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MEMBER OF



SOIL AND WATER MANAGEMENT PLAN

Tahmoor Coal



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1 Purpose

This Soil and Water Management Plan (SWMP) provides a framework for the management of soil and water on-site at Tahmoor Coal, operated by Tahmoor Coal Pty Ltd (Tahmoor Coal).

The purpose of this document is to:

- a) Provide employees and contractors with a clear and concise description of the surface water management systems at Tahmoor Coal;
- b) Provide employees and contractors with a clear and concise description of their responsibilities in relation to surface water management, ground disturbance, and the implementation of effective erosion and sediment controls;
- c) Address the relevant conditions of Tahmoor Coal's Development Consents, Environmental Protection Licence (EPL), and any other applicable approvals or regulatory requirements;
- d) Address any applicable internal requirements of Tahmoor Coal.

The layout of Tahmoor Coal's surface operations is shown below in **Figure 1**.

2 Scope

This SWMP applies to the management of soil and water systems associated with the operation of the Tahmoor Coal surface operations. This includes the mine pit top and surface infrastructure, ventilation shafts, coal handling & preparation plant, and refuse emplacement area. This SWMP details the following:

- a) Overview of regulatory compliance for soil and water management (**Section 5.1**);
- b) Components of the site's water management system (**Section 5.2**);
- c) Erosion and sediment controls (**Section 5.3**);
- d) Site water balance (**Section 6.0**);
- e) Surface and groundwater response plan (**Section 8.0**); and
- f) Water Efficiency Plan detailing targets and key water saving projects (**Appendix E**).

3 Statutory Conditions

3.1 Environmental Protection Licence

Tahmoor Coal holds an Environmental Protection Licence (EPL) 1389 issued under the Protection of the Environment Operations Act 1997. The licence authorises the carrying out of activities at the premises. The licence covers concentration limits and discharge limits for water discharged from site through licenced discharge point 1. Below are the limit conditions imposed by the recent EPL1389 dated 2 Dec 2020 in **Table 1** and **Table 2**.

Table 1 LDP1 EPL1389 Concentration Limits

Pollutant	Units of Measure	100 percentile concentration limit
Aluminium	Micrograms per litre	110
Arsenic	Micrograms per litre	200
Barium	Micrograms per litre	6440
Copper	Micrograms per litre	5
Electrical Conductivity	Microsiemens per centimetre	2600
Enterococci	Colony forming units per 100 millilitres	1700
Nickel	Micrograms per litre	200
Nitrogen (Total)	Milligrams per litre	8
pH	pH	6.5-9.0
Total suspended solids	Milligrams per litre	30
Turbidity	Nephelometric turbidity units	150
Zinc	Micrograms per litre	300

Table 2 LDP1 EPL1389 Volume Limits

Point	Unit of Measure	Volume/Mass Limit
1	Kilolitres per day	15500

3.2 Development Consent Conditions

All statutory development consent conditions and section where condition is addressed in this management plan are provided below; and are related to water management for site are provided in **Table 3** in accordance with DA67/98 condition 44 (b)

Table 3 Development Consent Conditions

Development Consent	Condition Number	Condition Description	Section where addressed in this plan
DA67/98	40	Within 2 weeks of obtaining monitoring results showing an exceedance of the relevant criteria in Tables 1-3, the Applicant must notify the affected landowner and tenants in writing of the exceedance, and provide monitoring results to each of these parties	Section 11

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	until the Tahmoor Mine is complying with the relevant criteria again.	
44	The Applicant must ensure that the management plans required under conditions of consent for the Tahmoor Mine are prepared in accordance with any relevant guidelines, and include: (a) a summary of relevant background or baseline data; (b) a description of: • the relevant statutory requirements (including any relevant approval, licence or lease conditions); • any relevant limits or performance measures/criteria; • the specific performance indicators that are proposed to be used to judge the performance of, or guide the implementation of, the Tahmoor Mine or any management measures; (c) a description of the measures that would be implemented to comply with the relevant statutory requirements, limits, or performance measures/criteria; (d) a program to monitor and report on the: • impacts and environmental performance of the Tahmoor Mine; • effectiveness of any management measures (see c above); (e) a contingency plan to manage any unpredicted impacts and their consequences and to ensure that ongoing impacts reduce to levels below relevant impact assessment criteria as quickly as possible; (f) a program to investigate and implement ways to improve the environmental performance of the Tahmoor Mine over time; (g) a protocol for managing and reporting any: • incidents; • complaints; • non-compliances with statutory requirements; and • exceedances of the impact assessment criteria and/or performance criteria; and (h) a protocol for periodic review of the plan. Note: The Secretary may waive some of these requirements if they are unnecessary or unwarranted for particular management plans.	Section 7 Section 3, Table 1,2 and 3 Section 5 and 9 Section 9 Section 8 Section 9.2 and 15 Section 10 and 11 Section 15

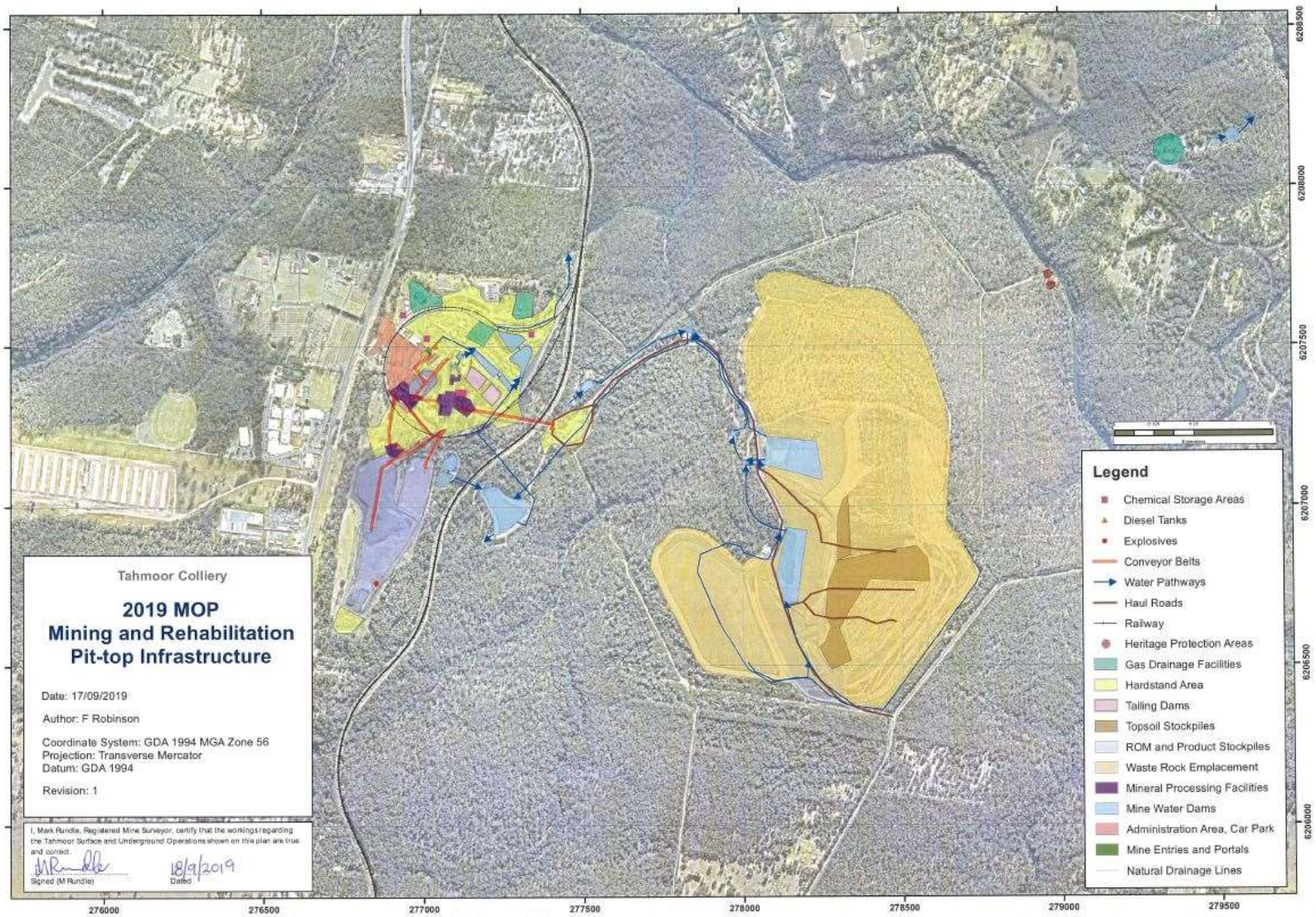


Figure 1: Tahmoor Coal surface operations and infrastructure

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4 Planning

4.1 Water Management Objectives

The objectives of the SWMP are to:

