12.0 Environmental Risk Analysis

This chapter provides a summary of the prioritisation process undertaken to identify the key environmental issues associated with the site and proposed development.

The environmental risk analysis addresses the risks associated with the site and proposal, before any mitigation strategies are taken into account, and the residual risk. The residual risk is the potential for environmental harm after the application of mitigation strategies and site management.

The assessment of risk allows for prioritisation of assessment processes, the identification of appropriate levels of environmental management and informs the design of ongoing monitoring programs.

12.1 OBJECTIVES

During the Preliminary EA phase, a Project Environmental Risk Analysis was conducted.

The Environmental Risk Analysis was reviewed and updated as part of the EA process in order to achieve the following objectives:

- Identify and confirm key environmental impacts of the proposed TSF and assist stakeholders to focus on the issues for assessment;
- Identify any additional key issues not specified in the DGR's that would require investigation. This includes an analysis of environmental impacts and potential residual environmental impacts after the application of proposed mitigation measures;
- Verification of the key environmental risks following any changes to the concept design and as the scope of the proposed TSF develops throughout the EA phase;
- Encourage a level of investigation that is equal with the risk of the potential environmental impacts which may result from the proposed TSF; and
- Assess the potential for harm arising from any residual risk.

12.2 METHODOLOGY

Preparation of the PEA, receipt of the subsequent DGRs issued on 22 March 2010 and results from the various sub-consultants assessments assisted in the identification of issues relating to the proposed TSF. This information and the DP&I Adequacy Review were used to identify the level of assessment required for this EA. The EA for the proposed TSF has been under refinement since the initial project application in 2008.

12.3 THE ISSUES

The key environmental issues identified through the PEA process, in the findings of specialist sub-consultant reports and identified in the DGRs are as follows:

- Ecology;
- Hydrology and Geology;
- Transport and Access;
- Infrastructure;
- Heritage (Indigenous and Non-Indigenous);
- Noise and Vibration;
- Air Quality;
- Hazard and Risk; and
- Waste Generation.

No other significant issues or risks have been identified for the site.

12.4 PRIORITISATION OF ISSUES

12.4.1 *Approach*

The risk assessment process is used to prioritise issues based on site sensitivities and the proposed construction and operations. Those issues assessed as having the highest risk require a higher degree of assessment. The assessment process identifies the level of threat to the environment and appropriate mitigation strategies. A level of residual risk remains after mitigation and the consequences of this also require assessment to ensure that there are no unacceptable consequences of the proposal.

The assessment of overall risk is based on the likely consequences or environmental impact of an event and the likelihood of an event occurring. The risk ranking is established by using the event likelihood ratings identified in Tables 55 to 58.

Table 55: Event Consequences.

Event Consequence	Event Impact
Substantial	Permanent widespread damage
Major	Heavy damage costly restoration
Minor	Limited but medium term negative effects
Negligible	Short term damage

Table 56: Event Likelihood.

Event Likelihood	Description
Almost certain	The event is likely to occur
Likely	The event will commonly occur
Possible	The event may occur occasionally
Unlikely	The event could occur infrequently
Rare	The event may occur in exceptional circumstances

Table 57: Risk Matrix.

Risk Matrix	Substantial	Major	Minor	Negligible
Almost Certain	9	8	7	6
Likely	8	7	6	5
Possible	7	6	5	4
Unlikely	6	5	4	3
Rare	5	4	3	2

Table 58: Event Threat Level.

Very High Threat 8 & 9	High Threat 6 & 7	Moderate Threat 5 & 4	Minor Threat 3	Low Threat 2
Red	Orange	Yellow	Pale yellow	White

Table 59 shows the prioritisation matrix used to identify priorities. Each issue was given a pre-mediation ranking based on the scope of the risk.

Following assessment of the potential environmental risks it is necessary to determine the residual environmental risks after the application of mitigation measures. This process assists in determining which issues require a greater degree of monitoring.

The prioritisation of environmental issues related to the proposed TSF is also shown in Table 59. The table is based on the relevant mitigation measures outlined in the draft Statement of Commitments at Section 13 of this EA.

Table 59: Prioritisation of Environmental Risk and Residual Risks.

