting habitat for listed threatened fauna species or native vegetation clearing beyond what is already required for the Project.
- Outside of the tree protection zone of trees or native vegetation identified for retention.
- So that any slump of the stockpile will not affect ERSED control measures or infringe specified minimum clearance requirements
- To ensure no cross contamination of contaminated materials with non-contaminated materials or topsoil with subsoil.
- On relatively flat land
- Within construction compounds where possible
- Positioned in areas to minimise visual, light spill, noise and vibration impacts at the nearest residence.
- Located in areas that will not impact on heritage sites (beyond those already impacted by the Project)
- Located within the approved Project site and EPL premise boundary.

8.2.2.1.2 Stockpile management

Mitigation measures for each stockpile site are provided below.

- Stockpile locations and any relevant controls are to be included in PESCPs.
- ERSED controls may include however not be limited to:
    - Diversion bunds or catch drains upslope of the stockpiles to divert water around the stockpile
    - Sediment fences, mulch bunds or other sediment controls downslope of stockpiles to catch sediment runoff
    - Stabilisation of long term stockpiles, particularly where they are large and/or located in or adjacent to sensitive areas.
- Topsoil stockpile heights should be no greater than 2 meters. Where taller stockpiles are required, additional controls may be required in consultation with the CPESC.
- Where required, stockpiles will be stabilised if they are not actively being worked and will be in place for more than 10 days using geofabrics, polymer, cover crop, hydromulching, cover crop, shaping or other suitable method.
- Dust management measures (including for vehicle movements associated with stockpiling activities) will be implemented. This may include temporary stabilisation (as per the previous point) and/or dust suppression.
- Mulch stockpiles are to be managed in accordance with Section 8.3.4.
- Stockpiles are to be segregated in a way to prevent cross-contamination i.e. topsoil, unsuitable material, contaminated material, mulch, sub-soils etc. Where there are several stockpile material types in an area, stockpiles should be signposted with a stockpile number, date established, material classification, origin, and quantity. Depending on the type and extent of any contaminated material, the stockpile may need to be covered with geofabric, plastic or similar to ensure additional surrounding material does not inadvertently become contaminated and to protect any nearby works.
- A spoil tracking and stockpile register will be maintained to ensure stockpiles and material movement is appropriately managed.
- Weed management measure will be undertaken as required on stockpiles which may include herbicide application, physical removal and/or or covering the stockpile to minimise weed growth.

8.2.2.2 Permanent Stockpiles

In accordance with CoA E123, permanent spoil mounds are to be located. Within the rail corridor;

- At least 50 metres from any watercourse or culvert or where there is a risk of erosion or flood impacts during any flood event ;
- At least 500 metres from any residence; and
- Outside the drip lines of trees located on private property.

  Note – for the purpose of CoA E123(d), JHG must not affect trees outside of the rail corridor for the purpose of preventing those trees' driplines overhanging spoil mounds.

Further to the above and in accordance with CoA E124, permanent spoil mounds are to comply with the following requirements.

- Maximum height must not exceed the top height of the upgraded rail line directly parallel to the spoil mound or two metres (whichever is the lesser);
- Not result in the clearing or covering of native vegetation beyond that described in the documents listed in CoA A1;
- Not result in heritage impacts beyond that described in the documents listed in CoA A1;
- Not result in additional changes to the upstream flooding regime beyond those described in the documents listed in CoA A1;
- Not affect the downstream flood regime;
- Not impede the flow of water through culverts;
- Not contain any contaminated soil classified as unsuitable for the proposed land use, acid sulphate soils or green waste;
- Are to be stabilised during construction of the Project; and
- Are to be stabilised following completion of construction of the Project.

Permanent stockpiles will require review for beneficial reuse, be appropriately designed and characterised and approved by Inland Rail.

8.3 Water Discharge Management

8.3.1 Water Quality Discharge Criteria

Water quality discharge criteria for surface water/ponded water, groundwater and water treatment plant/concrete batch plant effluent is provided in the Dewatering Procedure in Appendix D. This includes reusing water onsite, discharges to land, discharges to waterways and offsite disposal.

It's noted that if construction water discharges to waterways are undertaken, a Water Pollution Impact Assessment (WPIA) will be required which will inform the water quality discharge criteria included in the Project EPL. Until a WPIA is undertaken and water quality discharge criteria is included in the EPL, surface water runoff which accumulates in sediment basins, sumps and other areas cannot be discharged directly to waterways.

8.3.2 Dewatering

Dewatering is any activity that involves the removal of ponded stormwater or infiltrated groundwater from any location within the Project and the subsequent reuse or discharge of that water. A Dewatering Procedure is provided in Appendix D, which details how JHG will manage dewatering associated with the Project, including those from sediment basins, farm dams, sumps and other sources of construction water. The Dewatering Procedure also includes details on the treatment of water when a flocculant or coagulant is necessary to settle suspended sediments.

8.3.3 Farm Dam Management

The Farm Dam Dewatering Procedure is provided in Appendix E of the Biodiversity Management Sub-plan and should be read in conjunction with this Plan and the Dewatering Procedure (Appendix D).

In accordance with CoA E80, JHG will prepare a Farm Dam Register of all farm dams within 100m upstream and 500m downstream of the rail alignment. The Register must include:

a) property, location within property and owner;
b) approximate surface area, depth and volume;
c) alignment of dam inflow and outflow for 500m upstream and 100m downstream of the dam;
d) identification of all contour banks, drains or other water diverting structures that influence the water supply yield of existing farm dams;
e) catchment area feeding the dam;
f) identification of all surface water and groundwater sources supplying the dam; and
g) a map showing the items in (a) to (f) above.

The components of the Farm Dam Register will be compiled in consultation with the landowner. Copies of parts of the Farm Dam Register and supporting documentation that relate to a landowners' property will be provided to the landowner prior to construction. A copy of the Farm Dam Register must be provided to the Planning Secretary at the same time as submission of the Flood Design Verification Report.

8.3.4 Tannin Management

Tannins are naturally occurring plant compounds that can leach out of vegetation which has recently been mulched in areas that are subject to inundation or saturation. Tannin impacts may result in dark coloured water discharge from construction sites. This impact can be obvious and may raise the concern of the community and other stakeholders including regulatory authorities. Once discharged to the environment, tannins may reduce visibility and light penetration, increase the biological oxygen demand (BOD) and change the pH of receiving waters. These impacts may affect aquatic ecosystems in receiving environments.

Tannins will be managed on the Project by planning and work staging, mulch stockpile location considerations, mulch stockpile management measures and the management of tannin leachate which is detailed below. The management of mulch stockpiles in relation to spontaneous combustion is also detailed. It's noted that tannin management is only required on site-won mulch (as opposed to purchased mulch) and for species which are known to produce tannins e.g. *Melaleuca spp*.

8.3.4.1 Planning and works staging

Prior to commencement of clearing, planning and works staging will identify the amount of mulch to be generated. With this information, a strategy can be prepared to manage mulch on site. Staging of chipping, tub grinding and/or mulching activities should be planned to reduce the volume of mulch to be managed at any one time. Where feasible tub grinding will be prioritised over chipping to reduce tannin generation.

Suitable areas will be identified to stockpile the mulch required for the Project for landscaping and also for temporary ERSED controls. Mulch stockpile areas will be identified on PESCPs prior to commencement of clearing.

Surplus mulch will either be disposed at a suitable licensed waste facility or provided to the community where permitted under the POEO Act and the *Mulch Exemption 2016*. If it's likely that the Project will generate excess site-won mulch, logs should not be mulched and used as habitat features where possible and feasible.

8.3.4.2 Mulch stockpile location considerations

The location of mulch stockpiles should be selected with consideration of the following:

- Mulch stockpile sites should only be established on elevated ground that are not subject to inundation
- Mulch stockpiles should not be located within the dripline of trees
- Stockpile sites must be located away from drainage lines and watercourses and must be arranged to minimise damage to natural vegetation and trees
- The stockpile sites must be positioned so that the stockpiled material may be transported away at any time. Access should be readily available to the emergency services in the event of spontaneous combustion (Section 8.3.4.5)
- Stockpile sites with a duration of not more than 1 month should be constructed not less than 20 metres from a natural watercourse. Stockpile sites with a duration of more than 1 month should be constructed not less than 50 metres from a watercourse.

8.3.4.3 Mulch stockpile management measures

The following controls and management measures will be implemented when stockpiling mulch on site:

- On sloping land, mulch stockpiles must be designed and constructed with upslope bunds or catch drains to divert upgradient water around the stockpile and prevent it from entering the stockpile site. This may not be required where the mulch stockpile is located on flat land
- Mulch stockpiles must incorporate a bund to capture stockpile leachate or tannin impacted water. Bunds should be approximately 300mm high, to capture tannin impacted water
- For large mulch stockpiles, or where they will be in place for an extended period of time, they should include a lined discharge point for overflow in extreme rainfall events as determined by the CPESC.

8.3.4.4 Tannin leachate management

- Do not use mulch for surface cover or sedimentation controls in any low-lying areas of the site that remain consistently wet. Alternative controls such as geofabric (for surface protection) or sediment fence will be required in these areas
- Do not spread surface mulch thicker than 100 mm layers. Mixing mulch with topsoil is encouraged for batters to prevent loss of topsoil during initial stabilisation. It should be noted that mulch will generally cause nitrogen draw down which may inhibit plant growth unless mulch has been composted first. Care is to be taken to ensure that excessive mulch is not applied for sedimentation controls such as perimeter bunds or catch dams.
- Tannin impacted water should be removed from bunded stockpiles. This water should be used for on-site purposes including dust suppression, landscape watering or discharged to land where there is no risk of runoff to waterways.

8.3.4.5 Management of spontaneous combustion

Stockpiles must be regularly monitored and turned over as required to avoid spontaneous combustion. Mulch stockpile heights will be limited to a maximum of 2m to reduce heat generation.

Stockpiles are at risk of spontaneous combustion when the internal temperature is above 80°C. Indicators of elevated temperatures in mulch stockpiles include mushrooms, presence of steam and discolouration.

Where the above indicators are observed, temperature monitoring is to be undertaken of known hotspots and random sample locations within the entire mulch stockpile.

If stockpile is smoking or temperature is greater than 80°C the stockpile must be aerated and cooled.

8.4 Water Treatment Plant

Construction water treatment plants may be utilised during the Project including for the Temporary Workforce Accommodation Facility and any site based water treatment system.

In accordance with CoA E78, unless an EPL is in force in respect to the Project and that EPL specifies alternative criteria, discharges from construction water treatment plant(s), where required, to surface waters must not exceed the following.

- *Australian and New Zealand Guidelines for Fresh and Marine Water Quality 2018* (ANZG 2018) default guideline values for toxicants at the 95 per cent species protection level;
- Physical and chemical stressors, the guideline values set out in Tables 3.3.2 and 3.3.3 of the *Australian and New Zealand Guidelines for Fresh and Marine Water Quality 2000*; and
- Bioaccumulative and persistent toxicants, the ANZG 2018 values at a minimum of 99 per cent species protection level.

Where the ANZG 2018 does not provide a default guideline value for a particular pollutant, the approaches set out in the ANZG 2018 for deriving guideline values, using interim guideline values and/or using other lines of evidence such as international scientific literature or water quality guidelines from other countries, must be used.

8.5 Concrete Batching Plant

The Project is unlikely to construct and use any site based concrete batching plants. However where they are used and in accordance with RMM WQ-5, all wastewater from concrete batching plants would be captured and would either be disposed of to an appropriately licensed facility or treated prior to discharge to surface water bodies. All discharge water would comply with the WQOs and the relevant discharge criteria. Further, the following measures would also be implemented.

- Measures to prevent or minimise mud and dirt being tracked onto public roadways by trucks and any equipment leaving the site
- Requirements for training, inspections, corrective actions, notification and classification of environmental incidents, record keeping, monitoring and performance objectives for handover on completion of construction
- Any other requirements necessary to comply with CoA subsequent approvals or regulatory requirements
- PESCPs and this SWMSP will be approved by a CPESC.

8.6 Water Resource Management

Water resource management and planning for the Project will be important to ensure that adequate water sources are available and responsibly used by the Project. In accordance with CoA C22, this section details the following.

- A draft water balance for the Project
- Potential water sources which may be used by the Project and they are legally and physically available
- Transport and storage of water across the Project
- Mitigation measures to address construction water resource shortages that could arise.

Also refer to the Water Reuse Strategy for further details on water resource management which will be implemented during the Project and provide further compliance with CoA C22c.

8.6.1 Draft Water Balance

As described in Section 8.5.4 of the EIS, water would be required for a number of construction activities, including rail and road formation works, dust control, spoil compaction and reinstatement works. Preliminary estimates of water requirements for the Project indicate that a total of 675 ML of water would be required over the duration of construction as shown in Table 8-1.

Further to this, JHG have undertaken a detailed assessment of the estimated construction water requirements for the Project. The assessment was based on and considered the following.

- Preliminary information provided in the EIS i.e. Table 8-1
- Construction methodology and phasing proposed
- Anticipated climatic conditions (i.e. temperature, wind and corresponding evaporation rates), including seasonal variation
- Geotechnical data (specifically moisture content) of in situ formation material and quarry sourced materials
- Similar projects (Inland Rail - Parkes to Narromine; Narrabri to North Star)
- Previous experience.

Results of the detailed assessment, timing and a comparison to the preliminary estimates provided in the EIS are provided in Table 8-1.

The water balance study will be updated as the Project progresses and as more detailed information is realised. The final water balance study will be submitted as part of the Projects ISC submission.

Table 8-1 Draft water balance information

Construction Activity	Water Demand (ML)		Timing
	EIS	JHG Assessment	
Earthworks	585	322	Predominantly during bulk earthworks
Site won formation	42		
Dust suppression	26		Predominantly during bulk earthworks but also generally throughout the Project where there is ground disturbance
Landscape establishment watering	22	22	During and following landscaping
Temporary Workforce Accommodation Facility	Not calculated	30	During operation of the temporary workforce accommodation facilty
TOTAL	**675**	**374**	-

8.6.2 Primary Water Source, Transport and Storage

The primary water source for the Project will be from Goldenfields Water who are responsible for water supply functions within the LGAs of Junee, Temora and parts of Cootamundra–Gundagai. Initial consultation with Goldenfields Water has indicated that it can supply water at a rate of 15–20 L/s at Stockinbingal, adjacent to the rail alignment, and an additional 10 to 12 L/s at Cootamundra via its existing reticulated potable supply pipe network. Reliability of potable water supply at both locations is subject to restrictions at any time and at the discretion of Goldenfields Water.

Because the rate of consumption of construction water exceeds the available rate of supply from Goldenfields, accumulation of construction water prior to construction commencement may be required. This may be facilitated by provision of water storage tanks adjacent to the alignment and for ancillary facilities and potentially the pre-filling of farm dams and other water storage structures prior to the commencement of those high water use activities. Further, a water haulage program would be implemented to transport water from the reticulated supply at Cootamundra and Stockinbingal to the water storage structures along the Project alignment.

8.6.3 Alternative Water Sources and Water Shortage Planning

During times of drought, when Goldenfields Water are unable to supply the required amount of water to the Project, or if there is a more feasible water supply option, alternative water sources may be investigated and used by the Project which are detailed below.

- **Sewage Treatment Plants** – The use of treated effluent from sewage treatment plants (STPs) at Junee, Gundagai, Temora, Borowra, Coolamon and Wagga Wagga are potential water sources which may be used however they are unlikely to be feasible due to the large distances from the Project. Prior to the use of any STP effluent, an assessment will be undertaken to confirm that the water of suitable quality, will not impact the environment it is applied to (runoff to waterways etc.) and will consider any legislative waste requirements in accordance with NSW Waste Classification Guidelines 2014.
- **Other Landowners** – Other landowners which can potentially provide water to the Project will be considered as and if required. This includes the potential use of farm dams or private groundwater wells. When investigating a potential supplier, any licensing and legal requirements will be identified and complied with i.e. WAL. This will also depend on landowner approval/requirements and any commercial agreements.
- **Reusing Construction Water** – Reusing construction water from sediment basins, sumps, capture and storage of rainfall etc. Further potential construction water reuse options and details are provided in the Water Reuse Strategy in accordance with CoA E149.
- **Groundwater** – Although extraction of groundwater exists as a potential supplementary water source, and groundwater quality sampling has identified highly variable groundwater recharge rates, the Project does not anticipate that it would need to extract groundwater for the purpose of construction water supply due to high risks with this approach and potential additional licensing requirements. However, the use of groundwater will remain a potential water source noting that the applicable legislative licenses and/or approvals would be required.

In addition to the above, the following water saving and management strategies can potentially be implemented, if and when required, to reduce the Projects overall water consumption.

- Rooftop rainwater harvesting from site sheds and relevant infrastructure and storage in rainwater tanks
- Opportunistically sourcing water from within excavations, and from within roadside drains, borrow pits and other excavations with the necessary approval from the landowner
- Identifying farm dams located within the vicinity of the Project which could potentially be used should water shortages become an issue. Landowner approval and any legislative licenses/permits should be pre-arranged, so the water is available ahead of time
- Accumulation of water in water storage structures (basins, farm dams, water tanks etc.) prior to works which are expected to use large amounts of water. These water storage structures could be pre-emptively filled using potable water, or opportunistically by harvesting rainwater
- Oversizing sediment basins to allow water to be retained/stored while still achieving capacity requirements in accordance with the Blue Book

- When water must be used for dust suppression and/or conditioning of material, the methodology will be adjusted to ensure a sustainable use of water. This may include applying water in the early morning (with the correct out of hours approval) when water will infiltrate into the surface applied, rather than apply in the middle of the day when water is largely lost to evaporation
- Staging of ground disturbance work to minimise the amount of area requiring dust suppression at any given time
- As part of sustainable site facilities initiatives, implementation of low water use appliances (e.g. toilet cisterns, washing devices) and auto-shut off taps
- Selecting drought tolerant species for use in rehabilitation which do not require excessive irrigation/watering
- Progressive stabilisation/rehabilitation/revegetation of exposed areas to minimise the amount of area requiring dust suppression at any given time
- Education of all Project personnel on sustainable water supply and use.

8.7 Working in Waterways

Works within waterways, including any temporary waterway crossings and diversions, will be undertaken in accordance with the Working Within or Adjacent to Waterways Procedure provided in Appendix D of the Biodiversity Management Sub-Plan.

8.8 Flooding

JHG will implement a number of measures to mitigate the impacts of flooding on the Project site. These include the following:

- Where feasible, construction activities will be scheduled to avoid ground disturbance works or instream works during periods of heavy or prolonged rainfall
- Stockpiling and storage of materials to occur outside potential flood areas where possible
- Temporary facilities and hazardous material storage to be above 5% AEP design flood levels
- Maintain overland flow paths
- Monitoring of weather forecasts to identify potential flood events. Further information is provided in the Flood Emergency Response Management Plan appended to the CEMP
- Construction equipment (or excess material) would be removed from flood prone areas where significant events are predicted
- Site inspections will be completed to ensure ERSED controls are place prior to the potential flood event
- Where applicable, temporary levees or bunds would be strategically placed to contain potential flooding impacts resulting from any temporary works on the floodplain and minimise the risk to surrounding properties which might otherwise be affected
- Stockpiles will be located away from areas subject to concentrated overland flow
- Site facilities are to be located outside high flood hazard areas based on a 1% AEP flood and ideally outside the 1% AEP flood extent where possible.

In addition to the above, a Flood Emergency Management Sub-plan (Condition C24) has been developed and would be implemented for the Project during construction. Flood impacts within and adjacent to the rail corridor that are potentially still present during operations will be managed in accordance with the Flood Emergency Response Plan (FERP). This Plan forms an attachment to the Flood Design Verification Report (FDVR) and will be implemented during operations by IRPL as per Conditions E73-74 of the CoA.

8.9 Refuelling, Washdown and Chemical Storage

The storage, handling and use of dangerous goods and hazardous substances will be in accordance with the *Work Health and Safety Act 2011*; the *Storage and Handling of Dangerous Goods Code of Practice*; the *EPA "Bunding and Spill Management Guidelines*" contained within *EPA Environmental Protection Manual for Authorised Officers*; and all relevant legislation and Australian standards. It is noted the *Storage and Handling of Dangerous Goods Code of Practice* is no longer in force but has been retained 'for information'.

The Safety Manager (or delegate) will obtain Safety Data Sheets (SDS) for dangerous goods and hazardous substances prior to their arrival on site. SDS will be recorded in the Project SDS register and will be available on site. All hazardous substances will be transported in accordance with relevant legislation and codes, including the *Dangerous Goods (Road and Rail Transport) Regulation 2022* and the '*Australian Code for the Transport of Dangerous Goods by Road and Rail'*.

All fuels, chemicals, and liquids will be stored in bunded areas on relatively flat land, at least 50 metres away from waterways (including existing stormwater drainage systems) and flood prone areas. Bunded areas will be roofed to minimise any rainfall entering the bunded area. Where this is not possible, a risk assessment is to be undertaken to determine whether additional controls can be implemented to appropriately manage this risk.

The refuelling and maintenance of plant and equipment and any other activity which may result in spillage of a chemical fuel or lubricant will be undertaken in a way which minimises the risk of environmental spills i.e. designated sealed bunded areas, use of spill trays and plant nappies, spill kits etc.. Refuelling will not be undertaken within 50 m of any waterway. Refuelling activities will be supervised at all times. Where this is not possible, a risk assessment is to be undertaken to determine whether additional controls can be implemented to appropriately manage this risk.

Designated impervious bunded washdown facilities for concrete trucks and other vehicles will be provided at least 50 metres from areas prone to flash flooding or 100 metres away from other natural and built drainage lines. Plant and vehicle maintenance, including washdown, if undertaken onsite will be within designated areas to minimise the potential for offsite discharge and mud tracking. Where this is not possible, a risk assessment is to be undertaken to determine whether additional controls can be implemented to appropriately manage this risk.

8.10 Spill Response Procedure

A Spill Response Procedure for the Project is provided in Appendix E which details procedures to manage and minimise the impact of spills.

8.11 Groundwater Management

Groundwater interaction and subsequent dewatering may occur during construction if excavations (cuts) or piling for bridge foundations intersect with the groundwater table. An assessment has been undertaken to determine the risk of groundwater interaction for all cuts which is summarised below. It's noted that the Project has been designed to minimise any interaction with groundwater as much as possible, and to also manage impacts on groundwater quality and groundwater dependent ecosystems (GDE's) which is further detailed in the GMMP and BMSP. Further assessment/consideration will be undertaken throughout detailed design to ensure groundwater interaction is minimised.

- The groundwater levels within the Lachlan Alluvial Hydrostratigraphic Unit (HSU) was observed to be deeper than cut depths at between 7-19mBGL. Therefore, proposed cuts within the Lachlan Alluvial HSU are not anticipated to intersect the groundwater.

- Proposed cuts within the fractured rock HSU are not expected to intersect the shallow or deeper regional fractured rock aquifer. However, due to the localised topographic influences on the shallow fractured rock HSU, a low risk is still present.
- Depending on final construction methodology for bridge piling, groundwater may be intersected. However, the groundwater seepage is anticipated to be limited in volume and contained by topographic influences.

Where the groundwater table is close to or above the depth of excavation, controls may be implemented to minimise the amount of surface water entering the excavation. This will minimise the extent of water interacting with groundwater. This can be achieved by installing clean water diversion, swales etc. Should surface water enter an excavation containing groundwater, it will be classified as groundwater for the purpose of discharging.

Where groundwater interaction cannot be avoided and dewatering is required, it will be undertaken in accordance with the Dewatering Procedure (Appendix D) and the Project EPL. Groundwater typically has differing characteristics compared to freshwater waterways which may include lower pH levels, higher EC and Total Dissolved Solids (TDS), and in some cases heavy metals. Where groundwater discharge is required (onsite or offsite), further assessment will be required to ensure the discharge does not result in environmental impact. This may be achieved by a WPIA or other suitable assessment undertaken by a suitably qualified water quality specialist. Groundwater discharge will need to comply the Project EPL and any relevant discharge and testing criteria. The removal of groundwater from its water source may require approval under the WM Act prior to commencing dewatering activity.

For further information on how the Project will manage groundwater, refer to the GMMP.

8.12 Contaminated Land Management

Measures for the handling, treatment and management of hazardous and contaminated soils and materials, including measure to manage asbestos finds, are documented in the CLHMMP.

8.13 Acid Sulfate Soils Management

Measures to manage actual acid sulfate soils (ASS) are documented in the CLHMMP.

8.14 Soil and Water Mitigation and Management Measures

In addition to the mitigation and management measures provided in previous sections, the following general mitigation and management measures associated with soil and water management in Table 8-2 will be implemented throughout the Project.

Table 8-2 Soil and Water Mitigation and Management Measures

Ref	Measure / Requirement	When to implement	Responsibility	Reference / Source
General				
SW1	This SWMSP is to approved by the Planning Secretary prior to the commencement of Construction.	Prior to construction	Environment and Sustainability Manager	CoA C15
SW2	Develop SEPs or ECMs which should include identification of soil and water risk areas / sensitive areas and relevant management measures.	Prior to construction	Environment and Sustainability Manager	CEMP
SW3	All staff and subcontractors will undergo Project-specific induction training that includes relevant soil and water matters and associated management measures that must be implemented and taken into account when planning and delivering the work.	Prior to construction Construction	Environment and Sustainability Manager	CoA C13
SW4	Additional daily and task-specific training and awareness material may be delivered to relevant staff and workforce, in the form of toolbox talks and pre-start meetings, to ensure that where detailed information is required, it is accessible to all involved with the Project.	Construction	Environment and Sustainability Manager	CEMP, Best Practice
SW5	JHG will constantly monitor 7-day weather forecasts and record weather conditions using various nearby weather stations and site weather stations (where required) as detailed in Section 9.3.3.	Construction	Environment and Sustainability Manager	CEMP, FEMP Best Practice
SW6	Wet weather preparedness and response plan to be completed and provided to IRPL in August of each year unless an alternative timeframe is agreed with IRPL	Construction	Environment and Sustainability Manager	CEMF
SW7	Any incidents, non-compliances and non-conformances are to be managed in accordance with Section 8 of the CEMP. Notification of soil and water incidents is to be made to IRPL and any relevant statutory authorities such as NSW EPA, DPHI, DPI Fisheries, etc. Any communication required with IRPL and statutory authorities shall be limited to the Environment and Sustainability Manager (or suitable delegate) and/or the Construction Manager.	Construction	Environment and Sustainability Manager, Construction Manager	CoA A34 and A35 CEMF, CEMP

Ref	Measure / Requirement	When to implement	Responsibility	Reference / Source
SW8	Throughout the planning and construction phases of the Project, suitable planning and coordination will be undertaken to ensure the following: • Erosion and sediment control requirements are raised in regular planning meetings • Adequate time in the program is allowed for installation and maintenance of controls • Sequence construction works to allow for the progressive installation of erosion and sediment control measures, and limit the amount of exposed, uncovered soil • Adequate resources are allocated for the installation and maintenance of controls.	Prior to construction Construction	Environment and Sustainability Manager, Construction Manager	CEMP, Best Practice
Erosion and sediment control – Refer to Section 8 and the Erosion and Sediment Control Strategy in Appendix C				
SW9	All works are to be undertaken in accordance with the ESCS provided in Appendix C.	Construction	Environment and Sustainability Manager, Construction Manager, Site Supervisor	CoA C22
SW10	A CPESC will be engaged for the duration of construction of the Project to provide advice regarding erosion and sediment control, including review and approval of PESCPs.	Prior to construction Construction	Environment and Sustainability Manager	RMM WQ-5
SW11	PESCPs will be developed throughout the works to ensure that adequate controls are in place to manage surface water runoff and erosion potential. These plans will be developed in consultation with the CPESC. PESCPs will be developed for each work site prior to the commencement of significant ground disturbance and will be updated and managed progressively as site conditions change.	Prior to construction Construction	Environment and Sustainability Manager, CPESC	RMM SC-6, Best Practice
SW12	All reviews and amendments to the PESCPs will be conducted by the Environmental Manager or delegate in consultation with the Site Supervisor and the CPESC. The PESCP is a site-level, live document and will be reviewed and updated on an ongoing basis by the Project team to reflect the current site conditions as required.	Prior to construction Construction	Environment and Sustainability Manager, CPESC, Site Supervisor	RMM SC-6, Best Practice
SW13	Erosion and sediment control measures will be implemented and maintained in accordance with the principles and requirements in Managing Urban Stormwater – Soils and Construction, Volume 1 (Landcom 2004) and Volume 2D (NSW Department of Environment, Climate Change and Water 2008), commonly referred to as the ‘Blue Book’.	Prior to construction Construction	Environment and Sustainability Manager, Construction Manager, Site Supervisor	CoA E150, RMM SC-6,

Ref	Measure / Requirement	When to implement	Responsibility	Reference / Source
SW14	The JHG environment team, in consultation with the CPESC, will provide direction for the location, installation, maintenance and removal of erosion and sediment control devices in accordance with this SWMSP and other associated PESCPs. Control devices shall remain in place until approval is given for their removal by the JHG environment team, in consultation with the CPESC.	Construction	Environment and Sustainability Manager, CPESC	RMM WQ-5, Best Practice
SW15	Erosion and sediment control decisions will be made to encompass reasonable and practical prevention, and will consider the receiving environment, water quality objectives, quality and quantity of water, location and accessibility, and other requirements.	Construction	Environment and Sustainability Manager, CPESC	Best Practice
SW16	All ERSED and drainage control devices must be inspected in accordance with the PESCPs and ECMs. This will typically include; before, during (where safe site access allows) and after rainfall events causing runoff, during the weekly environmental inspection, prior to any shutdown periods or following an incident. The inspection will assess the implementation, suitability and effectiveness of the erosion and sediment controls in place, compliance with the PESCP and determine any maintenance requirements or opportunities for improvement. In the event that controls are inadequate or absent, immediate and appropriate action will be taken to ensure that suitable controls are in place.	Construction	Environment and Sustainability Manager, Site Supervisor	RMM SC-6, Best Practice
SW17	Pre-rainfall inspections are to be undertaken where there is more than an 80% chance of 20mm of rainfall or greater in a 24 hour period. Where this quantity of rainfall is received, post rainfall inspections will also be undertaken. Refer to Section 9.3 for further details.	Construction	Environment and Sustainability Manager, Site Supervisor	CEMP, Best Practice
SW18	During times of heavy rainfall or predicted heavy rainfall, work activities will be adjusted or will cease when there is a risk of sediment loss off site.	Construction	Environment and Sustainability Manager, Site Supervisor	CEMP, Best Practice
SW19	All equipment, personnel and materials shall be sufficient and available on site to respond to wet weather events and regular maintenance of erosion and sediment controls is to be completed pre and post wet weather events	Construction	Environment and Sustainability Manager, Site Supervisor	CEMF s6.6.4
SW20	Temporary erosion and sediment controls will be identified and implemented in anticipation of an extreme wet weather event, in consultation with the CPESC.	Construction	Environment and Sustainability Manager, Site Supervisor	CEMP, Best Practice

Ref	Measure / Requirement	When to implement	Responsibility	Reference / Source
SW21	Prolonged open excavations will have berms and/or diversion drains on their perimeter to divert overland storm water runoff away from the excavation. Where appropriate, utilise sandbags and/or geofabric to reduce flow velocity and minimise erosion within a drainage channel.	Construction	Environment and Sustainability Manager, Site Supervisor	CEMP, Best Practice
SW22	Clean water diversion controls are to be installed at relevant locations to minimise water entering the work area to minimise erosion and prevent pollution.	Construction	Environment and Sustainability Manager, Site Supervisor	CoA E150, RMM SC-6, Best Practice
SW23	Removed sediment to be added to existing stockpiles, redistributed to land outside of overland flow paths or appropriately disposed from site in accordance with the SEP/ECM and PESCP.	Construction	Environment and Sustainability Manager, Site Supervisor	Best Practice
SW24	ERSED controls that are damaged or otherwise rendered ineffective will be immediately replaced.	Construction	Environment and Sustainability Manager, Site Supervisor	Best Practice
SW25	Clean rock is to be used for ERSED controls and scour protection	Construction	Environment and Sustainability Manager, Site Supervisor	CEMFs6.6.4
SW26	All stormwater lines and/or drainage inlets where there is potential for sedimentation to occur as a result of construction activity shall be protected by geofabric, sandbags or other effective ERSED controls.	Construction	Environment and Sustainability Manager, Site Supervisor	Best Practice
SW27	All drainage feature crossings (permanent and temporary watercourse crossings and stream diversions) new or modified surface water drainage (including cess drains) and depressions are designed and constructed in accordance with relevant engineering and environmental design standards and guidelines.	Construction	Design Manager, Construction Manager	CoA E77
SW28	Permanent or temporary longitudinal and transverse drainage works will be installed and stabilised as early as practical in the construction program to minimise uncontrolled drainage and associated erosion and flooding issues.	Construction	Design Manager, Construction Manager	Best Practice
SW29	Where practical, vegetation clearing and ground-disturbing works will be staged sequentially/across the Project to minimise areas exposed to erosion and sediment risk.	Construction	Environment and Sustainability Manager, Construction Manager	Best Practice