- a) Define the structures, strategies and procedures to be implemented to ensure that all environmental impacts associated with site water management are minimised, based on the principle of separating water streams into dirty water and clean water catchments;
- b) Define the water quality objectives and monitoring requirements as detailed in the site Environmental Protection Licence and other approvals;
- c) Define individual responsibilities for achieving these water quality objectives;
- d) Define how the mine will mitigate and respond to potential impacts on surface and groundwater (including emergency scenarios); and
- e) Provide information on water targets and key projects aimed at minimising potable water use, while maximising recycled water use.

4.2 Catchment and Drainage

Tahmoor Coal is located within the Bargo River catchment. From its headwaters near the townships of Hill Top and Yerrinbool, the Bargo River flows in a generally north-easterly direction through incised valleys and gorges to its confluence with the Nepean River, near the Pheasants Nest Weir. The lower 4 kilometres (km) of the river pass through the Bargo River Gorge, which is characterized by steep rock faces up to 110m high. The river consists of a sequence of pools, glides and rock bars across sandstone bedrock, with occasional boulder fields and cobblestone riffles. The Bargo River drains a total catchment of some 130 square kilometres (km²) at its confluence with the Nepean River.

The Bargo River has intermittent flow in its upstream reaches. In its upper reaches' flows are, to some degree, regulated by the Picton Weir, which is approximately 14 km upstream of the Nepean River confluence. Downstream of the Tahmoor Coal pit top (i.e. downstream of Tea Tree Hollow confluence) flow is perennial due to persistent discharges from Tahmoor Coal. The Bargo River flows into the Nepean River nine kilometres downstream of the Tea Tree Hollow confluence.

The Nepean River rises in the Great Dividing Range to the west of Tahmoor Coal. Its headwaters also lie in the coastal ranges to the east of the Project Area. Flows in the upper reaches of the Nepean River are highly regulated by the Upper Nepean Water Supply Scheme, operated by the Sydney Catchment Authority (SCA), which incorporates four major water supply dams on the Cataract, Cordeaux, Avon and Nepean Rivers. The Nepean Dam is situated some 18 km upstream of the Bargo River confluence. Flows in the Nepean River near and downstream of Tahmoor Coal are not part of a SCA Drinking Water Catchment Area.

Further downstream, the Nepean River has been extensively modified by the construction of a series of in-stream weirs which have created a series of pondages, the closest to Tahmoor Coal being the Malden Weir. Ponding behind the Malden Weir does not affect water levels as far upstream as Tahmoor Coal.

The Nepean River flows into the Warragamba River near Wallacia River downstream of the Hawkesbury-Nepean River. The Hawkesbury-Nepean catchment is one of the largest coastal catchments in NSW with an area of some 21,400 km² at its mouth in Broken Bay on the northern side of the Sydney Metropolitan area.

A map of the local watercourses and their location in relation to Tahmoor Coal is shown in **Appendix D**.

4.2.1 Licensed Discharge Point 1 (LDP1)

Tahmoor Coal operates under Environmental Protection Licence 1389 (EPL 1389). Under EPL 1389, LDP1 is the primary Licenced Discharge Point (LDP) from site and is situated on the northern side of the pit top. The discharge drain is located on the property boundary downstream from the mine water final treatment dam (Dam M4) and labelled as Lic. No.1 on Tahmoor Coal's Location Plan N3320 dated March 1997. The point discharges approximately 6ML/day of underground mine water and surface runoff which is tested on a monthly basis for quality and volume. Under EPL 1389, Tahmoor Coal is also authorised to discharge from LDP3, LDP4 and LDP5, overflow points that discharge treated water from the premises during extended periods of high rainfall.

4.2.2 Tea Tree Hollow

Tea Tree Hollow drains from south of Tahmoor Coal pit top and flows northerly to the Bargo River, dissecting the general mine surface operations and the Refuse Emplacement Area (REA) (Appendix C). In total, it drains a total area of some 6.8 km². Tea Tree Hollow comprises two main tributary arms which join upstream of the REA.

Licenced discharges from the Tahmoor Coal pit top enters Tea Tree Hollow at LDP1 some 800m upstream of the confluence with the Bargo River.

Tahmoor Coal has established streamflow gauging sites and to date, the stream has not been undermined.

4.2.3 Redbank Creek

Redbank Creek is an up to 4th order stream system that drains to the east into Stonequarry Creek, which subsequently flows to the Nepean River. The creek flows out of the Thirlmere residential area in the vicinity and downstream of Panel 26, through a rural residential area between Longwalls 26 and 30, then an industrial area above Longwalls 30 to 32. The catchment of Redbank Creek is developed for residential use, as well as semi-rural residential development on the fringes of Thirlmere and industrial use above Longwalls 31 to 32. Small scale agricultural land use is present on the outskirts of Thirlmere, with limited scale orchards, commercial vegetable growing, as well as limited cattle and horse grazing.

The creek had extended periods of no-flow due to lack of rainfall runoff, with interspersed short periods of flow followed by static pondage as the creeks gradually dried up. Natural iron seepage flows into the creek from the bedrock, resulting in red colouration of the banks and pools.

Stream flow and water quality monitoring locations have been established in Redbank Creek.

4.2.4 Matthews Creek

Matthews Creek is an up to 4th order stream system that drains to the north into Cedar Creek, which subsequently flows to Stonequarry Creek, then the Nepean River. Tahmoor Coal has designed the mine layout of Longwalls in the Western Domain to avoid mining directly beneath Matthews, Cedar and Stonequarry Creeks. The purpose of the design is to substantially reduce the severity and extent of impacts on surface water flows within these creeks, compared to impacts that would occur if the longwalls were extracted directly beneath them.

A ridgeline separating the Redbank Creek and Matthews Creek catchments trends in a north - east / south - west direction over the southern to central sections of Longwalls West 1 to West 4 located in the Western Domain.

The headwaters of Matthews Creek lie within the residential area of Thirlmere, with residential development significantly affecting the vegetation and weed growth along the upper reaches of the creek. The creek flows to the north - east on the northern side of Thirlmere, with the creek bed located outside the 20mm subsidence zone of the previous and current longwalls near the village. The creek then flows to the north, downstream of Thirlmere, through a rural area with sparse residential development, along with poultry farms, commercial vegetable gardens and a shale quarry.

A cemented stone weir is located, approximately 850m upstream of the closest point between the creek and Longwall West 1.

There are eight surface water monitoring points established by Tahmoor Coal along Matthews Creek, comprising water quality, manual flow and automated flow monitoring points. Further details are provided in the Tahmoor North Western Domain LW West 1 and West 2 (LW W1-W2) Water Management Plan.

