

# MANAGEMENT PLAN

## Erosion and Sediment Control

### MAC-ENC-PRO-060

**BHP**

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Key Contact: Environment Superintendent

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## 1 Preface

Hunter Valley Energy Coal Pty Ltd (HVEC) operates the Mt Arthur Coal Mine Complex (MAC), which consists of approved open cut and underground mining operations, a rail loop and associated rail loading facilities. The operations are located in the Upper Hunter Valley, NSW approximately five kilometres south west of Muswellbrook.

Local hydrology comprises a number of ephemeral drainage lines and creeks flowing north and south-west towards the Hunter River. Quarry Creek, Fairford Creek, Whites Creek, and Ramrod Creek flow northwards while southwards flowing drainage lines report to Saddlers Creek which flows generally to the southwest and joins the Hunter River downstream of Denman. The Whites Creek Diversion directs runoff from undisturbed and rehabilitated mining areas around the north-eastern areas of the mine and discharges to a small tributary downstream of Denman Road and then to the Hunter River.

MAC is committed to minimising the impact of its operations on the local environment and community and has in place strict controls to monitor and manage these impacts.

Activities that have the potential to cause or increase erosion, and subsequently increase the generation of sediment at the site, include exposure of soils during construction of mine infrastructure (i.e. during vegetation clearance, soil stripping and earthworks activities), ongoing mining activities involving clearing, and stripping and stockpiling mine materials. The following components have the potential to generate sediment:

- open cut coal mine pits;
- coal handling and preparation plant (CHPP);
- out of pit waste emplacements, bunds and topsoil stockpiles;
- coal stockpiles;
- infrastructure and activities at the export coal loader;
- access and haul roads;
- water management infrastructure (pumps, pipelines, dams, pits, sumps and drains);
- flooding; and
- general construction works on site.

Controls in these areas are discussed further in sections 3 and 4, and sediment control structures are shown on Figures 1 to 6. Further detail on the nature and extent of activities planned as part of the MAC mining process (including planned sequence of mining, coal extraction program, overburden dumps and topsoil stockpile locations) is presented in the Mt Arthur Coal Consolidation Project Environmental Assessment (2009) and the current Mining Operations Plan.

The locations of vegetation/habitat communities and other critical natural areas relevant to erosion and sediment control at Mt Arthur are presented in Mt Arthur Coal Consolidation Project Environmental Assessment (2009), Appendix J – Ecological Assessment, Sections 3 and 4.

A detailed description of the project can be found in the Environmental Assessment and supporting documents supplied in support of the modification to the Mt Arthur Coal Mine Open Cut Consolidation Project Approval 09\_0062 MOD1 approved 26 September 2014.

## 2 Legislation, Standards and Regulations

### 2.1 Relevant Legislation and Regulations

Key legislation applicable to the management of erosion and sediment control at MAC include but are not limited to:

- Environmental Planning and Assessment Act 1979 (NSW) (EP&A Act);
- Protection of the Environment Operations Act 1997 (NSW) (PoEO Act);
- Protection of the Environment Operations (Hunter River Salinity Trading Scheme) Regulation 2002;
- Water Act 1912;
- Water Management Act 2000; and

Key statutory approvals associated with plan are:

- Mt Arthur Coal Mine Open Cut Consolidation Project Modification 1 (PA 09\_0062 MOD 1) (the Project Approval); and
- Environmental Protection Licence (EPL 11457).

## 2.2 Project Approval

The Project Approval was assessed under the EP&A Act and PA 09\_0062) and granted on 26 September 2014. A list of the relevant conditions of the approval and where they are addressed in this Erosion and Sediment Control Plan (ESCP) is found in Appendix 2.

## 2.3 Environment Protection Licence

Environment Protection Licence 11457 (EPL11457) was granted under the PoEO Act and prescribes the licensed discharges to water including locations of discharge points, concentration limits, volume limits and monitoring and recording limits. These points and limits are addressed in the MAC Water management Plan, (MAC-ENC-MTP-034) there are no specific requirements in this Management Plan.

## 2.4 Relevant Standards and Guidelines

MAC has well-established management systems that are aligned with the international environmental and safety management system standards ISO 14001 and ISO 45001. The management systems provide a framework to support the planning, implementation, monitoring and review of MAC's Water Management Systems, facilitating continual improvement in the performance of water management activities. The management systems include internal policies, subordinate plans and technical procedures that are referenced within this WMP.

# 3 References

## 3.1 External Documents

- NSW EPA (24 August 2017) Environmental Protection Licence 11457
- Department of Planning, Minister of Planning's Project Approval document (dated 26 September 2014, Application Number 09-0062, Mt Arthur Coal Mine – Open Cut Consolidation Project.
- Hansen Bailey (2009), Mt Arthur Coal Consolidation Project Environmental Assessment. Prepared for Hunter Valley Energy Coal Pty Ltd.
- AGE (2009). "Mt Arthur Coal Consolidation Project Environmental Assessment
- Gilbert and Associates (2009). "Mt Arthur Coal Consolidation Project Environmental Assessment – Appendix M Surface Water Assessment". Report prepared for Hunter Valley Energy Coal Pty Ltd November.
- Minerals Council of Australia (1997), "Mine Site Water Management Handbook"
- Protection of Environment Operations (Hunter River Salinity Trading Scheme) Regulation 2002
- URS Australia Pty Limited (2000) The Mount Arthur North Coal Project, Environmental Impact Statement. Prepared for Coal Operations Australia Limited.
- Resource Strategies (2013), Mt Arthur Coal Open Cut Modification – Prepared for Hunter Valley Energy Coal Pty Ltd.
- Landcom (2004), The Blue Book, Managing Urban Stormwater: Soils and Construction, Volume 1 Volume 2E, NSW Government, 4th ed., March.

## 3.2 Mt Arthur Coal Internal Documents

- MAC-STE-REG-013 Mt Arthur Environmental Compliance Register
- MAC-ENC-MTP-041 Environmental Management Strategy
- MAC-ENC-MTP-034 Water Management Plan
- MAC-ENC-PRO-080 Rehabilitation and Ecological Monitoring
- NEC-HSE-PRO-001 Coal Permit to Disturb Procedure
- NEC-HSE-FRM-001 Coal Permit to Disturb

## 4 Purpose and Scope

This Erosion and Sediment Control Plan (ESC Plan) has been prepared to satisfy the requirements of Schedule 3, Condition 31 of the Mt Arthur Coal Mine – Open Cut Consolidated Project Approval 09\_0062.

The objective of this ESC Plan is to set out strategies to control soil erosion and sediment generation close to the source and thereby minimise the potential for mine activities to adversely affect downstream water quality. A secondary objective is to ensure that measures are in place to adequately manage flood risks.

The key purposes of this ESCP are to:

- Ensure all relevant statutory requirements met;
- Meet the requirements of the Blue Book (Managing Urban Stormwater: Soils and Construction Volumes 1 and Volume 2E)
- Identify activities that could cause soil erosion, generate sediment or affect flooding
- Ensure applicable best practice erosion and sediment control management tools are employed to mitigate the impact of mining operations on surrounding surface water bodies;
- Ensure measures are implemented to maintain the management structures over time.
- Maintain an effective response mechanism to deal with issues and complaints.

The proposed Mt Arthur Underground operation is not included in this plan as it has not commenced. The management plan will be reviewed and updated prior to the commencement of underground operations.

## 5 Consultation and Communication

The original version of the ESC Plan was prepared in 2011 in consultation with EPA and NSW Office of Water (NOW) and approved by the Department of Planning and Infrastructure in 2012. Subsequent versions are submitted to the Department of Planning Infrastructure and Environment for review and approval.

In addition to formal consultation previously undertaken relating to the WMP, MAC has extensive consultation and communication processes, including:

- A comprehensive community engagement program which includes the establishment of a Community Consultative Committee (CCC);
- Consultation with Muswellbrook Shire Council (MSC);
- A community response line (1800 882 044) enables members of the community to contact Mt Arthur;
- Regular reporting on the environmental performance of the project on the BHP MAC website; and
- Publicly available project approvals, environmental and other related documentation (annual reports, complaints register, CCC minutes etc.) via the BHP MAC website.

## 6 Roles and Responsibilities

The maintenance and update of this ESC Plan is the responsibility of the Environment Superintendent. Responsibilities with respect to implementation of operational controls are defined within this plan and referenced in operational control documentation.