Ref	Measure / Requirement	When to implement	Responsibility	Reference / Source
SW30	Vegetation to be progressively re-established as soon as practicable to prevent erosion and slope degradation during construction.	Construction	Design Manager, Construction Manager	Best Practice
SW31	Where reasonable and feasible, all high-risk areas (i.e. stockpiles, batters and areas of concentrated flow) that have no scheduled work for more than 1 month will be revegetated and / or stabilised using the following process: • Light scarification or surface roughening across the entire area to be revegetated. • Application (i.e. hand seed, drill seed or hydraulically applied) of a suitable temporary covercover, which may consist of the below noting that specific species selection will be subject to requirements of the Rehabilitation Strategy and Individual Property Plans. o Japanese Millet 25kg/ha (spring and summer months); or o Rye 15kg/ha (autumn and winter months); and o Creeping Blue / Indian Blue 10kg/ha; and o Seca Stylo Legume 2kg/ha. In lieu of the above revegetation, soil binder (or other suitable stabilisation method) may be used to stabilise areas of high erosion risk.	Construction	Design Manager, Site Supervisor	Best Practice
SW32	ERSED controls shall remain in place until 70% groundcover is achieved, or as advised by the CPESC.	Construction	Environment and Sustainability Manager, CPESC	CoA E150, Best Practice
SW33	All cleared areas to be stabilised/restored as soon as practicable following completion.	Construction	Environment and Sustainability Manager, Site Supervisor	Best Practice
SW34	The construction impact zone defined for the Project would allow sufficient room for provision of temporary and permanent erosion and sediment control measures/pollution control measures where required based on consideration of overland flow paths and flood risk. Water quality control measures would be designed to capture and treat the 80th percentile five-day rainfall event and any other requirements as outlined in the Blue Book.	Prior to construction Construction	Environment and Sustainability Manager, Site Supervisor	RMM WQ-1

Ref	Measure / Requirement	When to implement	Responsibility	Reference / Source
SW35	Sediment basins must be designed and constructed in accordance with the Blue Book (Landcom 1994) and detailed within the PESCP.	Prior to construction Construction	Environment and Sustainability Manager, CPESC	CoA E150
SW36	ERSED controls, including temporary construction basins, will be cleaned or replaced prior to accumulated sediments and obstructions reducing their effective operating capacity by 60%.	Construction	Environment and Sustainability Manager, Site Supervisor	CoA E150, Best Practice
SW37	Remove all construction sediment retention basins and sediment traps before completion, making all areas good, but not before all upstream areas have been vegetated or otherwise stabilised in accordance with the Blue Book (Landcom, 2004).	Construction	Environment and Sustainability Manager, Site Supervisor	CoA E150, Best Practice
Stockpile management – Refer to Section 8				
SW38	All works in relation to stockpile management are to be undertaken in accordance with Section 8.2.2.	Construction	Environment and Sustainability Manager, Construction Manager, Site Supervisor	CEMP
SW39	No temporary construction stockpiles to be located within 5m of drainage lines, below 20 year flood levels, 10m from a watercourse or any area otherwise likely to be inundated with water unless it has been appropriately risk assessed by the CPESC. See further details in Section 8.2.2.1 for further location criteria for temporary stockpiles.	Construction	Environment and Sustainability Manager, Site Supervisor	RMM HF-5, SC-6
SW40	Where required, stockpiles will be stabilised if they are not actively being worked and will be in place for more than 10 days using geofabrics, polymer, cover crop, hydromulching, cover crop, shaping or other suitable method.	Construction	Environment and Sustainability Manager, Site Supervisor	Best Practice
SW41	ERSED controls for temporary stockpiles may include however not be limited to: • Diversion bunds or catch drains upslope of the stockpiles to divert water around the stockpile • Sediment fences, mulch bunds or other sediment controls downslope of stockpiles to catch sediment runoff • Stabilisation of long term stockpiles, particularly where they are large and/or located in or adjacent to sensitive areas.	Construction	Environment and Sustainability Manager, Site Supervisor	Best Practice

Ref	Measure / Requirement	When to implement	Responsibility	Reference / Source
SW42	Weed management measure will be undertaken as required on stockpiles which may include herbicide application, physical removal and/or or covering the stockpile to minimise weed growth.	Construction	Environment and Sustainability Manager, Site Supervisor	RMM BD-7, CEMF
SW43	Stockpiles are to be segregated in a way to prevent cross-contamination i.e. topsoil, unsuitable material, contaminated material, mulch, sub-soils etc. Where there are several stockpile material types in an area, stockpiles should be signposted with a stockpile number, date established, material classification, origin, and quantity.	Construction	Environment and Sustainability Manager, Site Supervisor	RMM BD-7, CEMF
SW44	Stockpile heights should be no greater than 2 meters. Where taller stockpiles are required, additional controls may be required in consultation with the CPESC.	Construction	Environment and Sustainability Manager, Site Supervisor	CEMF, Best Practice
SW45	Spotters and excavator operators to monitor the loading of spoil trucks to make sure they are not being overloaded	Construction	Site Supervisor	CEMF, Best Practice
SW46	Permanent stockpiles would only be constructed if they are compliant with the measures outlined in Section 8.2.2.2.	Construction	Environment and Sustainability Manager, Construction Manager, Design Manager	CoA E123, E124
SW47	Mulch stockpiles are to be managed in accordance with Section 8.3.4.	Construction	Environment and Sustainability Manager, Site Supervisor	Best Practice
Plant movement and access				
SW48	Mobile plant and vehicles, including deliveries must use designated travel routes, site access routes, site access tracks and lay down areas.	Construction	All personnel	CEMF, Best Practice
SW49	Whilst on site, vehicles to remain on the designated roadways and observe the site speed limits.	Construction	All personnel	CEMF, Best Practice
SW50	All plant and equipment must operate and park within the Project site unless expressly approved by the JHG environment team.	Construction	All personnel	Best Practice

Ref	Measure / Requirement	When to implement	Responsibility	Reference / Source
SW51	Where possible and feasible, access roads are to be constructed and stabilised with suitable material to minimise erosion. Where this is not possible or feasible, and located in a high risk area, additional ERSED controls may be required in consultation with the CPESC.	Construction	Environment and Sustainability Manager, Construction Manager, Site Supervisor	RMM AQ-2, Best Practice
SW52	Stabilised site access will be provided at all access / egress locations in accordance with NSW Blue Book Volumes 1 and 2D (Landcom, 2004 and DECC, 2008) to prevent tracking of mud onto public roads.	Construction	Environment and Sustainability Manager, Construction Manager, Site Supervisor	RMM AQ-2, WQ-5, Best Practice
SW53	Spoil, mud or the like spilt onto sealed roads to be removed within a reasonable timeframe through use of a street sweeper or other means.	Construction	Environment and Sustainability Manager, Site Supervisor	RMM WQ-5, CEMF
Accommodation camp management				
SW54	Hard stand areas in the vicinity of camp buildings will be minimised to reduce the amount of runoff and potential ERSED issues.	Construction	Environment and Sustainability Manager, Construction Manager, Design Manager	RMM AHF-1
SW55	Site drainage of the accommodation camp will be installed in accordance with the Blue Book.	Prior to construction, Construction	Environment and Sustainability Manager, Site Supervisor	RMM AHF-2
SW56	Stormwater drainage infrastructure would be included under proposed access tracks and roads to maintain existing local overland flows to the farm dam to the north of the accommodation camp site.	Prior to construction, Construction	Environment and Sustainability Manager, Construction Manager, Design Manager	RMM AHF-3
SW57	Accommodation camp wastewater would be collected and removed off-site for treatment and disposal at a licenced wastewater treatment facility.	Construction	Environment and Sustainability Manager, Construction Manager	RMM AHF-5

Ref	Measure / Requirement	When to implement	Responsibility	Reference / Source
SW58	Capture of all rainwater from the roofs of camp buildings across the accommodation camp site for suitable reuse within the site.	Prior to construction, Construction	Environment and Sustainability Manager, Construction Manager	RMM AHF-6
SW59	A stormwater detention basin will be constructed at the accommodation camp to capture stormwater runoff from the car park during the 10% AEP flood event.	Prior to construction, Construction	Environment and Sustainability Manager, Construction Manager, Design Manager	RMM AHF-4
Dewatering management – Refer to Section 8 and the Dewatering Procedure in Appendix D				
SW60	All dewatering is to be undertaken in accordance with the Dewatering Procedure detailed in Appendix D. In addition, should dewatering of a farm dam be required, the Farm Dam Dewatering Procedure provided in Appendix E of the Biodiversity Management Sub-plan will also be implemented.	Construction	Environment and Sustainability Manager, Site Supervisor	CoA C22
SW61	Water will only be discharged under a water discharge permit which will be issued by the JHG Environment Team. A permit will only be issued once water quality criteria (in accordance with the relevant water quality discharge criteria) and any other requirements have been met.	Construction	Environment and Sustainability Manager, Site Supervisor	CEMP, Best Practice
SW62	Discharge to surface water would consider the hydrological and geomorphological attributes of the receiving waterbody.	Construction	Environment and Sustainability Manager, Site Supervisor	RMM HF-6
SW63	The use of flocculants, coagulants, pH adjusters and other water treatment chemicals are to be carefully considered to ensure their use will not impact on receiving waters in which the construction water is being discharged to. Application of such chemicals is to be undertaken in accordance with manufacturer specifications/requirements.	Construction	Environment and Sustainability Manager, Site Supervisor	CEMP, Best Practice
SW64	Prior to the commencement of dewatering, JHG will inspect the entire system, including intakes and outlets, pumping and discharge locations. Supervision of dewatering is required unless approved by the JHG Environment and Sustainability Manager. If JHG chooses not to directly supervise dewatering, a risk assessment must be carried out and mitigation measures implemented to eliminate the risks of pollution and to prevent the occurrence of the following:	Construction	Environment and Sustainability Manager, Site Supervisor	Best Practice

Ref	Measure / Requirement	When to implement	Responsibility	Reference / Source
	• Intake suction placed within the deposited sediments resulting in discharge of sediment laden waters • Erosion at discharge locations and downstream areas • Inadvertent or intentional controlled discharge of untreated waters.			
SW65	All water to be pumped into water dissipation devices e.g, scour rock	Construction	Environment and Sustainability Manager, Site Supervisor	CEMF, Best Practice
SW66	The following records will be kept in relation to dewatering: • Dewatering procedure • Date and time for each discharge at each location • Water quality test results for each discharge • Personnel approving the dewatering activities • Evidence of discharge monitoring, or risk assessment and mitigation measures used to eliminate the risks of pollution or erosion • Any other EPA licence requirements where issued.	Construction	Environment and Sustainability Manager	CEMP, CEMF, Best Practice
SW67	Surface water monitoring must be undertaken in accordance with the Surface Water Monitoring Program and implemented for the duration of construction and for any longer period set out in the monitoring program or specified by the Planning Secretary, whichever is the greater.	Prior to construction, Construction	Environment and Sustainability Manager	CoA C27, C29, E84-E85 RMM WQ-2
SW68	Construction will be carried out in a manner so as to either maintain the NSW Water Quality Objectives where they are being achieved, and contribute towards achievement of the NSW Water Quality Objectives over time where they are not being achieved unless an EPL is in force in respect of the CSSI contains different requirements in relation to the NSW Water Quality Objectives, in which case those requirements must be complied with.	Prior to construction, Construction	Environment and Sustainability Manager, Construction Manager	CoA E76
SW69	If it is proposed to discharge construction stormwater to waterways, a Water Pollution Impact Assessment will be required to inform licensing, consistent with Section 45 of the POEO Act. Any such assessment must be prepared in consultation with the EPA and be consistent with the National Water Quality Guidelines, with the level of detail commensurate with the potential water pollution risk.	Prior to construction, Construction	Environment and Sustainability Manager	CoA E76

Ref	Measure / Requirement	When to implement	Responsibility	Reference / Source
SW70	All wastewater from concrete batching plants would be captured and would either be disposed of to an appropriately licensed facility or treated prior to discharge. All discharge water would comply with the WQOs and the relevant EPL requirements: • measures to prevent or minimise mud and dirt being tracked onto public roadways by trucks and any equipment leaving the site • requirements for training, inspections, corrective actions, notification and classification of environmental incidents, record keeping, monitoring and performance objectives for handover on completion of construction • any other requirements necessary to comply with CoA subsequent approvals or regulatory requirements • erosion and sediment control plans and SWMSP will be signed off by a CPESC in accordance with regulatory requirements.	Prior to construction, Construction	Environment and Sustainability Manager, Construction Manager, Design Manager	RMM WQ-5
SW71	All relevant personnel involved in the management of water on site will be appropriately trained including in monitoring, treatment and discharge requirements (where permitted).	Construction	Environment and Sustainability Manager	CEMP, Best Practice, CoA C13
SW72	Except as expressly provided for in any Project approval, including the EPL, Project activities will be managed to comply with Section 120 of the POEO Act.	Construction	Environment and Sustainability Manager, Construction Manager, Site Supervisor	POEO Act
SW73	If groundwater is intercepted or likely to be intercepted during construction works, NRAR must be consulted to determine if licensing and / or approval is required under the WM Act.	Construction	Environment and Sustainability Manager, Construction Manager	WM Act
Water Supply – Refer to Section 8.6				
SW74	A draft water balance study will be undertaken to understand water needs for the Project to ensure adequate water supply provisions are managed.	Prior to construction, Construction	Environment and Sustainability Manager, Construction Manager,	CoA C22
SW75	A Water Reuse Strategy will be developed by JHG to reduce reliance on potable water.	Prior to construction, Construction	Environment and Sustainability Manager, Sustainability Manager	CoA E149

Ref	Measure / Requirement	When to implement	Responsibility	Reference / Source
SW76	Where the rate of consumption of construction water exceeds the available rate of supply, a water accumulation, storage and transport/haulage program will need to be undertaken to ensure water supply to the Project is adequate. Further details are provided in Section 8.6.	Construction	Construction Manager,	CoA C22
SW77	Alternative water sources, such as those provided in Section 8.6, are to be investigated and implemented when and if required.	Construction	Construction Manager,	CoA C22
SW78	Any recycled wastewater (including recycled/treated water) used by the Project will consider risks to human health or the receiving environment and meets the relevant standards.	Construction	Environment and Sustainability Manager, Construction Manager	CoA E77
SW79	Water saving and management strategies to minimise water usages will be continually sought and adopted as appropriate. See Section 8.6 for further details.	Construction	Sustainability Manager, Construction Manager	CoA C22, Best Practice
SW80	Only water sources which are legally and physically available will be used for the Project.	Construction	Construction Manager	CoA C22
SW81	All sourced water will have flow meters and source/usage data provided to IRPL	Construction	Sustainability Manager	CEMF s6.6.4
SW82	Consultation would be undertaken with relevant stakeholders (including landowners/occupants) prior to construction, and appropriate approvals and agreements would be sought for the extraction of water. Monitoring would be undertaken during extraction to ensure volumes stipulated by license requirements and/or private landholder agreements are not exceeded.	Construction	Construction Manager, Community and Stakeholder Manager	WM Act, COA E79
SW83	Where farm dams are to be used as a water source, approval from the landowner is to be obtained and confirmation that the water can be legally used by the Project, including any WAL requirements.	Construction	Environment and Sustainability Manager, Construction Manager	CoA C20, E79
SW84	A farm dam register will be compiled for all farm dams within 100m upstream and 500m downstream of the rail alignment in accordance with CoA E80. A copy of the Register must be provided to the Planning Secretary at the same time as submission of the Flood Design Verification Report.	Construction	Environment and Sustainability Manager, Construction Manager	CoA E80
Works in waterways – Refer to Appendix D of the BMSP				
SW85	All works in waterways are to be undertaken in accordance with Appendix D of the BMSP.	Prior to construction, Construction	Environment and Sustainability Manager,	CoA C20, E42 RMM BD-1

Ref	Measure / Requirement	When to implement	Responsibility	Reference / Source
			Construction Manager, Site Supervisor	
SW86	Works within waterways, including any diversions, will be undertaken in accordance with the following documents. • *Guidelines for controlled activities on waterfront land – Riparian Corridors* • *Managing Urban Stormwater: Soils and Construction 4th Edition, Volumes 1 and 2* (the "Blue Book") • *Controlled activities on waterfront land – Guidelines for watercourse crossings on waterfront land* • *Policy and Guidelines for Fish Habitat Conservation and Management*	Prior to construction, Construction	Environment and Sustainability Manager, Construction Manager, CPESC	CoA C20, E42 RMM BD-1
SW87	JHG will design, construct and maintain any temporary waterway crossings, including any diversions, and maintain fish passage consistent with the following guidelines: • *Managing Urban Stormwater: Soils and Construction 4th Edition, Volumes 1 and 2* (the "Blue Book") • *DPI Fisheries guideline "Why do Fish Need to Cross the Road? Fish Passage Requirements for Waterway Crossings*." • *Fishnote – Policy and Guidelines for Fish Friendly Waterway Crossings* • *Guidelines for controlled activities on waterfront land*	Prior to construction, Construction	Environment and Sustainability Manager, Construction Manager, CPESC	RMM BD-1 CoA E77, E42, E43
SW88	Management of work in each waterway will consider site-specific geomorphic conditions in each waterway.	Construction	Environment and Sustainability Manager, Construction Manager, CPESC	RMM HF-6
SW89	Where work is required within a waterway, an Environmental Work Method Statement (EWMS) for the work will be prepared in consultation with the Project Ecologist and the CPESC. The EWMS will detail the control measures to avoid or minimise erosion and any adverse impact on water quality and riparian fauna and flora,	Construction	Environment and Sustainability Manager, CPESC	CEMP, Best Practice
SW90	Site specific PESCPs will be developed for all works within waterways in consultation with the CPESC and Project Ecologist where appropriate.	Construction	Environment and Sustainability Manager, CPESC, Project Ecologist	RMM SC-6, Best Practice

Ref	Measure / Requirement	When to implement	Responsibility	Reference / Source
SW91	Temporary waterway crossings and erosion and sediment controls will be managed by the Environment and Sustainability Manager or delegate and designed by a suitably qualified and experienced person and reviewed by the CPESC and Project Ecologist.	Construction	Environment and Sustainability Manager, CPESC, Project Ecologist	RMM BD-1 CoA E77, E42, E43 CEMP, Best Practice
SW92	Any temporary works installed in waterways is to maintain existing flows, turbidity and water quality values. During water diversion works water quality monitoring shall occur regularly			IRPL CEMF
SW93	The duration and extent of works within waterways will be minimised where practical, including prioritising undertaking instream works during periods of low flow and minimising the wet area impacted during these activities.	Construction	Environment and Sustainability Manager, Site Supervisor	CoA E82, Best Practice
SW94	All temporary works, flow diversion barriers and in-stream sediment control barriers will be removed as soon as practicable and in a manner that does not promote additional erosion.	Construction	Environment and Sustainability Manager, Site Supervisor	Best Practice
SW95	Booms, silt curtains and/or similar will be used by the construction team to contain and capture suspended sediment, during instream works. This will be detailed in PESCPs.	Construction	Environment and Sustainability Manager, Site Supervisor	Best Practice
SW96	No plant or machinery is to work in waterways unless authorised to do so by the Environment and Sustainability Manager.	Construction	Environment and Sustainability Manager, Site Supervisor	Best Practice
SW97	Where possible, prioritise precast structures over insitu concrete pours for structures within or over waterways	Construction	Environment and Sustainability Manager, Design Manager	IRPL CEMF s6.6.4
SW98	Prior to construction impacting a landowner anywhere on the alignment, the Proponent must consult with the landowner and/or relevant roads authority that is located immediately adjacent to new or upgraded culverts to determine the potential for impacts on infrastructure, dwellings, property access, agricultural productivity, farm operations and farm dams (including changes in water supply yield, reliability of supply, flood flows and embankment stability) due to the introduction or alteration of flows. Where potential adverse impacts are identified, the Proponent must consult with the affected landowner or relevant	Construction	Construction Manager, Community and Stakeholder Manager	CoA E79

Ref	Measure / Requirement	When to implement	Responsibility	Reference / Source
	roads authority on the management measures that will be implemented to mitigate the impacts. The outcomes of the consultation with affected landowners or relevant roads authority must be documented.			
SW99	Any works over water will undergo an individual construction risk assessment workshop which includes IRPL	Prior to works over waterways	Construction Manager Environment and Sustainability Manager,	IRPL CEMF s6.6.4
Refuelling, washdown and chemical storage – Refer to Section 8.9 and 8.10				
SW100	The construction team will undertake refuelling, washdown and chemical storage in accordance with the requirements set out in Section 8.9 of this SWMSP.	Construction	Site Supervisor	IRPL CEMF, Best Practice
SW101	Storage, handling and use of dangerous goods and hazardous substances must be in accordance with the *Work Health and Safety Act 2011*.	Construction	Site Supervisor, Safety Manager	IRPL CEMF, Best Practice
SW102	All hazardous substances must be transported in accordance with relevant legislation and codes, including the *Dangerous Goods (Road and Rail Transport) Regulation 2022* and the '*Australian Code for the Transport of Dangerous Goods by Road and Rail*'.	Construction	Site Supervisor, Safety Manager, Traffic Manager	Best Practice
SW103	Chemicals will be appropriately stored in bunded areas in accordance with the *EPA "Bunding and Spill Management Guidelines*" contained within "*EPA Environmental Protection Manual for Authorised Officers*"	Construction	Site Supervisor, Safety Manager, Environment and Sustainability Manager	Best Practice
SW104	SDS must be obtained for dangerous goods and hazardous substances stored onsite before their arrival.	Construction	Site Supervisor, Safety Manager	Best Practice
SW105	All fuels, chemicals, and liquids will be stored in bunded areas on relatively flat land, approximately 50 metres away from waterways (including existing stormwater drainage systems) and flood prone areas. Bunded areas will be roofed to minimise any rainfall entering the bunded area. Where this is not possible, a risk assessment is to be undertaken to determine whether additional controls can be implemented to appropriately manage this risk.	Construction	Site Supervisor	IRPL CEMF, Best Practice

Ref	Measure / Requirement	When to implement	Responsibility	Reference / Source
SW106	The refuelling and maintenance of plant and equipment and any other activity which may result in spillage of a chemical fuel or lubricant will be undertaken in a way which minimises the risk of environmental spills i.e. in a designated sealed bunded areas, use of spill trays and plant nappies, spill kits etc.Refuelling will not be undertaken within 50 m of any waterway. Refuelling activities will be supervised at all times. Where this is not possible, a risk assessment is to be undertaken to determine whether additional controls can be implemented to appropriately manage this risk.	Construction	Site Supervisor	IRPL CEMF, Best Practice
SW107	Spill kits will be located to allow for timely response to uncontained spills. Adequate quantities of suitable material to counteract spillage will be readily available.	Construction	Environment and Sustainability Manager, Site Supervisor	CEMF, CoA C22
SW108	The refuelling and maintenance of plant and equipment and any other activity which may result in spillage of a chemical fuel or lubricant will be undertaken in a way which minimises the risk of environmental spills i.e. in a designated sealed bunded areas, use of spill trays and plant nappies, spill kits etc.	Construction	Site Supervisor	Best Practice
SW109	Where refuelling of mobile plant in the field is required, it shall take place on level ground, an appropriate distance from watercourses and shall be accompanied by a spotter and suitable spill kit.	Construction	Site Supervisor	Best Practice
SW110	Designated impervious bunded washdown facilities for concrete trucks and other vehicles will be provided at least 50 metres from areas prone to flash flooding or 100 metres away from other natural and built drainage lines. Where this is not possible, a risk assessment is to be undertaken to determine whether additional controls can be implemented to appropriately manage this risk.	Construction	Environment and Sustainability Manager, Site Supervisor	Best Practice
SW111	Washout facilities must be in place and used for cleaning plant and equipment, concrete, paint or other environmentally hazardous substances. The location of these facilities will be identified on the SEP/ECM.	Construction	Environment and Sustainability Manager, Site Supervisor	Best Practice
SW112	All slurry to be captured and prevented from entry into waterways.	Construction	Environment and Sustainability Manager, Site Supervisor	CEMF
SW113	Where a spill occurs, the Spill Response Procedure (Appendix E) is to be implemented. The procedure includes details on the requirements for managing, cleaning up and reporting of spills.	Construction	Environment and Sustainability Manager, Site Supervisor	CoA C22

Ref	Measure / Requirement	When to implement	Responsibility	Reference / Source
Flooding – Refer to Section 8.8 and 8.15				
SW114	All works in relation to flooding are to be undertaken in accordance with the controls and mitigation measures detailed in Section 8.8 and 8.15 of this SWMSP.	Prior to construction, Construction	Environment and Sustainability Manager, Construction Supervisor, Site Supervisor	CoA C22
SW115	A Flood Emergency Management Sub-plan will be developed and implemented for the Project.	Prior to construction, Construction	Environment and Sustainability Manager	CoA C24
SW116	Wet weather preparedness and response plan to be completed and provided to IRPL in August of each year unless an alternative timeframe is agreed with IRPL.	August each year	Environment and Sustainability Manager	IRPL CEMF
Groundwater Management – Refer to Section 8.11				
SW117	All works in relation to flooding are to undertaken in accordance with the controls and mitigation measures detailed in Section 8.11 of this SWMSP.	Prior to construction, Construction	Environment and Sustainability Manager, Construction Supervisor, Site Supervisor	CoA C22

8.15 Soil and Water Management in Design

Table 8-3 details the soil and water-related design requirements and how they will be implemented for the Project.

Table 8-3 Soil and water management in design

Source	Design Requirement	How will it be implemented
CoA E76	The CSSI must be designed, constructed and operated so as to maintain the NSW Water Quality Objectives where they are being achieved as at the date of this approval, and contribute towards achievement of the NSW Water Quality Objectives over time where they are not being achieved as at the date of this approval, unless an EPL in force in respect of the CSSI contains different requirements in relation to the NSW Water Quality Objectives, in which case those requirements must be complied with. Note: If it is proposed to discharge construction stormwater to waterways, a Water Pollution Impact Assessment will be required to inform licensing, consistent with Section 45 of the POEO Act. Any such assessment must be prepared in consultation with the EPA and be consistent with the	Drainage design reports and drawings.
CoA E77	The CSSI must be designed, constructed and operated to: (a) ensure all drainage feature crossings (permanent and temporary watercourse crossings and stream diversions) new or modified surface water drainage (including cess drains), depressions are designed and constructed and maintained in accordance with Guidelines for controlled activities on waterfront land: riparian corridors (Department of Industry, 2018) and Policy and Guidelines for Fish Habitat Conservation and Management (Department of Primary Industries, 2013); (b) locate all scour protection work associated with replacement culverts or the construction of new culverts within the rail corridor, or as agreed to by the relevant landowner in accordance with Condition E57; (c) ensure that there is no permanent interception of, and/or connection with, groundwater; (d) ensure all discharges from new or modified surface drainage (including cess drains) adjacent to the new and upgraded track are released at a controlled rate to prevent scour; and (e) ensure that any recycled wastewater (including recycled/treated water) proposed for use by the CSSI, considers risks to human health or the receiving environment and meets the relevant standards.	Drainage design reports and drawings, flood modelling and associated reports, Flood Design Verification Report
CoA E81	The design of the Project including the longitudinal drainage and the cross drainage, is to be prepared to ensure there are no significant impacts to the farm dams in the Register and the other items listed in Condition E77. The hydrological modelling, calculations or other assessments demonstrating no significant impacts are to be documented.	Drainage design reports and drawings, flood modelling and associated reports, Flood Design Verification Report
CoA E82	Where culverts, bridge abutments and other cross drainage structures are designed to pass flood and surface water flows through the rail formation, the orientation of these structures is to be aligned with the existing flow direction to minimise disturbance of existing flow patterns around the entries and exits to these structures, or as otherwise agreed by the Secretary.	Drainage design reports and drawings, flood modelling and associated reports, Flood Design Verification Report
CoA E123	Permanent spoil mounds are to be located: (a) within the rail corridor; (b) at least 50 metres from any watercourse or culvert or where there is a risk of erosion or flood impacts during any flood event ;	Civil design reports and drawings, flood modelling and associated reports

Source	Design Requirement	How will it be implemented
	(c) at least 500 metres from any residence; and (d) outside the drip lines of trees located on private property. Note: For the purpose of Condition E123(d), the Proponent must not affect trees outside of the rail corridor for the purpose of preventing those trees' driplines overhanging spoil mounds.	
CoA E124	Permanent spoil mounds are to comply with the following requirements: (a) maximum height must not exceed the top height of the upgraded rail line directly parallel to the spoil mound or two metres (whichever is the lesser); (b) not result in the clearing or covering of native vegetation beyond that described in the documents listed in Condition A1; (c) not result in heritage impacts beyond that described in the documents listed in Condition A1; (d) not result in additional changes to the upstream flooding regime beyond those described in the documents listed in Condition A1; (e) not affect the downstream flood regime; (f) not impede the flow of water through culverts; (g) not contain any contaminated soil classified as unsuitable for the proposed land use, acid sulphate soils or green waste; (h) are to be stabilised during construction of the CSSI; and (i) are to be stabilised following completion of construction of the CSSI.	Civil design reports and drawings, flood modelling and associated reports
RMM HF-3	Detailed design would consider channelling of water around Ironbong Road level crossing and Burley Griffin Way realignment, and the potential formation of detention basins as a means of retaining flows in a similar manner to existing farm dams and flood levees.	Drainage, bridge and level crossing design reports and drawings, flood modelling and associated reports, Flood Design Verification Report
RMM SC-1	Detailed design would include engineering measures to minimise operational risks from dispersive, saline and/or low strength soils, particularly through foundation and batter design.	Civil/geotechnical design reports and drawings

9 Compliance Management

9.1 Roles and Responsibilities

Roles and responsibilities related to the environment discipline are outlined in Section 7 of the CEMP. The Project's organisational structure is also included in the CEMP. Section 8 of this SWMSP includes responsibilities around specific soil and water matters.

In addition to this, JHG have engaged a CPESC to:

- Review, comment and endorse PESCPs and this SWMSP
- Provide advice and guidance to manage and minimise potential impacts to any soil and water values
- Undertake erosion and sediment control inspections.

9.2 Training

All personnel performing environmental management activities for and on behalf of JHG will be appropriately trained, qualified and competent. Personnel performing specified assigned tasks shall be qualified on the basis of appropriate education, training, skills and/or experience, as appropriate.

All staff and subcontractors will undergo Project-specific induction training that includes relevant soil and water matters and associated management measures that must be implemented and taken into account when planning and delivering the work.

Additional daily and task-specific training and awareness material may be delivered to relevant staff and workforce, in the form of toolbox talks and pre-start meetings, to ensure that where detailed information is required, it is accessible to all involved with the Project.

Refer to Section 7 of the CEMP for further detail.

9.3 Monitoring and Inspections

9.3.1 Surface water monitoring program

A Surface Water Monitoring Program (SWMoP) has been developed as detailed in Appendix B of this SWMSP to comply with CoA C22, C29, E84 to E85, and RMM WQ-2. As detailed in Section 3.5 and in Appendix B, the SWMoP has been developed in consultation with DCCEEW Water and will be implemented throughout construction and for a minimum of 2 years from the commencement of operation or as otherwise agreed by the Planning Secretary.

9.3.2 Inspections

Table 9-1 details the inspections related to soil and water management required to be undertaken during for the Project. A full list of inspections is provided in Section 9 of the CEMP.

Table 9-1 Inspection required for the Project

Inspection	Timing	Responsibility	Documentation/Records
Daily visual surveillance	Daily	Site Supervisor	Site diary when notable items observed
General environmental inspections, which includes soil and water management	Weekly	Environment and Sustainability Manager/Advisor	JHG Environmental inspection checklist

Inspection	Timing	Responsibility	Documentation/**Records**
Significant rainfall inspections	Prior to heavy rainfall (forecast rainfall of >80% chance of rainfall >20mm in a 24-hour period)	Site Supervisor, Environment and Sustainability Manager/Advisor	Pre/Post rainfall inspection checklists
CPESC inspections	As required	CPESC, Environment and Sustainability Manager/Advisor	CPESC inspection reports
Shutdown inspections	Prior to >96 hour shutdown	Site Supervisor, Environment and Sustainability Manager/Advisor	Shutdown inspection checklists
Global Mandatory Requirement inspection	Every 2 months	Site Supervisor, Environment and Sustainability Manager/Advisor	JHG Environmental inspection checklist GMR inspection form
ARTC/IRPL environmental inspections	As required	ARTC/IRPL personnel	ARTC/IRPL Environmental inspection checklist
ER inspections	As required	ER	ER Inspection Report
External agencies inspections i.e. EPA, DPHI	As required	External regulator	Agency inspection forms, checklists, emails or other relevant documentation.

9.3.3 Weather monitoring

Weather and rainfall data will be taken from the following sources as appropriate.