4.2.5 Cedar Creek

Cedar Creek is an up to 5th order stream system that drains to the west then north to Stonequarry Creek, which subsequently flows to the Nepean River. Tahmoor Coal has designed the mine layout of Longwalls in the Western Domain to avoid mining directly beneath Matthews, Cedar and Stonequarry Creeks. The purpose of the design is to substantially reduce the severity and extent of impacts on surface water flows within these creeks, compared to impacts that would occur if the longwalls were extracted directly beneath them.

The headwaters of Cedar Creek lie to the north of Thirlmere, outside the subsidence zone of the previous and current longwalls and drains through a rural area with sparse residential development, along with poultry farms, commercial vegetable gardens, orchards and a shale quarry.

There are eight monitoring points established by Tahmoor Coal along Cedar Creek, comprising water quality, manual flow and automated flow monitoring points. Further details are provided in the Tahmoor North Western Domain LW W1-W2 Water Management Plan.

4.2.6 Stonequarry Creek

Stonequarry Creek is an up to 5th order stream system and flows to the Nepean River. Tahmoor Coal has designed the mine layout of Longwalls in the Western Domain to avoid mining directly beneath Matthews, Cedar and Stonequarry Creeks. The purpose of the design is to substantially reduce the severity and extent of impacts on surface water flows within these creeks, compared to impacts that would occur if the longwalls were extracted directly beneath them.

The headwaters of Stonequarry Creek lie to the north and west of Cedar Creek. The creek flows to the south, upstream of its junction with Cedar Creek, then to the east downstream of the junction through a rural area with sparse residential development, along with poultry farms, commercial vegetable gardens and a shale quarry.

There are five monitoring points established by Tahmoor Coal along Stonequarry Creek, comprising water quality, manual flow and automated flow monitoring points. Further details are provided in the Tahmoor North Western Domain LW W1-W2 Water Management Plan.

4.2.7 Myrtle Creek

Myrtle Creek flows eastwards along the northern side of the Tahmoor urban area before joining the Nepean River. The catchment for Myrtle Creek begins to the west of the Picton-Mittagong Railway and the creek has three major tributaries, downstream of which Myrtle Creek flows through a gully about 6 metres deep along the northern extent of the Tahmoor urban area.

Several road culverts and bridges cross Myrtle Creek and its tributaries. The creek also passes through a brick culvert under the Main Southern Railway. The waterway area of the culvert is much smaller than the channel cross-sectional area and the rail embankment is very high in comparison to the creek bed levels.

Myrtle Creek is located over Longwalls 3 to 7 and Longwalls 22 to 32.

4.2.8 Bargo River

The Bargo River is a watercourse of the Hawkesbury-Nepean catchment located in the Southern Highlands and Macarthur district. The river has intermittent flow in its upstream reaches which are, to some degree, regulated by the Picton Weir, approximately 14 km upstream of the Nepean River confluence. Downstream of the Tahmoor Coal pit top (i.e. downstream of Tea Tree Hollow confluence) flow is perennial due to persistent discharges from Tahmoor Coal. The Bargo River flows into the Nepean River nine kilometres downstream of the Tea Tree Hollow confluence. The Bargo River has been previously mined beneath.

4.3 Creek Monitoring

Monthly monitoring of selected sites in Myrtle Creek, Redbank Creek, Cedar Creek, Matthews Creek, Stonequarry Creek, Tea tree Hollow Creek, Bargo River, Dog trap Creek, Eliza Creek, Hornes Creek are conducted, and the following analytes tested for in water samples collected:

- pH
- Electrical Conductivity
- Total Dissolved Solids (TDS)
- Alkalinity suite
- Sulfate as SO₄
- Chloride
- Dissolved Major Cation suite
- Dissolved Metal suite
- Total Metals suite
- Flouride
- Nitrogen suite
- Total Phosphorus; and
- Ionic Balance

Monitoring sites are shown in **Figure 2** below. Additional monthly monitoring sites in accordance with Tahmoor Coal's EPL 1389 are discussed in **Section 7.2** and shown in **Figure 6**.

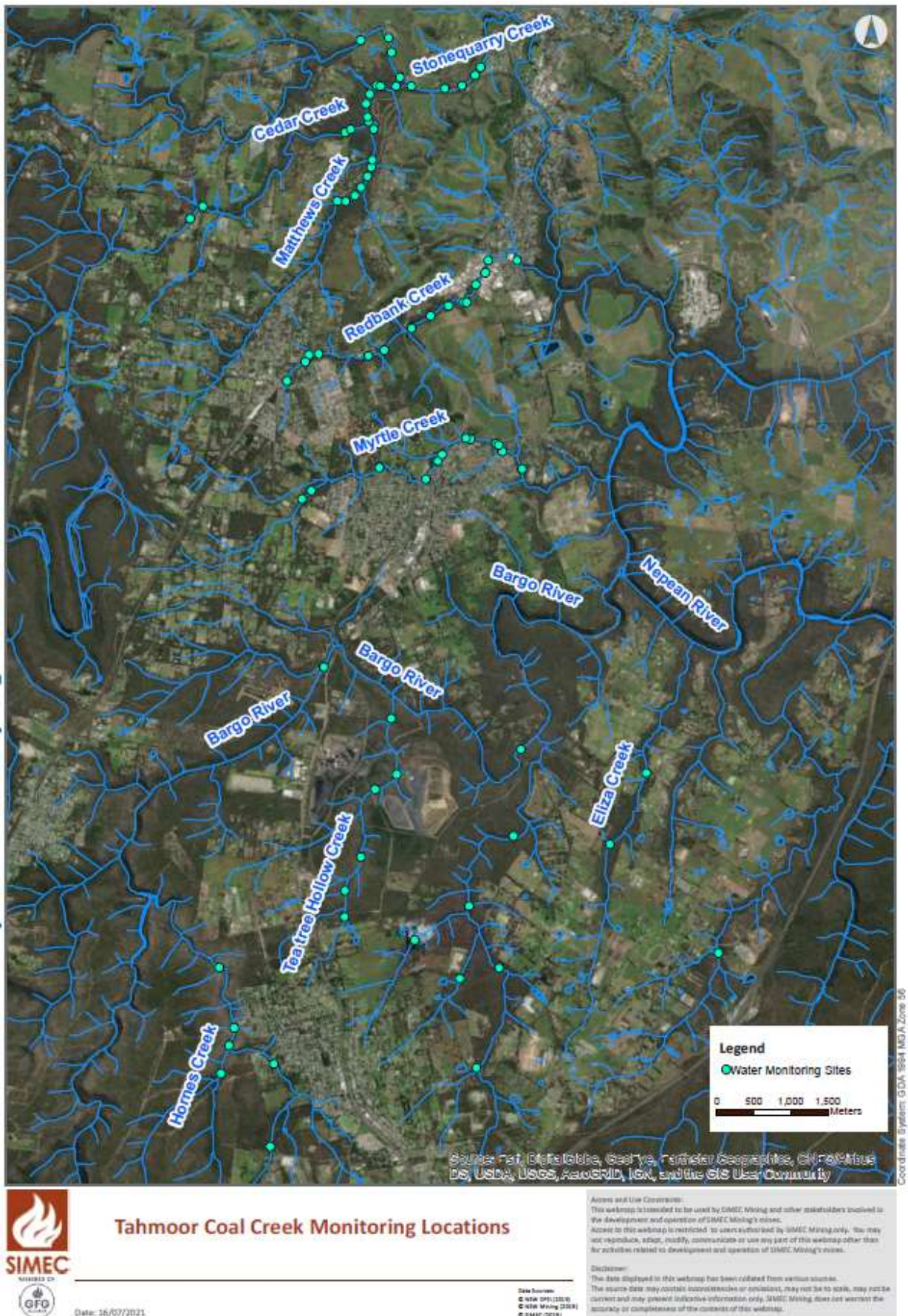


Figure 2 Monthly Creek Monitoring Sites

4.4 Environmental Risks

The 2020 Tahmoor Coal Environment & Community Broad Brush Risk Assessment (E&C BBRA) review, also known as the Aspects and Impacts Register, identified hazards and controls associated with various surface and underground operations at Tahmoor Coal. The hazards and controls related to soil and water management at Tahmoor Coal are detailed in **Appendix H**.