All personnel and contractors are responsible for undertaking works in accordance with the objectives and principles of this Plan and PTD (where relevant). Report all incidents involving the failure or damage to ESC or flooding structures.

## 7 Potential Causes of Flooding and Management

Localised landform and catchment area changes due to open cut mining and overburden and tailings emplacement have the potential to affect flooding.

Whites Creek Diversion is the only active flood management structure installed or managed for the ongoing operation of the project.

Whites Creek Diversion (Figure 1) is a constructed diversion channel that serves the purpose of diverting flows away from critical mine infrastructure including the Coal Handling and Preparation Plant. The diversion captures flow from local tributaries and discharges from the CHPP area approximately 1.5 km downstream of Whites Creek Upstream Dam via a 2100 mm RCP that runs through the Visual Bund. The diversion channel then continues to drain north for a further 4.5 km on the eastern side of the Dirty Water Dam and Environmental Dam before discharging from the Project area via an existing culvert under Denman Road.

Riparian Vegetation and Channel Stability Monitoring of White Creek Diversion is undertaken annually. The key objectives of the annual monitoring program are to:

- Monitor riparian vegetation community condition and development;
- Identify potential impacts from mining-related activities on creek bed stability and riparian vegetation health; and
- Identify requirements for remedial and/or maintenance works.

The annual monitoring consists of two components; riparian vegetation assessment and channel stability assessment. The riparian vegetation assessment involves conducting a photographic survey and rapid assessment using a riparian zone transect and survey plot at previously determined monitoring sites along White's Creek Diversion. The channel stability assessment is conducted via annual rapid assessment along Whites Creek Diversion.

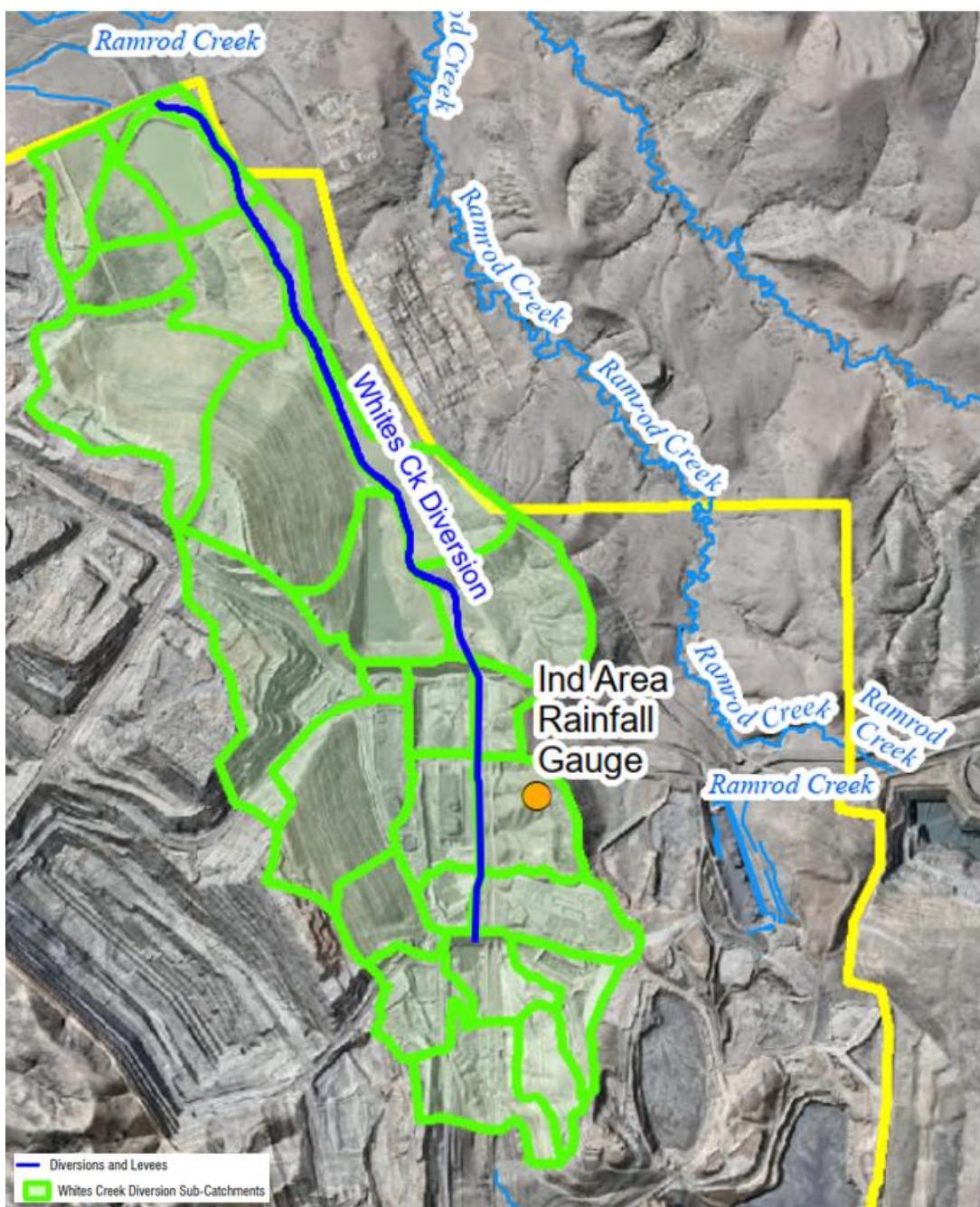


Figure 1: Whites Creek Diversion and Sub-Catchments

A site flood assessment is undertaken every two years, to ensure flood risks are identified and managed in consideration of the progression of mining operations, operational changes and infrastructure construction,

The most recent flood modelling and assessment was undertaken by SLR in June 2020 for waterways and catchments surrounding MAC excluding the Hunter River with reference made to the study referenced above by Golder in 2018. The Average Recurrence Interval (ARI) and Annual Exceedance Probability (AEP) flood events simulated were, ARI 10 years, 10% AEP, ARI 20 years, 5% AEP, ARI 50 years, 2% AEP, ARI 100 years, 1% AEP, ARI 1000 years, 0.1% AEP.

Catchment Studies were undertaken for Saddlers Creek, Quarry Creek and Whites Creek Diversion, which represent the major local watercourses in the vicinity of the Mine and associated leases. It was found that the Saddlers Creek and Quarry Creek catchments are characterised by steep terrain in the upper reaches and well defined flow paths throughout. The natural area of both catchments has been reduced due to the formation of mine pits, however the land use of the existing catchment area is generally the natural conditions including open space and moderate vegetation.

Hydraulic models were developed for the Saddlers Creek, Quarry Creek and Whites Creek catchments, which applied the hydrographs produced by the hydrologic models as inflow boundaries. The models were utilised to estimate the riverine flooding characteristics of the catchments under the existing conditions.

The assessment determined that there is no risk of flooding of the operations from the major local watercourses in the vicinity of the mine, no requirements for flood management structures in addition to Whites Creek Diversion were identified to protect the site from flooding from local water courses.

The assessment determined that there is no risk of flooding impacts caused by the operations to the major local watercourses or catchments in the vicinity of the mine, no flood management structures were identified as being required to protect the major local water courses and catchments from potential operational flood impacts.

Flooding of the Hunter River and associated risk to MAC is detailed in a study undertaken by Golder Associates, 'Mount Arthur Coal Mine Flood Study – Levee Extension Flood Level Assessment', 28 November 2018, Golder Associates (MACMFS). The flood model project scope was defined as requiring the design of the Windmill Pit levee to protect the ingress of flood water from a 0.1% (1 in 1000) Annual Exceedance Probability (AEP). While it is apparent that historically a flood levee has been constructed along the northern extant of the site adjacent to Denman Rd, the most recent hydraulics model completed by Golder and Associates in 2018 for the 0.1% AEP flood event Figure 2) indicate that the Hunter River does not inundate any MAC operating areas. So while the bund remains in place it is not considered a critical flood structure for the purposes of this ESC Plan. This report was reviewed and taken into consideration in the SLR 2020 review.