Issue	Scope Of Risk	Pre Mitigation Risk	Management Of Risk/ Issue	Residual Risk
Ecology				
Impact on flora and fauna at the site.	Development will occur over former industrial and agricultural areas with a footprint of some 38 ha. Existing vegetation and habitat, including disturbed wetland areas and EEC will be removed.	5	Environmental offsets of some 53.63ha are proposed. Monitoring of Green and Golden bell frog habitat. Control of stormwater drainage and management of waste. Control and management of contaminants, weed management. Conservation Management Plan for retained vegetation.	2 (Low)
Impact on flora and fauna offsite	Site adjoins an area of National Park including significant wetlands and saltmarsh.	4	Control of stormwater drainage and management of waste. Control and management of contaminants, weed management, ongoing monitoring.	2 (Low)
SEPP 14 Corridors	Rail lines will be constructed in an area of wetland.	7	Environmental offsets proposed. Erosion and sediment controls.	2 (Low)
Hexham Swamp Rehabilitation Project	This project is reintroducing salt water to the wetlands. This is a risk to the project if uncontrolled drainage affects tidal exchange of salt water.	5	Stormwater management to prevent unnecessary flows/runoff to wetlands. Waste water treatment controls.	2 (Low)
Hydrology and Geology				
Flooding	The site is located in an area of high hazard flood storage. There are safety and hazard issues for access, personnel, equipment, plant and storage.	6	Design for roads, equipment, floor levels and storage at safe elevations. A Flood Emergency Response Strategy has been prepared (Appendix G).	2 (Low)
Stormwater	Increased runoff from the development could affect adjoining ecologically sensitive areas.	6	SWMP for the site including prevention, isolation treatment, contingencies and monitoring (Appendix L).	2 (Low)
Acid Sulphate Soils	The site is in an area of PASS. Disturbance of soils can cause significant acid runoff problems. The proposed construction methods will minimise risk.	4	An ASSMP has been prepared for the site. The plan provides for the neutralisation of any affected soil and leachate (Appendix I).	2 (Low)
Surface water quality impacts during construction.	Construction activities can allow rainfall to mobilise silt and pollutants leading to adverse effects on wetlands, waterways and habitat.	6	A SWMP has been prepared which includes erosion and sediment controls (Appendix L).	2 (Low)
Surface water quality impacts during operation.	Surface run off can mobilise pollutants.	4	A SWMP for the site has been prepared. The plan provides for prevention, isolation from the	2 (Low)

Issue	Scope Of Risk	Pre Mitigation Risk	Management Of Risk/ Issue	Residual Risk
			main system of areas where potentially significant contaminants may be mobilised, treatment of stormwater, contingency measures and monitoring.	
Impacts to groundwater during construction.	Excavation is very limited. Works are either on or involve fill. Infiltration of rainfall during construction is unlikely to result in adverse groundwater impacts.	2	No specific mitigation required. Refer to the Groundwater Assessment Report (Appendix J).	2 (Low)
Impacts to groundwater during operation.	The ongoing risk is from effluent disposal.	3	Fill to be brought in to improve soil properties of irrigation area and minimise potential for groundwater pollution.	2 (Low)
Erosion and sedimentation during construction.	Construction will involve considerable disturbance of the site surface. Disturbance leaves the site vulnerable to erosion by wind and water and surrounding land vulnerable to dust and sedimentation. Surrounding land including wetlands and water ways are vulnerable to sedimentation and pollution.	6	The issue and risk have been addressed in the SWMP (Appendix L).	3 (Minor)
Erosion and sedimentation during operation.	Signification erosion and sedimentation during operation is unlikely but the sedimentation of surrounding lands adjacent could increase the risk.	5	Erosion and sedimentation issues are addressed in the SWMP (Appendix L).	3 (Minor)
Migration of existing onsite contaminants during construction.	A range of contaminants have been identified on the site.	6	Further investigation, remediation and validation of the site prior to construction commencing.	2 (Low)
Migration of existing onsite contaminants during operation.	Existing contamination over the project footprint will be remediated prior to construction with potential for new contamination from TSF operations.	6	Implementation of site stormwater, storage and waste management systems will maintain risk at acceptable levels.	3 (Minor)
Traffic, Transport and Access				
Temporary increase in road traffic during construction	Local Road traffic will increase as a result of construction.	5	A new access off the Tarro Interchange will be constructed to link with the NEH and avoid traffic utilising Woodland Close. Onsite parking will be provided for construction workers.	2 (Low)
Increases in road	The operational road traffic will	2	No specific requirements, the	2 (Low)