Overall the E&C BBRA determined that the site faces a number of hazards associated with contaminated water affecting the surrounding waterways including surface water and groundwater. The E&C BBRA identified effective existing controls for all hazards, and where applicable, proposed additional controls to reduce the risk ratings to as low as reasonably practical.

4.5 Climate Data

Rainfall data in the area is available from a number of sources. BoM operate two rainfall stations - Picton Council Depot (68052) and Buxton (68166) - which are both located near Tahmoor Coal. Tahmoor Coal operates its own station, and the SILO climate data source provide interpolated and infilled records for 0.05°x0.05° tiles.

Due to the occasional gaps in the data for the BoM sites, and the relatively short record of data held by Tahmoor Coal (continuous data since July 2006), the SILO record for the location 274253.9E, 6212954.2N has been adopted for this report to understand long-term trends. This record has been compared against the other data sources to verify its appropriateness for this task.

The spatial trends in long-term average rainfall across the region are shown on **Figure 33**. Average annual rainfall at Tahmoor is approximately 758 mm/yr. Areas with higher rainfall occur to the south and east, while areas to the north and west are typically drier.

Monthly rainfall is presented in **Figure 4**, alongside potential evaporation and evapotranspiration. Rainfall is generally consistent all year with monthly values falling between ~50- 80 mm. The highest rainfall occurs in January and February, at 82 and 85 mm respectively, while September is the driest month with an average rainfall of 41 mm for the period of record. Evaporation and evapotranspiration show similar trends with higher rates during the summer months and lower in winter. The average monthly evapotranspiration is highest in December at 153 mm.

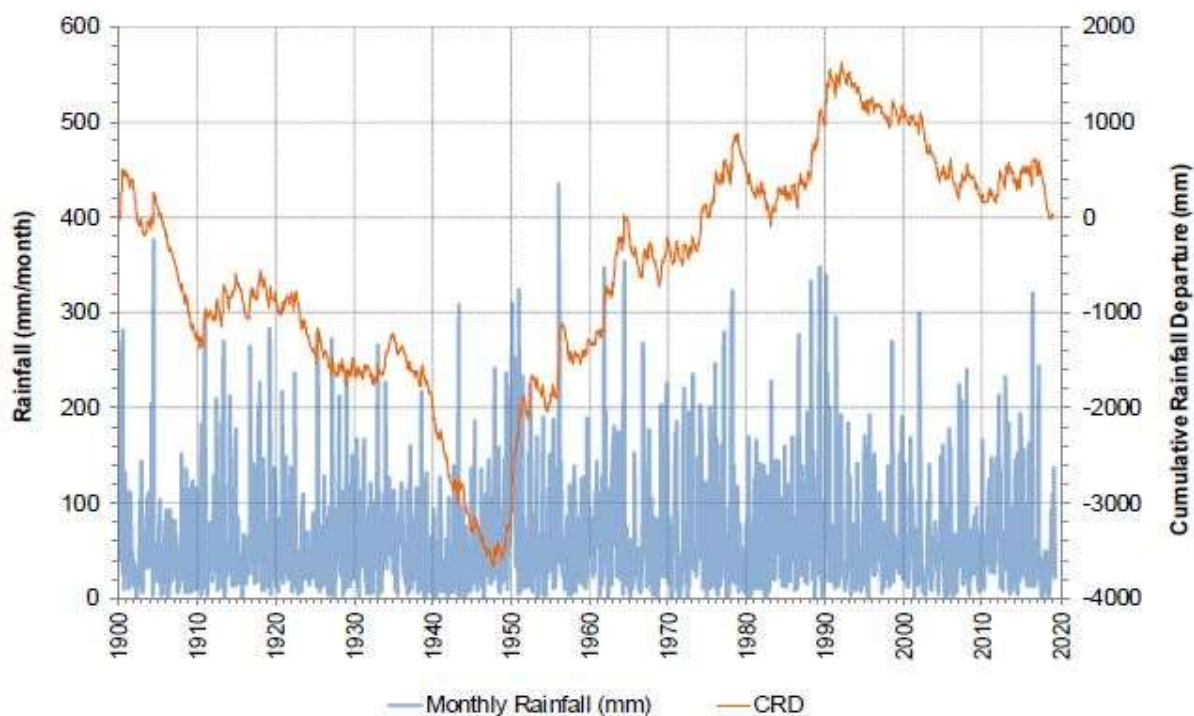


Figure 3: Long-term rainfall record and trends.

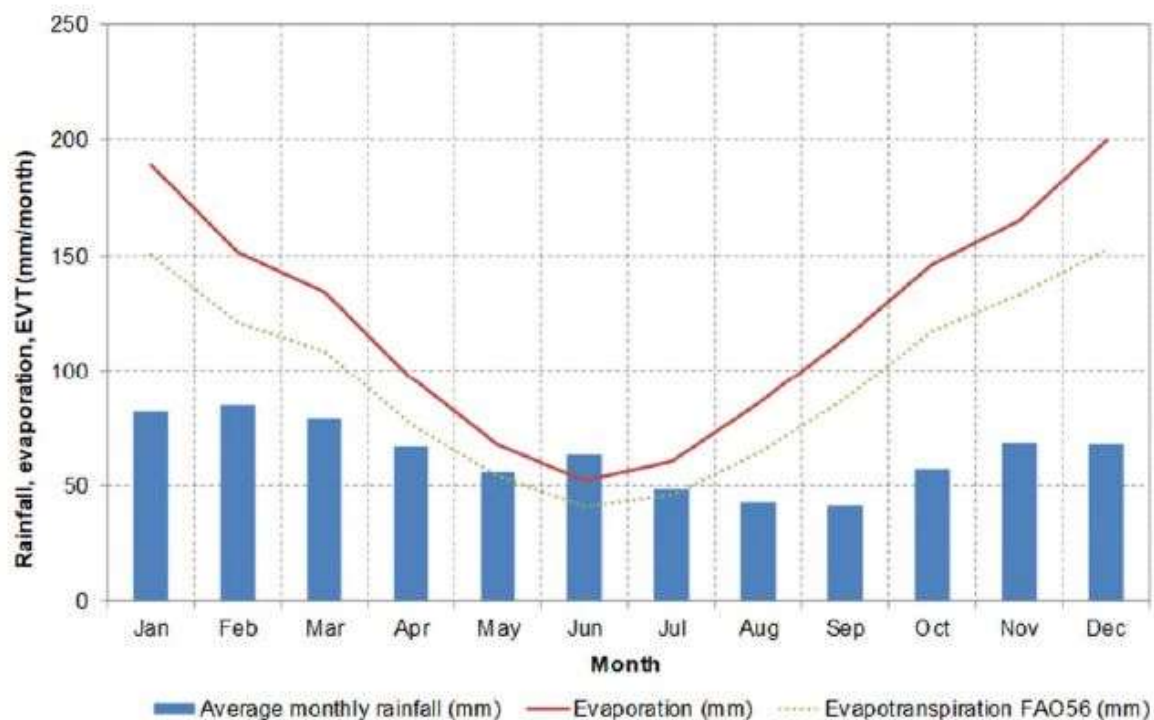


Figure 4: Monthly average rainfall and potential evaporation rainfall.

4.6 Regulated Structures

Tahmoor Coal does not currently have any regulated structures on site.

4.7 Sizing Criteria

The Water Storage Volume is the estimated volume of water that the site would like to store within a sediment dam for durations longer than the management period (i.e. 5 days) for the water supply of operational activities (such as dust suppression and coal washing). Ideally a separate water storage dam should be constructed for water storage and supply purposes however, often sediment dams have a dual function and, in these cases, an additional volume needs to be estimated for the ongoing storage of water.