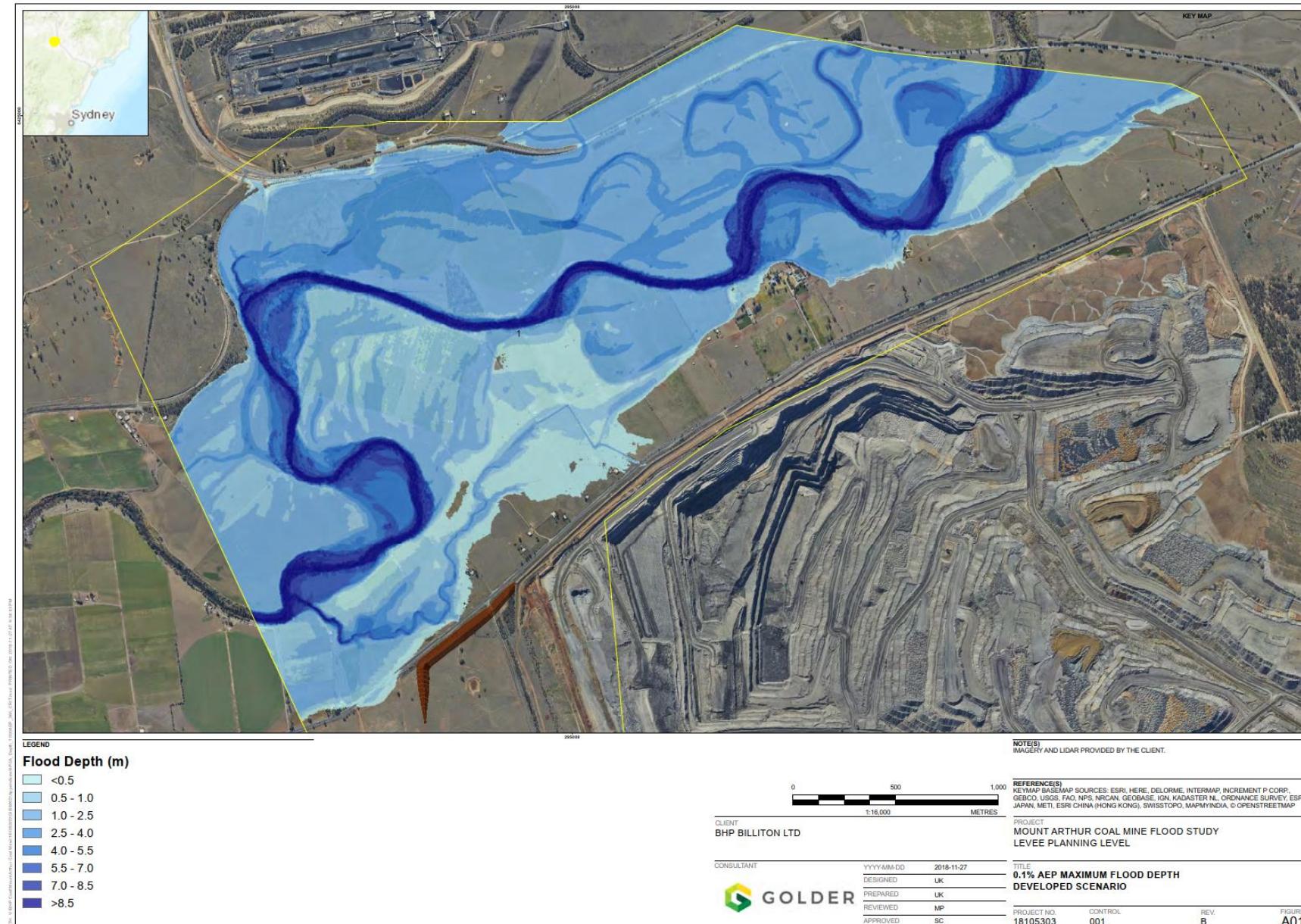


Figure 2: 0.1% AEP Maximum Flood Depth Development Scenario

A high level flood risk assessment was undertaken based on the results of the hydraulic models to identify inherent flood risks in the Project extent, including haul road inundation, pit inundation, nuisance ponding and assessment of existing infrastructure immunity. Key flood risks identified during the assessment include the significant accumulation of runoff in the existing low point around the ROM tanks, and the potential for blockage of the CHPP area outlet culvert to cause an increase in flood levels and inundation of infrastructure within the CHPP area as shown in Figure 3. The three main culverts draining the area are routinely inspected to ensure they not blocked.

These key flood risks to the internal site operations pose no risk to the Environment or external to MAC operating areas.

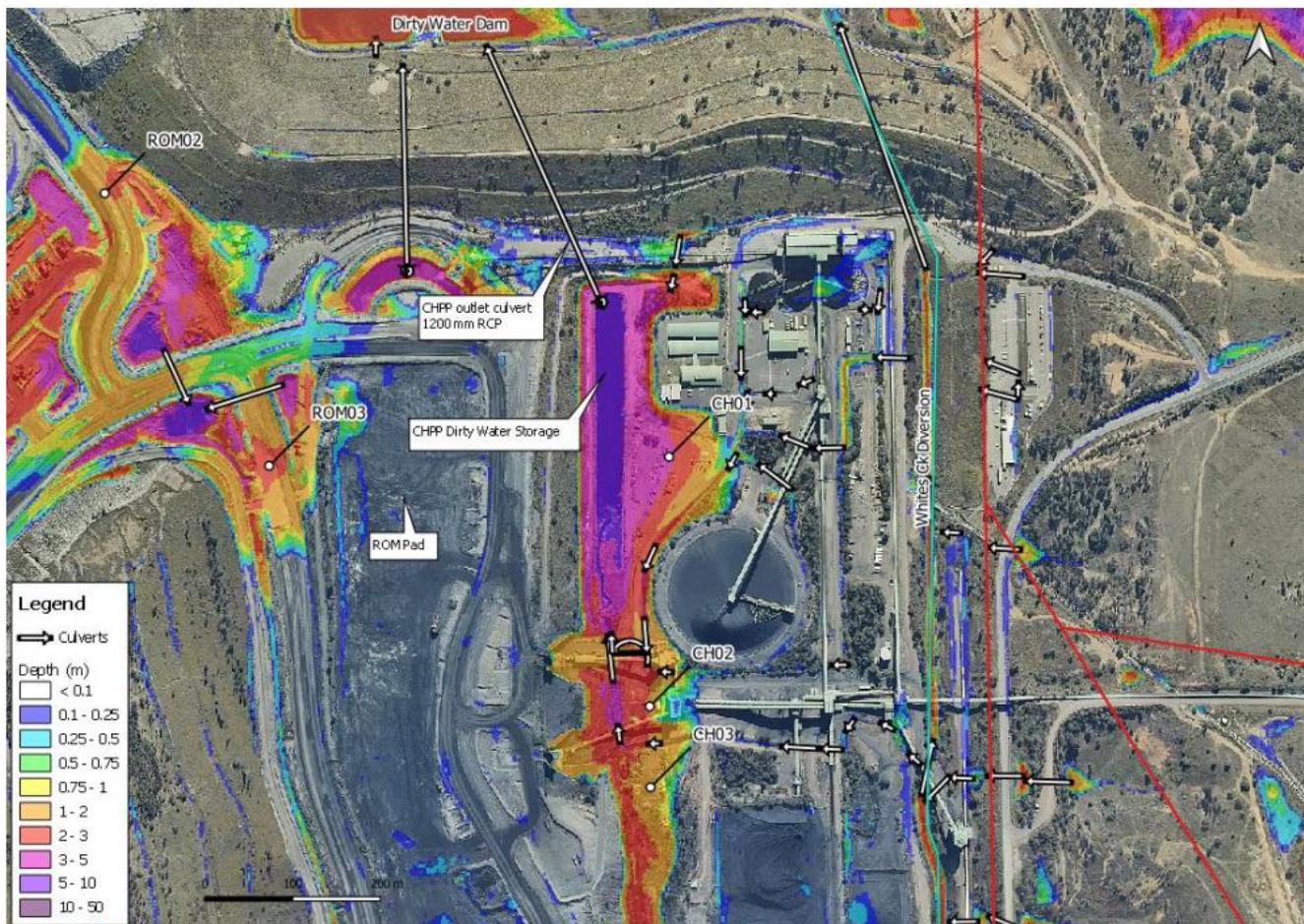


Figure 3: CHPP Area Flood Risk – 0.1% AEP Depths

## 8 Potential Causes of Erosion and Sedimentation

Mining operations that have the potential to cause erosion or generate sediment and impact the surrounding catchment areas are:

- continued mining operations and construction activities;
- clearing or disturbance of land for mining or other activities;
- exploration activities;
- construction of operational sediment control measures;
- construction of overburden and emplacement areas and haul routes;
- changes to drainage lines and/or catchments, including upslope diversions;
- placement of overburden and topsoil;
- early stage mine site rehabilitation with low cover and erosion potential.