- Stockinbingal weather station (Sunnydale) (station number 073150)
- Junee Treatment Works weather station (station number 073019)
- Temora weather (station number 073151) – for SiteHive observations
- Site weather stations (electronic or manual rain gauges for remote areas).

Weather forecasts and conditions will be constantly monitored and data periodically downloaded with records maintained on the Projects SharePoint.

This weather monitoring will be undertaken in conjunction with the weather monitoring and actions required to be undertaken for flood monitoring purposes as defined in the Flood Emergency Response Management Plan

9.4 Non-Compliance and Non-Conformance

Non-compliances and non-conformances, including those related to soil and water management, are detailed in Section 9 of the CEMP. This includes the definitions of non-compliance and non-conformance, corrective and preventative actions, communication of corrective and preventative actions to staff and non-conformance close-out.

9.5 Incident Response

Incident management, including those related to soil and water management, are detailed in Section 8 of the CEMP. This includes incident classification, notification and reporting including to external authorities, incident investigation and closeout.

In accordance with the CEMF Section 6.6.4, Any materials dropped into the water way will be managed as an Environmental Event.

9.6 Auditing

Audits (both internal and external) will be undertaken to assess the effectiveness of environmental controls, compliance with this sub plan, CoA and other relevant approvals, licenses and guidelines. Audit requirements are detailed in Section 9 of the CEMP.

9.7 Reporting

Reporting will be undertaken in accordance with Section 9 of the CEMP.

9.8 Complaints Management

Section 7 of the CEMP details communication and complaints management processes and procedures. The CCS identifies key stakeholder groups that will be consulted and engaged with during the Project and outlines the communication tools that will be used to consult and engage with these groups. During construction, any comments, feedback or complaints relating to soil or water management issues will be addressed through the Complaints Management System. The Complaints Management System includes a complaints register within the stakeholder database.

10 Review and Improvement

10.1 Continuous Improvement

Continuous improvement of this plan will be achieved by the ongoing evaluation of environmental management performance against environmental policies, objectives and targets for the purpose of identifying opportunities for improvement.

The continuous improvement process is designed to:

- Identify areas of opportunity for improvement of environmental management and performance
- Determine the cause or causes of non-conformances and deficiencies
- Develop and implement a plan of corrective and preventative action to address any non-conformances and deficiencies
- Verify the effectiveness of the corrective and preventative actions
- Document any changes in procedures resulting from process improvement, and
- Make comparisons with objectives and targets.

10.2 Plan Amendments and Version Control

The processes described in Section 9.7.2 of the CEMP may result in the need to update or revise this SWMSP. This includes a review, and where necessary, an update every 6 months. The SWMSP may be updated in response to the following.

- Changes to the Project EMS.
- Non-compliances, incidents, or recurring issues.
- In response to internal or external audits.
- Changes in legislation.
- Changes in the risk assessment.
- Changes in environmental management practices or technology.

Only the JHG Environment Manager, or delegate, has the authority to change any of the environmental management documentation.

11 Appendices

Appendix A – Consultation Summary Report (Soil & Water Management Plan and Monitoring Program)

CPHR (former BCS)

Date	Details of Engagement / Attempted Engagement
25/02/2025	Presentation to the BCS team (now CPHR-RD) providing an update and overview of all management plans and activities under development by JHG (including the SWMP). Discussions were included that covered the anticipated content and scope of the management plans.
18/06/2025	Draft Soil & Water Management Plan (SWMP) submitted to CPHR via email for review and comment.
9/07/2025	Comments provided on Draft SWMP via email by CPHR Regional Delivery team.
24/07/2025	Email with updated SWMP provided to CPHR team to confirm all comments have been addressed and considered closed.
31/07/2025	Email from CPHR to JHG with 2 comments still open that require further action.
1/08/2025	Email from JHG to CPHR with updates made to close the final 2 comments.
4/08/2025	Email from CPHR to JHG confirming that all comments on the Plan now closed.

Comment Raised	Project Response	Where addressed	Status
Would be useful to provide the maximum and minimum elevations across the project area, or specify if the ones provided are the max/min. A topographical map would be beneficial as well. Need to state where the LiDAR dataset was sourced from and its year.	Information provided in Section 6.2.1 topography is baseline information provided from the EIS. No additional baseline topographical studies have been completed by JH / IR. No LIDAR dataset is discussed in the document.	S6.2.1	Closed
Many of the images are low quality and difficult to read.	PDF's have been optimised as much as possible with images taken from the EIS.	NA	Closed
Some formatting fixes are required, eg. the text boxes in Figure 6.2 do not contain the full text.	Text boxes updated to include allwording.	Figure 6.2	Closed

Comment Raised	Project Response	Where addressed	Status
Given some of the velocities are high, the plan should identify any risk managment or specific approaches to ESC that will be undertaken for certain watercourses.	Working in waterways will be undertaken in accordance with specific working in waterways procedures, as discussed in S8.7. these procedures are attached to the Biodiversity Management Sub-Plan and contain speciifc controls for works within any waterway to minimise potential impacts.	S8.7	Closed
Mud tracking (i.e. trucks crrying mud on their wheels and transporting it outside the construction area) spreading sediment is a potential issue that has not been discussed.	Table 7.1 has been updated to include this potential project impact.	Table 7.1	Closed
Sensitive Area Plans (SAPs) should be provided within each sub plan at the time of preparation and updated as appropriate through the project. If there are any SAPs relative to this SWMP they should be included in this document.	SAPs are appended to the CEMP main document in appendix A6. as these are not required to be completed for each sub-plan - per conditions of approval, these plans have not been appended to sub-plans.	Main Doc CEMP	Closed
3rd dot point refers to stockpiles being located "above the 20 year flood level". Should use current AR&R terminology i.e. 5% AEP design flood level.	dot point has been updated as requested to refer to 5% design flood level.	S8.2.2.1.1	Closed
3rd dot point uses the term "above flood levels". Please confirm if this refers to all floods including the Probable Maximum Flood (PMF). Need to be more specific.	dot point has been updated as requested to refer to 5% design flood level - consistent with the above comment	S8.8	Closed
5th dot point refers to the monitoring of weather forecasts to identify potential flood events. Suggest that reference be made to the proposed early flood warning system contained in the Flood Emergency Management Plan.	Updated as requested to include reference to the Flood Emergency Response Management Plan	S8.8	Closed

Comment Raised	Project Response	Where addressed	Status
8th dot point refers to the use of temporary levees or bunds to protect surrounding properties that may be affected by flood impacts due to temporary works on the floodplain. Are these levees/bunds going to be included in the Flood Design Verification Report (FDVR) in the section dealing with construction impacts?	Where temporary levees are proposed to be retained post construction, these will be captured in the FDVR. The temporary works element for flooding is captured in the FEMP risk assessment associated with laydown areas and ancillary facilities which may be impacted or impact on flood water flows.	S8.8	Closed
Ref SW5 - rather than this general requirement to monitor weather forecasts would be better to refer directly to the proposed Flood Emergency Management Plan.	SW5 in S8.14 refers to details of weather monitoring provided in S9.3.3. Section 9.3.3 has been updated to refer to the use of weather monitoring for flood management purposes and provides a cross reference to the flood emergency response mgt plan, in response to this comment.	S9.3.3	Closed
Again this section should be rewritten to refer to and be consistent with the Flood Emergency Management Plan.	as above	S9.3.3	Closed
Map of erosion sites located across the project area could be useful.	Erosion locations described are from ad hoc notes taken during geotechnical surveys, and were not specific surveys for the purposes of erosion. The remaining background information is wording from EIS documentation.	S5.7 of appendix B	Closed
It is not clear what happens when trigger levels are exceeded. What is the response? Section 6.10 explains that a plan Triger Action Response Plan (TARP) will be triggered, but it would be beneficial to reference this within section 6.4. In addition, the TARP has not been included.	Clear steps to follow on the basis of a trigger are provided in Section 6.10 of appendix B this includes identification of exceedances attributable to the project, mitigation and monitoring required and reporting processes (if required.	S6.10	Closed
No typical drainage channel calculation or approach has been provided. It is recommended (Refer to Line 23 - General Issue - in this spreadsheet) that a typical ESCP, when completed, be provided which includes this information.	An update to Section 6.1.1 has been included for typical approach to drainage channels. Specific details on drainage channels will be included as part of the site specific progressivce ESCPs based on predicted flow and catchemnt areas to basin locations etc. It is noted that Sheet 23 of the Concept	Appendix C Section 6.1.1	Closed

Comment Raised	Project Response	Where addressed	Status
	ESCP provides detail on the standard diversion drain approach for the Project		
Content is vague on types of sediment basins (understandable due to site limitations) however it would be beneficial to expand on which type will be required for which conditions/constraints.	The type and specific on sediment basins will be determined during the preparation of site specific ESCPs, however noting that the majority of sediment basins are likely to be Type D basins with the potential for Type B where it is deemed beneficial to the location and is reasonable and feasable with construction methodologies. Therefore Section 7 of the Strategy has been updated with relevant details. It is noted that Sheet 23 of the Concept ESCP provides detail on both Type D and Type B basins design standards for implementation on the Project	Appendix C Section 7	Closed
No sediment basin dimensions or calculations have been provided. It is recommended (Refer to Line 23 - General Issue - in this spreadsheet) that a typical ESCP, when completed, be provided which includes this information.	The proposed sediment basin locations are indicative only and not all locations will be utilised. The site specific progressive ESCPs will detail the basin requirements prior to commencemtn of construction within the relevant catchemnt areas including specifying location, type and sizing of basins. The provision of indicative basin sizing may be considered misleading to construction personnel thus has not been included.	NA	Closed
Aggregate filter colour is near invisible in legend - suggest use a different colour to yellow.	Noted: Colour of control has been updated for visibility	Appendix C, Appendix 2	Closed

Comment Raised	Project Response	Where addressed	Status
All drawings only show 4 potential methods (earthen berm, sediment fence, potential basin, aggregate filter) despite mentioning many other ESC methods earlier and specifying, for example, that "the main approach for this project is to minimize the use of sediment fence where other measures may be more appropriate". It is recommended (Refer to Line 23 - General Issue - in this spreadsheet) that a typical ESCP, when completed, be provided which provides addtional detail as the methods adopted for the ESC.	The ESCP presnted is the concept ESCP for the proposed development and represents a base scenario only. Site specific Progressive ESCPs will be developed as part of the construction programming and will include a review of detailed methodiologies and potential erosion and sediment controls for implementation. The erosion and sediment control strategy identifies alternate measures for consideration during construction which may or may not be used. It is acknowledged that "the main approach for this project is to minimize the use of sediment fence where other measures may be more appropriate" however this does not intend to restrict the utilisation of sediment fence where it is deemed the most appropriate control based on location, practicality, required mitigation and construction compatability.	Appendix C, Appendix 2	Closed
This strategy is a good inclusion but will there be a trigger implemented that requires us to review the Progressive Erosion and Sediment Control Plans for high risk/impact sites?	please refer to Section 1.1.2 of Appendix C which states the development and isgn-off process for PESCPs. PESCPs will be developed and signed off by a CPESC and will be reviewed by IRPL representatives and ER in construction phase.	Appendix C Section 11.2	Closed
Given that a key concern for this project are erosion velocities how are these going to be monitored?	Please refer to Appendix B Section 6.8 Geomorphology Monitoring for monitoring details. in addition, please refer to the third dot point. A commitment has been made to site specific erosion threshold velocity assessments conducted by an experienced geotechnical or scour / erosion specialist in accordance with CoA E60 to E63. An ETV of 0.5 m/s is to be adopted in the absence of a site-specific assessment	Section 6.8 Appendix B	Closed

Comment Raised	Project Response	Where addressed	Status
The plan is somewhat generic for issues such as the water use and water balance. Many comments are descriptive and lack specific action, that is "may", "potentially" etc. The erosion and sediment control options have limited detail regarding triggers/parameters and design. It is recommended that a specific ESCP and Water Balance, when drafted, is provided which shows calculations, type and configuration of sediment basins etc.	project specific PESCPs will be developed through construction as per standard construction practice for SSI projects noting we have requirement as per CoA 150 to manage all works in accordance with the Blue Book.	NA	Closed
It is a condition of approval that a farm dam register be compiled and has been noted that this will be provided with the FDVR. Further detail is therefore required to understand if any mitigating measures are required due to works impacting the yield to farm dams, downstream of the project area.	This is not required as a condition of consent relating to this SWMP. this SWMP has been developed to address the CoA and UMMS specific to Soil and water. mitigation measure SW84 provides a commitment to the completion of the Farm Dam register - post approval of this SWMP, but prior to construction. It is JHG's intention to undertake this separately to complete the condition requirements as per E80. Condition E80 of the approval requires JH to develop a farm dam register, this has not yet been completed and is considered a separate pre construction requirement to the development , review and approval of this SWMP.	NA	Closed

DCCEEW Water

Date	Details of Engagement / Attempted Engagement
24/02/2025	Email submitted by IRPL (on behalf of JHG) to DCCEEW Water assessments team (water.assessments@dpe.nsw.gov.au) requesting confirmation of the correct contact and if a meeting would be required to provide a briefing on the Project.
13/03/2025	Email from DCCEEW team via the assessment mailbox confirming that no meeting was required and that the assessment team would review the Monitoring Program once submitted.
18/06/2025	Submission of the Surface Water Monitoring Program (as an attachment to the SWMP) to DCCEEW Water for review via email.
30/06/2025	Phone call to Tim Baker (DCCEEW) from JHG to confirm that Program had been received and if there were any questions. DCCEEW responded via email to confirm document had been received and comments would be provided by Close of Business 18/07/2025.

Date	Details of Engagement / Attempted Engagement
15/07/2025	Email to DCCEEW team from JHG confirming if there were any comments anticipated on the Soil & Water Monitoring Program.
16/07/2025	DCCEEW response confirming no comments (2 recommendations) in a formal letter attached via email.
22/07/2025	JHG response to DCCEEW addressing recommendations and confirming that these are addressed in the Water Re-Use Strategy (Strategy provided as an attachment via email).

Comment Raised	Project Response	Where addressed	Status
The proponent should update the Soil & Water Management Plan (SWMP) to include: • A table to clearly identity all the water sources, including the proposed supplementary and contingent sources and the proposed extraction volumes. • Status of agreements/consultation with third party water suppliers • Requirement for a Water Access License (WAL) or an exemption for water take.	Email provided to DCCEEW Water with the following response: JHG have reviewed the recommendations provided by DCCEEW- Water and can confirm that these elements of the SWMP are captured in a site-specific Water Re-Use Strategy. This Strategy has been developed in accordance with Condition E149 of the CSSI-9406 conditions of approval. The Strategy is referenced within the SWMP to provide this detail on re-use and anticipated volumes. The project anticipates negligible volumes of groundwater withdrawn during construction and does not trigger the requirement for a Water Access License at this time. Please note, the Strategy will be updated at regular intervals in line with the Project CEMP and will include groundwater volumes/license requirements as required.	Water Re-Use Strategy	Closed
The proponent should update the Soil & Water Management Plan (SWMP) to include: • Details of the groundwater take volumes associated with construction of bridges or other works potentially intersecting groundwater • Requirements for a Water Access License (WAL) or an exemption for water take.	Email provided to DCCEEW Water with the following response: JHG have reviewed the recommendations provided by DCCEEW- Water and can confirm that these elements of the SWMP are captured in a site-specific Water Re-Use Strategy. This Strategy has been developed in accordance with Condition E149 of the CSSI-9406 conditions of approval. The Strategy is referenced within the SWMP to provide this detail on re-use and anticipated volumes. The project anticipates negligible volumes of groundwater withdrawn during construction and does not trigger the requirement for a Water Access License at this time. Please note, the Strategy will be updated at regular intervals in line with the Project CEMP and	Water Re-Use Strategy	Closed

Comment Raised	Project Response	Where addressed	Status
	will include groundwater volumes/license requirements as required.		

Crown Lands

Date	Details of Engagement / Attempted Engagement
24/02/2025	Email from JHG to Crown Lands assessments mailbox (LAM.projects@crownland.nsw.gov.au) requesting a contact for review of the Surface Water Monitoring Program.
24/02/2025	Email from Danny Young (Crown Lands) confirming he is the correct contact for providing a copy of the Program to his team for review.
18/06/2025	Submission by JHG of the Surface Water Monitoring Program (as a link and attached to the SWMP) to DCCEEW Water for review via email.
15/07/2025	Email with attached formal letter from Crown Lands team stating no comments will be provided.

Comment Raised	Project Response	Where addressed	Status
Nil	NA	NA	NA

Cootamundra- Gundagai Regional Council and Junee Council

Date	Details of Engagement / Attempted Engagement
15/04/2025	Two presentations to Junee Council and Cootamundra- Gundagai Regional Council undertaken as face to face sessions that captured SIMP and environmental management plans for council review (including the Soil & Water Management Plan).
22/04/2025	Provision of the presentation meeting minutes from the 15/04 to both councils for review. The minutes included a slide capturing upcoming management plans being prepared for council consultation as per Condition C17 of the CoA.
26/06/2025	Submission of the Soil & Water Management Plan (SWMP) to both councils via Aconex. This submission was made by IRPL.
26/06/2025	Monthly meeting held with Junee Council via Teams. Discussion and agreement made in this meeting to undertake a face-to-face workshop on the C17 management plans (including the SWMP).
17/06/2025	Weekly meeting held with Cootamundra Gundagai Council via Teams. Discussion and agreement made in this meeting to undertake a face-to-face workshop on the C17 management plans (including the SWMP).
1/07/2025	Face to face workshop held with Junee Council, IRPL and JHG staff. Comments and questions made on the SWMP (see attached meeting minutes).
1/07/2025	Face to face workshop held with Cootamundra Gundagai Council, IRPL and JHG staff. Comments and questions made on the SWMP (see attached meeting minutes).

Date	Details of Engagement / Attempted Engagement
7/07/2025	Provision of meeting slides to Junee Council with a follow up request to confirm if the Council would be providing any further comments on the Plan.
8/07/2025	Confirmation from Cootamundra Gundagai Council that no further comments on the SWMP.
10/07/2025	Provision of meeting minutes to Junee Council with a follow up request to confirm if the Council would be providing any further comments on the Plan.
21/07/2025	Email from JHG to Junee Council requesting confirmation that the comments had been closed out and that no further comments anticipated. Meeting minutes from the face-to-face workshop were provided on 10/07/2025 with follow up meeting minutes with close out of action on the SWMP included and submitted via email on 21/07/2025

Comment Raised	Project Response	Where addressed	Status
Cootamundra Naturally asbestos occurred noted by CGRC for some areas (particularly on high ground).	JHG to review mapping and provide a reference appropriate in the SWMP. JHG further reviewed and noted that the work area applicable to the I2S project is outside any mapped areas of actual or potentially occurring asbestos.	NA	Closed
Junee Junee council questioned what licenses JHG will obtain for working in/around waterfront land. Action for JHG to double check what licenses required even though have been consulting with DPI Fisheries (noted that exemptions are in place for licenses)..	The following response was provided in the revised workshop meeting minutes to Junee Council: JHG have re-checked and can confirm that Part 5, Division 5.2, Subdivision 4 (5.23) of the *Environmental Planning & Assessment Act 1979* states the following (see highlighted text): 5.23 Approvals etc legislation that does not apply (cf previous s 115ZG) (1) The following authorisations are not required for approved State significant infrastructure (and accordingly the provisions of any Act that prohibit an activity without such an authority do not apply)— (a) (Repealed) **(b) a permit under section 201, 205 or 219 of the Fisheries Management Act 1994,** (c) an approval under Part 4, or an excavation permit under section 139, of the Heritage Act 1977, (d) an Aboriginal heritage impact permit under section 90 of the National Parks and Wildlife Act 1974, (e) (Repealed) (f) a bush fire safety authority under section 100B of the Rural Fires Act 1997,	NA	Closed

Comment Raised	Project Response	Where addressed	Status
	(g) a water use approval under section 89, a water management work approval under section 90 or an activity approval (other than an aquifer interference approval) under section 91 of the Water Management Act 2000. As noted, JHG have conditions that require consultation with DPI Fisheries regarding the design and implementation of riparian restoration, re-use of vegetation and watercourse crossings. This is noted in the SWMP and will be required as part of the Project during construction.		

Appendix B – Surface Water Monitoring Program

1 References, Definitions and Abbreviations

1.1 Compliance Roadmap

The following section provides a tabular representation of the Project requirements as described in the Conditions of Approval (CoA) and a reference link to detail how Inland Rail – Illabo to Stockinbingal (I2S or Project) intend to comply.

This Surface Water Monitoring Program (SWMoP or Program) provides a consistent approach to address the requirements of both the State and Federal approvals in a single document. The requirements of the Federal and State conditions relevant to the development of this SWMoP are shown in Section 1.1.1 and Section 1.1.2. The Revised Mitigation Measures (RMMs) from the Submissions Report are provided in Section 1.1.3. A cross reference is also included to indicate where each requirement is addressed in this SWMoP or other Project management documentation.

1.1.1 Federal Conditions of Approval

There are no surface water monitoring CoA associated with the Commonwealth Approval (EPBC 2018/8233). Non-surface water monitoring conditions are detailed in the CEMP.

1.1.2 State Conditions of Approval

CoA associated with the Infrastructure Approval (SSI-9406) relevant to the Project and SWMSP under the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act) are provided in Table 1-1.

Table 1-1 State CoAs relevant to this SWMoP

CoA No.	Condition Requirements	Document Reference
C22	The Soil and Water Management Sub-plan must include:	SWMSP
	(a) measures to avoid and minimise erosion and sedimentation impacts including to riparian, agricultural and forested land, and areas of high salinity and high erosion potential;	SWMSP
	(b) a draft water balance for the project;	SWMSP
	(c) information demonstrating that the required construction water resources are legally and physically available;	SWMSP
	(d) procedures and protocols for the appropriate supply, transport and storage of water across the CSSI;	SWMSP
	(e) mitigation measures to address construction water resource shortages that arise;	SWMSP
	(f) a protocol for avoiding, minimising and mitigating impacts in the event of interaction with groundwater;	SWMSP
	(g) a surface water monitoring framework as per Condition C29;	This Program
	(h) a dam dewatering protocol; and	SWMSP
	(i) a spill response procedure.	SWMSP
C26	Construction must not commence until the CEMP and all CEMP Sub-plans have been approved by the Planning Secretary or endorsed by the ER (as applicable and as identified in the CEMF approved under Condition C1). The CEMP and CEMP Sub-plans, as approved by the Planning Secretary, including any minor amendments approved by the ER, must be implemented for the duration of construction. Where the CSSI is being staged, construction of that stage is not to	Section 2.4.2

<table>
<tr><td></td><td>commence until the relevant CEMP and sub-plans have been endorsed by the ER and approved by the Planning Secretary or ER.</td><td></td></tr>
<tr><td>C27</td><td>Except as provided by Condition C1 the following Construction Monitoring Programs must be prepared in consultation with the relevant state agencies and relevant councils identified for the Construction Monitoring Programs to compare actual performance of construction of the CSSI against performance predicted in the documents specified in Condition A1.
<table>
<tr><th></th><th>Required Construction Monitoring Program</th><th>Relevant government authorities to be consulted for each Construction Monitoring Program</th></tr>
<tr><td>(b)</td><td>Surface Water</td><td>DECCW Water, Crown Lands and relevant councils</td></tr>
</table></td><td>Section 2.5</td></tr>
<tr><td>C28</td><td>Each Construction Monitoring Program (CMP) must have consideration of SMART principles and provide:</td><td></td></tr>
<tr><td></td><td>(a) details of baseline data available;</td><td>Section 6.1</td></tr>
<tr><td></td><td>(b) details of baseline data to be obtained and when;</td><td>Section 6.1</td></tr>
<tr><td></td><td>(c) details of all monitoring of the CSSI to be undertaken;</td><td>Section 6</td></tr>
<tr><td></td><td>(d) the parameters of the CSSI to be monitored;</td><td>Section 6.3</td></tr>
<tr><td></td><td>(e) the frequency of monitoring to be undertaken;</td><td>Section 6.6</td></tr>
<tr><td></td><td>(f) the location of monitoring and reasons for choosing the location;</td><td>Section 6.2</td></tr>
<tr><td></td><td>(g) the reporting of monitoring results and analysis results against relevant criteria;</td><td>Section 7.6</td></tr>
<tr><td></td><td>(h) details of the methods that will be used to analyse the monitoring data;</td><td>Section 6.6</td></tr>
<tr><td></td><td>(i) procedures to identify and implement additional mitigation measures where the results of the monitoring indicate unacceptable project impacts;</td><td>Section 6.10</td></tr>
<tr><td></td><td>(j) any consultation to be undertaken in relation to the monitoring programs; and</td><td>Section 2.5</td></tr>
<tr><td></td><td>(k) any specific requirements as required by Condition C29.</td><td>This Program</td></tr>
<tr><td>C29</td><td>The Surface Water Monitoring Program must be prepared in accordance with the requirements of Condition E84 to E85.</td><td>This Program</td></tr>
<tr><td>C31</td><td>CMPs must be submitted to the Planning Secretary for approval except those permitted to be endorsed by others pursuant to a CEMF approved by the Planning Secretary under Condition C1.</td><td>Section 2.4.2</td></tr>
<tr><td>C32</td><td>Where a CMP requires Planning Secretary’s approval, the CMP must be endorsed by the ER and then submitted to the Planning Secretary for approval no later than one (1) month before the commencement of construction, or where construction is staged, no later than one (1) month before the commencement of each stage.</td><td>Section 2.4.2</td></tr>
<tr><td>C33</td><td>CMP(s) not requiring the Planning Secretary’s approval, but requiring ER endorsement, must be submitted to the ER no later than one (1) month before the commencement of construction or where construction is staged no later than one (1) month before the commencement of that stage. The CMP(s) must be endorsed by the ER as being consistent with the conditions of this approval and all undertakings made in the documents listed in Condition A1.</td><td>Section 2.4.2</td></tr>
<tr><td>C34</td><td>Construction must not commence until the relevant CMP(s) have been approved by the Planning Secretary or endorsed by the ER, (as applicable and as identified in the CEMF approved under Condition C1), and all relevant baseline data for the specific construction activity has been collected.</td><td>Section 2.4.2</td></tr>
</table>

C35	The CMP(s), as approved or endorsed (as relevant), including any minor amendments approved by the ER, must be implemented for the duration of construction and for any longer period set out in the monitoring program or specified by the Planning Secretary, whichever is the greater.	Section 2.4.2
C36	The results of the CMP(s) must be made publicly available in the form of a Construction Monitoring Report at the frequency identified in the relevant CMP. ***Note:*** *Where a relevant CEMP Sub-plan exists, the relevant Construction Monitoring Program may be incorporated into that CEMP Sub-plan.*	Section 7.6
E76	The CSSI must be designed, constructed and operated so as to maintain the NSW Water Quality Objectives where they are being achieved as at the date of this approval, and contribute towards achievement of the NSW Water Quality Objectives over time where they are not being achieved as at the date of this approval, unless an EPL in force in respect of the CSSI contains different requirements in relation to the NSW Water Quality Objectives, in which case those requirements must be complied with. ***Note:*** *If it is proposed to discharge construction stormwater to waterways, a Water Pollution Impact Assessment will be required to inform licensing, consistent with section 45 of the POEO Act. Any such assessment must be prepared in consultation with the EPA and be consistent with the National Water Quality Guidelines, with the level of detail commensurate with the potential water pollution risk.*	SWMSP Section 6.5
E78	Unless an EPL is in force in respect to the CSSI and that licence specifies alternative criteria, discharges from construction water treatment plant(s), where required, to surface waters must not exceed:	Section 6.5
	(a) the Australian and New Zealand Guidelines for Fresh and Marine Water Quality 2018 (ANZG 2018) default guideline values for toxicants at the 95 per cent species protection level;	
	(b) for physical and chemical stressors, the guideline values set out in Tables 3.3.2 and 3.3.3 of the Australian and New Zealand Guidelines for Fresh and Marine Water Quality 2000; and	
	(c) for bioaccumulative and persistent toxicants, the ANZG 2018 values at a minimum of 99 per cent species protection level.	
	Where the ANZG 2018 does not provide a default guideline value for a particular pollutant, the approaches set out in the ANZG 2018 for deriving guideline values, using interim guideline values and/or using other lines of evidence such as international scientific literature or water quality guidelines from other countries, must be used.	
E84	A Surface Water Monitoring Program must be prepared in consultation with DCCEEW Water for construction and for a minimum of two years from commencement of operation or as otherwise agreed with the Secretary. The Surface Water Monitoring Program must include, but not be limited to:	This Program
	(a) identify surface water monitoring locations, frequency and duration at discharge points and selected watercourses where works are being undertaken;	Section 6.2
	(b) identify surface water monitoring parameters;	Section 6.3
	(c) include water quality objectives, parameters and criteria from documents listed in Condition A1;	Section 5.5 Section 6.3
	(d) monitoring of operational meters installed, recording and reporting to Natural Resources Regulator, in accordance with the relevant requirements of the NSW Non-Urban Water Metering Policy (DPIE, 2020) and clause 21(6) of the Water Management (General) Regulation 2018.	Section 6.7
	(e) monitoring to ensure water quality complies with relevant drinking water criteria from the National Water Quality Management Strategy Australian	Section 6.3

	Drinking Water Guidelines 6 2011 (National health and Medical Research Council 2017)	
	(f) monitoring geomorphological changes downstream of water treatment plant(s) (where required) and on watercourses' (at locations where the velocity QDL is exceeded or there is active erosion) physical structure on at least four cases of inundation to ensure mitigation measures are achieving desired outcomes;	Section 6.8
	(g) trigger points for responding to any monitored changes which adversely impact on baseflows of creeks in the vicinity of the CSSI, including the implementation of additional protection measures to address these changes and their associated timing (trigger points must be defined and designed as part of the Program in consultation with DCCEEW Water);	Section 6.8
	(h) methods for providing the data collected to the relevant water authority where discharges are directed to their assets; and	Section 7.6
	(i) a method for providing the surface water monitoring data to DCCEEW Water every six months during construction and for a minimum period of two years from commencement of operation or as otherwise agreed with the Secretary. ***Note:*** *With regards to monitoring data to be provided to DCCEEW Water, the format of the dataset must be both in a tabulated and electronic quality-controlled data (.csv, Excel) ready to use format*	Section 7.6
E85	The Surface Water Monitoring Program for construction must be submitted to and approved by the Planning Secretary before construction and the Surface Water Monitoring Program for operation must be submitted to and approved by the Planning Secretary prior to the completion of construction. The Surface Water Monitoring Programs for construction and operation must be implemented. ***Note:*** *Nothing in this condition prevents the Proponent from preparing separate or combined Surface Water Monitoring Programs for the construction and operational phases of the CSSI.*	Section 2.4.2

1.1.3 Revised Mitigation Measures

This SWMoP and associated documents have been prepared to describe how the Project will meet the construction phase requirements of the RMMs required as part of the Environmental Assessment Documentation. Table 1-2 includes additional requirements to be incorporated into this SWMoP.

Table 1-2 RMMs relevant to this SWMoP

Ref.	Issue	Mitigation Measure	Timing	Source / Document Reference
SWM-1	Water Quality	The construction impact zone defined for the Project would allow sufficient room for provision of temporary and permanent erosion and sediment control measures/pollution control measures where required based on consideration of overland flow paths and flood risk. Water quality control measures would be designed to capture and treat the 80th percentile five-day rainfall event and any other requirements as outlined in the Blue Book.	Detailed Design / Pre-Construction	RMM WQ-1 Addressed in the SWMSP
SWM-2	Surface Water Monitoring	A surface water monitoring framework would be developed and implemented as part of the soil and water management plan in the Construction Environmental Management Plan (CEMP). It would identify:	Detailed Design / Pre-Construction	RMM WQ-2 This Program

		• monitoring locations at discharge points and selected watercourses where works are being undertaken • monitoring parameters • frequency and duration of monitoring. The monitoring framework would include relevant water quality objectives (WQOs), parameters and criteria. It would be developed in consultation with the NSW Department of Planning and Environment and the NSW Environment Protection Authority.		
SWM-3	Sedimentation and erosion management	A soil and water management plan would be prepared and implemented as part of the CEMP. The plan would include measures, processes and responsibilities to minimise the potential for soil and water impacts (including impacts to groundwater and geomorphology) during construction.	Construction	RMM WQ-3 Addressed in the SWMSP
SWM-4	Dewatering of farm dams that require relocation and/or decommissioning	A dam dewatering protocol would be developed as part of the soil and water management plan. It would consider: • options for reuse of water in the dam • licensing and approval requirements, where relevant • the quality and quantity of the water to be released, where relevant • strategies to minimise impacts on native, threatened or protected species • strategies to minimise spread of nuisance flora and fauna species.	Construction	RMM WQ-4 Addressed in the SWMSP
SWM-5	Disposal of wastewater (concrete batching plants)	All wastewater from concrete batching plants would be captured and would either be disposed of to an appropriately licensed facility or treated prior to discharge to surface water bodies. All discharge water would comply with the WQOs and the relevant EPL requirements: • measures to prevent or minimise mud and dirt being tracked onto public roadways by trucks and any equipment leaving the site • requirements for training, inspections, corrective actions, notification and classification of environmental incidents, record keeping, monitoring and performance objectives for handover on completion of construction • any other requirements necessary to comply with conditions of approval subsequent approvals or regulatory requirements • erosion and sediment control plans and Soil and Water Management Plan (SWMP) will be signed off by a Suitably Qualified Person (e.g. Certified Professional in Erosion and Sediment	Construction	RMM WQ-5 Addressed in the SWMSP

		Control (CPESC) in accordance with regulatory requirements.		