Table 4 below presents an indicative range of sediment dam capacities for ‘typical’ disturbance areas. ‘Typical’ disturbances, for which Ground Disturbance Permits (GDPs) are regularly used, are generally small scale, temporary earthworks for disturbances ancillary to mining such as construction of access roads or small infrastructure. To develop the table below it has been assumed that sites are pervious, have nominal grades (up to 5%), moderate slope lengths (50 – 200m), minimal proactive erosion control, sediment dams that could be de-silted every 2 months, and that there is no clean water run-on. Where **Table 4** is intended to be used to determine the size of a sediment dam, the above assumptions must be understood and determined to be applicable to the area.

Table 4. Minimum required sediment dam capacity

Area (ha)	Minimum Required Sediment Dam Capacity (ML)
0.25	0.22
0.5	0.44
1.0	0.86
2.5	2.21
5.0	4.43
7.5	6.62
10	8.85

5 Implementation

5.1 Regulatory Compliance

5.1.1 Development Consent

Tahmoor Coal

Conditions W1-W6 of the 1975 Development Consent for Tahmoor Coal, detail various general requirements for management of stormwater, potable water and treated effluent from the on-site sewage treatment plant. These general requirements are captured in this management plan.

Condition 40 (iv) of Development Consent DA57-93 (Land & Environment Court of NSW 1994) required Tahmoor Coal to develop a Soil & Water Management Plan for the No.4 Ventilation Shaft (VS4) site at Bridge Street, Thirlmere. At the time of this review, construction of the VS4 site has not commenced nor is it planned for the short-term future. If construction of the VS4 site is to go ahead, a specific plan will be prepared for the construction site, while the final site water management information will be included in this site-wide document.

Condition 41 of Development Consent DA57-93 required Tahmoor Coal to develop a Refuse Emplacement Area (REA) Management, Rehabilitation and Water Monitoring Plan (1995) (also known as the REA Management Plan). This Soil & Water Management Plan should be read in conjunction with the existing REA Management Plan.

Bargo Colliery

Condition (j) of the 1976 Development Consent for Bargo Colliery requires the site to submit a management plan to show details of proposals for rehabilitation and erosion control acceptable to the Soil Conservation Service of New South Wales. No evidence can be located of a rehabilitation or erosion control plan submitted to Wollondilly Shire Council following consent in 1976. As the site is currently in care and maintenance, the basic soil and water management requirements for the Bargo shaft domain are detailed in this management plan.

Condition (u)(i) of the 1976 Development Consent for Bargo Colliery requires the site to comply with all requirements of the State Pollution Control Commission in respect of the Clean Air and Clean Waters Act. This Soil & Water Management Plan details controls for compliance with the site Environmental Protection Licence (*Protection of the Environment Operations Act 1997*).

5.1.2 Environmental Protection Licence

Tahmoor Coal operates under Environment Protection Licence (EPL) 1389. Details of Tahmoor Coals' EPL can be found in Section 3.2.2.

In December 2020 the following variations were made to the EPL 1389 under variation notice #1593223:

- Condition E 1.1 – Installation of a Water Treatment Plant at Tahmoor Colliery;
- Condition E 2.1 – Toxicity Monitoring Program
- Condition E 3.1 – Aquatic Health Monitoring Program
- Condition E 4.1 – Tea Tree Hollow Sediment Investigation
- Removed Condition U1 PRP22 – Mine Water Treatment Plant Program
- Condition L 2.4 – Added concentration limits for bicarbonate alkalinity, Aluminium, Barium, Total Nitrogen, Copper, and Enterococci for Discharge Point 1. The limits will remain on the licence for an interim period to allow completion of the Water Treatment Plant in Condition E1.1. The Limits are based on the maximum report values for 10 years of monitoring data in table 22, Appendix D of the Reply to Submissions Report for EIS for the Tahmoor South Project.

Licence condition U1 – PRP22 required construction of a Water Treatment Plant (WTP) to treat mine water discharges from LDP 1. The notice condition was varied to acknowledge installation of the water treatment plant by September 2015, and added a new date of August 2018 to complete plant re-commissioning. The notice condition was varied to acknowledge the failure of the initial plant, and the commissioning of a new plant commenced in 2020.

Licence Condition E 1.1 requires the installation of a New Water Treatment Plant to reduce the concentrations of pollutants released from Licence Discharge Point 1 following the installation of a successfully tested Pilot plant in 2021.

Licence Condition E 2.1 requires a Toxicity Monitoring Program to be commenced in the quarter before the commencement of the Final Water Treatment Plant. Monitoring must be undertaken for a period of 2 years following the commencement of operation of the Final Water Treatment Plant.

Licence condition U2 – PRP 23 required Tahmoor Coal to complete an aquatic health program in Tea Tree Hollow and the Bargo River. Tahmoor Coal completed the program and the prepared report was found satisfactory by the EPA. In order to ascertain any changes in aquatic biota following completion of PRP 22, the EPA attached a new condition to the licence. PRP 26 required sampling of Tea Tree Hollow and the Bargo River, and assessment of health stream and condition, with the report due nine months following the completion of PRP 22.

Licence Condition 3.1 requires the commencement of an Aquatic Health Monitoring Program of the Bargo River following commissioning of the Final Water Treatment Plant.

For further detail on EPL amendments, refer to the licence variation notices.

More recently, a number of detailed studies that have been undertaken, have determined the most effective way of treating Mine Water at Tahmoor Mine is to construct a Reverse Osmosis (RO) plant. As of June 2021 the WTP is currently in the planning phase, with expected practical completion by approximately September 2022.

For further detail on the specific conditions related to discharge water quality see **Appendix G**. For all other details, volumes, and the associated monitoring requirements for each, refer to EPL 1389.

5.1.3 Licence Details

The table below identifies the water licence conditions applicable to Tahmoor Coal.

Table 5 Water Licence Conditions for Tahmoor Mine

Licence Number	Date of Issue	Conditions
WAL36442	6/12/2013	Bore – Line 1: the volume of groundwater extracted from the works authorised by this licence and by licences 10BL602336 and 10BL602337 shall not exceed 1,642 megalitres (ML) in any 12 month period commencing 1 st July Bore – Line 2: the volume of groundwater extracted from the works authorised by this licence and by licences 10BL602336 and 10BL602333 shall not exceed 1,642 megalitres (ML) in any 12 month period commencing 1 st July Bore – No. 3 Shaft: the volume of groundwater extracted from the works authorised by this licence and by licences 10BL602337 and 10BL602333 shall not exceed 1,642 megalitres (ML) in any 12 month period commencing 1 st July
10WA103026	01/07/2011	Bargo: Subject to any access or flow conditions contained in the licence, the holder may in any one year commencing 1 July divert up to the licences volume of 5 megalitres (ML) of water for industrial use. The holder may divert up to twice the licenced volume in one year provided diversions do not exceed three times the licenced volume in any three year period.

5.1.4 Water Sharing Plan

The Natural Resources Access Regulator (NRAR) implements water regulation according to the *Water Management Act 2000*. A primary objective of this policy is the sustainable management and use of water resources, balancing environmental, social and economic considerations. NOW has developed Water Sharing Plans (WSPs) for much of the State and these establish rules for sharing and trading water between the environment, town water supplies, basic landholder rights and commercial uses.

The Water Sharing Plan for Greater Metropolitan Region Unregulated River Water Sources (the WSP) is the relevant plan for surface waters at Tahmoor Coal.

Tahmoor Coal uses water for coal processing within the existing facilities at Tahmoor Coal and for control of dust emission from the REA. The water used in these operations is sourced from the underground operations and from water captured within the existing site water management system, principally at the coal handling area and REA. Some water is also supplied under agreement with Sydney Water. None of these activities involve extraction of water or water sharing from sources covered by the WSP.