Erosion and sedimentation impacts which may result from the MAC mining operations include:

- increased runoff volumes and velocities from the removal of vegetation, land disturbance and the introduction of impervious surfaces on hardstand areas;

- increased potential for sedimentation to occur from increased erosion and runoff associated with open cut mining, stockpiling of material and the construction of surface facilities, access
- roads/tracks and exploration drilling;
- potential for increased scouring during the construction of surface facilities adjacent to watercourses.

## 9 Erosion and Sediment Control Strategy

### 9.1 General Principles

MAC categorises water into three types to effectively manage water, and to mitigate any potential for environmental harm to occur. Each type of water requires different management measures to minimise the risk of contamination of downstream drainage systems. A description of the water quality and potential sources for the three categories of water are summarised in Table 1.

*Table 1: Water Categories and Design Criteria*

Water Category	Description	Target Design Criteria
Clean Water	Runoff from undisturbed or rehabilitated areas where vegetation is fully established and where the water quality is suitable for release/discharge.	Overland flow where practicable, to downstream environment.
Runoff Water	Runoff from disturbed areas that do not have the potential to generate elevated salinity and/or contain pollutants other than suspended solids.	Managed in accordance with the guidelines in Landcom (2004) (Managing Urban Stormwater: Soils and Construction Volume 1 and Volume 2E).
Mine Affected	Water runoff exposed to coal or used in coal processing. Mine water includes water associated with groundwater inflows into open cut pits. This water may be highly saline and/or contain pollutants such as hydrocarbons.	Contained within the mine water management system, for events up to and including the 1% Annual Exceedance Probability (AEP), 24 hour storm event (equivalent to the 100 year Average Recurrence Interval (ARI), 24 hour storm event).  Contained water will be preferably reused, if necessary releases must be from the licensed discharge point documented within EPL 11457.

This ESCP is concerned with the management of ‘runoff water’ as described in **Table 1**. Standard ESC techniques and management principles are utilised in accordance with the Managing Urban Stormwater: Soils and Construction Volume 1 (Landcom, 2004) and Volumes 2A, 2C, 2D and 2E (DECC, 2008) (the Blue Book). These standard techniques and management principles are achieved at MAC through the following key principles:

- Prior to site disturbance, a Permit to Disturb (NEC-HSE-FRM-001 Coal Permit to Disturb) must be completed and approved by a MAC Environment Specialists;
- Install erosion and sediment control measures where required as the first step in the process for land disturbance;
- Minimise all disturbed areas and stabilisation by progressive rehabilitation of disturbed land as soon as practicable in accordance with the Mining Operations Plan;
- Construction of diversion drains upslope of areas to be disturbed to direct clean runoff away from disturbed areas, where practical and where they will significantly reduce the catchment reporting to disturbance areas;
- The diversion drains will be designed to ensure effective segregation of sediment-laden runoff and allow clean surface water to return to natural watercourses;

- Construction of sediment dams/sumps where required to provide for temporary retention of runoff from disturbance areas. Where practicable, existing dams, existing farm dams and non-operational open cut voids will be preferentially utilised for this purpose;
- Construction of catch drains to capture runoff from disturbed areas and rehabilitation areas and direct runoff into sediment dams;
- Construction of sediment fences and straw bale filters (downslope of disturbance and stockpile areas) where required;
- Progressively stripping and stockpiling topsoil for later use in rehabilitation topsoil stockpiles stored for more than three months will be fertilised and grassed to reduce the potential for weed contamination and erosion;
- Level or gently sloping areas will be selected as stockpile sites, where required, to minimise erosion and potential soil loss where possible;
- Appropriate sediment controls will be installed upslope of stockpiles to divert water around the stockpiles and downslope of stockpiles to prevent soil loss;
- Placement of geotextile liners and rock check dams in drains as required to reduce water velocities and prevent scouring;
- Locate stockpiled material away from concentrated water flows;
- Construction of road and earthworks cut and fill batters at slopes of 1V:3H (vertical: horizontal) or less (where possible) to maximise long term stability;
- Inspection and maintenance of all sedimentation controls and rehabilitation areas after storm events (greater than 25 mm of rainfall in 24 hours) to ensure ESCs are performing adequately;
- and follow up repair or redesign of ESCs that are not performing adequately;
- Maintenance of design capacity of sediment dams by removing built-up sediment;
- Establishment of vegetative cover on rehabilitation areas as a priority to minimise exposed subsoils and the control of weeds through selective herbicide application and the reseeding of areas that fail to establish as soon as practicable;
- Restricting access to rehabilitated areas through the use of fencing and/or signposting where practical; and
- Repair or redesign of erosion and sediment controls that are not performing adequately, as identified in field inspections.

## 9.2 Control Methods

MAC employs the use of the following methods to control erosion and manage sediment laden runoff:

- Permit to Disturb (NEC-HSE-FRM-001 Coal Permit to Disturb) – permit system to manage and minimise disturbance to undisturbed or rehabilitated land.
- Progressive rehabilitation – mining disturbed land is rehabilitated to a stable, vegetated landform following completion of mining related activities. Rehabilitation of mining disturbed land is completed in accordance with the rehabilitation sequence and methodology contained in the current Mining Operations Plan.
- Sediment dams – retain runoff volume from a rainfall event such that suspended solids can settle to the base of the dam.
- Collection drains - constructed downslope of, or within, disturbed areas where required to convey runoff to sediment dams or other storages.
- Sediment fences – vertical support pickets are spaced at a maximum of 2.5m intervals and are placed parallel to contours with limited contributing catchment area to any one section, self-supporting geotextile is placed on the upslope side of the posts.
- Straw bale filters – similar to sediment fences with straw bales used instead of geotextile.
- Kerbside turf filter strips – kerbs are surrounded by strips of turf such that sediment laden runoff from upslope has the opportunity to be filtered by the grass before discharging to the stormwater system.
- Post-rain inspections – sediment management structures are inspected following rain events of 25mm, or greater, in 24 hour period.

Runoff from most disturbed areas on site reports to water management containment storages or to mine open cut pits which are part of the mine water management system. Runoff from coal stockpile areas is managed within the mine site containment storages.

## 10 Design

Table 2: Design Criteria for Sediment Control Structures

Sediment Control structure	Function	Design Capacity
Upslope diversion drains	Reduce runoff from undisturbed areas onto disturbed areas	Peak flow calculated for 1 in 10 year critical duration rainfall event (Landcom (2004), Section 5.4.3(b)-(d))
Downslope collection drains	Intercept and convey disturbed area runoff water to sediment dams/sumps	Peak flow calculated for 1 in 10 year critical duration rainfall event (Landcom (2004), Section 5.4.3(b)-(d))
Sediment dams (Facilities)	Containment of sediment-laden runoff from disturbed areas with more than 150m3/yr estimated soil loss (Landcom (2004), Section 6.3.2(d))	<p><b>Settling Zone:</b> Capacity to store the runoff produced from the 80th percentile, 5-day rainfall event (Landcom (2004), Section 6.3.4(f) and (i))</p> <p><b>Sediment Zone:</b> Two months calculated soil loss estimated using RUSLE* (Landcom (2004), Section 6.3.4 (i))</p>
Sediment fences and/or straw bale filters	Retention/filtration of suspended sediments	Limit flow to less than 50L/s in the design 1 in 10 year critical duration rainfall event (Landcom (2004), Section 6.3.7(e))

\*Revised Universal Soil Loss Equation (RUSLE)

### 10.1 Sediment Filter Fences and Other Temporary Sedimentation Control Methods

Sediment fences, sediment traps, rock check dams and other temporary erosion and sediment control measures from the Blue Book will be installed in advance of, or in conjunction with, earthworks to prevent sediment laden water leaving the site or entering clean water systems. These temporary controls are intended to be used for short periods whilst more permanent erosion and sediment control structures are being implemented or during emergency scenarios where permanent structures are not deemed appropriate.