Issue	Scope Of Risk	Pre Mitigation Risk	Management Of Risk/ Issue	Residual Risk
traffic during operation	be minor. The measures implemented to ensure construction traffic has no significant impact will also ensure operational traffic is adequately catered for.		access and intersection improvements for the construction phase will satisfy operational needs.	
Increase in rail transport during operation	Any rail traffic increase during operations will be due to increased coal extraction not the proposed TSF.	2	Responsibility for addressing the impacts of increased rail traffic rests with the relevant rail authorities. Mitigation of rail traffic impact is outside the scope of the approval sought.	2 (Low)
Infrastructure				
Impacts on existing infrastructure and utilities.	The proposal will have requirements for water, energy and effluent disposal. While water and energy concerns can be readily addressed by extension of services onsite wastewater disposal is required. A gas main on this site will need to be relocated. A gas main on this site will be protected The proposal will assist in maintaining the efficiency of operation of the rail network.	6	• Obtain water from HWC. • Provide an onsite effluent disposal system. • Provide a recycled water wash down for trains and wagons. • Provide an onsite effluent disposal system. • Extend electrical services to the rail via Ausgrid. • Extend telecommunications to this site via Telstra. • Protection to existing gas main.	3 (Minor)
Impacts on future service demand, capacity and augmentation of proposed infrastructure and utilities.	The site is in an area that functions as a major infrastructure corridor for road, rail and essential services. Project design is such, that conflicts with future infrastructure have been largely avoided.	3	No specific additional mitigation is required. Site management and operations will need to acknowledge the presence of major infrastructure.	3 (Minor)
Hunter Expressway	The ongoing operations and efficiency of the Hunter Expressway will be maintained as access will be off the existing Tarro Interchange.	2	Implement traffic management measures recommended in the Traffic Impact Assessment (Appendix O).	2 (Low)
F3 Extension	The proposed F3 extension is north of the TSF but crosses over the access road.	2	No site operations to be established on or immediately adjacent to the F3 extension corridor.	2 (Low)
Hunter Water Pipeline	The Hunter Water pipeline crosses the site but is outside the TSF footprint. The only potential conflict is with the access road.	3	The proposal design protects and avoids conflicts with the pipeline corridor.	2 (Low)
Power Grid	There are transmission easements in the north of the project site which are in part	2	There is no significant conflict created by the access road.	2 (Low)

Issue	Scope Of Risk	Pre Mitigation Risk	Management Of Risk/ Issue	Residual Risk
	over the proposed access road.			
Heritage				
Impacts on existing Non-Indigenous heritage items on the site.	Proposed TSF design has avoided areas of potential archaeological sensitivity. The majority of works will be over already highly disturbed areas. As the area is former wetlands and a floodway the likelihood of significant values is low.	4	Any works on areas not previously used for access or industry may need to be investigated if ground disturbance is involved.	3 (Minor)
European Heritage	The proposed TSF has been assessed as having "very minimal inherent impact" on the heritage values of the site.	2	Reuse of bricks from the demolition of the Control Box and provision of appropriate interpretation on the site will assist in maintaining site heritage values.	2 (Low)
Minmi to Hexham Railway	Remains from the Hexham Minmi railway may be unearthed during construction works.	2	An excavation director will oversee works in the vicinity of the junction of the Hexham Minmi Railway and the GNR (refer to Section 9.13.3 and commitment EH4 in Section 13).	2 (Low)
Impacts on Indigenous heritage at the site.	The proposed TSF footprint avoids impact on sites of archaeological significance. The access road has been designed to avoid Archaeological Site (HS1). The likelihood of the access road impacting on sites of archaeological significance will be assessed prior to its construction.	4	The area of potential archaeological significance will be assessed in cooperation with the HRR Project. Where construction of the proposed access road cannot avoid impacting a site of archaeological significance an AHIP will be obtained. Refer to Section 9.12.3 and commitment AA5 in Section 13.	3 (Minor
Visual				
Intrusive visual impacts on surrounding landscape.	While the proposal occupies a large area, the majority is rail tracks which will not be visible. Sheds will be constructed over work areas but these will be of relatively low profile. The site is of low visual sensitivity and adjoining the railway and other industrial development. The effect on scenic values will be low. There is very little risk to the scenic environment.	3	No specific mitigation measures are required, however landscaping including trees would mitigate external views into the site.	2 (Low)
Noise and Vibration				
Temporary noise emissions during construction.	No noise on vibration impacts are expected during construction. There is however the potential for "marginal" exceedences of relevant noise	3	Noise management recommendations for construction have been made to ensure any effects are mitigated. Refer to commitment N1 in	2 (low)