5.2 Overview of Water Management System

5.2.1 Stormwater Management

Pit Top Area

The pit top area encompasses all surface operations within the rail loop including the workshop, warehouse, storage yard, and mine sedimentation dams M1, M2, M3 & M4, before discharge via LDP1. The pit top includes a mix of sealed and unsealed areas.

Runoff from the workshop area (sealed ground) including the bulk diesel storage tank, Quintolubric tank, and waste oil tank/storage area, report to an intercept drain which directs water to an in-ground sump for treatment by an oil water separator. Treated water reports to M1 Dam, while the waste oil reports to an above ground waste oil tank.

All other stormwater runoff from the storage yard and remaining surface areas (mix of sealed and unsealed ground) reports to the mine dams and associated drainage channels for retention before discharge via LDP1.

No.1 Shaft

The No.1 ventilation shaft site is located at Stratford Road, Tahmoor. The No.1 shaft is separate from the main mine site, and is currently serving as a downcast shaft only, with no water discharges currently occurring from this area or planned to occur in the future. The site is considered a clean water catchment as there are no active surface operations or work areas at the site, with all clean surface stormwater runoff reporting to the surrounding bushland and down towards the Bargo River via natural drainage lines.

No.2 Shaft

The No.2 ventilation shaft site is located at Rockford Road, Tahmoor. The No.2 shaft is separate from the main mine site and is currently used as the site main upcast ventilation fan. The surface area around the No.2 shaft (gravel road, core sheds and bushland) report via a surface drainage channel down to M5 & M6 Dams.

No.3 Shaft

The No.3 ventilation shaft site is located adjacent to the mine pit top, outside the rail loop. The No.3 shaft is currently serving as a downcast shaft and as a man access lift via a shaft winder.

The surface area around the No.3 shaft site (unsealed roads and vegetated earthen bund) reports to a series of gravel check and sediment retention dams (constructed as per Blue Book requirements), before continuing along a surface drainage channel around the outside of the rail loop, eventually joining the overflow water from M4 Dam, and is discharged via LDP1.

Gas Extraction Plant & EDL Power Generation Plant

The Gas Extraction Plant and Energy Developments Limited (EDL) Power Station are located adjacent to the mine pit top, outside the rail loop. The surface area around the Gas Extraction Plant (unsealed road) reports to a surface drainage channel on the outside of the rail loop, eventually joining the overflow water from M4 Dam, and is discharged via LDP1.

Refuse Emplacement Area & Haul Road

The Refuse Emplacement Area (REA) is located near Charlies Point Road, Tahmoor. The REA is separated from the main mine site by the main southern railway line, and is accessed on foot by 3R conveyor, or by vehicle via access gates on Charlie's Point Road. The REA is used for disposal of refuse (coarse reject and fine tailings material from the coal washing process). Dewatered fines and coarse reject are mixed and transported via 3R conveyor from the CHPP to 3R bin for loading onto a rear dump haul truck. Refuse is then hauled along a sealed road to the REA dump site, where unsealed roads are used to emplace and construct the dump to design specifications. The surface area around the REA is a mix of sealed and unsealed haul roads and access tracks, active and rehabilitated refuse emplacement areas, and various small areas of infrastructure used in the operation of the site and the REA stormwater management system (including several sedimentation dams).

Surface runoff and leachate discharging from the active operational areas (including the haul road areas) pass through several sedimentation dams (S5, S6, S7, S7a, S7b, S8 and S9) prior to discharging via licensed discharge points.

In 2011, a significant upgrade to the REA stormwater management system was completed. This upgrade involved the consolidation of LDPs 3 & 5 to LDP 4, by installing a system of pumps and pipelines to connect dams S8 and S9 to S4. Following acceptance of the system by the EPA in December 2011, LDPs 3, 4, 5 & 6 were removed from the EPL, and renamed as unregulated overflow points from which rain events exceeding the design capacity of the stormwater system, can overflow via the redundant discharge points without monitoring or reporting requirements.

Coal Stockpile Areas

Tahmoor Coal has three main stockpile stages in the Coal Handling and Preparation Process (CHPP) - Run of Mine (ROM), raw coal, and product coal. Runoff and seepage from all coal stockpiles at Tahmoor Coal are contained within bund walls around the base of the stockpiles, before reporting to sedimentation dams for retention of coal fines.

Drainage from the ROM Coal stockpile area is captured by the ROM stockpile drains, which report to M1 dam. Drainage from the Product Coal stockpile area flows into two stockpile dams (S2 and S3). Water travels by gravity from S2 to S3, and eventually to S4, where it can be discharged via LDP4.

Drainage from coal stockpile areas is typically dark brown to black in colour, and often high in turbidity and/or suspended solids. Water from these areas should always report to sedimentation ponds for retention prior to discharging via licensed discharge point.

5.2.2 Groundwater

There are extensive groundwater reserves above and around Tahmoor Coal's active and sealed underground workings. Water from porous sandstone layers above the mine workings seep into the mine at a rate of approximately 2.5 ML/day. This water is intercepted by an underground water reticulation system, eventually reaching pit bottom where it is pumped up the main drift to the surface. Water is pumped to the surface via dewatering lines 1 & 2, and then directed to mine dam M1, where it cycles through M1-M4 prior to discharge via LDP1.

Water is also pumped from the bottom of ventilation shaft 3 to the surface via dewatering line 3. This water is a cleaner stream, mainly composed of pure groundwater, with no exposure to operational areas and low solids contamination. This water source is utilised for recycling in the Recycled Water Plant located on the surface at No.3 shaft. An updated groundwater model was completed by SLR in 2020.

5.2.3 Sewage Treatment

There is a Smith & Loveless model Sewage Treatment Plant (STP) located on-site near mine dam M1 which treats sewage from the mine production offices, mine bathhouses and CHPP. Treated effluent from the plant discharges into two maturation ponds, which overflow to mine dam M1, eventually discharging via LDP1. The monthly water quality analysis at LDP1 includes testing for faecal coliforms (cfu/mL) to ensure levels are below ANZECC criteria. The STP is maintained by the Surface Services Department on a monthly basis to ensure the plant is operating correctly.

Sewage from the Health, Safety & Training demountable offices reports to an in-ground septic tank next to those offices, before being pumped across to the main administration building in-ground seep-away septic unit, located just north of the main administration building. Both septic systems are maintained by the Surface Services Department and contract plumber as required.

5.2.4 Potable Water

Potable water is supplied to Tahmoor Coal by the Sydney Water Corporation, with the take-off from the main pipeline near the main administration building on Remembrance Drive, Tahmoor. The mine uses approximately 1.2 ML/day of potable and recycled water. Water supplied to the underground mine at Tahmoor Coal is sourced from recycled and potable water. Potable water is supplied to the underground via two surface water tanks, described in the table below. The recycled water plant described above has seen a dramatic reduction in daily (and annual) potable water usage at Tahmoor Coal.

Table 6 Tank Details

Tank No	Capacity	Location	Use
1	200 KL	Pit Top closest to Gas Extraction Plant	Underground process areas supply and statutory firefighting supply.
2	200 KL	Pit top closest to CHPP	Underground process areas supply and statutory firefighting supply.

5.2.5 Recycled Water

Whenever possible, recycled water should be used instead of potable water to minimise potable water consumption.

Water is recycled by the CHPP from M4 dam, and used in coal washing and dust suppression, including a pipeline over 3R conveyor for the water cart fill point at the REA. Water is also drawn from dams S2/S3 for dust suppression on the coal stockpiles.

In May 2013 a recycled water plant was constructed at No.3 shaft to treat and recycle groundwater (up to 1ML/day). Treated water is supplied to underground as a potable substitute for industrial purposes only (not for human consumption). A small amount of potable water is continued to be supplied to key underground process areas, such as the emulsion mixing station at the longwall. This recycled water plant significantly reduces Tahmoor Coal's potable water consumption.