Where necessary, sediment filter fences or other temporary controls are constructed immediately downslope of areas to be disturbed to minimise the potential for sediment transport into receiving waterways.

Sediment filter fences are constructed in line with Best Practice Erosion and Sediment Control Guidelines, (Landcom, 2004) they are generally comprised of geotextile filter fabric with structural posts.

### 10.2 Sediment Dams (Facilities)

Sediment dams are installed as required in order to capture and treat sediment laden runoff from disturbed areas prior to release off-site. The use of flocculants or other ameliorants to reduce suspended sediment content will be considered on a case by case basis.

Sediment dams are designed based on the methodology and parameters contained in Landcom (2004), the settling zone capacity and sediment storage zone capacity and hence required dam capacity are calculated using Equations 1, 2 and 3 below respectively:

$$\text{Settling Zone Capacity (m}^3\text{)} = V_{\text{settling}} = 82.25 \times A \quad (1)$$

$$\text{Sediment Zone Capacity (m}^3\text{)} = V_{\text{sediment}} = 27.16 \times A \quad (2)$$

$$\text{Required Dam Capacity (m}^3\text{)} = V_{\text{total}} = V_{\text{settling}} + V_{\text{sediment}} \quad (3)$$

Where;  $V_{\text{settling}}$  = settling volume

$V_{\text{sediment}}$  = sediment volume

$V_{\text{total}}$  = total volume

$A$  = catchment area of the sediment dam (ha)

The 90th percentile 5-day rainfall event, used in determining the sediment dam settling zone capacity, was calculated to be 39.35mm from the average of values for Scone and Cessnock as given in Table 6.3a in Landcom (2004). The adopted design standard does not provide 100% containment for runoff from disturbed areas. Hence, it is possible and expected that overflows will occur from sediment dams if rainfall exceeds the design standard, these designed overflows are not considered a reportable event.

Sediment dam batters should be covered with topsoil and/or seeded with a cover crop to assist with minimising the potential for erosion of the dam batters. The final design locations, functions and capacities of sediment dams are described in the sediment dam operation and maintenance manual/s and were appropriate Permit to disturb for an area.

Where necessary, sediment dams will be constructed prior to any land disturbance activities occurring and will be maintained during the duration of catchment disturbance. Sediment dams will be maintained in a drawn down state as far as practicable by transferring water to the mine water storages, with water to be used for dust suppression or other mine related purposes, or by pumping water onto grassed and or rehabilitated areas for irrigation purposes.

Runoff from rehabilitated areas is diverted to sediment dams for treatment until the water quality of surface runoff is suitable for release from the site, at which time the sediment dams may be decommissioned or active management (by dewatering and periodic de-silting) ceased. In the latter case, the sediment dams would remain in place in the longer term and become an asset for future land use.

## 11 Current Erosion and Sediment Containment Structures

### 11.1 Sediment Filter Fences and Other Temporary Sedimentation Control Structures

Sediment fences, sediment traps, rock check dams and other temporary erosion and sediment control measures from the Blue Book are installed in advance of, or in conjunction with, earthworks to prevent sediment laden water leaving the site or entering clean water systems. These temporary controls are intended to be used for short periods whilst more permanent erosion and sediment control structures are being implemented or during emergency scenarios where permanent structures are not deemed appropriate. Due to the temporary nature of these structures the specific location and individual construction of these are not detailed in the ESC plan. Where they are required they will be designed, implemented and managed in accordance with this ESC plan and the Best Practice Erosion and Sediment Control Guidelines, (Landcom, 2004)

### 11.2 Sediment Dams (Facilities)

Sediment Dams (Facilities) are the primary long term erosion and sediment control structures implemented onsite. Where they naturally drain to existing storages, disturbed catchments are also managed in mine affected water dams and existing mine pits and voids. The need for a purpose built sediment facility is determined by a catchment assessment undertaken during the planning phase.

Where a facility serves a dual purpose as a mine affected water facility and sediment control it will not be operated in accordance with Best Practice Erosion and Sediment Control Guidelines, (Landcom, 2004), rather the more stringent controls of a mine affected water facility will be implemented. Mine affected water facilities are designed and operated to ensure, as a minimum, containment of a 1 in 100yr ARI event.

The current Sediment facilities and Mine affected water facilities are identified in Table 3.

Catchment boundaries, and associated sediment control dams and or mine affected water storages and pits are shown in Appendix 1.

The operational design and function of the major site sediment dams are documented within the facility Operation and Maintenance Manual.

Table 3: Sediment Control and Mine Affected Water Facilities

	Facility Type	Dam / Pit	Post rainfall inspection required by ESC plan
<b>Belmont West B</b>	Sediment Facility	Dam	Yes
<b>Windmill Highwall Sed Dam</b>	Sediment Facility	Dam	Yes
<b>Sed Dam A</b>	Sediment Facility	Dam	Yes
<b>Sed Dam B</b>	Sediment Facility	Dam	Yes
<b>Sed Dam C</b>	Sediment Facility	Dam	Yes
<b>Sed Dam D</b>	Sediment Facility	Dam	Yes
<b>VD 2</b>	Sediment Facility	Dam	Yes
<b>Visual Bund</b>	Sediment Facility	Dam	
<b>Saddlers Creek Sed Dam</b>	Sediment Facility	Dam	Yes
<b>Saddlers Rehab 1</b>	Sediment Facility	Dam	Catchment Rehabilitated no inspection required
<b>Saddlers Rehab 2</b>	Sediment Facility	Dam	Catchment Rehabilitated no inspection required
<b>Saddlers Rehab 3</b>	Sediment Facility	Dam	Catchment Rehabilitated no inspection required
<b>Saddlers Rehab 4</b>	Sediment Facility	Dam	Catchment Rehabilitated no inspection required
<b>D11 Dam 1</b>	Sediment Facility	Dam	Catchment Rehabilitated no inspection required
<b>D11 Dam 2</b>	Sediment Facility	Dam	Catchment Rehabilitated no inspection required
<b>Ayredale Sed Dam</b>	Sediment Facility	Dam	Yes
<b>Environmental Dam</b>	Sediment and Mine Affected Water Facility	Dam	No
<b>Dirty Water Dam</b>	Sediment and Mine Affected Water Facility	Dam	No
<b>VD 1</b>	Sediment and Mine Affected Water Facility	Dam	No
<b>Export Coal Stockpile Dam</b>	Sediment and Mine Affected Water Facility	Dam	Yes
<b>Whites Creek Dam</b>	Sediment and Mine Affected Water Facility	Dam	Yes
<b>Industrial Area Dam</b>	Sediment and Mine Affected Water Facility	Dam	No
<b>Mcdonalds Dam</b>	Sediment and Mine Affected Water Facility	Dam	Yes
<b>Paradise Truck Fill Dam</b>	Sediment and Mine Affected Water Facility	Dam	No
<b>Bayswater Main Dam</b>	Sediment and Mine Affected Water Facility	Dam	Yes
<b>Drayton Void</b>	Sediment and Mine Affected Water Facility	Pit/Void	No
<b>Belmont Pit</b>	Sediment and Mine Affected Water Facility	Pit/Void	No
<b>McDonalds Pit</b>	Sediment and Mine Affected Water Facility	Pit/Void	No
<b>Saddlers Pit</b>	Sediment and Mine Affected Water Facility	Pit/Void	No
<b>West Cut TSF</b>	Sediment and Mine Affected Water Facility	Dam	No
<b>South West Valley TSF</b>	Sediment and Mine Affected Water Facility	Dam	No
<b>North Cut TSF</b>	Sediment and Mine Affected Water Facility	Dam	No

## 12 Operation and Maintenance

### 12.1 Drainage Channels

Any signs of erosion along the length of either clean water or dirty water catch drains are noted and remedial works undertaken as required. Where significant erosion is observed, additional erosion controls will be constructed, which will include a combination of the re-establishment of vegetative cover, installation of an erosion blanket or rock armouring.

### 12.2 Sediment Filter Fences and Other Temporary Sedimentation Control Methods

Routine inspections of sediment control structures.

Temporary silt fences and straw bale filters are inspected and trapped sediment removed or straw bales replaced as necessary. Removed sediment is placed within the mine water management footprint. Temporary structures will be removed when no longer required.