Issue	Scope Of Risk	Pre Mitigation Risk	Management Of Risk/ Issue	Residual Risk
	criteria at a nearby dwelling house.		Section 13.	
Noise emissions during operation.	Operational noise levels are predicted to be below the relevant guidelines at the closest residential receivers	3	No specific operational noise controls are required.	2 (Low)
Vibration impacts during construction.	The assumed level of vibration at the nearest residential premises is expected to be below the criteria for "minimal risk of cosmetic damage".	2	No vibration management is required for the site.	2 (Low)
Air Quality				
Emissions of air pollutants during construction.	Dust from construction is to be addressed.	4	Dust mitigation during construction is essential. Mitigation measures include watering and early stabilisation of disturbed areas.	2 (Low)
Emissions of air pollutants during operation.	Low volume of locomotives will result in minimised diesel exhaust emissions.	3	Dust control measures including road washing, road sealing, wind breaks, truck movement controls and vehicle washing are proposed to minimise transport of dust.	2 (Low)
Odour emissions during operation.	No odour emissions are likely during operations.	2	No mitigation measures are required.	2 (Low)
GHG emissions.	The operation of the TSF is expected to produce no additional GHG emissions.	2	No mitigation required to reduce risk.	2 (Low)
Hazard and Risk				
Dangerous Goods / SEPP 33	Trains will be refuelled on the site. The storage of diesel does not trigger SEPP 33 assessments. No other significant diesel fuel or lubricant storage is required on the site.	3	Risks will be minimised by appropriate fuel storage (refer to Sections 7.3.5 and 11.4).	3 (Minor)
Land Contamination	The site is known to be contaminated as a result of past uses. Farther assessment and remediation will be required.	5	A RAP has been prepared for the site and is contained within Appendix J.	2 (Low)
External environment effects	The main external environmental risk is to adjoining wetland areas which have the potential to be degraded by existing	5	Once the full range of proposed mitigation measures are applied the risk to the external environment is considerably reduced.	2 low

Issue	Scope Of Risk	Pre Mitigation Risk	Management Of Risk/ Issue	Residual Risk
	contamination and uncontrolled run off from the site. The TSF construction and operation could introduce a range of temporary influences on the local environment including nearby dwellings.			
Waste Generation				
Construction Waste	Construction waste is likely to be minimal due to the nature of the project. Solid Waste and minor quantities of Hazardous waste will be generated. The construction risk from waste is moderate and can be almost entirely eliminated by waste management.	4	A construction waste management plan providing for classification and disposal of waste in accordance with DECCW Guidelines will maintain risk from works at low levels (refer to Section 9.17.3 and commitment WM1 in Section 13).	2 (Low)
Operational Waste	Operational works will not be significant. The waste generated by the operational TSF can all be managed within existing waste disposal services.	6	A waste holding strategy has been developed which provides for recycling, reuse on site when appropriate.	2 (Low)
Hazardous Waste	The waste stream from the TSF has been assessed. It will include liquid waste (coolant), waste oil and batteries. These wastes will be removed by licensed contractors for disposal and recycling.	6	A Waste Management Plan for site operations will be required. Provided a suitable plan is implemented in full risks will be kept low (refer to Section 9.17.3 and commitment H1 and H2 in Section 13).	2 (Low)

12.4.2 Assessment of Residual Risks

Following assessment of the potential environmental risks it is necessary to determine the residual environmental risks after the application of mitigation measures. This process assists in determining which issues require a greater degree of monitoring.

The prioritisation of environmental issues related to the proposed TSF is shown below. The assessment is based on the relevant mitigation measures presented within the Statement of Commitments in Section 13 of this EA.

In summary, the final prioritisation of environmental issues is as follows:

Very High Threat:

- No environmental issues.

High Threat:

- No environmental issues.

Moderate Threat:

- No environmental issues.

Minor Threat:

- Hydrology and Geology;
- Traffic, Transport and Access;
- Infrastructure;
- Heritage and Culture;
- Air Quality; and
- Hazard and Risk;

Low Threat:

- Ecology;
- Hydrology and Geology;
- Infrastructure;
- Heritage and Culture;
- Visual Impact;
- Noise and Vibration;
- Air Quality; and
- Waste Generation.

A number of minor threat and low threat residual risks have been identified. However, these risks can be mitigated/managed as demonstrated within Table 61. Management processes that allow a rapid response, should they occur, will need to be included in construction and operational environmental management plans.