1.2 Definitions and Abbreviations

Definitions and abbreviations relevant to this SWMoP are provided in Table 1-3.

Table 1-3 Definitions and abbreviations relevant to this SWMoP

Term / Abbreviation	Definition / Expanded text
ADWG	Australian Drinking Water Guidelines
ANZECC	Australian and New Zealand Guidelines for Fresh and Marine Water Quality
ANZG	Australian and New Zealand Guidelines for Fresh and Marine Water Quality
ARTC	Australian Rail Track Corporation
BTEX	Benzene, Toluene, Ethylbenzene and Xylene
BMSP	Biodiversity Management Sub-Plan
BOM	Bureau of Meteorology
CCS	Community Communication Strategy
CoA	Conditions of Approval
CoC	Chain of Custody
CPESC	Certified Professional in Environment and Sediment Control
CEMP	Construction Environmental Management Plan
CSSI	Critical State Significant Infrastructure
D&C	Design and Construct
DCCEEW	Department of Climate Change, Energy, the Environment and Water
DPHI	Department of Planning, Housing and Infrastructure
EIS	Environmental Impact Statement
EMS	Environmental Management System
EP&A Act	*Environmental Planning and Assessment Act 1979* (NSW)
EPBC Act	Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*
EPA	Environment Protection Authority
ER	Environmental Representative
EPL	Environment Protection Licence
FM Act	*Fisheries Management Act 1994*
FEMSP	Flood Emergency Management Sub-Plan
GDEs	Groundwater Dependent Ecosystems
GMR	Global Mandatory Requirement
I2S	Illabo to Stockinbingal
IMS	Integrated Management System (John Holland)

Term / Abbreviation	Definition / Expanded text
Incident	An occurrence or set of circumstances that causes or threatens material harm or non-compliance
IRPL	Inland Rail Pty Ltd
JHG	John Holland Group
km	Kilometres
KFH	Key Fish Habitat
LGA	Local Government Area
Material Harm	Harm that affects health, safety, or property beyond $10,000 or significant environmental impact
m	Metres
NATA	National Association of Testing Authorities
NTU	Turbidity
NSW	New South Wales
PAHs	Polycyclic Aromatic Hydrocarbons
PCBs	Polychlorinated Biphenyl
PFAS	Per- and Polyfluoroalkyl Substances
PQL	Practical Quantitation Limit
POEO Act	*Protection of the Environment Operations Act 1997*
PIRMP	Pollution Incident Response Management Plan
%	Per Cent
pH	pH Units
RMMs	Revised Mitigation Measures
SEARs	Secretary's Environmental Assessment Requirements
SWMoP	Surface Water Monitoring Program
SWMSP	Soil and Water Management Sub-plan
TARP	Trigger Action Response Plan
TDS	Total Dissolved Solids
The Project	Inland Rail - Illabo to Stockinbingal Project
TSS	Total Suspended Solids
VOCs	Volatile Organic Compounds
WQOs	NSW Water Quality Objectives
Worker	Refers to John Holland workers, contractors, or anyone engaged in work activities at the workplace
°C	Degrees Celsius
µS/cm	Electrical Conductivity

2 Introduction

2.1 Context

This SWMoP is an appendix of the SWMSP which forms part of the Construction Environmental Management Plan (CEMP) for the Inland Rail, I2S Project.

This SWMoP has been prepared to address the requirements related to surface water monitoring associated with Infrastructure Approval (SSI-9406) and associated CoA, the measures listed in the Environmental Impact Statement (EIS) as amended by the Submissions Report (and associated RMMs), Environmental Protection License (EPL), Commonwealth Approval (EPBC 2018/8233) and all applicable legislation, guidelines, standards and specifications.

2.2 Scope of the plan

The scope of this Monitoring Program is to describe how the potential impacts to surface water from construction will be monitored during the delivery of the Project. This Monitoring Program has been prepared under and consistent with the SWMSP, considering relevant sensitive receivers and construction activities.

Operational monitoring measures do not fall within the scope of the construction phase and therefore are not included in this Monitoring Program.

Following the approval the CEMP, John Holland Group (JHG) will commence monitoring and reporting during construction. A copy of this Monitoring Program will be publicly available and uploaded to the Project website where it will be available for the duration of construction.

2.3 Environmental Management Systems Overview

An overview of the JHG Environmental Management System (EMS), including Global Mandatory Requirements (GMRs) is provided in Section 3.4 of the SWMSP.

2.3.1 Relationship between this Monitoring Program and other Project Documents

Other Project documents that interface with this Monitoring Program to ensure the Project CoA and RMMs are implemented include:

- CEMP and associated Sub-Plans
- Construction Management Plan
- Safety Management Plan
- Sustainability Management Plan
- Environmental management documents (e.g. plans, protocols, strategies, reports, and programs).

The key CEMP Sub-Plan interfaces are as follows:

- SWMSP, which details controls regarding surface water management, the interception and discharge surface waters, and acid sulfate soils, salinity, and contamination management, and includes the Project Erosion and Sediment Control measures as applicable.
- Flood Emergency Management Sub-Plan (FEMSP), which addressed controls regarding the management of the site in response to forecast and actual flood events.
- Biodiversity Management Sub-Plan (BMSP) which describes how the Project will manage and protect flora and fauna during construction of the Project and farm dam dewatering procedures.

The CEMP provides a full list of plans, procedures and other documents that form the EMS.

2.3.2 Plan preparation, endorsement and approval

The Monitoring Program has been prepared to satisfy the Infrastructure Approval (SSI-0406) and RMMs in relation to the monitoring of surface water during construction of the Project.

This Program will be reviewed by Inland Rail Pty Ltd (IRPL) and the independent Environmental Representative (ER) in conjunction with the SWMSP. Consultation during the preparation of this Monitoring Program has been undertaken in accordance with Section 2.5.

In accordance with CoA C32, SWMoP will be endorsed by the ER and then submitted to the Planning Secretary for approval no later than one (1) month before the commencement of construction, or where construction is staged, no later than one (1) month before the commencement of each stage. Refer to Appendix B for more details.

Construction of the Project will not commence until the SWMoP is endorsed by the ER and approved by the Planning Secretary.

In accordance with CoA C35, this Program will be implemented for the duration of construction and for any longer period set out in this Monitoring Program or specified by the Planning Secretary, whichever is the greater. This Monitoring Program will be reviewed, and where required, updated every 12 months by the Environment and Sustainability Manager (or delegate) in consultation with IRPL. Minor amendments to this Monitoring Program will be approved by the ER as detailed in CoA A26 (i). As noted in CoA E85, the Monitoring Program can be developed separately between construction and operational activities. This document has been prepared and relevant to construction activities only.

Any amendments to the Program will be documented in subsequent revisions of this document. A copy of the updated Program and changes will be distributed to all relevant stakeholders in accordance with the approved document control procedure outlined in the CEMP. Site personnel with responsibilities relevant to water quality monitoring will be informed of any amendments to the Monitoring Program and training provided, where required.

2.4 Consultation

In accordance with CoA A10 and C27 (b), this Monitoring Program has been prepared as part of the CEMP in consultation with the following agencies:

- DCCEEW Water
- Crown Lands
- Relevant Councils (including Junee and Cootamundra-Gundagai)

This Program was provided to the above listed agencies from [DATE]. All comments received were considered and the Monitoring Program updated accordingly. Appendix A provides details of the consultation undertaken for the development of this Program. Table 2-1 provides a summary of the key issues identified by the relevant stakeholders and how these have been addressed. Consultation undertaken is further detailed in Appendix A.

Table 2-1 Comments received from Stakeholders regarding this Monitoring Program

Reference	Comment	How the comment has been addressed

Ongoing consultation with relevant stakeholders, including any local receivers identified may be undertaken for specific issues pertaining to the Project's impact on surface water. Community feedback and complaints relating to surface water impacts will be dealt with in accordance with the Community Communication Strategy and the Complaints Management System (see Section 7.7 of this Monitoring Program).

In accordance with CoA A26(d)(iii), C32 and C33 this Program was endorsed by the ER prior to submission to the Planning Secretary for approval.

3 Purpose and Objectives

3.1 Purpose

The purpose of this Monitoring Program is to describe how, where and when JHG will monitor receiving surface waters during construction of the Project including:

- Provide procedures to monitor for surface water quality and impacts during construction of the Project
- Meet the requirements of the relevant conditions of approval for the Project
- Meet any relevant legal and other requirements including criteria from the Environment Protection Licence (EPL) for the Project.

The Program is based on the water quality monitoring methodology, water quality indicators and the monitoring locations identified in the Surface water and hydrology assessment report (EIS – Chapter 13 and Technical Paper 5).

3.2 Objectives

The key objective of this Monitoring Program is to minimise potential impacts on surface water resources during construction of the Project. To aid in achieving this objective all CoA, RMMs and licence/permit requirements relevant to surface water are described, scheduled and assigned responsibility as outlined in:

- Environmental Assessment Documentation (the EIS)
- The Submissions Report prepared for the Project, including the RMMs
- Infrastructure Approval (SSI-9409) and associated Minister's CoA
- Commonwealth Approval (EPBC 2018/8233)
- Environment Protection Licence (once obtained)
- Inland Rail Specifications
- All relevant legislation and other requirements

To achieve compliance with the conditions and objectives of the Project documents above, the Project will undertake the following:

- Establish the monitoring program including parameters, frequency, and location and ensure its implementation for the duration of the program
- Establish the reporting requirements including monitoring results and analysis of results against relevant criteria
- Establish the methods that will be applied to analyse the monitoring data
- Establish procedures to identify and implement additional mitigation measures where the result of monitoring indicates unacceptable impacts determined to be from the construction of the Project.

3.2.1 Performance Outcomes

The SEARs identify a number of desired performance outcomes for the Project. These desired performance outcomes outline the broader objectives to be achieved across design, construction and operational phases.

JHG will meet the performance outcomes relating to the management of surface water from the SEARs and EIS (Chapter 13 – Water Quality and Technical Paper 5 – Water Quality Impact Assessment) as required by CoA and RMMs . Relevant performance outcomes are detailed in Table 3-1.

Table 3-1 Performance Outcomes during construction

Performance Outcome	How Addressed	Measurement Tool
Water—Quality The project is designed, constructed and operated to protect the NSW Water Quality Objectives over time where they are currently not being achieved, including downstream of the project to the extent of the project impact including estuarine and marine waters (if applicable).	• Surface water monitoring program (this document) developed to monitor surface water quality during construction. • Surface water monitoring criteria and triggers set for the project during construction. • Water management structures during construction will be adequately designed • Monitoring results are reviewed regularly and reports developed identifying trends in data where applicable.	Weekly inspections / observations Surface water monitoring Program Construction monitoring reports

3.3 Targets

Targets for the management of surface water monitoring during the Project have been established to enable compliance with relevant legislative requirements, Infrastructure Approval (SSI-0406) and RMMs. These targets and how they will be measured are outlined in Table 3-2.

Table 3-2 Targets for the management of surface water monitoring during construction

Target	Measurement Tool
Compliance with the relevant legislative requirements and RMMs	Compliance monitoring
No pollution to the receiving environment	Register of contaminated sites Environmental incidents registers and records
Align with the NSW Water Quality Objectives (WQOs) (OEH, 2006) for receiving waters and ensure consistency with consistent with the agreed national framework for assessing water quality set out in the ANZG 2018 / ANZECC 2000).	Compliance monitoring Construction Monitoring Reports
Ensure project personnel are informed via toolbox talks and the Project induction to enable the identification of potential surface water impacts	Induction and training records
Minimise impacts on the surrounding community and stakeholders.	Complaints Register
Minimisation of potential complaints from the community.	Complaints Management Process

4 Environmental Requirements

In addition to the Infrastructure Approval (SSI-9409) (Section 1.1.2), Commonwealth Approval (EPBC 2018/8233) (Section 1.1.1), and the relevant legislation and guidelines provided in Section 5 of the SWMSP, this section details additional environmental requirements associated with this SWMoP.

4.1 Environment Protection Licence

The Project will be required to apply and maintain an EPL for rail construction for the duration of the Project. Once the Project has obtained an EPL, this section will be updated with the relevant soil and water related conditions.

4.2 Inland Rail D&C Specifications

The Inland Rail Design and Construct (D&C) Specifications set out the minimum requirements for the detailed outcomes in terms of quality or performance expected in the finished product for construction projects and are relevant to various construction activities on work sites to minimise impacts to the environment.

The specifications set out environmental protection requirements, including Hold Points and Witness Points that must be complied with during construction of the Project. A Hold Point is a point beyond which a work process must not proceed without express written authorisation from Inland Rail. Witness Points are an identified point in the process where Inland Rail request to, review, witness, inspect method and/or process of work. The activities, however, may proceed. For processes under the CEMP, the request for release of Hold Points and Witness Points is to be made through the Inland Rail Principal Environment Advisor (or delegate). Hold Points and Witness Points are detailed in the CEMP.

5 Existing Environment

5.1 Key Reference Documentation

Key reference documents used to develop this section which are relevant to the surface water monitoring include:

- EIS Chapter 13 – Water Quality
- EIS Technical Paper 2 - Aquatic Biodiversity Assessment
- EIS Technical Paper 5 – Water Quality Impact Assessment.

5.2 Catchment Description and Watercourses

The Project site is located within the Murrumbidgee River and Lachlan River catchments, which are sub-catchments of the Murray–Darling Basin. Surface water within the Project site is comprised of ephemeral watercourses. The watercourses in the Project site are generally in the headwaters of the catchments and are likely to only flow during rainfall events. Additionally, the rainfall for the region is low, as there is no base flow resulting from groundwater expression.

The northern portion of the Project site is in the upper reaches of the Lachlan catchment. Named watercourses in the Lachlan catchment that are crossed by the Project

- Dudauman Creek
- Powder Horn Creek.

Dudauman and Powder Horn Creeks are the most substantial watercourses intersected by the Project site in this catchment. These creeks are tributaries of Bland Creek which is located in the study area but is not intersected by the Project. Bland Creek forms to the east of Stockinbingal, runs north and discharges into Lake Cowal. Lake Cowal overflows into the Lachlan River floodplain during high flows. Other watercourses crossed by the Project are unnamed tributaries to these creeks.

The southern 22km of the Project site lies in the upper slopes of the Murrumbidgee catchment. Named watercourses in the Murrumbidgee catchment that are crossed by the Project are:

- Isobel Creek
- Run Boundary Creek
- Billabong Creek
- Ulandra Creek.

All of these watercourses flow into Ironbong Creek which does not intersect the Project. Other watercourses crossed by the Project are unnamed tributaries to these creeks.

Catchment areas and watercourses within or adjacent to the Project are provided in Figure 5-1 and Table 5-1.

There are 14 farm dams located within the Project site and a number of farm dams located within the Project site. These areas are shown on Figure 5-2. These dams intercept overland flow and may be used as water supply for stock throughout the area.

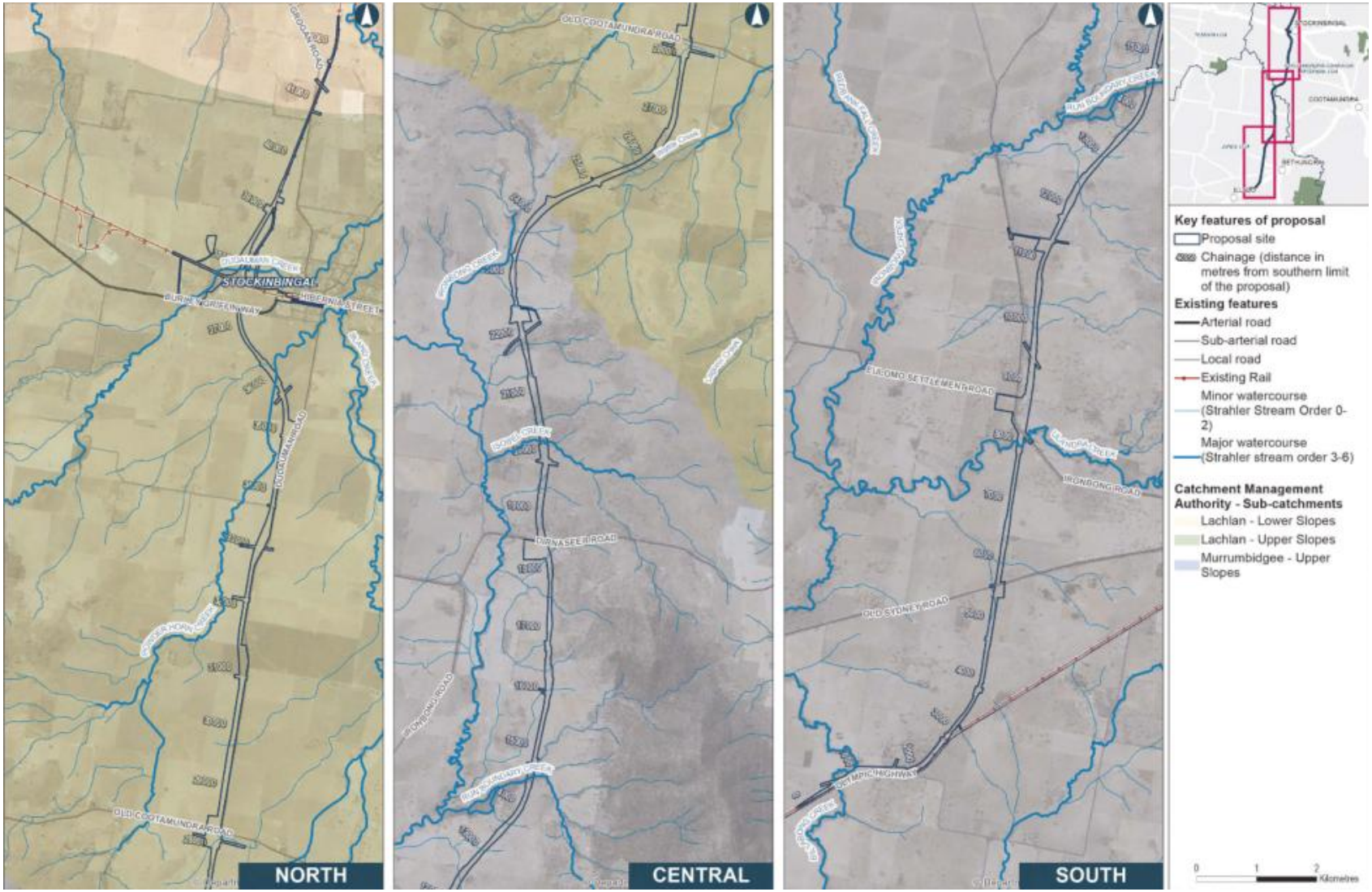


Figure 5-1 Catchments and Key watercourses

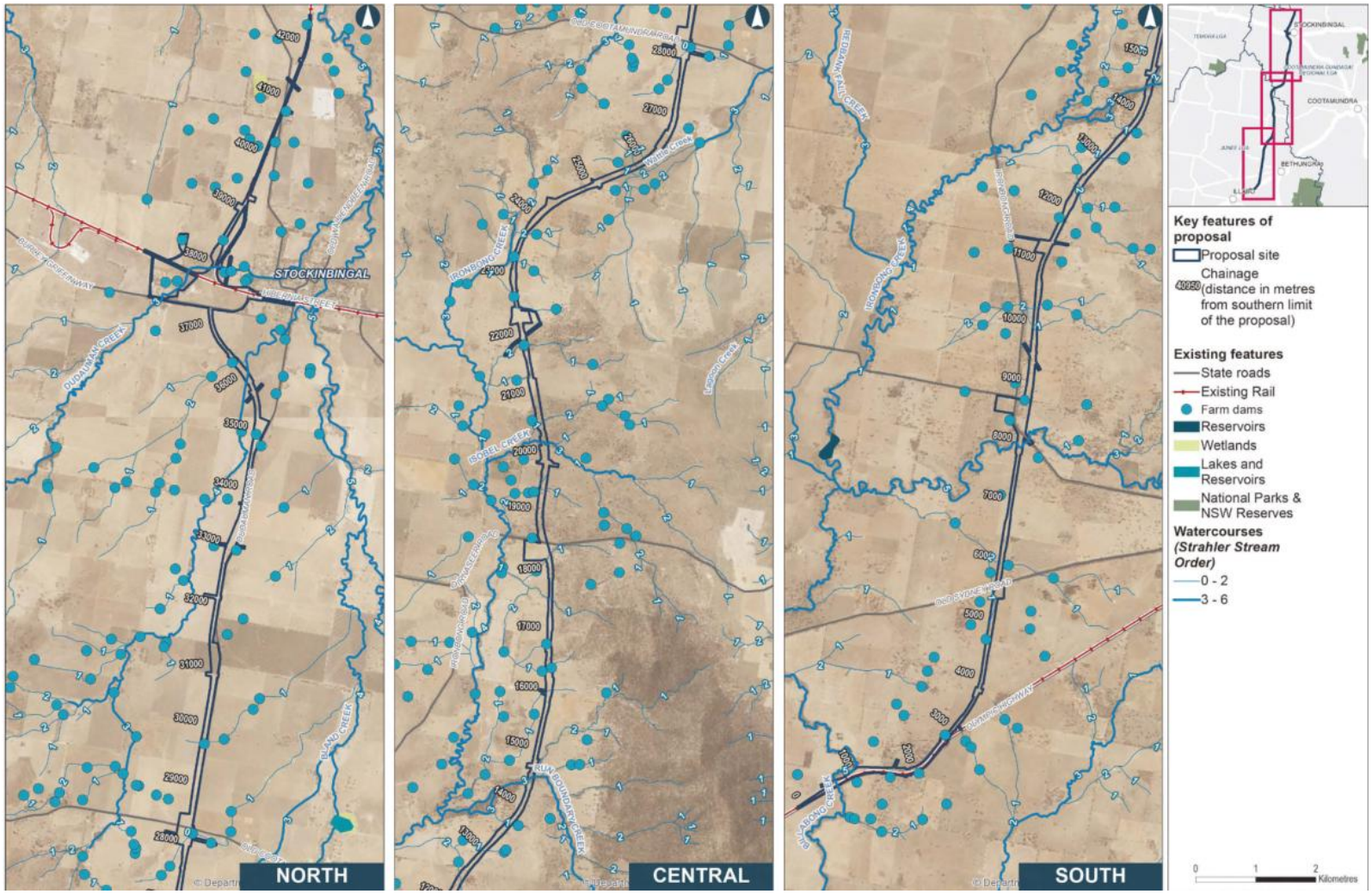


Figure 5-2 Location of Farm dams and other water features across the Project Are

Table 5-1 Catchment areas and key watercourses within and adjacent to the Project

Watercourse	Catchment	Strahler stream order	Flow conditions	Proximity to Project	Comments
Dudauman Creek	Lachlan	3rd	Ephemeral	Intersected by the Project	Generally flows from south–north, turning east through Stockinbingal within the Project site and confluences Band Creek Flows are influenced by existing road and rail lines, and a number of levees identified near Stockinbingal. Dudauman Creek is intersected by the Project at two locations.
Powder Horn Creek	Lachlan	3rd	Ephemeral	Intersected by the Project	Generally flows from south–north and confluences with Bland Creek downstream of the Project site, and intersected by the Project site.
Bland Creek	Lachlan	5th	Ephemeral	Not intersected by the Project. Approximately 400m east of the Project Site at its closest point.	Generally flows from south to North. Dudauman Creek and Powder Horn Creek flow into Bland Creek.
Run Boundary Creek	Murrumbidgee	3rd	Ephemeral	Intersected by the Project	Flows in a north-westerly direction, before turning south east and confluencing with Ironbong Creek, and intersected by the Project site.
Isobel Creek	Murrumbidgee	3rd	Ephemeral	Intersected by the Project	Flows from east to west through the Project site, confluencing with Ironbong Creek and intersected by the Project site.
Ulandra Creek	Murrumbidgee	5th	Ephemeral	Intersected by the Project	Generally, flows from east to west and confluences with Ironbong Creek and intersected by the Project site.
Billabong Creek	Murrumbidgee	6th	Ephemeral	Intersected by the Project	Flows from north to south and intersected by the Project site.
Ironbong Creek	Murrumbidgee	3rd	Ephemeral	Not intersected by the Project. Approximately 250m west of the Project Site at its closest point.	Generally flows in a north–south direction, confluencing with Billabong Creek.

5.3 Topography

The topographic information indicates that the northern section of the Project between Stockinbingal and Old Cootamundra Road generally passes through gently sloping to level farming land east of the Dudauman Range. While topographic depressions are formed from runoff, flow paths are interrupted by farm dams and no permanent watercourses are identified in this area.

Between Old Cootamundra Road and Ironbong Road, there is moderately undulating terrain west of Lighthouse Hill, the Twins Range and east of the Bethungra Range. The terrain is cut by numerous streams and watercourses associated with Ironbong Creek and its tributaries. The topographic low points and watercourses flow into Ironbong Creek which flows south across gently sloping agricultural land.

Between the township of Illabo and Ironbong Road the Project site includes gently sloping farming land cut by Ironbong Creek and Ulandra Creek. To the east of Ulandra Creek are the steeper upper reaches of the creek's catchment, however the terrain flattens out before intersecting the Project site. Ulandra Creek is a well-defined channel, with its floodplain expanding near Ironbong Road.

South of Old Sydney Road the topography within the Project site slopes toward the lower reaches of Ironbong Creek and Billabong Creek. Billabong Creek is relatively flat at the southern portion of the Project, with a well-defined creek channel with both a low flow section and a higher flow section before a sudden change in slope to the floodplain and agricultural land.

5.4 Climate and Rainfall

The climate of the South West Slopes of the Riverina region is classified as hot dry zone (with cooler winters) climatic zone. The region experiences hot and dry summers and cold to mild temperatures during the winter months. The nearest Bureau of Meteorology (BOM) weather station located at the south of the Project site with long term temperature records, Wagga Wagga Research Centre (station number 074114) records mean daily maximum temperatures from 31.0°C in January to 12.4°C in July. The nearest station located at the north of the Project site (Temora Airport) (station number 073151) records mean daily maximum temperatures of 34.1°C in January to 13.8°C in July.

Rainfall levels are typically low. Rainfall data from the Stockinbingal (Post Office) (station number 073036) shows an average annual rainfall of 533 millimetres (mm). Rainfall data from the Old Junee (Millbank station) (station number 073025) at the south of the Project site shows an average annual rainfall of 422mm. Rainfall is generally consistent across the year, with slightly higher rainfall from July to October.

5.5 Water Quality

Baseline water quality has been described for the Project as detailed in the EIS, Chapter 13 – Water Quality. While the samples provide information on the potential water quality of the existing environment, they do not cover an adequate time period or physical extent of monitoring to conclusively characterise the existing water quality environment of the Project site. Water quality information is described as follows.

5.5.1 Broader Catchment Water Quality

Existing (not Project-specific) water quality data from the Murrumbidgee River and Lachlan River catchments from the National Water Quality Assessment was reviewed to understand the general water quality of the watercourses within the Project site and then compared with the ANZG criteria for slightly disturbed ecosystems in south-east Australia. In the Murrumbidgee River catchment, values for turbidity, salinity and pH were generally 'Good' with 75% of samples compliant with the trigger values. Measured nutrients values exceeded the guidelines and generally had fair to poor compliance. Total nitrogen was rated 'Poor' and total phosphorus was rated 'Fair'. In the Lachlan River catchment, only the pH indicators were rated as 'Good'. Compliance for samples from the Lachlan River catchment for total nitrogen and

total phosphorus were rated 'Very Poor' and 'Fair' respectively. Compliance for turbidity samples in the Lachlan River catchment was rated as 'Fair'. This is provided in Table 5-2.

Table 5-2 Existing water sample results

Catchment	Water quality item	Turbidity	Salinity	pH	Total nitrogen	Total phosphorous
Murrumbidgee catchment	Water quality sample compliance rating	Good	Good	Good	Poor	Fair
	% of samples compliant with trigger values	75%	75%	75%	26%	50%
Lachlan catchment	Water quality sample compliance rating	Fair	Fair	Good	Very poor	Poor
	% of samples compliant with trigger values	69%	50%	85%	4%	28%

* Compliance rating based on percentage of samples compliant with trigger values: very poor (0–24%), poor (25–49%), fair (50–74%), good (75–100%)

5.5.2 Baseline Water Sampling

Additional opportunistic post -rainfall water quality sampling was undertaken in May 2019 at Ironbong Creek, and in April 2021 at Ironbong Creek, Powder Horn Creek and Dudauman Creek. Field measurements are provided in Table 5-3 noting that all parameters except saturated dissolved oxygen and electrical conductivity were within the water quality trigger value range. Lab results are provided in Table 5-4 noting that samples were generally below trigger values for the environmental values (aquatic ecosystems, irrigation, primary and secondary contact, livestock and aquatic foods) for metals and nutrients apart from sodium, chloride and calcium. Electrical conductivity was outside the key water quality objective range.

Table 5-3 Post-rainfall water quality test results. Exceedances of trigger values are shown in red

Parameter	Trigger values	Sampling Results				
		Ironbong Creek – 2019	Ironbong Creek – 2019	Ironbong Creek – 2021	Powder Horn Creek – 2021	Dudauman Creek – 2021
Temperature (^{0}C)	N/A	19.2	15.3	22.84	23.6	22.9
Electrical conductivity (EC) (us/cm)	30-350	1600	1618	6970	195	130
Dissolved oxygen (% sat)	90-110	45	45.9	103.9	102.8	97.8
pH	7.0-8.0	7.85	7.81	7.85	7.44	7.06
Reduction-oxidation	N/A	220	257.2	180.7	127.8	179.0

Table 5-4 Water monitoring laboratory results. Exceedances of freshwater ecosystem trigger values are shown in red

Parameter	Water Quality Trigger Values					Sampling Results			
	Water quality	Fresh-water eco-systems[1]	Irrigation	Livestock	Aquatic foods	Ironbong Creek – 2019	Ironbong Creek – 2021	Powder Horn Creek – 2021	Dudauman Creek – 2021
EC (µS/cm)	30–350	30–350	-	2000–5000		1680	6930	187	129
TDS (mg/L)	-	-	-	-	-	1090	4500	122	84
TSS (mg/L)	40	-	-	-	-	21	44	50	15
Turbidity (NTU)	20	2–25	-	-	-	11.1	21.4	26.2	115
Total alkalinity as CaCO3 (mg/L)	-	-	-	-	-	196	339	84	51
Sulfate as SO4 (mg/L)	-	-	-	1000	-	37	274	3	<1
Arsenic (mg/L)	-	0.024	-	-	-	0.002	0.003	0.004	0.002
Arsenic (dissolved) (mg/L)	-	0.024	0.1	0.5	0.05	0.001	0.003	0.003	0.001
Cadmium (mg/L)	-	0.0002	-	-	-	0.0005	<0.0001	<0.0001	<0.0001
Cadmium (dissolved) (mg/L)	-	0.0002	0.01	0.01	0.0018	0.0001	<0.0001	<0.0001	<0.0001
Calcium (mg/L)	-	-	-	1000	-	60	237	17	6
Chloride (mg/L)	-	-	750	-	-	425	1860	9	13
Magnesium (mg/L)	-	-	-	2000	-	45	205	5	4
Nickel (mg/L)	-	0.011	-	-	-	0.003	0.003	0.003	0.008
Nickel (dissolved) (mg/L)	-	0.011	0.2	1	0.1	0.002	0.003	0.004	0.003
Nitrite (mg/L)	-	-	-	30	0.1	0.01	<0.01	<0.01	<0.01
Nitrate (mg/L)	-	0.7	-	400	50	0.01	0.02	<0.01	<0.01
Potassium (mg/L)	-	-	-	-	-	12	26	17	8
Sodium (mg/L)	-	-	460	-	-	190	965	9	14

1) ANZG value for toxicants at the 95% species protection level

It's noted that given the predominantly agricultural land uses and ephemeral nature of the watercourses in the Project site, it is unlikely that the watercourses within the Project site would achieve the water quality trigger values, particularly for nutrients. The sources of the high nutrient levels are likely to be diffuse and related to current and historical agricultural activities within the Project site.