### 12.3 Sediment Dams (Facilities)

MAC implements the following sediment dam management measures:

- Within 5 days following a rainfall event, if the available freeboard volume in sediment dams is approaching the required design capacity, sediment dams are dewatered to the mine water system or to well-grassed areas where sufficient grassed buffer exists to prevent the migration of sediments to watercourses. Water will be released outside the mine water system only if the total suspended sediment (TSS) content meets the recommended criterion of 50mg/L (Landcom, 2004). Flocculant addition will be used, if required, to meet the recommended Landcom (2004) criterion.
- Sediment dams are maintained in between rainfall events to ensure sufficient capacity is available to manage the required rainfall intensity.
- Environmental and sediment dam batters are appropriately stabilised to assist with minimising the potential for erosion of dam batters.
- Inspection - Sediment dams that have a catchment with sediment generating potential and the potential to spill to the environment are inspected immediately after rainfall events with more than 25mm in 24 hours. Dams will be inspected for
  - capacity,
  - structural integrity and
  - effectiveness.

Where inspections indicate substantial accumulation of sediment in a sediment dam, clean-out will be undertaken as soon as practicable so as to reinstate the minimum required volumes.

Table 3 identifies the facilities that require post rainfall inspection as per the ESC Plan.

Inspections are documented with a summary of the identified maintenance requirements for each inspected dam.

## 13 Cumulative Impacts

In conjunction with the owners of the nearby Drayton and Bengalla mines, MAC will use its best endeavours to minimise the cumulative impacts of the project on the surrounding area to the satisfaction of the Secretary.

## 14 Response Procedures

### 14.1 Operational Response Process

In situations where surface water sampling results (following 25mm or more of rain in 24 hours) are identified as exceeding the impact assessment criteria, the following actions will be undertaken:

- The Environment Specialist and appropriate operational supervisor will assess the source and extent of the exceedence;

- If the exceedence is attributable to MAC, the DPIE, EPA and any other relevant agencies will be contacted as soon as practicable, in accordance with Condition R2 of the EPL, and Schedule 5, Condition 7 of the Project Approval.
- MAC will initiate an investigation and provide a detailed investigation report to DPIE, EPA and any other relevant agencies, with the report within 7 days of the incident, in accordance with Schedule 5, Condition 7 of the Project Approval.
- Any corrective action will be recorded in the site event management database and reported to the Environment Specialist.

## 14.2 Complaint Response

All complaints received in relation to erosion and sedimentation will be responded to in accordance with MAC-ENC-PRO-042 Community and Environmental Incident Response and Reporting and Condition M7 of the EPL. These provide details on how to receive, handle, respond to, and record and action any community complaints.

Upon receipt of a complaint from the community, preliminary investigations will commence as soon as practicable to determine the likely causes of the complaint using information such as rainfall data, location of erosion or sediment and recent water quality monitoring results. A response will be provided as soon as practicable, which may include the provision of relevant monitoring data.

MAC will record all community complaints into the site event management database. The database is maintained to include reporting, incident/event notification, close out action tracking, inspections, and audits.

## 15 Review

This ESCP will be reviewed and evaluated to assess its adequacy and effectiveness, to the satisfaction of the Secretary (in consultation with relevant government agencies) in accordance with Condition 4 of Schedule 5 of the Project Approval. This requires that this is undertaken within 3 months of:

- The submission of the Annual Review;
- The submission of an incident report;
- The submission of an audit; and
- Any modifications to the conditions of the Approval.

If necessary this ESCP will be revised to incorporate any recommended measures to improve the environmental performance of MAC resulting from audits, community complaints and incident investigation findings. In addition, the review process will include ongoing evaluation of operational modifications, alternative methodologies and new technologies that become available.

## 16 Reporting

MAC will report on the effectiveness of the ESCP annually in the MAC Annual Review this will be undertaken in accordance with Condition 3 of Schedule 5 of the Project Approval and include:

- Erosion and or Sediment related complaints and management/mitigation measures undertaken;
- Management/mitigation measures undertaken in the event of any confirmed exceedance of the impact assessment criteria, caused in relation to erosion and sediment control.

### 16.1 Incident Reporting

Incident reporting will be undertaken in accordance with Schedule 5 Condition 7 of the Project Approval 09\_0062.

Incidents are defined as a contravention of the conditions within Schedule 3 of the Project Approval 09\_0062 related to erosion and sediment control or where a set of circumstances causes, or threatens to cause, material harm to the environment; will be reported to the relevant Regulatory Authority in accordance with the following protocol:

- An email and or verbal notification will be provided to the Regulatory Authority immediately after becoming aware of the incident;
- Exceedances of impact assessment criteria will be notified as an 'interim exceedance'.
- An investigation will be conducted to determine the cause of the incident, and in the case of an exceedance, the monitoring result will also be validated;

- A incident or hazard will be recorded in the site incident management system, this record will have an appointed Owner and Reviewer to ensure appropriate internal stakeholders are notified of the incident;
- A written report on the incident will be provided to the relevant Regulatory Authority within 7 days of becoming aware of the incident (or as otherwise directed by the Regulatory Authority).

The NEC-STE-MTP-009 Pollution Incident Response Management Plan (PIRMP) ensures the comprehensive and timely communication about a pollution incident to staff at the premises, the relevant authorities and people outside the facility who may be affected by the impacts of the pollution incident;

## Version Management

**Note:**

- **Major** versions (1.0, 2.0 etc.) are for changes after a significant event / incident or for a periodic review of the document.
- **Minor** versions (1.1, 1.2 etc.) are for small changes to a page or pages within a document.

Date	Version Control		Page(s)	Details
	Major	Minor		
30/06/2011	1.0		All	<i>Draft Submitted to DPI for comment</i>
15/08/2012		1.1	All	<i>Draft Submitted to DPI for comment</i>
20/08/2012		1.2	All	<i>Approved by the Department of Planning &amp; Infrastructure on 20/08/2012</i>
14/09/2021	2.0		All	<i>Submitted to DPIE for approval</i>
12/11/21		2.1		<i>Updated following feedback from DPIE</i>

## **Appendix 1 – Catchment Facility Plans**

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FIG 02: NORTHERN WATER FACILITIES