5.3 Erosion and Sediment Control

All erosion and sediment management is to be undertaken alignment with the *NSW Department of Environment and Climate Change (2008) Managing Urban Stormwater, Soils and Construction, Volume 2E: Mines and Quarries (Blue Book) Guideline*.

5.3.1 Objectives

The main objectives of erosion and sediment control at Tahmoor Coal include:

- Meeting the requirements of development consent relevant to the operation of the Tahmoor Coal;
- Minimizing the amount of land utilized for mining and undertaking rehabilitation activities which commensurate with operational requirements;
- Preventing contamination of clean water by mining activities, particularly with respect to Tea Tree Hollow and the Bargo River;
- Establishing and maintaining controlled diversion of clean water around mining activities into existing watercourses so as to reduce the volume of sediment laden material;
- Detaining all dirty water by the use of appropriate run-off controls and storage;
- Conducting the Erosion & Sediment Control Program in a manner which meets or exceeds the requirements of all regulatory agencies;
- Detailing the review and reporting protocols; and
- Establishing responsibilities for the management of Erosion and Sediment Control issues at Tahmoor Coal.

5.3.2 Potential Impacts

The following is a description of the activities associated with Tahmoor Coal which have the potential to result in erosion & sediment control issues.

As part of the Environmental Management Strategy (EMS), Tahmoor Coal has completed a detailed Environment & Community Broad Brush Risk Assessment (ECBBRA) in order to identify all “aspects and impacts” associated with all underground and surface operations at the site. During this process all activities that were identified as having the potential to impact on water pollution including erosion and sediment movement were considered. Each activity was then ranked in order of priority (highest risk first) using the Risk Assessment Matrix, in accordance with *TAH-HSEC—00229 Risk Management*.

The aspects of the operation which had potential impact on erosion & sedimentation have been considered include:

- a) Vegetation removal / disturbance
- b) Topsoil stripping and stockpiling
- c) Coal handling activities
- d) Construction of access roads, exploration pads and other surface infrastructure
- e) Construction of water management structures
- f) Miscellaneous earthworks

Broad control measures for these items are detailed in the next section.

5.3.3 Control Measures

5.3.3.1.1 GROUND DISTURBANCE PERMIT

Prior to the commencement of any vegetation clearing or ground disturbance activities by Tahmoor Coal employees or external contractors, a Ground Disturbance Permit must be completed. This permit should be completed in accordance with the Work Authorisation process. The Ground Disturbance Permit requires detailed information to be provided in summary for all erosion and sediment controls. In the absence of a formal Erosion & Sediment Control Plan for a particular project, the Ground Disturbance Permit is an acceptable way to formalise erosion and sediment controls.

5.3.3.1.2 CLEARING

Land disturbance will be minimised by clearing the smallest practical area of land for the shortest possible time. This will be achieved by limiting the cleared width to that required to accommodate excavation plus areas required for overburden emplacement and topsoil stockpiling; and programming the works so that only the areas which are under active excavation are cleared.

General clearing will not be undertaken until earthwork operations are ready to commence.

All proposed erosion and sediment control measures will be implemented in advance of, or in conjunction with, clearing operations. Prior to clearing commencing, the limits of clearing shall be marked by pegs or other markers to clearly define the disturbance boundaries. All operations will be planned to ensure that there is no disturbance outside the limits.

Triggers to review these controls are captured as part of the Ground Disturbance Permit.

5.3.3.1.3 TOPSOIL STRIPPING

Topsoil will be stripped ahead of the active dump areas at the REA as per the conditions of Development Consent DA57-93 (1994 Land & Environment Court Consent). The area stripped will be minimised to the smallest practical area to avoid unnecessarily exposing disturbed ground to weathering processes including erosion.

Prior to stripping operations, the stripping panel will be delineated on a plan and in the field through the use of survey pegs or similar markers. Topsoil limits and the topsoil stripping depths will be shown on the pegs or markers. Topsoil stripping depths are not specified in DA57-93 for the REA; however, topsoil placement depth and stockpiling requirements are detailed in Section 5 of the REA Management Plan (1995). Topsoil should be immediately placed on final landform rehabilitation areas to a nominal depth of approximately 200mm. If no areas are available for rehabilitation, topsoil should be stockpiled (see next section). Where possible, topsoil will be stripped in moist condition to reduce deterioration in topsoil quality and dust generation. All proposed erosion and sediment control measures will be implemented in advance of, or in conjunction with, topsoil stripping operations.

Triggers to review these controls are captured as part of the Ground Disturbance Permit.

5.3.3.1.4 TOPSOIL STOCKPILING

Tahmoor Coal has no specific development consent conditions for topsoil stockpiles at the REA.

Where suitable areas are unavailable for immediate re-spreading, topsoil should be stockpiled to a maximum height of 3 metres, in elongated windrows parallel with prevailing winds to reduce the surface area exposed to wind erosion.

The period of stockpiling will be minimised in order to reduce the detrimental effects of storage on organic material and any native seed in the soil, and to reduce weathering.

Stockpile locations and design will be selected for ease of access, minimisation of re-handling, segregation from other mining activities and minimisation of soil structure degradation.

Once stockpiled, the surfaces of the topsoil stockpile should be deep ripped (up to 500mm) and sown with a perennial pasture seed mix to encourage immediate vegetation cover to reduce wind erosion, water erosion and prevent weed colonisation. Topsoil stockpiles should be maintained over time to prevent erosion and weed colonisation.

Stockpiles will be clearly identified with signage, and where practical a windrow around the stockpile area to reduce the likelihood of contamination and soil loss.

Appropriate erosion and sediment controls (i.e. sediment fencing) should be installed around the topsoil stockpiles, in areas where the water flowing from the area is not contained within the mine stormwater management system.

A review of erosion and sediment controls, signage and any windrows will be conducted during the site monthly environmental housekeeping inspection.

5.3.3.1.5 COAL STOCKPILING

Runoff generated from ROM and product coal stockpiling areas must be diverted to sedimentation basins by a series of bunds, culverts, channels and drains. Drainage from the ROM stockpile currently reports to M1 Dam, while drainage from the Product Stockpile area reports to S2 and S3 Dams.

5.3.3.1.6 CONSTRUCTION OF WATER MANAGEMENT STRUCTURES

Any new water management structures including diversionary works such as drains and channels, sediment control dams, and any associated pump and pipeline infrastructure should be installed generally in accordance with the Blue Book (Landcom, 2004). Such structures should only be installed with the appropriate development consent or other approvals in place prior to commencing construction.

6 Site Water Balance

6.1 Water Balance Overview

Tahmoor Coal's site water balance was developed by CH2M Hill in 2008.

6.2 Water Storages

As detailed in the site water balance (**Appendix A**), the table below provides a summary of the main surface water storages (mine and stormwater sedimentation dams) at Tahmoor Coal. The sizing of each dam was designed to be compliant with previous (Glencore) standards as outlined in the table below that for every 1ha of catchment area a dam is required to have at least 0.86ML of storage. The catchment areas are depicted in **Appendix I**.

The appropriateness of designs, condition or the structure of these dams is required to be reviewed at a minimum of every 5 years.