5.6 Sensitive Receiving Environments

5.6.1 Aquatic Ecosystems and Key Fish Habitat

Six named watercourses are intersected by the Project site, these include Billabong Creek, Ulandra Creek, Isobel Creek, Run Boundary Creek, Powder Horn Creek and Dudauman Creek. Isobel Creek is classified as 'Class 2—moderate' key fish habitat (KFH) and 'Type 2—moderately sensitive' in accordance with Fisheries NSW policy and guidelines for fish habitat conservation and management (DPI) and is characterised by a clearly defined bed and bank, with semi-permanent to permanent waters, and with freshwater aquatic vegetation present. Four (4) of the six (6) watercourses are classified as 'Class 3—minimal' key fish habitat and 'Type 3—minimally sensitive' fish habitat. These watercourses flow intermittently and contain limited refuge pools and limited exotic aquatic vegetation species Powder Horn Creek is classified as 'Class 4—unlikely' as it was highly ephemeral with no connected wetland areas and semi-permanent water in pools only after rain events.

Technical Paper 2: Aquatic Biodiversity Assessment identified that the following endangered ecological communities listed under the *Fisheries Management Act 1994* (FM Act) are present within the study area:

- Lowland Lachlan River aquatic ecological community
- Murray River aquatic ecological community.

None of the threatened species or endangered communities are likely to occur in the watercourses within the Project site.

5.6.2 Groundwater Dependent Ecosystems

Eight Groundwater Dependant Ecosystems (GDEs) have been identified within the Project site that rely on the subsurface presence of groundwater for their ecological processes and health. Within these ecosystems, the following high potential GDEs have been identified.

- Four high potential aquatic (river) GDEs—Billabong Creek, Ulandra Creek, Ironbong Creek and Dudauman Creek. These ecosystems depend on subsurface groundwater, particularly during periods of low surface water availability, to maintain hydrological and ecological balance.
- Four high potential terrestrial (vegetation) GDE species—Blakely's red gum, yellow box, western grey box and white cypress pine. These vegetation communities rely on groundwater to sustain growth, particularly in fragmented and degraded landscapes where surface water is scarce.

5.7 Erosion Characteristics

High erosion hazard has been identified along some sections of the Project site as part of the agricultural and geotechnical investigation undertaken for the Project. Sheet and gully erosion have been identified north of Illabo with a potential for seasonal waterlogging near Ironbong Creek. Other instances of erosion noted during geotechnical investigation included:

- significant depths of gully or bank erosion within several incised drainage gullies and watercourse was observed
- soil has eroded on some crests and ridges to expose rock
- rill and sheet erosion in other areas was generally minimal.

The Environmental Assessment Documentation also noted some instances of erosion in the form of bank degradation in the following locations:

- Ulandra Creek - within the Project site

- Isobel Creek - 60 m downstream of the Project site
- Unnamed tributary of Isobel Creek - 80 m downstream of the Project site
- Dudauman Creek - 300 m upstream of the Project site.

5.8 Salinity

Most of the soil types between Illabo and Stockinbingal have localised salinity hazard listed as a potential limitation. Salinity hazard is complex and relates to the soil type, the landscape features, local hydrology and the development on the land.

A review of the Soil and Land Information System (NSW EES, 2019) was undertaken as part of the Environmental Assessment Documentation, which indicated that generally no surface salt was evident at sample locations near the Project site (within one kilometre). This indicates that the likelihood of salt scalds at the surface is low, but salinisation remains a potential hazard on the site.

Soils and associated erodibility and salinity issues identified within the Project site are discussed further in the SWMSP.

6 Water Quality Monitoring Program

6.1 Baseline Surface Water Monitoring

Baseline surface water data was reviewed and collected for the EIS (Chapter 13 and Technical Paper 5) and is summarised in Section 5.5.

Additional baseline data will be obtained opportunistically by JH prior to construction where possible. As a result of the ephemeral nature of the creeks, it has proven difficult to obtain surface water quality data of relevant creek systems in the preconstruction phase of the project. Additional opportunistic baseline data will be undertaken (where available during periods of rainfall preconstruction) per the monitoring details provided in the sections below.

6.2 Monitoring Locations

Surface water quality sampling locations have been selected with consideration of the location of construction compounds, culvert and bridge construction and identification of any areas of potential contamination, salinity or acid sulfate soils. Sampling will be undertaken at upstream and downstream of construction areas where feasible. Monitoring locations are detailed in Table 6-1 shown in Figure 6-1 and Figure 6-2. It's noted that upstream and downstream locations may vary depending whether water is present for sampling (as most creeks are ephemeral) and land access/safety factors.

Monitoring locations will be reviewed throughout construction. Locations will be reviewed with the intention of identifying sites that most accurately identify water quality changes due to the Project itself, rather than external influences in the catchment (especially in downstream samples). Monitoring locations and changes to the number of locations may also be refined based on monitoring results and adaptive management outcomes (refer to Section 6.10). Any changes to individual monitoring locations and / or number of monitoring locations will be approved by the ER, undertaken in accordance with the EPL and identified in future revisions of the SWMoP.

Table 6-1 Project surface water monitoring locations – during construction

Site ID	Watercourse	Location Details
I2S-SW1	Ironbong Creek	Ironbong Creek at Ironbong Road
I2S-SW2	Bland Creek	Bland Creek at Burley Griffin Way - Bland Creek is considered to be the most likely location at which flow will be present.
I2S-SW3	Ulandra Creek	Upstream and downstream locations of where the construction corridor crosses Ulandra Creek at Ironbong Road;
I2S-SW4	Dudauman Creek	Upstream and downstream locations of where the construction corridor crosses Dudauman Creek.
I2S-SW5	Powder Horn Creek	Upstream and downstream locations of where the construction corridor crosses Dudauman Creek.

I2S-SW6	Run Boundary Creek	Upstream and downstream locations of where the construction corridor crosses Dudauman Creek.
I2S-SW7	Isobel Creek	Upstream and downstream locations of where the construction corridor crosses Dudauman Creek.
I2S-SW8	Billabong Creek	Upstream and downstream locations of where the construction corridor crosses Dudauman Creek.

Surface water quality monitoring will be undertaken for the potential contaminants associated with construction activities for the Project. Trigger values and site discharge criteria are discussed further in the below sections.

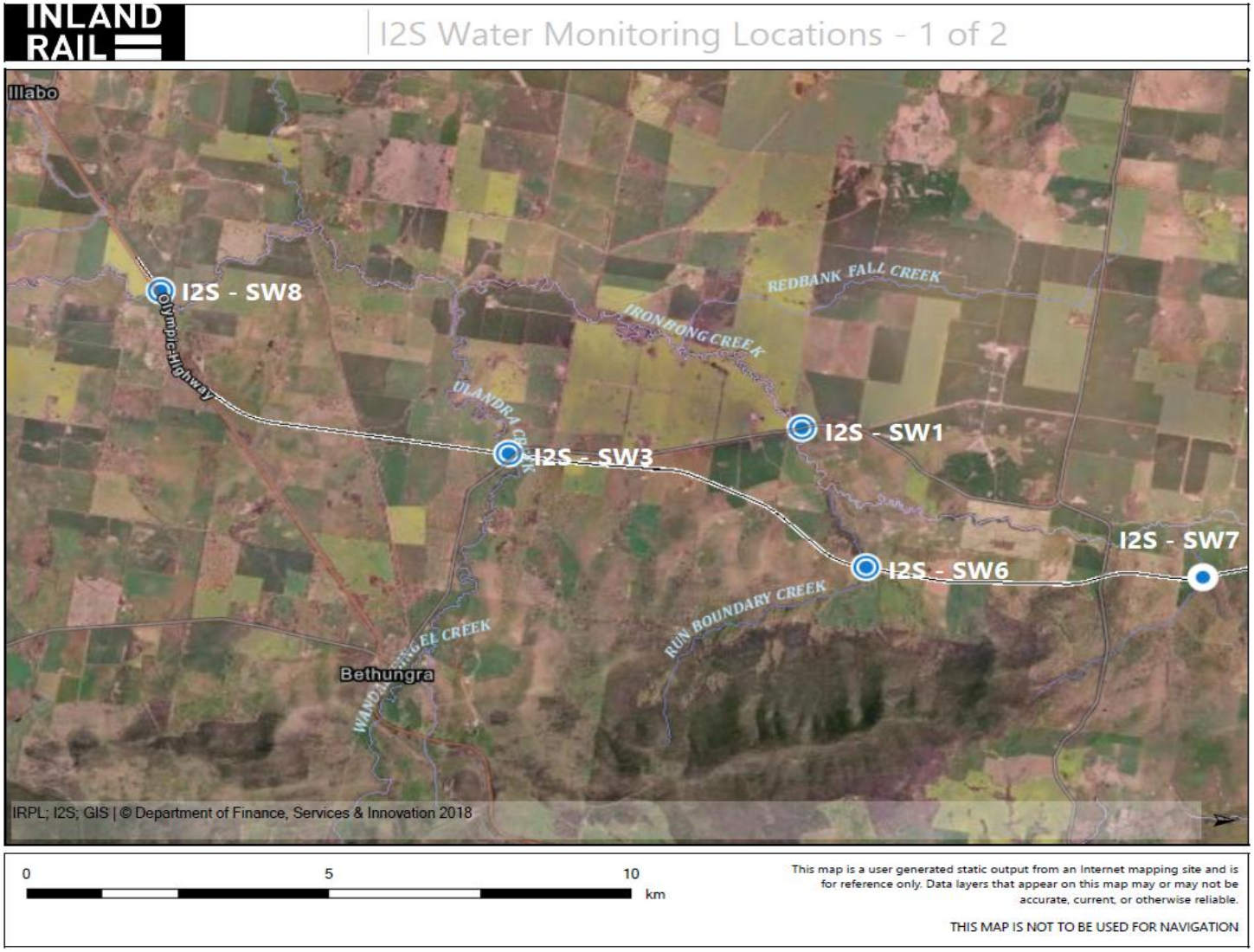


Figure 6-1 Construction surface water monitoring locations (1 of 2)



Figure 6-2 Construction surface water monitoring locations (2 of 2)

6.3 Surface Water Quality Objectives and Trigger Values

The Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZG) and the NSW Water Quality Objectives (WQOs) identify catchment-specific and watercourse-specific water quality management goals and trigger values for different potential pollutants based on the identified environmental values. Both the ANZG and WQOs have been established to align with the National Water Quality Management Strategy: Australian Drinking Water Guidelines 6 2011 (National health and Medical Research Council 2017). Monitoring results of upstream and downstream samples collected will be compared to the criteria and trigger values presented in Table 6-2 and Table 6-3. Criteria for site discharge is discussed in Section 6.5.

The purpose of identifying these trigger values is to protect downstream environments from the potential impacts of surface runoff and discharge during construction. The trigger values are not compliance values but values that, if exceeded, would indicate a potential environmental issue, and so 'trigger' a management response, which aligns with the assessment undertaken as part of the EIS.

Based on the existing environment assessment and impacts identified in the Environmental Assessment Documentation, key pollutants that would be relevant to the Project include:

- nutrients (nitrogen and phosphorus)—commonly present in agricultural areas and may become mobilised as a result of disturbance of agricultural land
- sediments and soils—present in run-off from construction areas and from any additional scour due to construction and operation
- chemicals, oils, grease and hydrocarbons—from use of plant and equipment during construction and operation
- concrete slurry and wastewater—from mobile concrete batching plants
- contaminants of concern related to previous land uses—heavy metals, total recoverable hydrocarbon (TRH); benzene, toluene, ethylbenzene and xylene (BTEX); polycyclic aromatic hydrocarbons (PAHs),; per- and polyfluoroalkyl substances (PFAS); organochlorine pesticides (OCPs); organophosphate pesticides (OPPs); polychlorinated biphenyl (PCBs); volatile organic compounds (VOCs) and potential asbestos containing material (ACM) (refer to Chapter 20: Soils and contamination).

Based on these likely pollutants, relevant water quality indicators have been selected for the Project and are shown in Table 6-2 and Table 6-3. Where a contaminant or pollutant is an indicator for more than one environmental value, thereby having multiple trigger values or criteria, the most stringent criteria was adopted.

Table 6-2 Water Quality Indicators (Physical and Chemical) and Surface Water Trigger Values

Water Quality Indicator	Units	Trigger Value / Criteria
Total Phosphorus	µg/L	20
Total nitrogen	µg/L	250
Dissolved oxygen	%	90 – 110
pH	pH units	7.0 – 8.0*
Electrical conductivity	µS/cm	30 – 350
Turbidity	NTU	20*
Oils, petroleum and hydrocarbons	N/A	Oils and petrochemicals should not be noticeable as a visible film on the water, nor should they be detectable by odour.

* Murray–Darling Basin Plan value (adopted where the value is more stringent than the ANZG).

Table 6-3 Water Quality Indicators (Toxicants) and Surface Water Trigger Values

Water Quality Indicator[1]	Units	Applicable guideline	Trigger Value / Criteria
Aluminium (pH>6.5)	ug/L	Freshwater aquatic ecosystems[2]	55
Arsenic (III)	ug/L	Freshwater aquatic ecosystems	24
Cadmium	ug/L	Freshwater aquatic ecosystems	0.2
Calcium	mg/L	Livestock	1,000
Chromium	ug/L	Freshwater aquatic ecosystems (marine)	27
Copper	ug/L	Freshwater aquatic ecosystems	1.4
Iron	mg/L	Irrigation (draft)(long-term value)[2]	0.2
Lead	ug/L	Freshwater aquatic ecosystems	3.4
Magnesium	mg/L	Livestock	500
Mercury	ug/L	Freshwater aquatic ecosystems	0.6
Nickel	ug/L	Freshwater aquatic ecosystems	70
Zinc	ug/L	Freshwater aquatic ecosystems	8
Ammonia	ug/L	Freshwater aquatic ecosystems	900
Nitrate	mg/L	Livestock	1,500
Benzene	ug/L	Freshwater aquatic ecosystems	950
Tolulene	ug/L	Freshwater aquatic ecosystems	180
Ethylbenzene	ug/L	Freshwater aquatic ecosystems	80
o-xylene	ug/L	Freshwater aquatic ecosystems	350
1,2,4-trichlorobenzene	ug/L	Freshwater aquatic ecosystems	170

1 Long-term values are the maximum concentration of contaminant in the irrigation water that can be tolerated assuming 100 years of irrigation. Draft irrigation guideline levels utilised

2 ANZG 2018/ANZECC 2000 value for toxicants at the 95 % species protection level.

6.4 Trigger Response

Data collected during the construction phase of the Project will be compared to trigger values (refer to Section 6.3) and, where relevant, will be derived from the baseline data to assist in determining whether construction is impacting receiving surface waters. This data analysis, review and reporting process is discussed in Section 7.6.

Surface water samples will be analysed and results will be assessed for compliance in accordance with the performance criteria. Initial results for all analytes will be screened against the Australian and New Zealand Guidelines for Fresh and Marine Water Quality ANZG (2018) guidelines for slightly to moderately disturbed ecosystem (95% species protection level and 99% for pollutants which bioaccumulate), refer to Table 6-2 and Table 6-3. Where ANZG default values are exceeded, data will be assessed with consideration of location (upstream / downstream) and other relevant results as follows:

- Assessment to determine whether the exceedance is caused by Project activities or non-Project activities.
- Whether upstream and downstream samples have <20% variation indicating that the exceedance may be caused by the Project.
- Results will be assessed against baseline data where 12 months of data is available. The 80th percentile has been adopted for all analytes.
- A three-month rolling average will be utilised where 12 months of data is not available (results that are greater than 20% of the three-month rolling average will trigger an investigation).

The level of reporting for concentrations of pollutants will be sensitive enough to detect pollutants at levels related to their environmental risk and the ANZG (2018) guideline value while having regard to the best available analytical quantification limits.

The Trigger Action Response Plan (TARP) that will be implemented in the event of an exceedance occurs as described above, is detailed and addressed in Section 6.10 of this Plan.

6.5 Site Discharge

The EPL for the Project prescribes the water quality parameters and the water quality limits for discharges of pollutants to water. The limits for discharges of pollutants set in the EPL only apply to the licensed monitoring and discharge points. The licensed monitoring and discharge points, and all sediment basins, are identified in the map(s) and in a schedule submitted to, and approved in writing by, the EPA.

The concentration of a pollutant discharged at Licenced Discharge Points, or applied to that area, must not exceed the concentration limits specified for that pollutant in the Table 6-4.

Table 6-4: Offsite Water Discharge Concentration Limits

Pollutant	Unit of Measure	Concentration Limit (100 percentile)
Oil and grease	Visible	TBC following issue of the EPL
pH	pH	TBC following issue of the EPL
Turbidity	nephelometric turbidity units (NTU)	TBC following issue of the EPL
Any other pollutant identified in the EPL	-	TBC following issue of the EPL

Exceeding the limits specified in Table 6-4 for discharges from licensed discharge points is only permitted when:

- the discharge occurs solely as a result of rainfall measured at the premises exceeding the design 5-day rainfall depth value and,
- the sediment basins and other erosion and sediment controls corresponding to the discharge point(s) have been designed, constructed, operated and maintained in accordance in accordance with Managing Urban Stormwater – Soils and Construction, Volume 2D, Main Road Construction (DECC, 2008), to be read and used in conjunction with Managing Urban Stormwater: Soils and Construction, Volume 1, 4th Edition (Landcom, 2004).

In all other circumstances, JHG must comply with section 120 of the POEO Act. Until such time as an EPL is obtained, CoA E78 specifies that unless an EPL is in force in respect to the CSSI and that licence specifies alternative criteria, discharges from construction water treatment plant(s), where required, to surface waters must not exceed:

(a) the Australian and New Zealand Guidelines for Fresh and Marine Water Quality 2018 (ANZG 2018) default guideline values for toxicants at the 95 per cent species protection level;

(b) for physical and chemical stressors, the guideline values set out in Tables 3.3.2 and 3.3.3 of the Australian and New Zealand Guidelines for Fresh and Marine Water Quality 2000; and

(c) for bioaccumulative and persistent toxicants, the ANZG 2018 values at a minimum of 99 per cent species protection level.

Where the ANZG 2018 does not provide a default guideline value for a particular pollutant, the approaches set out in the ANZG 2018 for deriving guideline values, using interim guideline values and/or

using other lines of evidence such as international scientific literature or water quality guidelines from other countries, must be used.

6.6 Monitoring Methodology and Procedures

6.6.1 Routine Sampling

Surface water monitoring of the locations detailed in Table 6-1 will be undertaken in accordance Table 6-5, and will commence following the approval of this plan at the commencement of construction. Many of the watercourses are ephemeral and therefore water sampling will only be undertaken where water is observed and appropriate for sample collection.

Table 6-5 Routine water monitoring frequency

Site ID	Watercourse	Monitoring Frequency
I2S-SW1	Ironbong Creek	Monthly
I2S-SW2	Bland Creek	Monthly
I2S-SW3	Ulandra Creek	Monthly, during construction through the watercourse only.
I2S-SW4	Dudauman Creek	Monthly, during construction through the watercourse only.
I2S-SW5	Powder Horn Creek	Monthly, during construction through the watercourse only.
I2S-SW6	Run Boundary Creek	Monthly, during construction through the watercourse only.
I2S-SW7	Isobel Creek	Monthly, during construction through the watercourse only.
I2S-SW8	Billabong Creek	Monthly, during construction through the watercourse only.

Surface water monitoring will be undertaken by suitably experienced JHG personnel at frequencies provided in Table 6-5.

Surface water monitoring at each location will cease once the disturbed (by the Project) catchment area is appropriately stabilised as determined by the Project CPESC.

Due to the ephemeral nature of these watercourses, surface water monitoring will be dependent upon the presence of flowing water within these creek lines.

6.6.2 Weather Event Sampling

In addition to routine sampling, wet weather sampling is being undertaken by JHG during construction. Data from wet weather samples will demonstrate the variability in pollutant concentrations at each of the sample sites under wet weather conditions. This data will assist in providing an assessment of the impacts of the rail construction on adjacent waterways and also the effectiveness of construction mitigation measures. Wet weather sampling will occur at each location detailed in Table 6-1 until the disturbance area in that catchment is appropriately stabilised as determined by the CPESC. Further, wet weather sampling for I2S-SW3 to I2S-SW8 is only required during construction through that watercourse.

Wet weather sampling events are defined as 20 millimetres or more of rain within 24 hours. Sampling occurs within the following 24 hours of the rain event where it is safe to do so and where there is adequate access. If rainfall events are regularly less than 20 millimetres, opportunistic wet weather monitoring may be undertaken to ensure that some wet weather data is collected.

6.6.3 Sampling methodology

Water quality sampling will be conducted in accordance with:

- Australian Standard 5667:1998 Water Quality – Sampling, Part 1: Guidance on the design of sampling programs, sampling techniques and the preservation and handling of samples (AS/NZS 5667.1:1998).
- Australian Standard 5667:1998 Water Quality – Sampling, Part 6: Guidance on sampling of rivers and streams (AS/NZS 5667.6:1998).
- ANZECC & ARMCANZ (2000) guidelines and the NSW EPA's Approved Methods for the Sampling and Interpretation of Results of Water Pollutants (NSW EPA, 2004).

In situ water quality parameters will be measured and recorded in three ways:

1. Using the appropriate in-field equipment
2. Obtaining grab samples collected from each site for laboratory analysis, and
3. Visual observations, photographs and record keeping..

6.6.3.1 Field Sampling

In situ field measurements of water quality are taken at all sites during each site visit by suitably trained and experienced personnel. Physico-chemical measurements are taken using a fully calibrated multi-parameter water quality meter for:

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

Relevant site descriptions and notes are taken for each site and visual observations made of:

- Visual oil and grease
- Occurrence of algal scum
- Streamflow
- Water clarity
- Water colour, odour and any other notable observations.

Photos are taken to record the visual appearance of each water quality sample site at the time of sampling. Where appropriate, photos of the stream bank are also taken to provide a record of bank stability, geomorphology and riparian vegetation condition.

6.6.3.2 Laboratory Sampling

Grab samples are collected near the in-situ monitoring point to ensure representative sampling. At each site, several sub-samples are taken from 100 - 200 mm depth below the surface using a long-handled sampling pole and bottle. The sub-samples are combined in a bucket to form a 'composite' sample from which the sample bottles for analyses are filled. The bucket and the sampling bottle are washed between sampling sites to prevent cross contamination.

Water quality samples are transported in ice in an esky to a National Association of Testing Authorities (NATA) accredited laboratory, under Chain of Custody (CoC) requirements. Samples will be tested for the list of analytes provided in Table 6-2and Table 6-3.

Surface water samples will be collected in laboratory supplied containers made of the appropriate material and suitably preserved for the required analytes, according to well-established analytical standards.

All sample containers will be clearly labelled with:

- Sample ID
- Job number
- Sampler name
- Date and time.

6.7 Water Extraction Monitoring

In accordance with CoA E84 (d), monitoring of any water extracted from watercourses or groundwater will be undertaken in accordance with the *NSW Non-Urban Water Metering Policy* (DPIE, 2020) and clause 21(6) of the *Water Management (General) Regulation 2018*. This includes maintaining records such as the following.

- Record water taken
- Make the record not later than 24 hours after water is taken,
- Make the record in an approved form and manner,
- Keep the record for a period of 5 years,
- Give the record to DPE – Water in an approved form and manner—
  - not later than 28 days after the end of the water year in which the water was taken, or
  - if DPE – Water directs the person in writing to give the record to the Minister on an earlier date, by that date.

6.8 Geomorphology Monitoring

In accordance with CoA E84(f) and E84(g), stream bank stability, geomorphology aspects and any potential adverse impacts on stream baseflows of areas downstream of the Project will be monitored to assess for any potential changes or impacts from construction activities.

Visual inspections of areas immediately downstream of water treatment plant discharge locations will be undertaken during routine environmental inspections and following site discharge or rainfall events exceeding 20 millimetres (mm) over a 24-hour period. The monitoring will include visual observations for any changes particularly downstream of water treatment plants and on watercourses where the velocity flow rate (Quantitative Design Limits) is exceeded or there is active erosion. Photographic monitoring points will also be established in any areas where noticeable changes or active erosion is observed.

Quantitative Design Limits from the EIS are:

- Flow Distribution: A 20% increase in velocity
- Scour / Erosion potential for ground surfaces that have been sealed (road or industrial land, forested land): Velocities are not to exceed the limiting velocities which would erode the sealing or remove the protection that has been applied to the surface

- Scour / Erosion potential for watercourses: An erosion threshold velocity (ETV) is to be determined through a site-specific assessment conducted by an experienced geotechnical or scour / erosion specialist in accordance with CoA E60 to E63. An ETV of 0.5 m/s is to be adopted in the absence of a site-specific assessment.

Any significant changes recorded during routine visual inspections will trigger an inspection by the Certified Professional in Erosion and Sediment Control (CPESC) or geomorphologist to complete a stream bank stability and geomorphology inspection of the area. An inspection report will be completed by the CPESC or geomorphologist and recommendations made on any applicable mitigation measures for implementation by JHG in the event that the impacts are deemed to have been caused by the Project. Any additional protection measures to address changes and their associated timing and trigger points must be defined and designed as part of the Program in consultation with DCCEEW Water (refer to Section 2.4 for details of consultation undertaken).

Operational erosion mitigation and monitoring (OEMMP) is outside the scope of this plan and will be undertaken in the operational phase as required by Conditions E68-E70. The OEMMP will form part of the Flood Design Verification Report (FDVR) which will be prepared in consultation with CPHR, DCCEEW Water, Junee Council, Cootamundra-Gubdagai Regional Council and landowners.

6.9 Climate monitoring

In accordance with normal standard construction practices, weather forecasts will be used to guide work activities undertaken on-site. Weather forecasts will be reviewed at the start of each day and before undertaking new work activities that may be affected by rainfall or adverse weather.

Where weather forecasts predict conditions that may pose an environmental risk, site environmental controls will be inspected and secured to reduce erosion and sediment control impacts. Contingency planning to prevent spills will also involve monitoring for predicted flood events and the removal of fuels and chemicals from flood prone areas.

Weather and rainfall data will be taken from the following sources as appropriate.

- Stockinbingal weather station (Sunnydale) (station number 73150)
- Junee Treatment Works weather station (station number 73019)
- Site weather stations (electronic or manual rain gauges for remote areas).

Weather forecasts and conditions will be constantly monitored and data periodically downloaded with records maintained on the Projects SharePoint.

6.10 Adaptive management

Should any monthly surface water quality monitoring or geomorphology monitoring results exceed the criteria in Section 6.3, data from the monitoring round will be reviewed against the results upstream and downstream monitoring to determine whether the project may have caused impact / caused the elevated results. If the project is determined to have been the cause, the Trigger Action Response Plan (TARP) provided below will be triggered. If the downstream / upstream monitoring review determines that the monitoring results are not a result of the project, then the TARP will not be triggered.

Regardless of the above, should any water quality or geomorphology monitoring results be found to be directly attributable to the Project and exceed the criteria set out in Section 6.3 of this Program on three (3) consecutive occasions, the following steps will be undertaken to formulate the TARP:

Trigger Action Response Plan

1. Analysis of the results by the Environment and Sustainability Manager (or delegate), in consultation with the appointed consultant and Inland Rail, in more detail with a view of determining possible causes for the exceedance, including identifying the Project stage (or stages) responsible for the issue
2. Site inspection by the Environment and Sustainability Manager (or delegate)
3. Advising relevant personnel of the potential issue and suggesting possible mitigation measures
4. Identifying and agreeing on actions and/or additional monitoring or mitigation measures to resolve or mitigate the exceedance. This may include:
    a. Assessing the monitoring frequency that is being undertaking and increasing it based on the risk of the activities being undertaken. Examples include:
        i. Increasing the surface water monitoring frequency to weekly or daily in the event of exceedances, visual observations or significant spill that has the potential, or causes surface water impacts
    b. Increasing the analytical suite to determine if potential contaminates are observed or based on exceedances (e.g. If TPH are observed and the source is not identifiable, an increase scope of full suite of volatile / semi-volatile organic compounds may be undertaken to determine if a specific analyte is causing contamination)
5. Implementing actions to rectify or mitigate the exceedance, including stop work arrangements where necessary or if directed by the ER
6. Identifying and implementing additional mitigation measures.

Where criteria are exceeded, the Environment and Sustainability Manager (in consultation with the appointed consultant and Inland Rail if applicable) will identify the source of the exceedance and implement any additional measures available to reduce the impacts on the receiving environment. The Environment and Sustainability Manager will verify and document the effectiveness of any management measures or preventative / corrective actions implemented to avoid further exceedances.

The Environment and Sustainability Manager will communicate regularly to the Project Team to ensure plans are co-ordinated and cumulative soil and water quality impacts are minimised. The timing for any improvement will be agreed between the relevant Project Engineer / Superintendent and Inland Rail Project Manager and Senior Environment Advisor (or delegate) based on the level of risk or reoccurrence.

7 Compliance Management

7.1 Roles and Responsibilities

Roles and responsibilities related to the environment discipline are outlined in Section 7 of the CEMP. The Project's organisational structure is also included in the CEMP. Section 7.1 of this SWMSP includes responsibilities around specific soil and water matters.

7.2 Training

All personnel performing environmental management activities for and on behalf of JHG will be appropriately trained, qualified and competent. Personnel performing specified assigned tasks shall be qualified on the basis of appropriate education, training, skills and/or experience, as appropriate.

All staff and subcontractors will undergo Project-specific induction training that includes relevant soil and water matters and associated management measures that must be implemented and taken into account when planning and delivering the work.

Additional daily and task-specific training and awareness material may be delivered to relevant staff and workforce, in the form of toolbox talks and pre-start meetings, to ensure that where detailed information is required, it is accessible to all involved with the Project.

Persons undertaken water quality monitoring will be appropriately experienced in water quality sampling.

Refer to Section 7 of the CEMP for further detail.

7.3 Non-Compliance and Non-Conformance

Non-compliances and non-conformances, including those related to surface water monitoring are detailed in Section 9 of the CEMP, and also specifically in Section 6.3 and 6.10 of this Program.

This includes the definitions of non-compliance and non-conformance, corrective and preventative actions, communication of corrective and preventative actions to staff and non-conformance close-out.

7.4 Incident Response

Incident management, including those related to soil and water management, are detailed in Section 8 of the CEMP. This includes incident classification, notification and reporting including to external authorities, incident investigation and closeout.

7.5 Auditing

Audits (both internal and external) will be undertaken to assess the effectiveness of environmental controls, compliance with this sub plan, CoA and other relevant approvals, licenses and guidelines. Audit requirements are detailed in Section 9 of the CEMP.

7.6 Reporting

Reporting requirements relevant to the management of surface water monitoring and associated activities are identified in Table 7-1. Requirements and responsibilities for reporting are further described in Section 9 of the CEMP.

Table 7-1 Reporting Requirements specific to Surface Water Monitoring

Report	Requirement	Timing	Responsibility	Recipient
Surface Water Monitoring Report	Monitoring results from this Program will be documented in a Surface Water – Construction Monitoring Report. The reports will provide the following information: • The rainfall data for the reporting period • Analysis of the results including summary statistics of the monitored parameters including number of samples, minimum, maximum, mean, median, standard deviation for the monitored analytes and analysis against trigger levels • Identification of any trends in the monitoring data • Comparison of the statistics to the ANZG criteria and Trigger Values and identification of any exceedances • Outliers and extreme data points, which may indicate significant deviances resulting from in extreme events, are also identified and the reasons for any exceedances • Discussion and analysis of the results and recommendations arising from the monitoring and detail of any management and mitigation measures that were implemented to address the exceedances during the reporting period.	Bi-annual (6 months) Report to be finalised within 3 months of the end of each 6-monthly monitoring period.	Project Environment and Sustainability Manager (or delegate)	Inland Rail ER
EPL monitoring data	A summary of relevant monitoring and discharge data required by the EPL, in accordance with s66 of the POEO Act.	Within 14 working days of the data being obtained for the last sample collected for the monthly period – refer to EPA Requirements for publishing pollution monitoring data	Environment and Sustainability Manager (or delegate)	JHG website
EPL annual returns	A summary of site discharge water quality monitoring results, including a statement of compliance with the relevant EPL conditions, and a summary of complaints received related to water quality issues, for inclusion in the annual EPL return. EPL annual returns will be prepared for the Project and submitted to the EPA within 60 days of the anniversary of the EPL for the duration of construction.	Within 60 days of the EPL anniversary date	Project Environment and Sustainability Manager (or delegate)	EPA
Incident reporting	Environmental incident classification, notification, and reporting in accordance with the JHG Environmental Incident Procedure.	Following occurrence of an incident in accordance with the CEMP	Project Environment and Sustainability Manager (or delegate)	Inland Rail Relevant Regulatory agency (as applicable)

Report	Requirement	Timing	Responsibility	Recipient
	Environmental incident notification to the Planning Secretary that causes or threatens to cause material harm as defined within the CoA.	As soon as possible and no later than 24 hours after becoming aware in accordance with the CEMP.	Project Environment and Sustainability Manager (or delegate)	Inland Rail DPHI
Complaint Reporting	Complaint management and reporting in accordance with the Community Communication Strategy (CCS) and Section 7.7 of this Plan.	As specified in the CEMP and CCS	Project Environment and Sustainability Manager (or delegate)	Inland Rail
Water quality monitoring data	JHG will provide any water quality monitoring data to the relevant water authority where discharges are directed to their assets.	As requested/agreed with the water authority	Project Environment and Sustainability Manager (or delegate)	Relevant water authority

7.6.1 Provision of Surface Water Monitoring Data

JHG will provide surface water monitoring data to DCCEEW Water every six months during construction. Inland rail will provide this data for a minimum period of two years from commencement of operation or as otherwise agreed with the Secretary. Monitoring data will be provided in a ready to use format (e.g. csv, Excel) and will be tabulated and electronic quality-controlled.