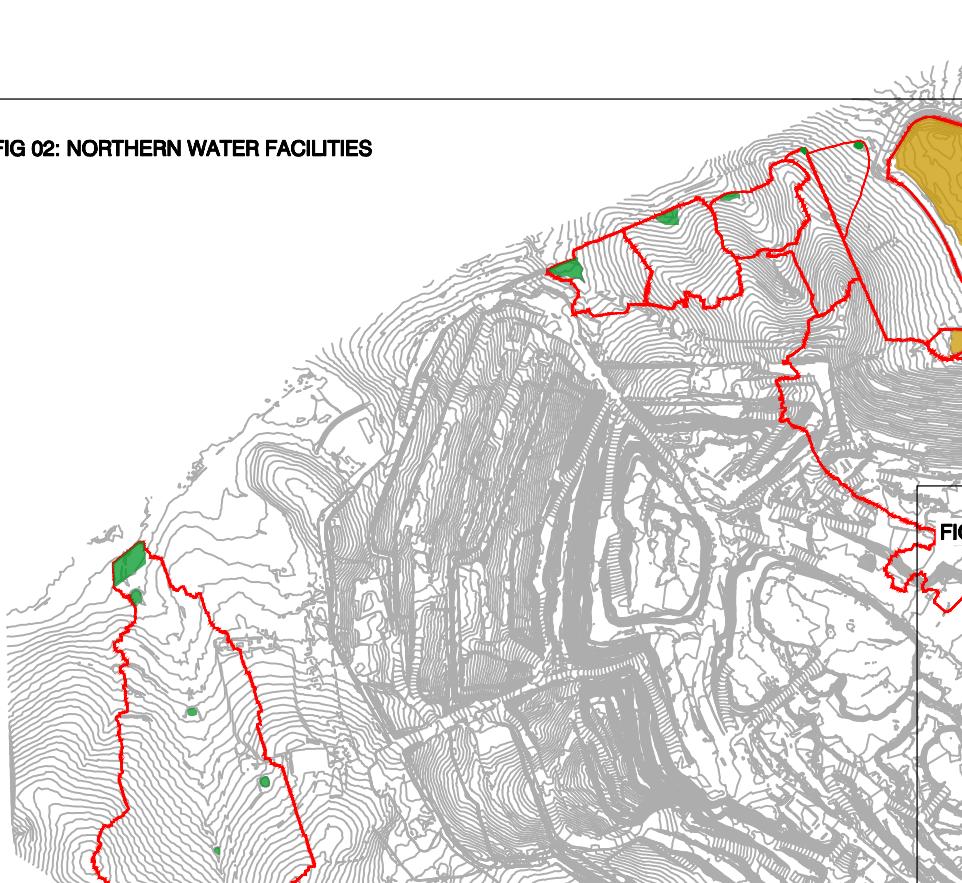


FIG 03: CENTRAL WATER FACILITIES

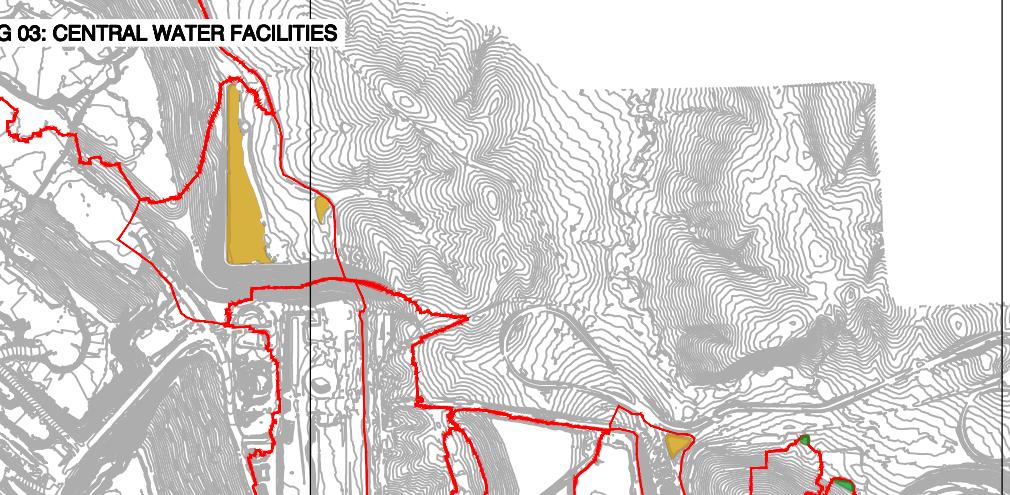
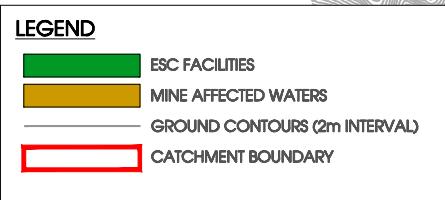


FIG 04: SOUTHERN WATER FACILITIES



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SCALE OF METRES 1:40,000 @ A3

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BHP MT. ARTHUR COAL  
SEDIMENT DAM REVIEW

CATCHMENT OVERVIEW PLAN

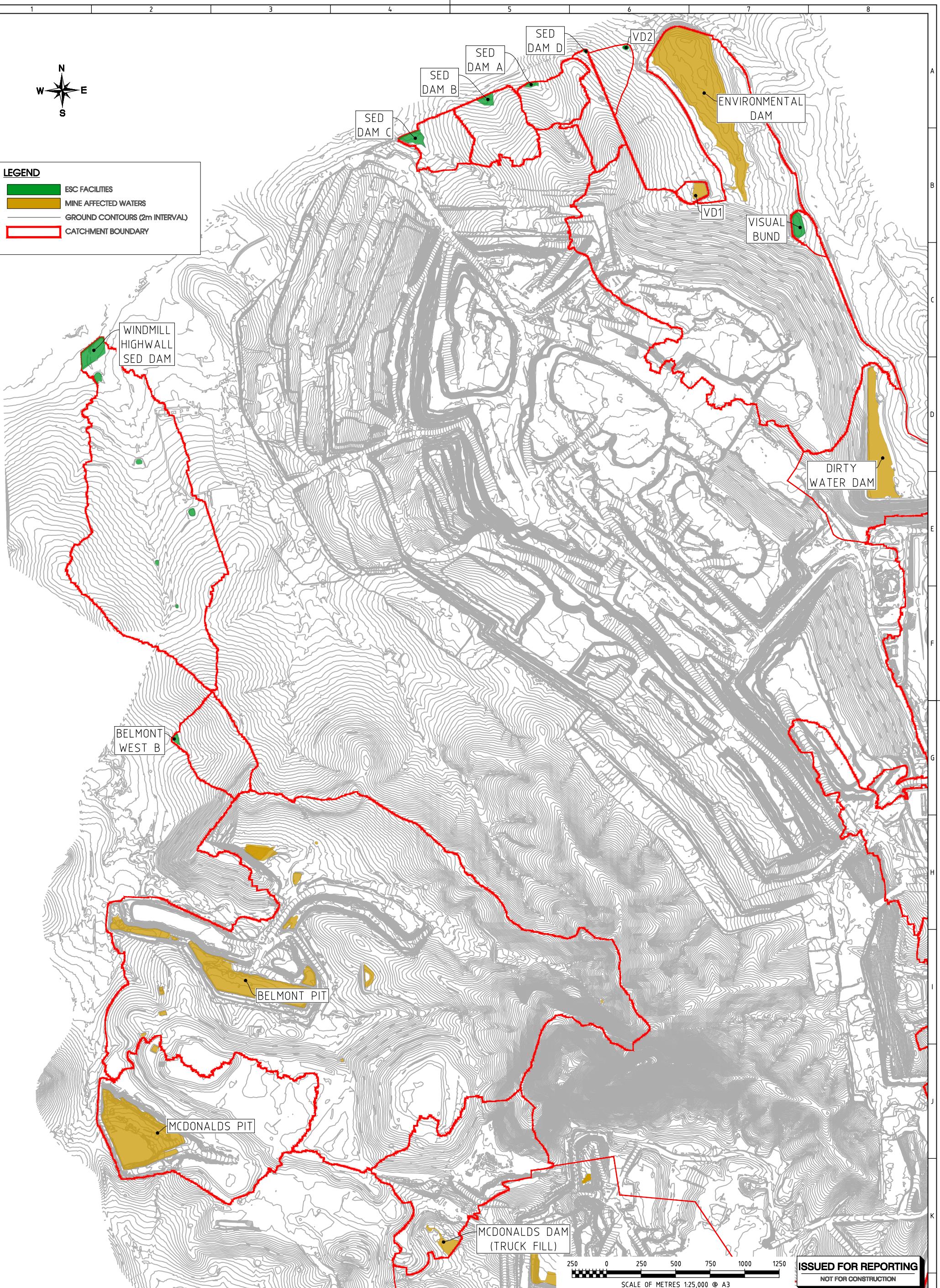
FIG No.

01

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**BHP MT. ARTHUR COAL  
SEDIMENT DAM REVIEW**

**NORTHERN WATER FACILITIES**

FIG No.

02

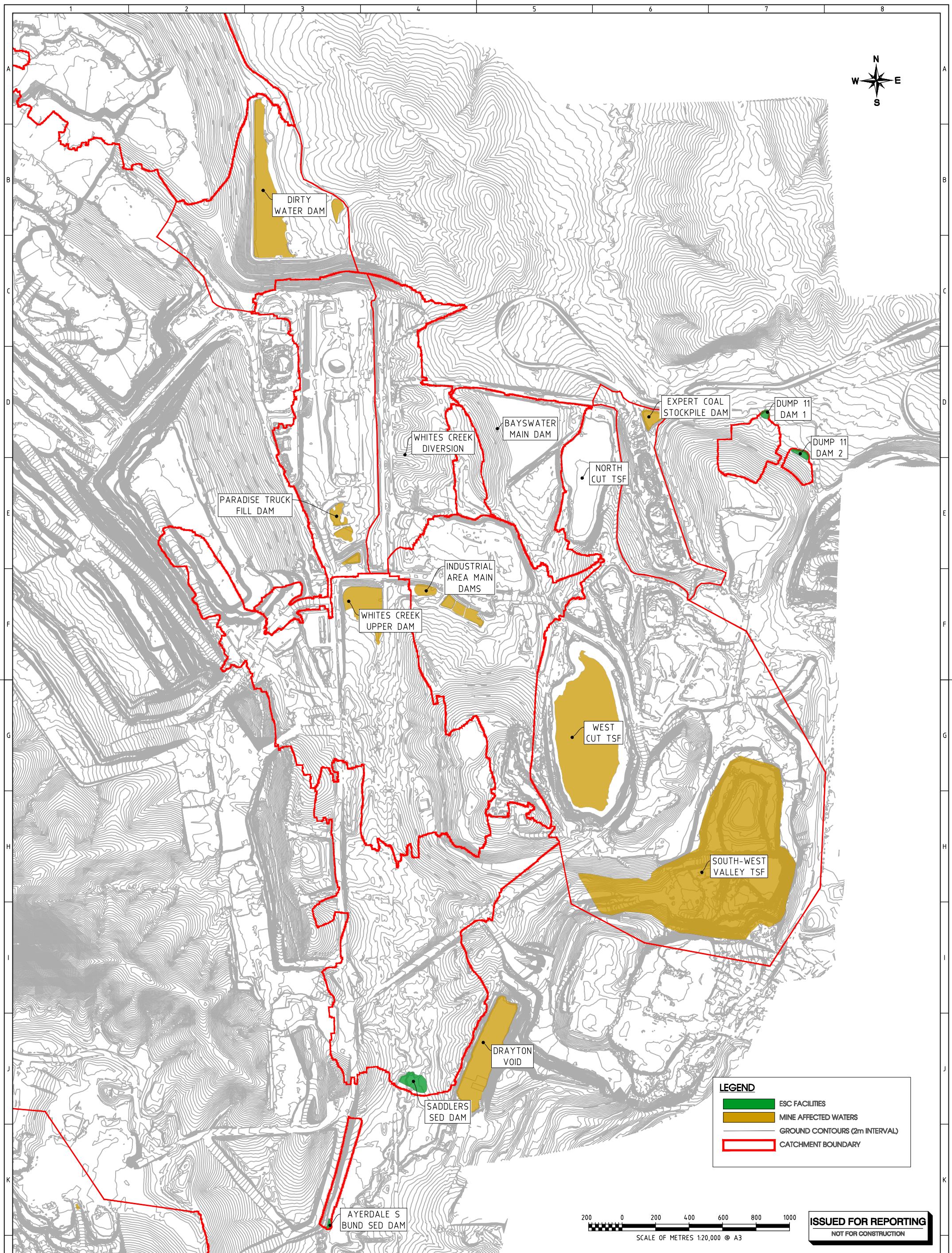
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J:\2004\104035 Mt Arthur\26a Sed Dam Review\Data and Calcs\1. Sed Dam Review\2. Catchments\CAD\Catchment (AC)v2.dwg

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SEDIMENT DAM REVIEW**

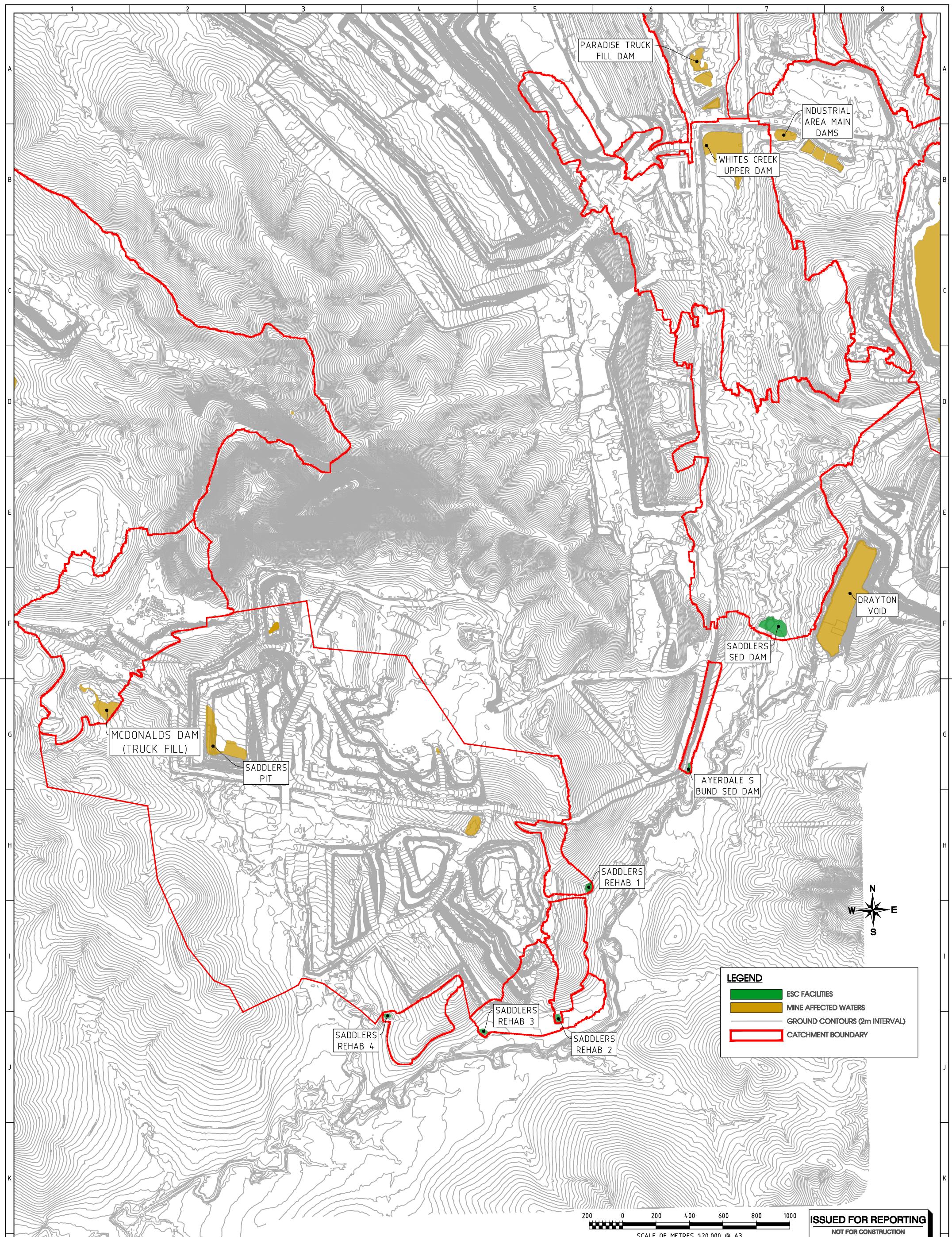
**CENTRAL WATER FACILITIES**

FIG No.

03

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Brisbane T +61 7 3352 7222			<b>ISSUED FOR REPORTING</b> NOT FOR CONSTRUCTION
1	2	3	4

## Appendix 2 – Approval Conditions Compliance Tables

*Table 4: Development Consent (09\_0062) relevant conditions*

Condition Number	Environmental Performance Condition	Addressed within
<b>Development Consent (09_0062)</b>		
Schedule 3 Condition 31	The Erosion and Sediment Control Plan must:	
	<p>a) be consistent with the requirements of Managing Urban Stormwater: Soils and Construction, Volume 1, 4th Edition, 2004 (Landcom), or its latest version;</p>	Throughout this ESCP Section 3.1 Section 4
	<p>b) identify activities that could cause soil erosion, generate sediment or affect flooding;</p>	Section <b>Error!</b> <b>Reference source not found.</b> - flooding Section 0 - soil erosion, generate sediment
	<p>c) describe measures to minimise soil erosion and the potential for the transport of sediment to downstream waters, and manage flood risk;</p>	Section <b>Error!</b> <b>Reference source not found.</b> – flood risk Section 0 – erosion and sediment
	<p>d) describe the location, function, and capacity of erosion and sediment control structures and flood management structures; and</p>	Section 10 Section 12 Section <b>Error!</b> <b>Reference source not found.</b>
	<p>e) describe what measures would be implemented to maintain the structures over time</p>	Section 12
Schedule 5 Condition 3	Annual Review	Section 16
Schedule 5 Condition 4	Revision of Strategies, Plans and Programs	Section 15
Schedule 5 Condition 6	Management of Cumulative Impacts	Section 13
Schedule 5 Condition 7	Incident Reporting	Section 16.1

## Appendix 3 – Department Letter of Approval