7.7 Complaints Management

Section 7 of the CEMP details communication and complaints management processes and procedures. The CCS identifies key stakeholder groups that will be consulted and engaged with during the Project and outlines the communication tools that will be used to consult and engage with these groups. During construction, any comments, feedback or complaints relating to soil or water management issues will be addressed through the Complaints Management System. The Complaints Management System includes a complaints register within the stakeholder database.

8 Review and Improvement

8.1 Continuous Improvement

Continuous improvement of this Program will be achieved by the ongoing evaluation of environmental management performance against environmental policies, objectives, and targets for the purpose of identifying opportunities for improvement.

The continuous improvement process will be designed to:

- Identify areas of opportunity for improvement of environmental management and performance Determine the cause or causes of non-conformances and deficiencies
- Develop and implement a plan of corrective and preventative action to address any non-conformances and deficiencies
- Verify the effectiveness of the corrective and preventative actions
- Document any changes in procedures resulting from process improvement
- Make comparisons with objectives and targets.

The Project Environment and Sustainability Manager (or delegate) is responsible for ensuring stage-specific environmental risks are identified and included in the Project risk register and appropriate mitigation measures implemented throughout the construction, as part of the continuous improvement process. The process for ongoing risk identification and management during construction is outlined in the CEMP.

8.2 Plan Amendments and Version Control

The processes described in the CEMP may result in the need to update or revise this Plan. Only the Project Environment and Sustainability Manager (or delegate) has the authority to approve changes to the requirements of this Plan. Minor amendments to the Plan may be approved by the ER (at Plannings discretion) in accordance with the CEMP and are to be implemented for the duration of construction and for any longer period set out in the monitoring programs or specified by the Planning Secretary, whichever is the greater. Amendments not considered minor by the ER require approval by the Planning Secretary.

A copy of the updated plan and changes will be distributed to all relevant stakeholders in accordance with the approved document control procedure detailed in the CEMP.

Appendix C – **Dewatering Procedure**

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1 Definitions and Abbreviations

Definitions and abbreviations relevant to this Dewatering Procedure are provided in Table 1-1.

Table 1-1 Definitions and abbreviations relevant to this Dewatering procedure

Term / Abbreviation	Definition / Expanded text
CEMP	Construction Environmental Management Plan
CoA	Conditions of Approval
CSSI	Critical State Significant Infrastructure
EIS	Environmental Impact Statement
EPA	Environment Protection Authority
EPBC	*Environmental Protection and Biodiversity Conservation Act 1999*
EPL	Environmental Protection License
Incident	An occurrence or set of circumstances that causes or threatens to cause material harm and which may or may not be or cause a non-compliance.

Term / Abbreviation	Definition / Expanded text
Material Harm	is harm that: (c) involves actual or potential harm to the health or safety of human beings or to the environment that is not trivial; or results in actual or potential loss or property damage of an amount, or amounts in aggregate, exceeding $10,000, (such loss includes the reasonable costs and expenses that would be incurred in taking all reasonable and practicable measures to prevent, mitigate or make good harm to the environment).
NTU	Nephelometric turbidity units
PPE	Personal Protective Equipment
RMMs	Revised Mitigation Measures
SDS	Safety Data Sheet
SSI	State Significant Infrastructure
SWMSP	Soil and Water Management Sub-plan
The Project	Inland Rail - Illabo to Stockinbingal Project
TSS	Total Suspended Solids
WAL	Water Access License
Work	Any physical work for the purpose of the Critical State Significant Infrastructure (CSSI) including construction and low impact work but not including operational maintenance work
WPIA	Water Pollution Impact Assessment

2 Introduction

2.1 Purpose and Scope

The purpose of this Dewatering Procedure (this Procedure) is to provide guidance to ensure that dewatering activities undertaken on the Inland Rail - Illabo to Stockinbingal Project (the Project), does not cause harm to the environment, and is compliant with Project requirements. This Procedure details the following types of dewatering.

- Surface water or ponded stormwater within trenches, sediment basins etc.
- Groundwater infiltration into excavations
- Water treatment plants and concrete batch plant effluent.

This Procedure is an appendix of the Soil and Water Management Sub-plan (SWMSP) which forms part of the Construction Environmental Management Plan (CEMP) for the Project.

This Procedure has been prepared to address the requirements related to soil and water management, particularly dewatering activities, associated with Infrastructure Approval (SSI-0406) and associated Conditions of Approval (CoA), the measures listed in the Environmental Impact Statement (EIS) as amended by the Submissions Report (known as Revised Mitigation Measures (RMMs)), Environmental Protection License (EPL), Commonwealth Approval (EPBC 2018/8233) and all applicable legislation, guidelines, standards and specifications.

This Plan is applicable to all activities conducted by site personnel (including sub-contractors) that have the potential to require transfer, movement or dewatering on-site during construction of the Project.

2.2 Objective

The objectives of this Procedure include:

- Ensure compliance with environmental requirements of the Project
- Implement industry standard methods for dewatering for construction sites
- Provide a clear methodology for the management of water discharges to be implemented throughout the Project
- Ensure that water discharges from the Project are compliant with the documents identified in Section 2.1.

2.3 Training

All employees and sub-contractors involved in dewatering would be trained in this Procedure in accordance with the requirements of this Plan.

3 Procedure

This Section details the dewatering procedure for surface water runoff, groundwater and effluent from water treatment plants and concrete batch plants associated with the Project activities.

3.1 Surface water runoff dewatering

Surface water runoff refers to rainwater which accumulates in sumps, trenches, sediment basins or other areas within the Project which requires dewatering.

3.1.1 Dewatering approach

The approach to dewatering will generally follow the following hierarchy.

1. **Onsite reuse** – Investigate any opportunities for onsite reuse. This may include applications such as dust suppression, earthworks compaction, vegetation establishment/rehabilitation, and plant/vehicle wash-down. Water used for onsite reuse will not impact waterways or result in offsite water quality impacts.
2. **Discharge to land –** Investigate any opportunities of discharging water to land to allow the water to infiltrate into the ground within the Project site, thus avoiding direct discharge to waterways.
3. **Discharge to waters** – Discharge offsite to waterways may be required where onsite reuse or discharge to land is not feasible.
4. **Offsite disposal** – Where none of the above options are possible, water may need to be disposed offsite to a licensed liquid waste facility. This includes any contaminated water concrete wastewater or water contaminated by activities such as surface washing, grit blasting, saw cutting, drilling, washing vehicles and plant is not suitable for reuse on site.

3.1.2 Water Quality Criteria

3.1.2.1 Onsite reuse

On-site reuse will be deemed permissible only if:

- pH levels are between 6.5 – 8.5.
- There is no visible oil or grease
- No erosion is caused from the reuse activity
- Any runoff generated by the reuse is controlled entirely within the site boundary and appropriate sediment controls are installed and maintained in accordance with the Blue Book (Landcom, 2004).

If all criteria above are met, the water can be reused onsite for dust suppression, earthworks compaction, vegetation establishment/rehabilitation, plant/vehicle wash-down etc. If the above criteria are not met, treatment of water will occur in accordance with Section 3.1.3 or the water will be disposed of at an appropriately licenced waste facility.

3.1.2.2 Discharge to land

A discharge from the Project will only occur when the above options are exhausted. This typically occurs when:

- Heavy rainfall has made the site too wet for beneficial onsite re-use such as dust suppression; and/or
- The volume of detained surface water in sediment sumps exceeds what can be feasibly re-used onsite within the 5-day period for sump maintenance; and/or
- Heavy rainfall has made land application onto nearby vegetated or revegetation areas impossible; and/or
- There are no suitable onsite re-use options available in reasonable proximity to the detained body of surface water.

Discharge to land within the site boundary will only occur if:

- pH levels are between 6.5 – 8.5
- There is no visible oil or grease
- No significant surface runoff will be generated from the discharge, additionally that there is no potential for discharged water to reach any watercourse (within or outside the site)
- No erosion is caused from the discharge and appropriate erosion and sediment control are installed in accordance with the Blue Book (Landcom, 2004)

- Approval is obtained via a water discharge permit approved by the Environmental Manager or delegate.

In addition to the above, discharges to land outside the boundary will only occur if consultation has been undertaken with the landowner and the discharge will not impact their property or operations and are compliant with the EPL and regulatory discharge criteria where applicable.

If the criteria are met, water can be discharged to land. If the above criteria are not met, treatment of water will occur in accordance with Section 3.1.3 or the water will be disposed of at an appropriately licenced waste facility.

3.1.2.3 Discharge to waters

Where discharges to waterways are undertaken, a Water Pollution Impact Assessment (WPIA) will be required which will inform the water quality discharge criteria included in the Project EPL. Until this occurs, surface water runoff which accumulates in sediment basins, sumps and other areas cannot be discharged to waterways. Discharge criteria for the Project is provided in Table 3-1.

Table 3-1 Discharge criteria for the Project

Discharge Source	Parameter	Unit of Measure	Discharge Criteria
Surface water runoff – sediment basins, sumps, trenches etc.	pH	pH	As per Environment Protection Licence
	Turbidity	Nephelometric turbidity units (NTU)	As per Environment Protection Licence
	Turbidity	Total Suspended Solids (TSS)	As per Environment Protection Licence
	Oil and Grease	Visible	As per Environment Protection Licence
	All other relevant parameters	-	As per Environment Protection Licence

3.1.3 Water Treatment

Water treatment will be required when water quality discharge criteria, as detailed in Section 2.1.2, is not achieved. This section provides guidance on the treatment methods which can be used however it's noted that specialist water quality/treatment personnel should be consulted for more detailed and scenario specific advice where necessary.

3.1.3.1 pH

The following provides guidance for treating pH where it does not meet the water quality discharge criteria.

1. Test water with appropriately calibrated pH meter
2. No action if pH reading between 6.5 and 8.5
3. Lime, soda ash (or similar basic compound) to be added if pH below 6.5
4. Hydrochloric Acid (32% Muriatic) or Sulfuric Acid (or similar acidic compound) to be added if pH above 8.5
5. Determine volume of water in basin or excavation to be treated
6. Bucket Test – Determine percentage of lime or acid required by taking a sample (e.g.10 litre) of basin or excavation water and adding a known amount of lime or acid (initially 0.004%). If the pH is still not acceptable, vary the amount of lime or acid until within the limits

7. Once the required percentage has been determined, calculate the actual amount of lime or acid to be added by multiplying the volume of water in the basin or excavation by the determined percentage
8. Add the required amount of basic or acidic compound to the basin or excavation
9. Mix the water in the sediment basin or excavation by pumping water to recirculate
10. Treat for pH prior to NTU.

The Safety Data Sheet (SDS) should be reviewed prior to handling to ensure appropriate controls and Personal Protective Equipment (PPE) are worn when handling chemicals which may include the following.

- Safety glasses with side shields, chemical goggles or full-face shields.
- Impervious PVC or butyl rubber gloves.
- PVC overalls/jacket/apron and butyl rubber Wellington boots.
- If handling indoors, approved respirator with replaceable vapour/mist filter.

3.1.3.2 Turbidity and Total Suspended Solids

Where the treatment of turbidity and/or TSS is required, there are several types of flocculants and coagulants which can be used. The use of a gypsum based product is the preferred method however other alternative flocculants/coagulants may be used where gypsum is not appropriate or feasible. Care should be taken to when using alternative products to ensure the correct dosage rates are applied to prevent any inadvertent impact to waterways. The following provides guidance on the application methods of gypsum to treat turbidity and/or TSS.

- Broadcast by shovels – recommended dosage is 30kg – 50kg/100 cubic meters. Spreading powder evenly and thinly (i.e. “dusting”) is recommend.
- Mixing in a drum with water and pumping through a hose on large basins or excavations (i.e. >200m3).
- When using liquid gypsum or liquid flocculants, the solution must be mixed before use to ensure the product is evenly suspended throughout mixture. To be applied as per manufacturer instructions.

Basins or excavations should be monitored and recorded daily after flocculation until desired turbidity is achieved and to assist in determination of optimal dosage levels.

3.1.3.3 Oil, Grease and Other Hydrocarbons

The following provides guidance on the method for treating water if it does not meet the discharge criteria for oil and grease.

1. Examine surface of water for evidence (e.g. sheen, discoloration).
2. No action if no visual contamination.
3. If visual contamination is observed (rainbow sheen, dark oil discolouration), use absorbant materials to remove which may include floating booms, Xtrasorb, pads/socks etc. Depending on the extent of contamination, a sucker truck or oil/water separator may also be required.
4. Leave basins to compensate for 24 to 48 hours, or until contamination is no longer evident.
5. Where significant contamination occurs which the above methods cannot rectify, other treatment methods may be investigated or the water removed and disposed at a licensed waste facility.

3.1.4 Discharging Water

3.1.4.1 Testing

All water must meet the water quality discharge criteria, prior to being discharged. If the criteria are met, the water is suitable for discharge. If the criteria are not met, treatment of water will occur in accordance with Section 3.1.3.

Water quality testing will be conducted in accordance with:

- *Australian Standard 5667:1998 Water Quality – Sampling, Part 1: Guidance on the design of sampling programs, sampling techniques and the preservation and handling of samples* (AS/NZS 5667.1:1998)
- *Australian Standard 5667:1998 Water Quality – Sampling, Part 6: Guidance on sampling of rivers and streams* (AS/NZS 5667.6:1998)
- *Approved Methods for Sampling and Analysis of Water Pollutants in NSW* (EPA, 2022).

In situ water quality parameters will be recorded and grab samples collected for laboratory analysis (as required). Water quality testing will be undertaken less than 24 hours prior to a controlled discharge and daily for any continued controlled discharge or when rainfall causes runoff to the source of water under control discharge.

3.1.4.2 Discharge, inspection and monitoring

Once the water is compliant with the water quality discharge criteria, the Environment Manager (or delegate) will inspect the entire system, including intakes and outlets, pumping and discharge locations. If deemed satisfactory, the Environment Manager (or delegate) will issue a dewatering permit.

The dewatering activities will be directly supervised by personnel trained in this Procedure. Dewatering must be undertaken to prevent the following occurring.

All dewatering activities, whether offsite or onsite, are monitored to prevent the following from occurring.

- Intake suction placed within the deposited sediments resulting in discharge of sediment laden waters
- Erosion at discharge locations and downstream areas
- Inadvertent or intentional controlled discharge of untreated waters
- Downstream flooding of properties
- If native fish become stranded as a result of dewatering activities, they are to be relocated by a qualified aquatic ecologist where feasible.

During site water discharges visual monitoring, involving observations for sediment plumes, will be undertaken during the operation to identify potential impacts to water quality. The monitoring regime and frequency is to be specified in the site-specific discharge permit prior to commencement.

Mandatory requirements for discharging water are as follows.

- Ensure the pump is manned at all times during dewatering
- Ensure the pump intake is setup/positioned so it does not draw up sediment.
- Ensure that the discharge point is stabilised (e.g. with geofabric, plastic or rock) so that it will not cause scour, erosion or re-suspension of sediment
- Check the discharge point regularly to ensure it remains clear of visible sediment and appears clean.

Dewatering will cease immediately if any negative environmental impact such as flooding, erosion or dirty water discharge is observed.

3.1.5 Farm Dam Dewatering

The Farm Dam Dewatering Procedure is provided in Appendix E of the Biodiversity Management Sub-Plan and should be read in conjunction with this Procedure.

3.2 Groundwater dewatering

The discharge of groundwater will require further assessment to identify the existing groundwater quality/contamination, suitability of discharge to waterways and any potential reinjection methodologies. If groundwater dewatering is proposed, it will be assessed via the WPIA and any discharge criteria included in the EPL.

Approvals to extract groundwater, such as a Water Access License (WAL), may also need to be considered.

3.3 Water Treatment Plants or Concrete Batch Plants Effluent

Where discharges from water treatment and concrete batch plants to waterways are proposed, a WPIA will be required which will inform the water quality discharge criteria included in the Project EPL. Until this occurs, water treatment and concrete batch plant discharges must not exceed the following which is also provided in Table 3-2.

- *The Australian and New Zealand Guidelines for Fresh and Marine Water Quality 2018* (ANZG 2018) default guideline values for toxicants at the 95 per cent species protection level;
- For physical and chemical stressors, the guideline values set out in Tables 3.3.2 and 3.3.3 of the *Australian and New Zealand Guidelines for Fresh and Marine Water Quality 2000* (ANZECC, 2000); and
- For bioaccumulative and persistent toxicants, the ANZG 2018 values at a minimum of 99 per cent species protection level.

Table 3-2 Water treatment plant and concrete batch plant discharge criteria

Discharge Source	Parameter	Unit of Measure	Discharge Criteria
Water treatment plant	pH	pH	ANZG 2018
	Turbidity	Nephelometric turbidity units (NTU)	ANZG 2018
	Turbidity – TSS	Total Suspended Solids (TSS)	ANZG 2018
	Oil and Grease	Visible	ANZG 2018
	Default guideline values for toxicants	-	ANZG 2018
	Physical and chemical stressors	-	ANZECC 2000
	Bioaccumulative and persistent toxicants	-	ANZG 2018
	pH	pH	NSW WQO

Discharge Source	Parameter	Unit of Measure	Discharge Criteria
Concrete batch plant	Turbidity	Nephelometric turbidity units (NTU)	NSW WQO
	Turbidity – TSS	Total Suspended Solids (TSS)	NSW WQO
	Oil and Grease	Visible	NSW WQO
	All other relevant parameters	-	NSW WQO

4 Records

The Environment Manager (or delegate) will maintain records of relevant data, including records of water quality management and water discharge permits. A record will be maintained for each discharge that will include:

- Date and time for each discharge at each location
- Water quality test results for each discharge
- Personnel approving the dewatering activities
- Evidence of discharge monitoring, or risk assessment and mitigation measures used to eliminate the risks of pollution or erosion
- Quantity of water pumped and/or sourced and provided to IRPL upon request
- Details of aquatic fauna captured and relocated after dam dewatering has occurred
- Any other EPA licence requirements.

4.1 Pollution incident response management

Pollution incidents will be managed in accordance with stage specific Pollution Incident Response Management Plan (PIRMP), which is required by the EPL and included in the CEMP. The PIRMP will be prepared and tested in accordance with Environmental Guidelines: Preparation of Pollution Incident Response Management Plans (EPA, 2012).

The PIRMP will include a description and likelihood of hazards on site, including an inventory of potential pollutants, pre-emptive actions to be taken to minimise or prevent risk of pollution incidents and harm to site personnel, safety equipment available, a list of contact details for response or notification and community communication tools. The PIRMP will also set out detailed descriptions of the actions to be undertaken in the event of a pollution incident to reduce or control pollution, and training for staff in the use and implementation of the PIRMP

Appendix D – Spill Response Procedure

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1 Terms and Abbreviations

Definitions and abbreviations relevant to this Spill Response Procedure are provided in Table 1-1.

Table 1-1 Definitions and abbreviations relevant to this Spill Response Procedure

Term / Abbreviation	Definition / Expanded text
CEMP	Construction Environmental Management Plan
CoA	Conditions of Approval
CSSI	Critical State Significant Infrastructure

Term / Abbreviation	Definition / Expanded text
EIS	Environmental Impact Statement
EPBC	*Environment Protection and Biodiversity Conservation Act 1999*
EPL	Environmental Protection License
Incident	An occurrence or set of circumstances that causes or threatens to cause material harm and which may or may not be or cause a non-compliance.
Material Harm	is harm that: (d) involves actual or potential harm to the health or safety of human beings or to the environment that is not trivial; or (e) results in actual or potential loss or property damage of an amount, or amounts in aggregate, exceeding $10,000, (such loss includes the reasonable costs and expenses that would be incurred in taking all reasonable and practicable measures to prevent, mitigate or make good harm to the environment).
PIRMP	Pollution Incident Response Management Plan
PPE	Personal Protective Equipment
RMMs	Revised Mitigation Measures
SDS	Safety Data Sheets
SSI	State Significant Infrastructure
SWMSP	Soil and Water Management Sub-plan
The Project	Inland Rail - Illabo to Stockinbingal Project
Work	Any physical work for the purpose of the Critical State Significant Infrastructure (CSSI) including construction and low impact work but not including operational maintenance work

2 Introduction

2.1 Purpose and Scope

The purpose of this Spill Response Procedure (this Procedure) is to detail the procedure to be carried out for spill response associated with construction activities on the Inland Rail - Illabo to Stockinbingal Project (the Project). This Procedure includes site specific advice and control measures for responding to spills and ensure compliant and appropriate response, handling, and disposal.

This Procedure is an appendix of the Soil and Water Management Sub-plan (SWMSP) which forms part of the Construction Environmental Management Plan (CEMP) for the Project.

This Procedure has been prepared to address the requirements related to soil and water management, particularly dewatering activities, associated with Infrastructure Approval (SSI-0406) and associated Conditions of Approval (CoA), the measures listed in the Environmental Impact Statement (EIS) as amended by the Submissions Report (known as Revised Mitigation Measures (RMMs)), Environmental Protection License (EPL), Commonwealth Approval (EPBC 2018/8233) and all applicable legislation, guidelines, standards and specifications.

This Procedure is applicable to all activities conducted by site personnel (including sub-contractors) that have the potential to require transfer, movement or dewatering on-site during construction of the Project.

2.2 Objective

The objectives of this Procedure include:

- Ensure compliance with environmental requirements of the Project
- Provide a clear methodology for spill response procedures to mitigate the environmental impacts of any spills.

2.3 Training

All personal involved in the project will be trained during the project induction in the requirements of this spill response procedure. Training will also include toolbox talks, pre-starts and targeted training as required.

3 General Mitigation Measures

The following general mitigation measures are to be implemented to prevent or minimise the impact associated with an environmental spill.

Appropriate security measures will be implemented to prevent unauthorised access by the public to the work site.

- Fuel, chemical storage and handling areas will be clearly identified with signage
- Fuel, chemical storage and handling areas will be regularly checked for signs of spills and ensure the capacity of secondary containment is maintained
- Bunds must have 110% capacity of the total volume of liquids stored (*Australian Standard AS 1940-2004: The storage and handling of flammable and combustible liquids*)
- Hazardous substances will be stored onsite in lockable containers, in their original receptacles only
- All hazardous substances will be clearly labelled and have Safety Data Sheets (SDS) available nearby

- All hazardous substances will be stored and managed in accordance with the *Storage and Handling of Dangerous Goods Code of Practice* (WorkCover NSW, 2005) and *Hazardous and Offensive Development Application Guidelines*
- An up-to-date register of hazardous substances will be kept onsite at all times
- Hazardous substance use that could result in a spill will not be carried out near drainage or stormwater lines and, wherever possible, will be conducted within defined bunds. Where practical, small bunds will be provided on site to provide temporary storage for small containers at the point of use.
- Spill kit and fire response equipment will be located where chemicals are stored and where refuelled plant are operated or maintained. If refuelling is undertaken on site, it will be in a designated area away from drainage lines. All refuelling activities will be supervised.
- All spills or leakages will be immediately contained and cleaned up, ensuring waste material is appropriately disposed of
- Used packages (drums and containers) and containers storing waste liquids must be sealed and disposed of in accordance with the Waste and Resource Use Management Procedure
- Plan and execute the works so as to minimise the possibility of pollution of the site and adjoining areas by chemicals, dangerous goods and other potential contaminants.

4 Spill Response Summary

The spill incident response process is detailed below and provided in Figure 4-1. A photographic example is provided in Section 4.1 (Figure 4-2 to Figure 4-9). This procedure should be read in conjunction with the incident management process detailed in Section 6 of the CEMP and the Pollution Incident Response Management Plan (PIRMP).

1. Control the source of the spill; stop the leak, close the valve, and turn off the machine.
2. Contain the spilled material to a smallest area possible:
    a) Spills on land: On bare soil, use soil to create a bund to prevent the spill from spreading. Shovel up or excavate any contaminated soil and dispose of to a licensed landfill site. On non-impervious surfaces, use spill kit socks (or sandbags or similar) to form a bund downhill from the spill to stop it from spreading; place the spill kit under leaks; broadcast absorbent material over the spill and work towards the centre of the spilled material with a stiff bristle broom. Mop up liquids with spill kit pads or pillows; sweep, shovel or vacuum up granular absorbent material; dispose to a licensed landfill site.
    b) Spills on water: Deploy a floating boom on the downstream side of the spill. Consider wind direction and current or tidal flows. Slowly pull the boom around the spill and draw it back into a small area. Position hydrophobic absorbent pads or hydrophobic granular material over the surface of the spill contained by the floating boom.
3. Contact and report spill to the Supervisor and/or Environment Representative.
4. Identify the spilled material and refer to the SDS for any specific Personal Protective Equipment (PPE) requirements.
5. Clean-up using the spill kit materials, absorbent sweep, absorbent pads, and implement any specific procedure specified in the SDS.
6. Place the spill response materials in the contaminated waste bags and place the contaminated materials in the allocated area on site. Pending disposal to a licensed facility. Do not place contaminated materials into general waste bins.
7. Communicate details of the incident and response efforts. Complete the Environmental Incident Report and submit the details and improvements to the relevant stakeholders.
8. Restock the spill kits after use.

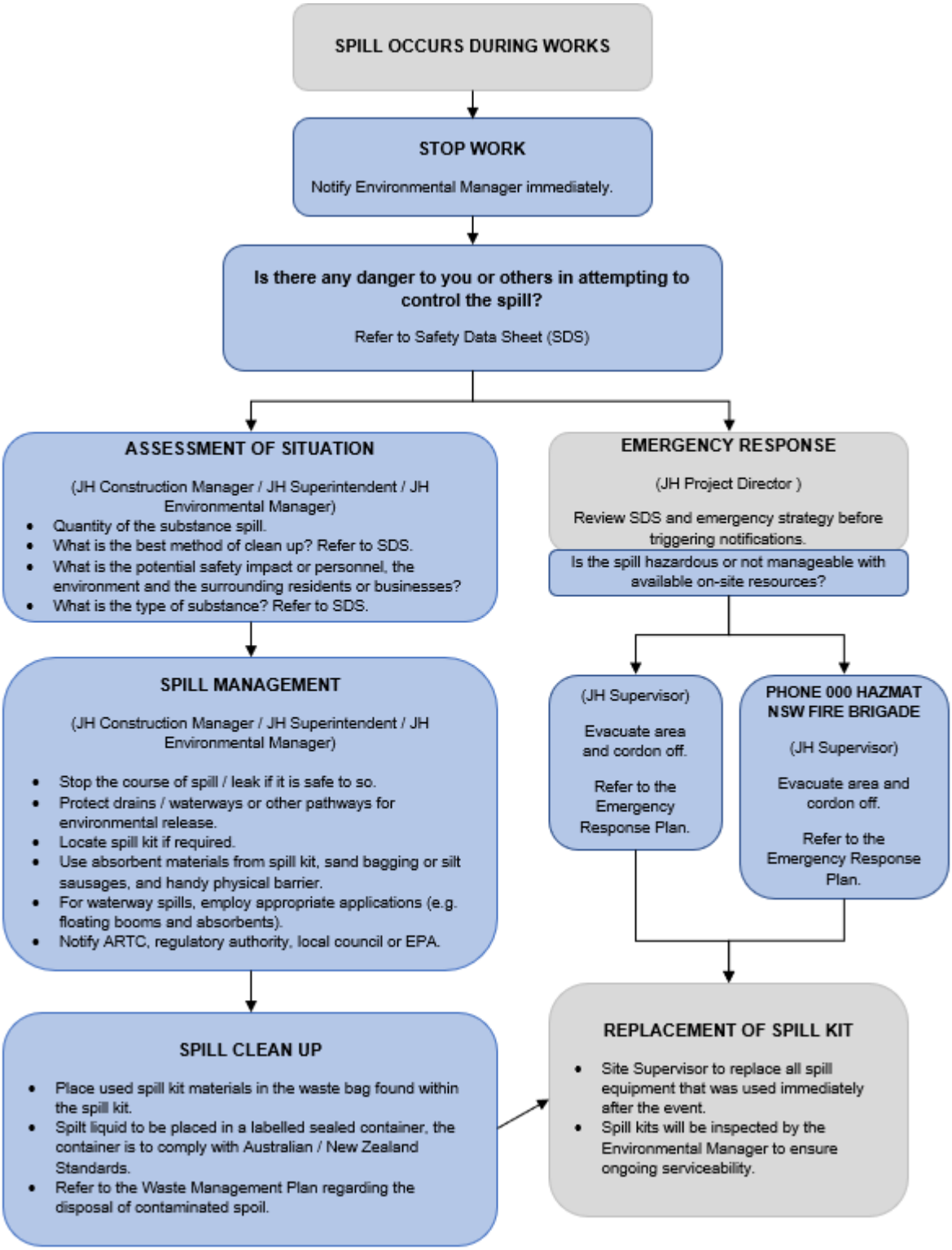


Figure 4-1 Spill incident response process

4.1 Spill Response Procedure – Photographic Example

A photographic example of the spill response steps is provided in Table 4-1.

Table 4-1 Photographic example of spill response steps

Step	Description
1	Turn off the plant/equipment causing the leak. Contain the spilled material to a smallest area possible, using booms, bunds or another suitable material. When the spill is contained, and the leak and source has been stopped. Contact the Supervisor.  **Figure 4-2 Containment of spilled material**
2	Once contained, install absorbent sweep. Ensure that the absorbent sweep is placed across the spill and thoroughly swept in multiple times.  **Figure 4-3 Absorbent sweep**

Step	Description
3	Use the absorbent pads to soak up the spill. Place all spill materials into the clearly labelled contaminated waste bags and tie up the bag 
	Figure 4-4 Absorbent pads
4	Once the pads and absorbent sweep has be used, conduct a final spray of the dispersant to collect any surface remnants caused by the spill. Use pads to collect the surface remnants and placed in contaminated waste bag. 
	Figure 4-5 Spray dispersant

Step	Description
5	If the spill is on the ground. Remove the contaminated and earthen materials and place in the contaminated waste bags.  Figure 4-6 Remove the contaminated and earthen materials
6	Place all materials, absorbent sweep, spill pads and contaminated earthen materials into the contaminated waste bags.  Figure 4-7 Use contaminated waste bags

Step	Description
7	Place the contaminated waste bags into the designated hydrocarbon waste site facility. This will include steel drums, fully bunded, signed and secured.  **Figure 4-8 Designated hydrocarbon waste site facility**
8	Restock the spill kits. Ensure they have all items, including: • Absorbent Pads • Absorbent Mini-Booms • Absorbent Pillows • Absorbent Sweep • Contaminated Waste Disposal Bags & Ties • Nitrile Rubber Gloves • Heavy Duty Brush and Shovel Set • Laminated Instructions  **Figure 4-9 Spill kits**

Appendix E – Erosion and Sediment Control Strategy

Primary Erosion and Sediment Control Strategy

Inland Rail

Illabo to Stockinbingal

CONTRACT No.: TBA

Revision History

Rev	Prepared By	Approved By	Date	Description/Summary of Changes
A	Bradley Cole		13 March 2025	Initial Draft for Review
B	Bradley Cole		17 July 2025	Updated Draft following Agency Review

Draft issues of this document are identified as Revision A, B, C etc. Following acceptance by the document approver, the first finalised revision will be Revision 0. Subsequent revisions will have an increase of "1" in the revision number (1, 2, 3 etc.).

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1 Objective of this plan

John Holland Group (JHG) are committed to planning and executing the Work under the Contract for the construction of the Inland Rail – Illabo to Stockinbingal Project (I2S or the Project) as described in the Project specific Construction Environmental Management Plan (CEMP). The works are to be undertaken in a manner that does not cause erosion and/or pollute the environment. This strategy has been prepared with reference to revised mitigation measures (RMM) HF-6, SC-6 and WQ-3 to provide measures, processes and responsibilities to minimise the potential for soil and water impacts (including impacts to groundwater and geomorphology) during construction and details how Erosion and Sediment Control (ESC) will be managed and implemented during construction and provides:

- key management principles;
- management of specific areas/stages of construction;
- details of proposed erosion and sediment control measures;
- comments on the use or exclusion of existing operational structures within the ESC Strategy;
- proposed alternative approaches;
- specific approaches for sensitive areas and a process for planning inspection and review;
- guidance on planning and communication of ESC through model erosion and sediment control plans; and
- the commitment to training and communication with construction personnel.

This Plan has been developed in accordance with the principles discussed in the following publications and documents:

- Best Practice Erosion and Sediment Control (International Erosion Control Association (IECA), 2008)
- Managing Urban Stormwater, Soils & Construction, Vol 1. (Landcom, 2004);
- Managing Urban Stormwater: Soils and construction - Volume 2A Installation of services (DECC, 2008).
- Managing Urban Stormwater: Soils and construction – Volume 2C, Unsealed roads (DECC, 2008).
- Managing Urban Stormwater, Soils & Construction, – Volume 2D, Main road construction (DECC, 2008).

Upon commencement of construction activities, progressive erosion and sediment control plans will be developed to provide detailed and up-to-date information relating to specific areas and control measures. Progressive ESCPs will be updated as works progress or upon review of site condition performance to reflect the evolution of site conditions.

1.1 Supporting Documents

This plan has been prepared in reference to other key documents, strategies and procedures for the Project, which collectively provide a holistic approach to the site management of erosion and sediment control for the I2S Inland Rail construction activities.

1.1.1 SWMSP

This plan should be read in conjunction with the approved Soil and Water Management Sub-plan (SWMSO) for the Projectand the overarching soil and water management guidelines maintained by IRPL as part of the Environmental Management System and Contract requirements. The SWMSP provide guidance on roles and responsibilities on site, monitoring requirements for water quality objectives and Project specific requirements for the management of soil on the site.

1.1.2 PESCP's

Progressive Erosion and Sediment Control Plans (PESCP's) will be developed for the site throughout the construction period. These plans will be developed in accordance with this strategy and will document the specific measures to be implemented within the work areas.

Project Engineers, Superintendents, Foremen, Certified Professional in Erosion and Sediment Control (CPESC), and environmental management staff will be responsible for the development and implementation of PESCP's on site. This

will ensure that erosion and sediment management is incorporated into the planning phase of construction activities. PESCPs will be reviewed and certified by the Project CPESC. A hold point is to be established at the time ESC measures have been installed and prior to works commencing in the catchment. Sign-off is to be provided by a CPESC (or delegate) that the controls have been adequately installed.

PESCP's will reviewed every three months (or more frequently if progression of works fundamentally change landscapes and site management requirements) and updated as required. Once approved by the Project CPESC, all revisions will be controlled and allocated an appropriate revision number. PESCP's will be maintained in a site-specific register and available to site personnel for reference. A process for the preparation, review and auditing of PESCP's is detailed in the SWMP.

PESCP's will generally be prepared on site / design layout plans and/or detailed drainage diagrams, however topographic maps (aerials) or digital base layers may also be utilised where relevant and effective. PESCP's will incorporate the following aspects:

- title, date and revision number;
- details regarding the implementation period and staging;
- a layout of the site, including the location of access roads, ancillary infrastructure, stockpile locations;
- protected vegetation, heritage, potential contaminated sites and disturbed (cleared) areas;
- the location of temporary and permanent erosion and sediment control measures proposed to treat storm water prior to discharge (including vegetated treatment systems); and
- approval and signoff from CPESC (if applicable).

A concept PESCP has been developed for the Project and provided in Appendix 2. It's noted that the intent of this concept PESCP is to illustrate the general approach to erosion and sediment control management and indicate the potential location and type of controls which may be implemented throughout the Project. Site specific PESCPs will be developed for each work area as the Project progresses.

1.1.3 EWMS

An environmental work method statement will be prepared for high risk activities as defined by the Project risk assessment or as specified in the Project contract. These work statements will detail the specific requirements for the high-risk activity and any additional requirements required.

1.1.4 Procedures

All staff on site will be trained in the approved Project procedures and guidelines for the management of site risks including erosion and sediment control management and dewatering activities as well and Project specific incident and reporting procedures.

2 Project Description

2.1 Key Project Components

The Project is located in south-western NSW in the Riverina region (Figure 1). Illabo is a small town located at the southern end of the alignment 16 kilometres (km) north-east of Junee in the Junee Local Government Area (LGA). Stockinbingal is situated at the northern end of the Project, approximately 20 km north-west of Cootamundra in the Cootamundra–Gundagai Regional LGA. The major towns surrounding the Project are Wagga Wagga, about 50 km to the south, Young to the north-east and Cootamundra to the east.

The Project comprises a new rail corridor that would connect Illabo to Stockinbingal (I2S). The alignment branches out from the existing rail line north-east of Illabo and travels north to join the Stockinbingal–Parkes Line west of Stockinbingal. The route will travel primarily through undeveloped land predominantly used for agriculture. The Project includes modifications to the tie-in points at Illabo and Stockinbingal to allow for trains to safely enter and exit the I2S section of Inland Rail. The alignment also crosses several local and private roads, watercourses and privately owned properties. Additionally, no major towns are located within the Project site between Illabo and Stockinbingal.

The Project will include a total extent of approximately 42.5 km, including 39 km of new, greenfield railway which will incorporate the following key features:

- Single track standard gauge on a combination of existing ground level embankments and within cuttings
- New bridges and road overpasses
- Crossing loop and maintenance siding
- New level crossings, stock crossings and upgrades to existing level crossings
- New major stormwater diversion and minor drainage works associated with installation and upgrades to culverts.

The Project will also include upgrades to approximately 3 km of existing track associated with tie-in works and construction of an additional 1.7 km of new track to maintain the existing rail network connections. Road upgrade works will also be undertaken to re-align approximately 1.4 km of Burley Griffin Way to provide a road-over-rail bridge at Stockinbingal. Re-alignment of Ironbong Road will also be completed to allow for safe sight lines. A temporary workforce accommodation camp will also be constructed to house the workforce for the duration of works. Key features of the Project are shown on Figure 1.A detailed Project description is provided in Section 3 of the CEMP.

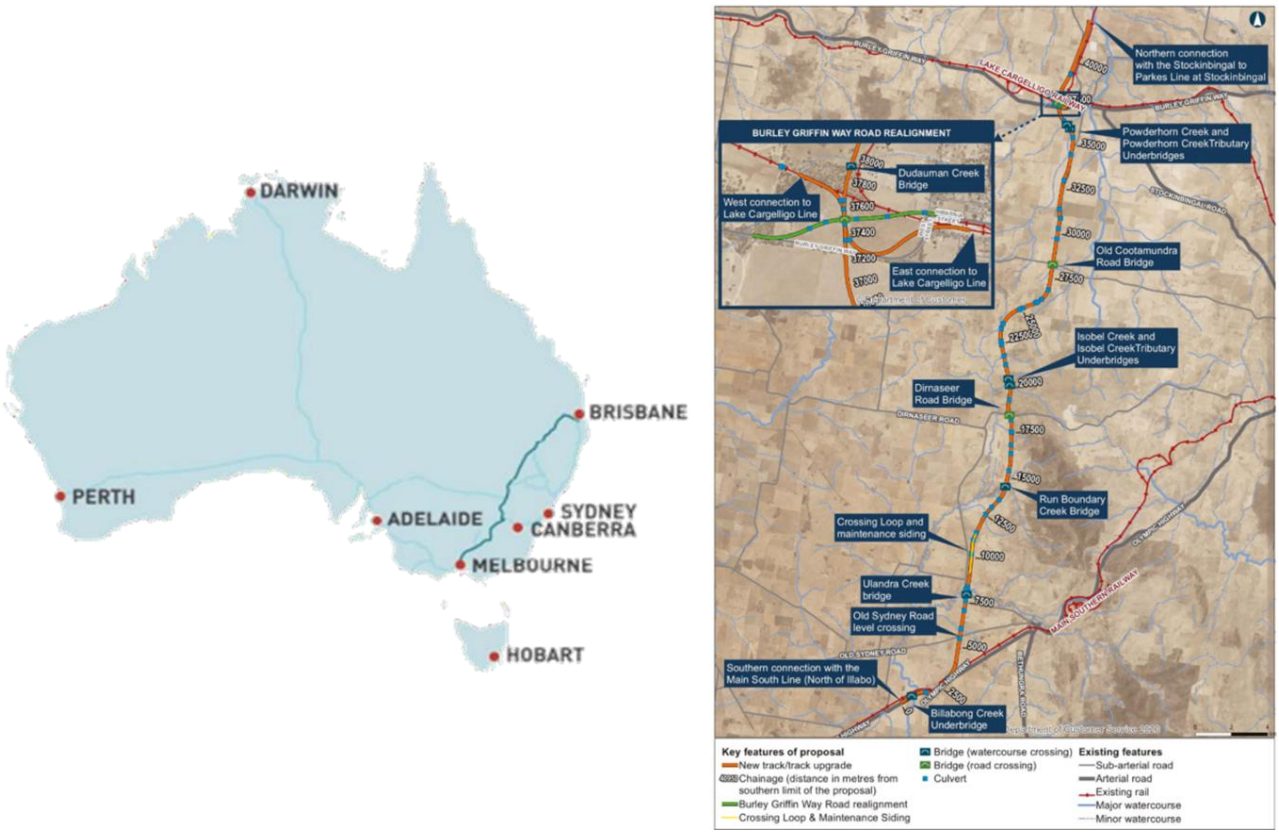


Figure 1 - I2S Project details and key Features.

Erosion and sediment impact from the Project has the potential to result in pollution of waters and offsite impacts if not managed effectively. For this Project erosion and sedimentation risks are related to the following aspects:

- stockpiling or material storage;
- earthworks exposing bare soils and affecting flow paths;
- drainage works;
- movement of vehicles and machinery on and off site; and
- wind and water impacts on exposed soils.

2.1.1 Preliminary Erosion and Sediment Assessment

Upon commencement of the Project, a Preliminary Erosion and Sedimentation Assessment (PESA) for the proposed works will be undertaken to assess the proposal works and identify areas of high risk based on the ground condition and receiving environments encountered. (Note: A preliminary / desktop PESA has been undertaken to inform the details of this document). These may include:

- Areas of land greater than 2500m^2 that would likely be disturbed;
- Soil erodibility and erosion hazard that has been mapped as very high for some parts of the proposal; and
- Receiving environments and wetlands which are located in proximity to the proposal.
- Sensitive landform and drainage features.

An Erosion and Sedimentation Management Report (ESMR) is to be prepared for projects that are identified as high risk in the PESA

2.2 Objectives and Targets

The objectives and targets cited in Section 4 of the SWMSP are applicable to this plan and have been designed to promote the environmental performance and mitigate impacts associated with the construction activities for the Project. Environmental performance will be monitored and work processes reviewed to improve, innovate and learn. Employees are responsible for complying with relevant procedures, reporting and rectifying non-compliance, and actively participating in meetings, committees and various training sessions to improve Project operations and performance.

2.3 Project Management System

The Project Management System (PMS) is based on the requirements of the JHG Environmental Management System and has been specifically tailored to ensure compliance with the contract requirements. The Project Management Plan and Construction Environmental Management Plan provides more detail about the process adopted to deliver against Project specific requirements.

3 Key Project Environmental Considerations

The Project is located in south-western NSW in the Riverina region (Figure 1). The route will travel primarily through undeveloped land predominantly used for agriculture. The alignment also crosses several local and private roads, watercourses and privately owned properties. Additionally, no major towns are located within the Project site between Illabo and Stockinbingal.

3.1 Surface Water

The upper catchment areas for the Project are largely regenerative and agricultural landscapes with limited development / residential areas. The surface water features for the Project are presented in Section 6.3.1 of the SWMP. Table 6-2 has been replicated below:

Watercourse	Catchment	Strahler stream order	Flow conditions	Proximity to Project	Comments
Dudauman Creek	Lachlan	3rd	Ephemeral	Intersected by the Project	Generally flows from south–north, turning east through Stockinbingal within the Project area. Flows are influenced by existing road and rail lines, and a number of levees identified near Stockinbingal.

Watercourse	Catchment	Strahler stream order	Flow conditions	Proximity to Project	Comments
					Dudauman Creek is intersected by the Project at two locations.
Powder Horn Creek	Lachlan	3rd	Ephemeral	Intersected by the Project	Generally flows from south–north and confluences with Bland Creek downstream of the Project area, and intersected by the Project site.
Bland Creek	Lachlan	5th	Ephemeral	Not intersected by the Project. Approximately 400m east of the Project Site at its closest point.	Generally flows from south to North. Dudauman Creek and Powder Horn Creek flow into Bland Creek.
Run Boundary Creek	Murrumbidgee	3rd	Ephemeral	Intersected by the Project	Flows in a north-westerly direction, before turning south east and confluencing with Ironbong Creek, and intersected by the Project site.
Isobel Creek	Murrumbidgee	3rd	Ephemeral	Intersected by the Project	Flows from east to west through the Project area, confluencing with Ironbong Creek and intersected by the Project site.
Ulandra Creek	Murrumbidgee	5th	Ephemeral	Intersected by the Project	Generally, flows from east to west and confluences with Ironbong Creek and intersected by the Project site.
Billabong Creek	Murrumbidgee	6th	Ephemeral	Intersected by the Project	Flows from north to south and intersected by the Project site.
Ironbong Creek	Murrumbidgee	3rd	Ephemeral	Not intersected by the Project. Approximately 250m west of the Project Site at its closest point.	Generally flows in a north–south direction, confluencing with Billabong Creek. Ironbong is not intersected by the Project—at its closest point the main channel is less than 250 m from the Project site.

3.2 Topography and drainage

The township of Stockinbingal has an elevation of 295 metres Australian Height Datum (AHD) and the south end of the Project site near Illabo has an elevation of 280m AHD. The Project area is located on gently to moderately sloping terrain. The topography of the southern portion of the Project generally slopes to the south and east. This transitions to higher ground in the central portion, with moderate undulations cut by Run Boundary Creek and Isobel Creek, north of Old Cootamundra Road, the Project passes through flat to gently sloping farmland, before passing through a low hillslope around Dudauman Creek.

The Project area is located within the upper reaches of the Murrumbidgee River and Lachlan River catchments which are not subject to regional flooding. Isolated flooding occurs within the Project area within local catchments. Flood levees have been constructed to mitigate existing impacts of flooding from Dudauman Creek within the township of Stockinbingal.

3.3 Soils

Soil landscapes identified in the Project footprint are presented in the table below:

Soil Landscape	Soils	Recorded Limitations
Stoney Hill	Generally shallow (<50 cm) deep gravelly tenosols and rudosols (young soils with limited profiled development) some deeper red kandosols and dermosols.	• Shallow, rocky soils • Localised erosion hazard • Localised salinity hazard • Low fertility
Eurongilly	Generally deep (>100 cm) clay dominated soils including imperfectly drained red and brown chromosols, kurosols and dermosols. Some poorly drained sodosols on lower slopes and drainage lines.	• Sheet erosion hazard • Localised gully erosion • Localised salinity hazard • Poor drainage • Localised acidity • Localised sodicity and dispersive soils • Low fertility
Ironbong Creek	Moderately deep (>50 cm) brown imperfectly drained chromosols and red Kandosols, and mottled brown sodosols on flood plains. Young kandosols and rudosols are present along creek lines.	• Seasonal waterlogging • Sheet erosion • Localised gully erosion • Poor drainage • Localised flood hazard • Localised topsoil acidity
Oakville	Deep red and brown chromosols on upper slopes and red and brown sodosols on lower slopes and depressions.	• Sheet erosion • Localised gully erosion • Poor drainage • Localised topsoil acidity • Localised salinity hazard • Low fertility
Twin Range	Shallow (<25 cm) to deep (>100 cm) tenosols and chromosols on crests, deep red chromosols and kandosols and dermosols on slopes and brown clay dominated sodosols and sandy tenosols on lower slopes and flats.	• Localised salinity hazard • Rock outcropping • Sheet erosion hazard • Localised poor drainage • Acidity • Dispersive subsoils
Frampton	Shallow (<50 cm) sandy tenosols on upper slopes, imperfectly drained red chromosols, dermosols and kandosols on mid slopes and poorly drained brown chromosols in drainage depressions.	• Soil erosion hazard • Topsoil acidity • Hard setting surfaces
Narraburra	Deep (>100 cm) sandy rudosols and poorly drained clayey sodosols along creek floodplains and depressions. Deep red chromosols and kurosols, brown dermosols on adjacent levees and plains and occasional red vertosols on back plains.	• Poor drainage • Sheet erosion hazard • Localised flood hazard • Localised salinity hazard • Seasonal waterlogging • Shrink/swell

The erosion potential of the soils across the Project site was assessed as low; however, evidence of significant soil erosion was identified in some areas of the Project site. Significant depths of gully/bank erosion within several incised drainage gullies and waterways, including:

- Ulandra Creek
- Isobel Creek – 60m downstream of the Project site
- Unnamed tributary of Isobel Creek – 80m downstream of the Project site
- Dudauman Creek – 300m upstream of the Project site.

The majority of soil landscapes identified within the Project area are identified to have localised salinity issues.

Given the distance of the Project site from the coast and its elevation, no ASS are expected or known to occur. A review of the Australian Soil Resource Information System (ASRIS) undertaken on 13 May 2019 (Commonwealth Scientific and Industrial Research Organisation (CSIRO), 2018) identified that the Project site is located in an area of low probability of ASS, also including inland ASS.

4 Key Principles

The PESCS draws upon the best management practices and principles to mitigate the overall environmental impact of the proposed upgrade. The objective of these is to minimise the pollution of ground and surface waters resulting from construction activities. This includes specific structures and measures to minimise erosion and sedimentation to be implemented in conjunction with various site management techniques. The following principles will apply to all areas and stages of the construction program:

1. minimise extent of ground disturbance;
2. control “clean” water around and through the work areas as they are undertaken;
3. implement erosion control strategies to prevent generation of sediment;
4. implement sediment control strategies to prevent off-site pollution;
5. progressive stabilisation following completion of each work area; and
6. monitoring of controls & strategies including maintenance requirements.

Specific erosion and sediment control measures as identified below will be implemented to achieve a dual phased approach to the mitigation of pollution. The approach will utilise site specific features, such as topography, vegetation, structures and infiltration areas to develop a complementary approach to the site erosion and sediment management.

4.1 Site management and hygiene

Maintaining a site that it is clean, free of excessive loose site material and where site erosion and sediment controls are well maintained and installed is the most effective means of preventing sediment pollution.

Key to effective site management is communication and integration of site sediment control activities into daily work practices. Staff will be inducted into the plans and made aware of not only the intent and function of site controls but also of their responsibilities in their use. Site shutdown procedures will be detailed for each construction area and use of controls included in work method statements.

Site erosion and sediment control plans will consider and address factors such as access, management of bulk material and sweeping. It will also detail key points for protection, the selection and location of sediment controls.

4.2 Minimise Site Disturbance

All works are to be undertaken within the impact boundary as detailed in the approval conditions. Due to the limited area available for the site works, in many cases the construction works will be constrained with little available space adjacent to the Project boundaries.

The PESCPs is aimed at utilising existing drainage infrastructure where appropriate and will minimise clearing of native vegetation for additional control measures where possible. The PESCP aims to address each individual areas as a separate management location to reduce impacts and cross contamination of areas as far as reasonably practicable.

Erosion and sediment controls will be implemented prior to works with ongoing ,measures implemented concurrently with earthworks operations.

4.3 Separation of site and non-site water

Separation of construction water and off site water running through the Project (drainage lines, paved areas, existing drainage network etc.) is central to the erosion and sediment strategy proposed in this document. Off site water will be diverted around and through the site without contamination and/or mixing with construction runoff. This will be achieved through constructing adequately sized diversion structures with suitable armouring to prevent erosion of such structures. These include;

- concrete cut-off drains;
- lined channels;
- diversion banks; and
- permanent and temporary culverts.

The absence of space for substantial sediment controls and basins necessitates that water from the construction areas to be managed and treated as close to the source as practicable using numerous smaller or alternate sediment controls prior to release. The separation of these waters enables the volume of water requiring treatment to be minimised.

4.3.1 Existing drainage

Construction work associated with the Project will be carried out adjacent to the existing infrastructure for which the existing stormwater system comprises a combination of pit and pipe subsurface structures and surface diversion / table drains. Cross drainage occur at various locations along the length connecting stormwater pits and pipes.

This system shall remain operational throughout the Project and will be upgraded as part of the proposed works.

To ensure best practice in sediment control, the existing drainage infrastructure shall be maintained separate from the movement of site waters within the various construction areas wherever possible. This includes isolation of construction areas from water moving through and across the site area with the local topography (north to south).

Construction water shall only mix with off site water where no other option exists to separate and manage water. These combined locations will be marked on the site specific PESCP and will be treated using appropriate construction sediment controls.

Work staging will accommodate expansion and improvements to the existing stormwater drainage and construction of the new stormwater network within the progressive erosion and sediment control plans.

4.3.2 Catchment areas and working around drainage lines

The Project exists in a gently undulating plain with broad catchment areas. Key catchment features include Run Boundary Creek and Isobel Creek, north of Old Cootamundra Road and, Dudauman Creek associated with the sloping farmland in the southern areas.

The small topographical variation provides gradual catchment runoff velocities with the transfer of surface waters into creek lines and drainage depressions the principle drainage activity of the Project work areas. Due to limited traverse drainage areas the focus of the Project water management strategy will be to provide a clean water pathway for the carriage for all catchment water through or diverted around the site without contamination. This will be achieved by several measures including lined channels and temporary pipes. These measures and their use are described in more detail in Section 5.

4.4 Erosion Control

Mitigation of erosion within construction sites is to be the primary approach for the prevention of pollution. A proactive and committed approach to erosion control will minimise the sediment generated from the site and lessen the chance of off-site impacts.

Construction activities will be planned and undertaken to:

- ensure any permanent erosion control measures are in place prior to construction;
- prevent water moving into the site from external areas;
- minimise the extent of disturbed areas and rehabilitate disturbed areas quickly;
- reduce length and steepness of slopes to reduce water velocity over exposed surfaces;
- limit volume of water movement within the site by taking water from work areas at regular intervals where this is practicable; and
- Implement erosion control measures in high risk areas such as sensitive sites.

4.5 Sediment Control

Although essential, sediment controls are considered secondary to erosion controls in minimising ground and surface water pollution resulting from construction activities in Projects with confined corridor construction. The aim of this strategy will be to first reduce erosion (Section 4.4) and then capture sediment as close to the source of erosion as possible.

This will be achieved using multiple small measures, as reliance on a lesser number of large structures is not possible due to site constraints. Runoff from construction areas will be managed to ensure the highest possible water quality standard prior to its exit from the site, within design requirements.

Selection measures to use at specific locations will be based on site specific factors including the level of site disturbance required to construct, effectiveness, practicality given construction activities and ease of maintenance. Measures will be selected for their effectiveness as well as practicality in construction and use by work teams. Where suitable, measures will utilise the existing topography and vegetation cover.

In all cases, a primary consideration in implementing effective controls will be through effective site management and the correct selection, location and number of control measures. A suitably qualified CPESC will be engaged to assist in planning and then to continually monitor and improve implementation of control measures during construction.

4.6 Revegetation and Temporary Stabilisation

Sites will be progressively revegetated or temporarily stabilised following completion and/or suspension of construction activities. Required treatments will be nominated within the site PESCP and included in the construction schedule to ensure that materials and resources are available for correct and timely application. Rehabilitation will be undertaken in accordance with the Rehabilitation Strategy and Individual Property Plans.

Prior to carrying of significant volume or concentrated flows, drainage lines are to have either adequate vegetation cover, armouring or lining equivalent to a maximum C-factor of 0.05 (70% groundcover equivalent). A combination of hydro mulching, hydro seeding and hand-seeding of batters may be implemented to achieve permanent rehabilitation. Site materials such as topsoil and mulched native vegetation will also be extensively used to promote revegetation and achieve immediate cover and protection of exposed areas. For smaller, temporary channels these are to be protected with checking measures such as gravel bags or stacked rock.

Lands (drainage lines, batters, stockpiles) which are to be left exposed without works activities for extended periods (>5 days) are to be protected. As a minimum, the controls identified in the site specific PESCP will be implemented. For high erosion risk sites, additional control measures may be required as detailed in the Project's ERSED shutdown procedure Additional control measures for these high-risk areas may include covering with construction fabric or plastic, or sprayed with a suitable soil binder.

Permanent rehabilitation of sites will aim to achieve a C-factor of 0.05 (70% groundcover equivalent) over a period of 60 days following completion of works.

4.7 Monitoring and Evaluation

The installation and maintenance of all soil and water management works on the site are to be continually monitored to ensure effective operation, correct implementation and modification of Primary and Progressive Plans when necessary. Daily monitoring of measures will be undertaken by internal environment and construction staff and site management personnel (e.g. Project Manager, Senior Engineers). Training will be provided to site personnel to raise the level of skills and awareness of effective erosion and sediment control.

Post rainfall inspections will be undertaken to ensure controls are operating effectively and to identify the requirement for additional controls, modification of existing controls and /or maintenance of existing controls.

Regular inspections, monitoring and updating of PESCPs will be undertaken by a CPESC (Soil Conservationist) at least monthly during key construction activities. The frequency of inspections and monitoring by the CPESC will be determined by the requirements of the construction activities and the site risks at the relevant time with a ersosion risk assessment prepared for justification of altered inspection regimes.

5 Sensitive Area Management

Within the Project, there are several particularly sensitive areas which require a carefully considered approach to erosion and sediment control. The Project traverses a diversity of environmental and socially sensitive areas. To assist pre-construction planning and onsite construction management, these constraints are consolidated on a series of map-based sheets that extend the length of the Project.

Sensitive Area Plans include information pertaining, but not limited to:

- Flora features, including threatened species and endangered ecological communities;
- Local waterways and sensitive wetland areas;
- Areas of high erosion hazard;
- Identified contamination areas
- Areas of cultural sensitivity; and
- Recorded threatened fauna sightings.

These are identified in Appendix A5 of the CEMP.

5.1 Clearing Procedure

Minimal clearing is to be required for the undertaking of the Project with large areas of grasslands and agricultural areas being the dominant vegetative landform. Where vegetation clearing is required, the initial clearing of the site will be undertaken in a staged manner to minimise the area of the site exposed to erosion at any one time. Cleared vegetation is to be stockpiled in windrows across the contour of the disturbed area to act as a sediment control in slowing the flow of surface waters. PESCPs will be implemented on the Project prior to undertaking wide scaled clearing to control site water.

Wherever possible clearing activities will maintain native vegetation buffers, and avoid significant stands of vegetation within the site that do not conflict with the road footprint or key Project features. This may require minor design alterations to minimise the impact on existing vegetation. This will be undertaken on a case by case basis and be undertaken in consultation with IRPL.

Refer to the Clearing Procedure provided in Appendix B of the Biodiversity Management Sub-plan for further details.

5.2 Clearing around Drainage lines and Waterways

Vegetation in drainage lines will be retained until drainage works are scheduled to begin. Where clearing is required for access or other requirements prior to drainage works, the vegetation near drainage lines will be cut at the stump with root structures retained in the ground and ground disturbance minimised.

Clearing of riparian vegetation will be undertaken to avoid excessive disturbance of bed and banks. Riparian clearing will commence with ‘scarfing’ involving the retention of roots and large woody vegetation. Ground disturbance to be minimised in all riparian areas until appropriate erosion and sediment controls can be installed.

Refer to the Working Within and Adjacent to Waterways Procedure provided in Appendix D of the Biodiversity Management Sub-plan for further details.

5.3 Access Tracks and Haul Roads

Potential for the sediment tracking onto public roadways is recognised as a key environmental risk on the Project. This risk will be addressed through a focus on maintaining stable trafficable surfaces within construction areas which are free of excess material or areas of poor drainage. Regular inspection and maintenance of site access points is to be nominated within the site PESCPs as will regular sweeping and clearing of adjacent road way surfaces. Stabilised access areas will be provided to work compounds in accordance with best practice requirements (refer Figure 1).

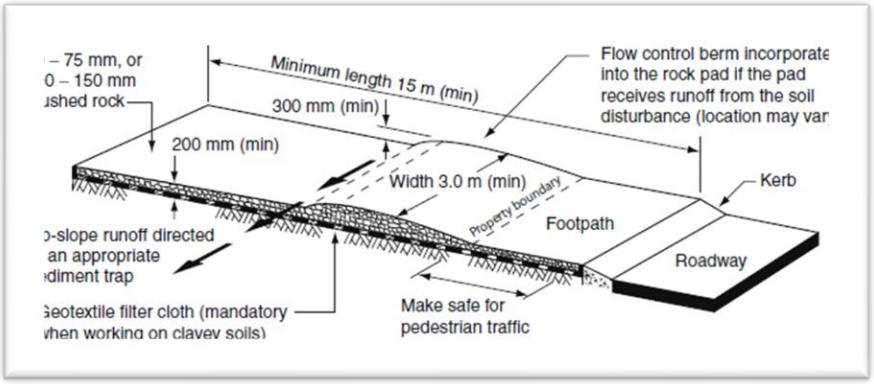


Figure 1 Stabilising access tracks

Existing and permanent access tracks will be used in preference to creation of new tracks when these are available. These existing tracks will be enhanced with improved drainage and surfacing if required.

New formed access tracks or enhanced access tracks will be:

- within the extent of approved Project boundaries, with clearing minimise to essential areas;
- graded to a crown, or will include cross-fall drainage, trafficable cross banks or similar drainage measures;
- constructed as stabilised surfaces (including batters)
- constructed with appropriate sediment control measures including rumble grids, catch drains, drainage outlets, sediment fence etc;
- of a maximum slope of 15%, wherever possible;
- constructed with drop-down structures and dissipater where drains divert water over exposed fill batters;
- inspected and maintained regularly; and
- ripped and rehabilitated following construction.

5.4 Works Around Drainage lines

As part of the works, significant enhancement to the existing stormwater infrastructure is planned. These works include:

- Construction of drainage;
- Connection of new lines with in with existing pipes;
- Extend existing pipes;
- New table drains and surface water channels.

To avoid or minimise erosion and any adverse impact on water quality and riparian fauna and flora, construction activities are to be planned and scheduled, as much as feasible and reasonable, to be undertaken in dry conditions. If work is to continue over an extended period, exposed surfaces are to be covered with geotextile or similar material and secured with pins or sandbags. Clearing of riparian vegetation is to be minimised where practicable, and access to

waterways is to be restricted to the minimum amount of bank length required for an activity. Where practicable, stumps in riparian zones and aquatic habitats are to be retained to reduce the potential for bank erosion. Work staging for these activities is to be detailed in the relevant PESCP specific to the location works.

5.5 Earthworks

Some fill operations are proposed to support the new infrastructure. The following approaches for the various earthworks have been developed to minimise the potential for soil loss and subsequent sedimentation resultant from the earthworks phase of the Project.

5.5.1 Batter formation

Batters are typically designed with a 2h:1v grade. Although a reduced batter grade is more desirable from a potential erosion perspective, this also increases the footprint of the alignment which has other environmental implications associated with additional clearing. Prior to revegetation, steep batters have the potential to experience sheet and rill erosion if site water is not controlled effectively over the formation. To assist in the retention of topsoil on batters, and their subsequent stabilisation, any batters will be constructed with the following principles:

- Clean water to be diverted around site (cut-off drains, push banks, temporary lined channels);
- Where required, ensure top of batter drains are in place and functioning as per engineering plans to capture and direct catchment waters to stormwater system;
- Site runoff above batters will be diverted away from the batters using small diversion bunds or directed to a batter chute to move from top of formation to toe of batter and sediment control structures (refer Figure 2);

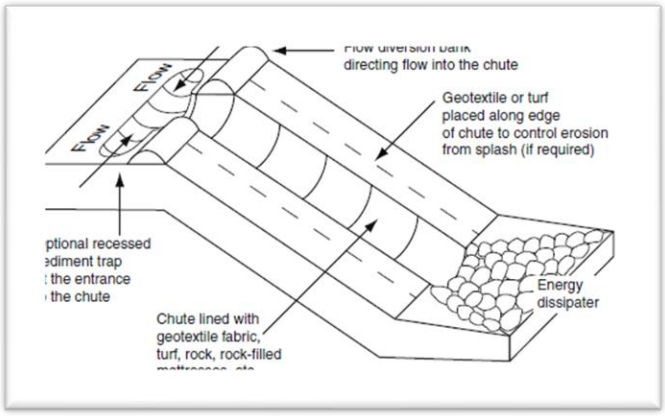


Figure 2 Batter chutes

- Topsoil to be stripped and stockpiled in designated areas or wherever possible direct transferred to minimise stockpiling impacts;
- Batters to be constructed as per plans, utilising a bench in the batter to control water flow on larger slopes with water released from the construction area at regular intervals;
- Sediment control structures such as rock and sandbag checks, mulch bunds and detention areas (sumps) will be utilised to contain runoff;
- Batters to be 'roughened' horizontally along the contour and progressively topsoiled;
- Batters to be revegetated as soon as practical after completion, in accordance with the Revegetation Management Sub-plan;
- Weather forecasts will be monitored to ensure prepared batters are not exposed to high rainfall events without adequate controls.

5.6 Ancillary Sites

"Ancillary sites" refers to temporary infrastructure such as site compounds, offices, car parks and material laydown areas or areas required for implementation of the construction program. These areas are high traffic and interaction areas and will have specific erosion and sediment control plans to manage site specific risks dependant on location and use of the ancillary site. The establishment of these areas will include the following erosion and sediment control considerations:

- suitable stabilised access including sediment / tracking controls (e.g. rumble pads & grids);
- bitumen or crushed concrete foundation for high use tracks where appropriate;
- use of clean fill to create pads & hard stand areas;
- appropriate temporary stabilisation;
- diversion of clean water around the site; and
- diversion of site runoff to sediment control structures.

A typical access setup for a site compound is detailed in Figure 3.

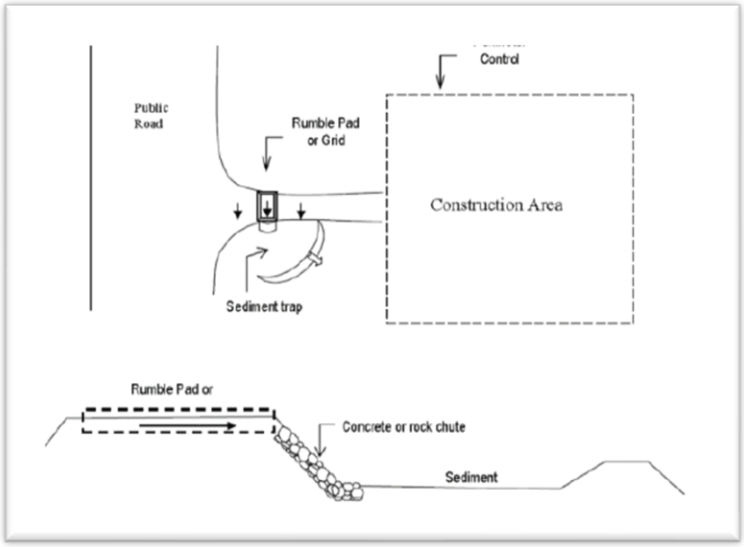


Figure 3 Typical site access to ancillary facility

Ancillary facilities which will undertake a substantial material processing component including the storage of loose material / spoil will implement a detention site control (such as a basin) to contain runoff from the site prior to discharge.

5.7 Stockpile Activities

The Project will undertake materials handling and storage of spoil at the ancillary facilities identified among the alignment. A site specific PESCP will be prepared for each compound location and will include specific measures for stockpile management and controls to reduce the risk of sediment laden runoff and contamination. Establishment of site soil and water management procedures will be detailed in the PESCP, reviewed by the Project CPESC and signed off by the Environmental Manager. Stockpile sites will be located and constructed consistent with the CEMP and the stockpile management plan. Refer to Section 8.2 of the SWMSP for further details on stockpile management.

Long-term stockpiles are to be revegetated/stabilised as detailed in Section 2 and 8.15 of the SWMSP and the relevant Rehabilitation Strategy.

5.8 Mulch

Following vegetation clearing, suitable mulch generated from these operations (i.e. non-weed, native hardwood mulch) will be utilised for erosion and sediment control in certain locations across the construction site. As sediment control, mulch is generally compacted into bunds to intercept sheet flow and trap sediments as runoff filters through

the bund. These controls may be berms, "horse shoe" detention areas, mulch blanket cover or wrapped in geofabric as sediment filters. As an erosion control, the use of mulch as a blanket cover protects the soil from raindrop impact and subsequent erosion.

Mulch will not to be stockpiled or used for erosion and sediment control in poorly drained areas and/or within the upper banks of a watercourse. The use of mulch as an erosion and sediment control measure is subject to meeting the following requirements:

- mulch is to be clean and free from soil material;
- mulch bunds are to be compacted to a height not exceeding 750mm (e.g. perimeter bunds, contour bunds, across haul roads). Mulch bunds within 50m of watercourses are to be compacted to a height not exceeding 300mm and monitored for tannin leachate;
- preference is to be given to the use of aged mulch in controls;
- mulch stockpiles will be located more than 50m from watercourses and poorly drained areas;
- mulch stockpiles will be located so that runoff is not directed to adjacent watercourses;
- mulch stockpiles will be protected with earth bund to divert run-on water and contain local runoff; and
- tannin leachate from mulch controls will be monitored daily within normal working hours.

Refer to Section 8.3.4 of the SWMSP for further details on mulch and tannin management.

6 Erosion Control

Erosion control is the first priority of any erosion and sediment control strategy. Erosion control measures generally function by reducing the duration of soil exposure to erosive forces, either by holding the soil in place or by shielding it. Measures to be used include a variety of construction practices, structural controls and vegetative measures aimed at managing runoff at a non-erosive velocity, and the protection of disturbed soil surfaces.

Effective and practical erosion control is achieved through:

- limiting area of disturbance and implementing progressive stabilisation to limit time of disturbance / exposure to erosion;
- integrating measures which reduce volume of water moving over exposed surfaces.
- these include diversions of non-site water safely around the site but also measures within the construction area to reduce the sizes of local catchments and take water to a regular outlet or some stable conveyance, pipe or lined channel;
- utilising measures which slow the movement of water over exposed areas to velocities which do not lead to scour of the surface. This may be achieved via creating flat gradients in channels and formations, introducing roughness or installing flow checking measures within channels; and
- providing additional protection, cover or stability to exposed surfaces so that it is less readily eroded. Options, depending on site constraints, include additional compaction, spray on stabilisers (tackifiers), mulches, blankets and temporary vegetation.

These approaches will be addressed in the planning phases for each work activity and integrated with the works at each site. This will lead to a greatly reduced potential in the generation of sediment and similarly reduce the reliance on sediment control for water quality management on the Project. A range of typical erosion control measures are expected to be used within this Project.

6.1 Minimised Disturbance

Construction areas will be kept to the minimum area required to allow for construction and access and effective working conditions. The Project environmental staff will work with construction managers to ensure limits of disturbance are clearly identified and delimitated on site. Disturbance limits (the Project boundary) will be shown on site erosion and sediment control plans and communicated within site inductions and toolbox talks.

Progressive stabilisation will be implemented on site and scheduled into the construction program as a work activity. This may mean that final revegetation is commenced in areas prior to completion of significant works across the whole of Project. Works in the areas of high erosion and pollution risk will be planned so that the period between disturbance and stabilisation is kept to an absolute minimum required to perform the works.

6.1.1 Lined Channels

Where runoff is collected and diverted to channels, these will be, as far as practical, kept to near zero grade (refer Figure 4). Where these channels exceed generally 3% slope or are expected to carry a substantial volume of water, they will be protected with concrete, rock, geotextile, plastic, jute or similar to prevent erosion of the channel invert. Where water is to be carried over steep areas such as batters, formal drop down measures will be provided. A standard approach to the construction of diversion drains will include the following elements:

- batter no steeper than 3:1
- minimum base width of 1000mm
- minimum 300mm overflow protection berm
- fabric or jute mesh lined for erosion protection

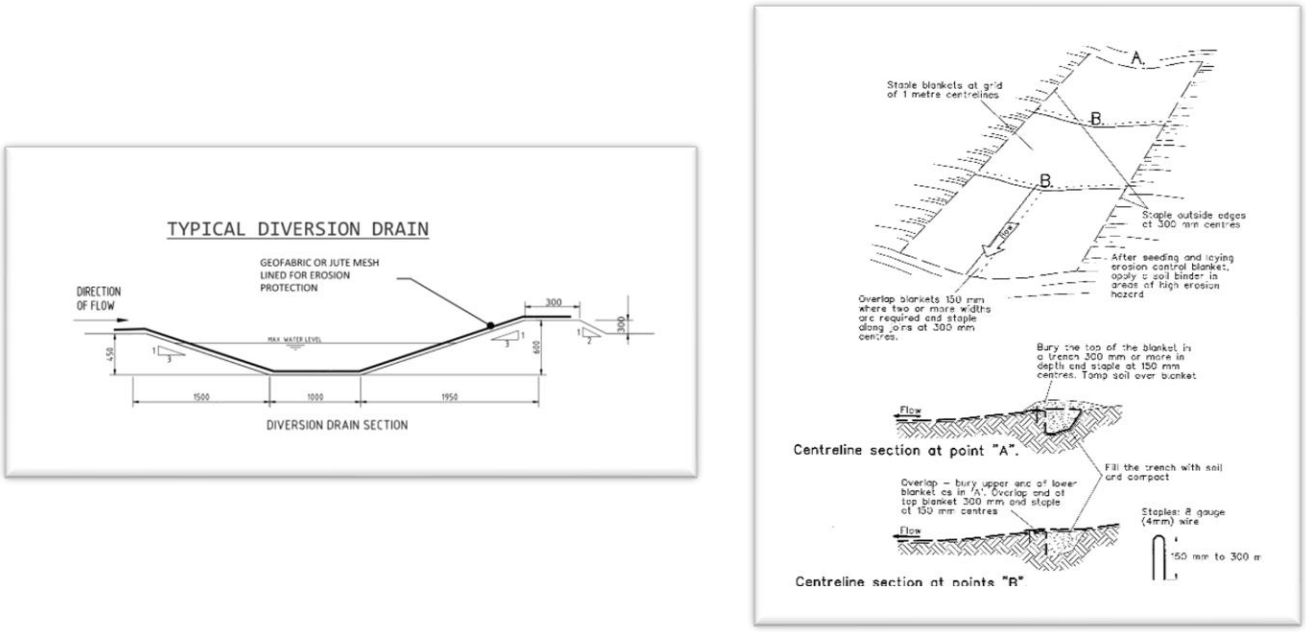


Figure 4 Lined diversion drain / channels

Construction batter cutes may be used with the incorporation of a rock dissipation area at the outlet to prevent erosion.

Common to all channelized structures (channels, chutes, pipes etc.) is the requirement to ensure they are stable at both the inlet and outlet and are designed to convey the predict water flows without overtopping.

6.1.2 Diversion Banks

Diversion measures such as banks, berms, gravel socks and scratch drains assist in reducing site erosion by:

- reducing the length of slope (and the potential soil loss);
- increasing the time of concentration of overland flow;
- directing overland flow to a stable outlet point; and
- diverting run-on water around the construction site.

These measures are very effective at limiting the potential for erosion and, when integrated into the construction activities, form a critical part of the erosion and sediment control strategy. They are relatively simple to construct and are to be implemented during all stages of the construction program where appropriate. Figure 5 demonstrates a typical installation of a diversion bund.

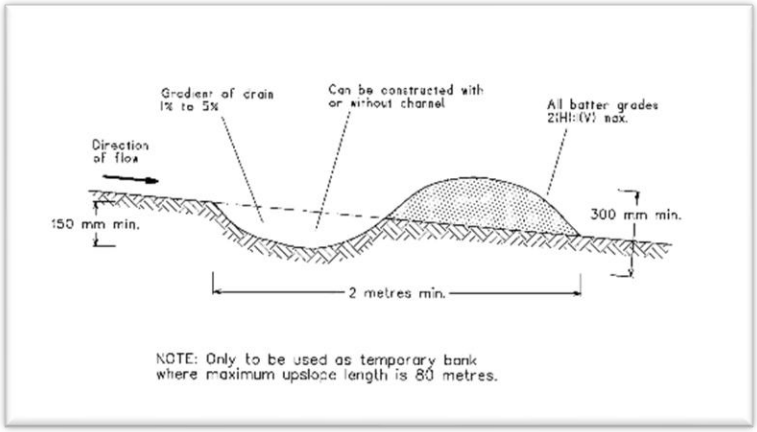


Figure 5 Typical diversion bund

6.1.3 Slow movement of water

Check dams and temporary detention areas may be formed out of rock, mulch or gravel/sand bags or similar materials to slow the movement of water on the Project. These will be used extensively on the Project for both erosion and sediment control where site water is moved either within a drain or against a formation or cut. They are inexpensive and easily implemented on site. The key to their implementation is understanding of where site water will discharge to create a stable and clearly defined spillway so as not to exacerbated loss of sediment.

Provision of greater storage capacity allows for them to function as effective small sediment controls and their performance is enhanced by reducing their spacing in the channel or flow line.

6.2 Surface Protection

In areas close to sensitive environments (bushland or clean waters) or where there is a lack of available space for sediment control, temporary and immediate protection will be achieved through covering the soil surface using geotextile, mulch, soil binders (tackifier) or plastic. This approach can also be applied as part of the construction works to secure areas which may be difficult to access removing a potential ongoing maintenance concern.

Areas disturbed as part of access construction or main works activities which are no longer required within the construction zone will be immediately protected using site mulch or light weight covers prior to revegetation and permanent rehabilitation. This approach will limit the size of the exposed construction area and reduce erosion potential.

7 Sediment Control

Although essential, sediment control is considered as secondary to erosion control in minimising ground and surface water pollution resulting from construction activities. The primary sediment control is a commitment to limiting the volume of lose and easily transportable material through generally small control measures which can be removed or replaced easily as site access and progression of work staging requires. The location and nature of controls will be indicated on progressive erosion and sediment control plans and will include temporary basins and sumps, check dams and traps and sediment fence and filters/flocculants.

7.1 Sediment Basins

Construction Sediment Basins are structures designed to meet the sediment control requirements for the construction stage and are designed to ensure containment and treatment of runoff from exposed and active work areas for a design rainfall event. For this Project, temporary sediment basins may be proposed around bridge structures and key drainage / creekline areas, however it is noted the confined corridor reduces the potential to implement standard

basin controls. Sediment basins will be implemented in accordance with the PESCPs prepared by the Project CPESC and will be complimented with smaller sediment controls on site to provide and adaptive approach to management of site runoff. This may include temporary sediment traps and sumps at a smaller scale or a greater division of catchment areas to reduce the quantity of water / runoff treated at any single location.

Sediment basin design will be in accordance with best practice guidelines and consider the sensitivity of receiving environments for the adoption of design criteria. Basin implementation may include Type D, Type A or Type B basins based on the sensitivity of the receiving waters, the available area for the implementation of the control and specific soil loss calculations for the basin design. Where discharge of the basin is to be directly into a significant (Class 2 or higher) waterbody or a sensitive receiving environment based on drinking catchments, proximity to townships etc, Type A or B basins will be preferred where reasonable and feasible. These may include basins near Dudauman Creek, Ironbark Creek, Run Boundary Creek, Ulandra Creek and Billabong Creek

7.2 Sediment Traps

Due to limitations of space on these types of Projects and to minimise disturbance, the Project will aim to manage catchments so that smaller volumes are generated which can be treated by smaller construction site sediment controls in conjunction with the larger formal sediment basin areas.

In most cases these sediment controls may need to be removed to allow progress of works, as such they must be easily and readily replaced at the end of each day's work. Sediment controls will generally consist of check dams and temporary sumps constructed through stacked gravel filled bags or wrapped mulch bunds to form measures to detain surface water prior to inlets of pits or discharge locations. Shaped berms that are vegetation stabilised or covered with construction fabric will also be utilised for higher concentration areas to create a more substantial control and to act as a temporary basin / detention area.

Performance of the traps may be enhanced through incorporating an excavated sump or similar to increase capacity, lining the excavation or through providing a permeable wall or portion of wall. Performance of these type of controls is improved through the increasing of the size of the measure relevant to the catchments it treats. For this Project, this increase is to be achieved through implementation of a higher number of structures treating water from smaller catchments.

7.3 Perimeter Banks

Perimeter banks will be installed on relatively flat areas where the catchment disturbance does not warrant or does not allow a basin to be installed. Perimeter banks function to slow and retain small volumes of water as sheet flow and allow sediment to drop out prior to the water passing slowly through. Their function is compromised should the volume or velocity of the water lead to excessive pressure at any one point along the structure. Key to their effective use is ensuring they are on the contour of the slope and that they are regularly inspected and maintained. Their use can be enhanced by integrating their placement with vegetation strips to be retained adjacent the construction area. Despite having relatively low storage capacity (compared to basins), the resulting linear area has a large length/width ratio, thereby offering a good opportunity for sediment to settle, particularly when fully grassed.





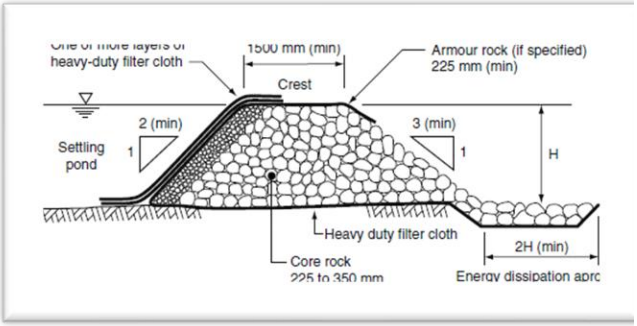
Figure 6 Example perimeter banks

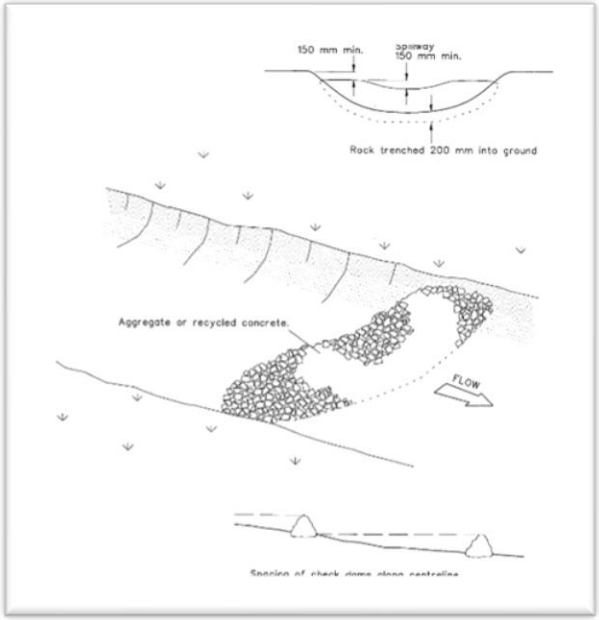
7.4 Rock Berms and Check dams

Rock berms are formed by the wrapping of rock with geotextile fabric to form a sediment trap by temporarily retaining runoff to allow for slow filtering of runoff though the fabric and rock medium. They will be used along drainage lines and adjacent to watercourses where clearing of vegetation is to be minimised.

A similar method is achieved through a broader pile or berm formed out of smaller or graded aggregate without geotextile to slow flow prior to filtering through the rock material. These measures may be used on relatively flat areas in temporary drains and/or integrated into an earth berm to provide a stable and permeable section at the spillway. In these cases, care needs to be taken to ensure that the interface of the rock and earth are well protected with fabric to prevent scour and bypassing of the control.

Rock checks and sand bag checks will be used extensively on the Project for both erosion and sediment control. They have the advantage of being effective, cheap, easy and mobile. Sand bags will be filled with clean sand/gravel to around 3/4 of capacity to enable them to better conform to the desired shape. Rock checks will be used in swale and diversion drains to slow flow, reduce grade, provide dissipation and filter sediment. They will be constructed with a defined spillway to prevent undesirable diversion of runoff resulting in erosion.









7.5 Sediment fence

The main approach for this Project is to minimise the use of sediment fence where other measures may be more appropriate (e.g. mulch bunds, rock socks, and diversion banks). However, there will be occasions where sediment fence provides the best sediment control solution, particularly where space is limited. In these situations, sediment fencing will be woven polypropylene or cotton/geotextile thread with a flow rate >110litres/m² (AS 3706.9).

Sediment fences must be used as a control measure on the contour of the slope to ensure effective operation and installation of sediment fence in accordance with Blue Book best practice guidelines (refer Figure 7) is imperative to the effectiveness of the control.

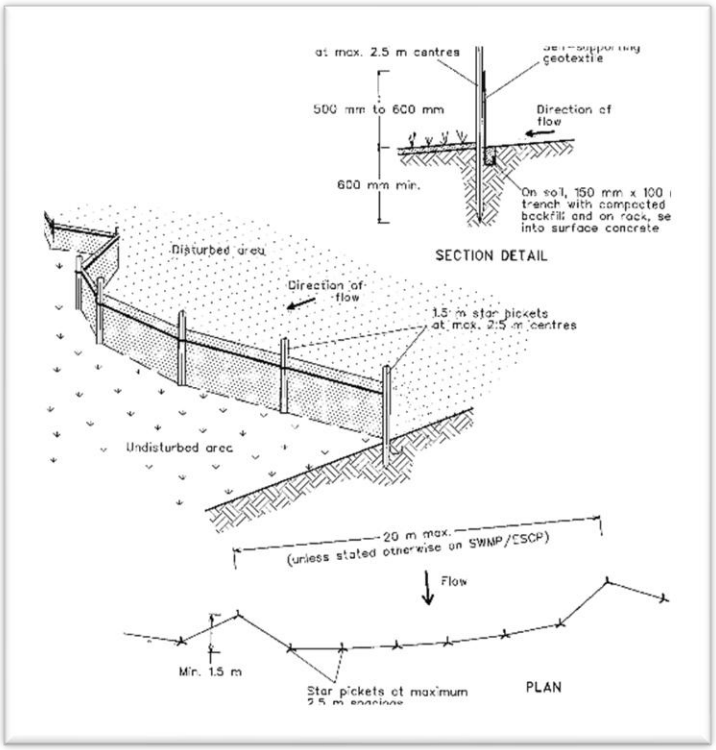


Figure 7 Typical installation of sediment fence

Some reasons that sediment fence may not be selected, in favour of other sediment controls include:

- they require disturbance of the ground to install and can be difficult to maintain mechanically;
- they can act to divert water and cause scour;
- they require a high degree of maintenance; and
- they are generally ineffective for smaller soil particles (i.e. silt and clay fractions of the soil).

7.6 Inlet Filter Protection

Inlet filter protection will be utilised during the construction stage where site water enters a formal stormwater system. In many areas this will be where the site waters discharge to the environment. Prior to this point numerous other measures will have been implemented to reduce generation of sediment and to prevent sediment movement.

These protections may be formed out of a sediment fence or other fabric (refer Figure 8) or may utilise gravel bags placed around the perimeter of the pit. In all cases the use of these measures must be balanced with the required function of the pit and the potential for flooding of road and access areas.

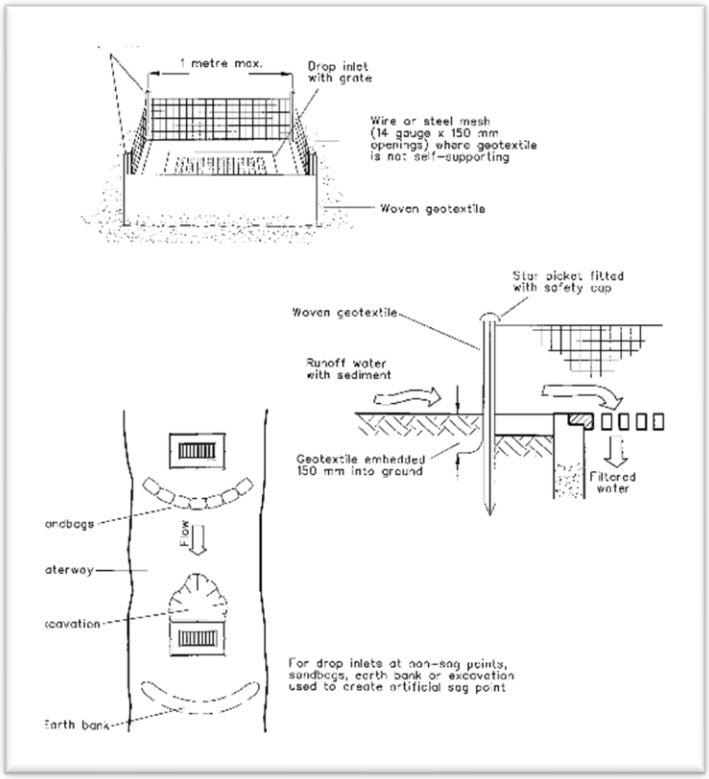


Figure 8 Inlet protection

7.7 Mulch

Following clearing of vegetation, the mulch generated will be utilised as a sediment control measure. Mulch is very effective in controlling sediment and has the added benefits of being biodegradable, and easy to maintain. As the mulch breaks down it can also act to trap finer soil particles which would not be trapped by sediment fences. It will be used to form a berm around a sediment trap and may be covered with fabric to prevent its movement by water flows. Mulch may be formed as a long berm on the contour as an alternative to sediment fence and without the need to trench, as shown in the photograph below. Refer to Section 8.3.4 of the SWMSP for further details on mulch and tannin management.



Figure 9 Example of mulch berm

8 Timing of installation

The timing for installation of major erosion and sediment controls is required to be consistent with the construction staging strategy as follows:

- Early works package – As required for service relocations and drainage works
- Stage 0 – Early installation of major erosion and sediment control measures is recommended. This includes clean water diversion channels, sediment basins/sumps and stabilisation of existing temporary cross drainage as detailed within this report
- Construction Stage – Standard erosion and sediment controls implemented as per the PESCPs for each sub-stage.

Detailed sub-staging will be specified by the construction contractor within the appropriate PESCPs and EWMS (refer to Section 6.3).

9 Design Parameters

Should sediment basins be required, their location and sizing of controls and construction will be developed consistent with recommendations of *Best Practice Erosion and Sediment Control (International Erosion Control Association (IECA), 2008)*). The parameters used in calculation of construction sediment basin capacities are to be updated in Table 1 upon contract award.

Table 1 Sediment basin parameters

Site Parameters	
Rainfall erosivity (R-factor)	1250
Soil erodibility (K-factor)	0.025 – 0.072
Length / Slope factor (LS – factor	0.65 – 1.19
Erosion Control Practice (P-factor)	1.3 (default)
Cover factor (C-factor)	1 (default)
5 day 85% rainfall depth (mm)	23.4
Runoff Coefficient (C_{10})	0.56

9.1 Sediment Basin Construction

Construction Sediment Basin design capacities are based upon the parameters described in Table 1, together with the estimated contributing catchment area and topography of the construction site. Where possible, construction basins should be situated in areas where they will be converted to operational basins later in the Project, whilst maximising trapping of sediment and pollutant. Construction sediment basins will be constructed consistent with the *Best Practice Erosion and Sediment Control (International Erosion Control Association (IECA), 2008)*. Inlets and spillways are to be installed within one month of basin installation.

A review of the site potential for sediment yield in accordance with the Blue Book requirements will be undertaken with the progression of the Project and the information included in Appendix A. This assessment will utilise the Revised Universal Soil Loss Equation (RUSLE) to determine the areas with predicted soil yield greater then 150m^3 per year. Construction sediment basin capacities, catchment areas and proposed locations, will be populated within Appendix A.

9.2 Flocculation

The management of site runoff is required to meet required water quality parameters prior to discharge as defined in the SWMSP. To achieve this, it is likely that site water will need to be treated (flocculated) to remove sediment from suspension.

Automated dosage systems and alternative agents (e.g. flocculent blocks, inlet sumps) will also be considered to promote rapid management of sediment basins and reduce ongoing basin maintenance to achieve the desired result.

9.3 Sediment Basin Maintenance

Sediment basins will be maintained to ensure that accumulated sediment does not exceed 30% of the sediment storage zone (generally the 2-month potential soil loss). Markers will be installed within the basin to enable fast and effective measurement. Disposal of accumulated sediment will be incorporated into construction activities following drying and must ensure that sediment will not be conveyed back into the construction area or into watercourses. Where practical, sediment will be re-used on site (e.g. within sound mounds if approved/ practical) or incorporated into fill material. Where this is not a practical option, sediment will be disposed of offsite as a waste product. Suitable access to basins will be provided to enable maintenance in all weather conditions.

Runoff water stored in basins will be used on site in dust suppression as a preference prior to discharge from site.

10 Site stabilisation

The progressive stabilisation of the site during construction is an important component of erosion and sediment control strategy as it reduces the total exposed area vulnerable to erosion forces and therefore the potential sediment yield form the Project. Stabilisation of the work site at the end of each day and/or in the event of wet weather will include:

- covering of vulnerable areas with geofabric or similar material to limit erosion;
- grading and smooth drum rolling placed fill and material; and
- installation of contour banks and diversions to limit slope length and direct runoff to control areas.

Permanent stabilisation of the site will be achieved through the implementation of the Rehabilitation Strategy.

10.1 Extended Shutdown and High Rainfall

During the holiday season and when weather conditions exceed the site capacity and the ability to undertake effective work, the Project will be shut down for an extended period. To prepare for these instances, additional controls will be implemented to ensure the site remains secure and erosion potential is reduced. These controls will be based on the predicted weather events for the closure period and will be undertaken in consultation with the Project CPESC. Key activities to be undertaken in these events will include:

- installation of additional controls at key locations on the Project, Particularly around discharge locations, sensitive areas and large exposed surfaces;
- reduction of slope length across the Project to reduce runoff velocity;
- covering of excess material and stockpiles with geofabric or similar to reduce erosion potential;
- removing loose material and spoil from low areas and the vicinity of drainage lines;
- ensuring basins, detention areas and key site controls have maximum capacity to manage predicted site condition; and
- undertaking a pre-closure site inspection to ensure all controls are in place and effective.

Where the predicted event is likely to include excessive rainfall and potential flooding, controls details in Section 8.8 of the SWMSP will be implemented.

Personnel will be available to undertake required activities as required during these periods.

11 Implementation

11.1 Training

An essential component of the erosion and sediment control strategy is the training and supervision of staff involved in the construction of the Project. This includes managers, supervisors, engineers, environmental staff, designers, foreman, leading hands, machine operators and labourers. Initial training would be undertaken upon commencement

of the Project through inductions and specific training to key staff on implementation and maintenance. Additional training will be conducted throughout the duration of construction including specific erosion and sediment control training (such as control installation, principles of erosion and sedimentation and stabilisation and rehabilitation) to targeted staff to ensure best practice is implemented through the Project. Refer to Section 9.2 and Appendix B of the SWMSP for further details on training.

11.2 Monitoring and Auditing

An accredited CPESC will be engaged to undertake regular inspection throughout the duration of the Project. Inspection frequency will be determined according the requirements and risk of construction activities. It is anticipated that in the early stages of the Project inspections will be conducted more regularly and then reduce in the latter stages of the Project as the site becomes more stable and risk is reduced.

An important part of the inspections will be continued communication and feedback by the specialist with construction staff to reinforce the initial training and drive continued improvement.

In addition to regular inspections by an accredited CPESC, the effectiveness of strategies and controls will be monitored by environment and construction staff daily as detailed in Section 9.3 of the SWMSP.

All permanent and temporary erosion and sediment control works will be inspected:

- regularly during normal construction hours;
- regularly during periods of rainfall within normal working hours;
- following the cessation of all rainfall events resulting in runoff (generally 20mm)

Appropriate recording will be carried out to identify and rectify general problems including:

- controls prior to commencement of significant ground disturbance;
- areas of erosion, sediment deposition (sediment structures not to exceed 30% storage capacity) and/or poor vegetative cover;
- control and drainage failure (i.e. blocked drains, slumped batters, tracking of material onto roadways)
- stockpile locations, protection and stabilisation
- sediment basins and/or other erosion and sediment control measures requiring maintenance;
- flocculation and discharge of licensed construction sediment basins;
- progressive stabilisation of the site.

11.3 Maintenance and Reporting

The site environmental inspection checklist will be completed during the inspection of erosion and sediment controls identifying any corrective actions, additional controls or maintenance activities to be undertaken for the effective operation of site controls. Any modifications required will be documented on the checklist and provided to the foreman to action who will date and sign upon completion. A copy of the completed form identifies the closure of actions will be retained by the site environmental staff to document closure of actions and compliance with the approval and contract requirements. The site environmental checklist documenting the status of environmental controls will be reported to IRPL:

- weekly during normal construction hours;
- regularly during periods of rainfall within normal working hours;
- within 24hrs following the cessation of all rainfall events resulting in runoff (generally 20mm); and
- following discharge of sediment basins in accordance with the EPL.

Appendix 1 – Project Basins

Revised Universal Soil Loss Equation (RUSLE) sediment yield results

Construction area	Chainage (from- to)	RUSLE Sediment yield	Basin requirement (y/n)	Additional Information

Project Basin Information

Type D Basin Specifications		Basin I2S D1	Basin I2S D2	Basin I2S D3
Item	**Unit**			
Design volume requirement	m^3			
Design sediment storage component	m^3			
Length	m			
Width	m			
Type B Basin Specifications		**Basin I2S B1**	**Basin I2S B2**	**Basin I2S B3**
Item	**Unit**			
Design volume requirement	m^3			
Design surface area requirement	m^2			
Length	m			
Width	m			
Surface area	m^2			
Length to width ratio	ratio			
Depth	m			
Basin wall batter slope	ratio			
X-section area	m^2			
Basin volume	m^3			
Forebay (10% of volume)	m^3			
Forebay length	m			
Forebay width	m			
Forebay depth	m			
Forebay spillway basin slope	ratio			
X-section area	m^2			
Forebay volume	m^3			
Spillway crest below basin wall	m			
Spillway width	m			
Spillway freeboard	m			
Basin lining	ea			
Spillway lining	ea			
Outlet, concrete culvert	dia			

Appendix 2 – Concept PESCP