Table 7 Site Water Balance

Dam	Capacity	Location	Catchment	Use	Type of Dam
M1	1.8ML	Pit Top	M1-M4 combined catchment area of 12.4 ha	These dams act together to treat mine water pumped from underground and stormwater. These dams discharge via Licence Point 1.	Mine water dam
M2	0.5 ML	Pit Top	As above	As above	Mine water dam
M3	9.0 ML	Pit Top	As above	As above	Mine water dam
M4	8.0 ML	Pit Top	As above	As above	Mine water dam
S1	14.5 ML	Coking coal stockpile	S1 to S3 combined catchment area of 10.6 ha	The coking coal stockpile acts as a retention basin during major storms. Discharges to S2.	Mine water dam
S2/S3	8.3 ML	Stockpile area	As above	These dams are kept full and are used to supply water used for dust suppression. Discharges to S4.	Mine water dam
S4	36.9 ML	East of stockpile area over rail line	29.8 ha	This dam is designed to act as a retention basin with a controlled outlet. Discharges via License Point 4.	Mine water dam
S5	small	Reject loading bin		Silt trap only. Discharges to dam S6.	Mine water dam
S6	1.5 ML	Reject loading bin area	0.24 ha	This dam is designed to act as a retention basin with a controlled outlet. Discharges to Dam S9.	Mine water dam

Dam	Capacity	Location	Catchment	Use	Type of Dam
S7a	12.0 ML	S7 & S7a and S7b are connected to treat runoff from the reject disposal area	S7a and S7b combined catchment area of 14 ha	These dams are designed to act as retention basins with a controlled outlet from S7 to S8. Discharges to dam S8.	Mine water dam
S7b	1.0 ML	As above	As above	As above	Mine water dam
S7	41.5 ml	As above	26 ha	As above	Mine water dam
S8	0.45 ML	Reject area final dam	2.4 ha	Final dam in reject area dam complex. Discharges via Licence Point 5.	Mine water dam
S9	0.4 ml	Reject area haul road	1.7 ha	Silt trap only for sealed haul road. Discharges via Licence Point 3.	Mine water dam

7 Baseline Data

7.1 Water Discharge

Tahmoor Coal is licensed to discharge water from one (1) licenced discharge location (LDP1) with a daily discharge limit of 15500kL and overflow from three (3) Licenced Overflow Points (LOP) during periods of wet weather (as per EPL 1389) which refers to more than 10 mm of rainfall within a 24 hour period at the premises. The location of the LDP1 and LOPs are shown in **Figure 6**.

On average, Tahmoor Mine discharges between 5-6 kL/day with a total of approximately 1500-2000ML per year (as shown in **Figure 5** below). In **Table 8**, daily discharge data is recorded from LDP1 and any exceedances of the 15500kL EPL Limit are attributed to rainfall events recording more than 10mm of rainfall in a 24hour period as the licence permits. These results are also included in the Annual Environmental Management Review (AEMR) or Annual Review.

Figure 5 Discharge Volumes from LDP1 from 2008 to 2020

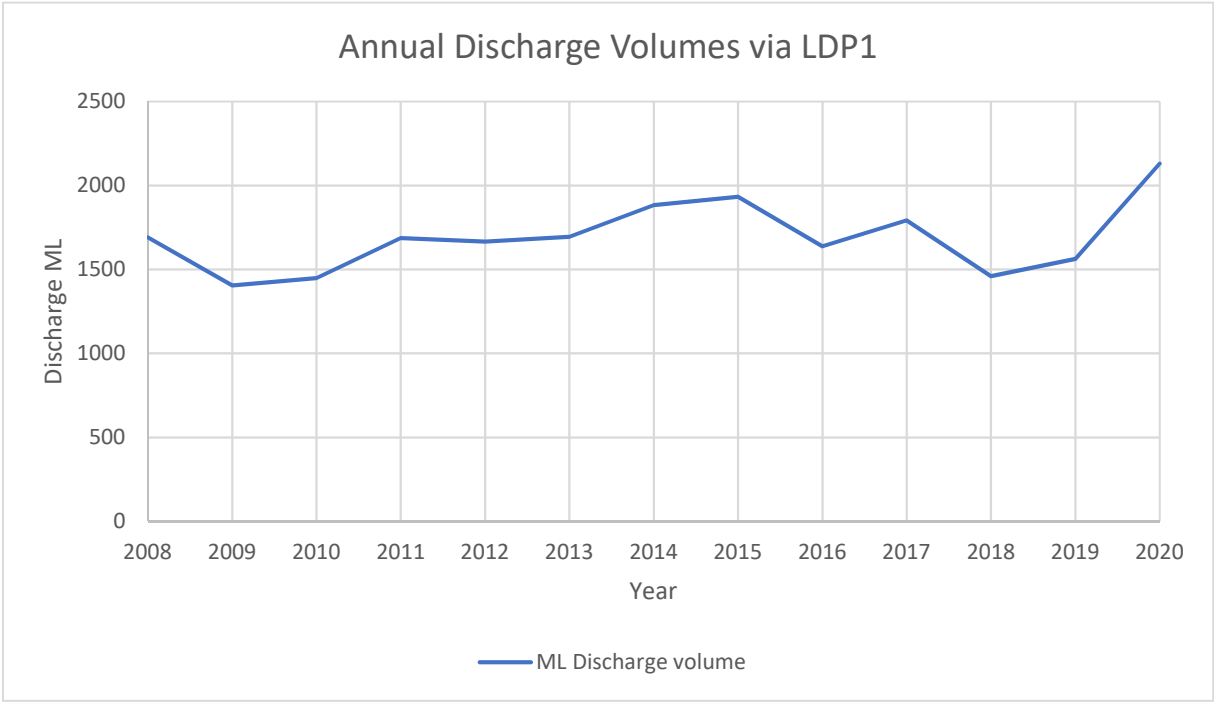


Table 8 Daily Discharge (kL) from Licensed Discharge Point 1 (LDP1) for 2020

Day	Jan (kL)	Feb (kL)	Mar (kL)	Apr (kL)	May (kL)	Jun (kL)	Jul (kL)	Aug (kL)	Sep (kL)	Oct (kL)	Nov (kL)	Dec (kL)	EPL Daily Discharge Limit (kL)
1	5988	1405	4259	4798	5741	8912	4744	5255	4974	4862	7274	4193	15500
2	3988	3136	4847	4779	4745	5138	5286	5420	5696	4057	6234	2791	15500
3	4438	4778	5487	5783	4505	5481	4407	4735	5914	5260	5712	4490	15500
4	4638	6002	6991	5209	2505	6551	5314	5624	5209	4646	6923	5983	15500
5	4002	4870	8733	4856	2495	6129	4384	5005	5579	5761	8741	5482	15500
6	1805	7755	7410	4417	4013	5786	4573	7036	4937	5223	6572	4814	15500
7	2025	13619	7549	5800	3641	5396	6240	9236	6084	5981	7777	4371	15500
8	2979	15017	7130	4908	3501	7358	6031	5064	5937	5988	7879	3898	15500
9	4024	24536	7120	4641	3293	5674	6427	3156	6228	5135	7147	4532	15500
10	6419	13512	7042	6113	5216	5272	6350	6096	5665	5992	6288	4262	15500
11	3971	8690	6704	5465	6216	5687	4744	7360	5745	5562	6528	4452	15500
12	5430	7962	6561	4633	6645	5482	5003	6217	5754	4909	5816	4414	15500
13	4503	8607	7746	3592	6108	6018	4203	7711	5078	5339	7485	4718	15500
14	3902	6091	6698	5284	5793	6244	5324	8117	7091	5513	4939	4762	15500
15	4103	4812	5487	5406	5289	5330	6521	8697	5722	6293	5130	6053	15500
16	5781	3854	6548	6595	4164	4453	5940	8484	5949	5470	7532	6506	15500
17	6517	5691	6246	6032	4453	4890	4967	8488	6553	5772	6718	6449	15500
18	3628	4119	4770	3464	4214	5142	5569	7255	6533	6428	7906	5253	15500
19	4220	3746	5479	786.4	4837	6901	4631	7983	6639	5483	7777	5844	15500
20	4219	3608	6141	4948	7193	5639	5510	8040	7355	5950	7620	4267	15500
21	3299	4987	4979	3901	7996	7051	4948	7644	5922	5767	7478	5271	15500
22	4089	2646	4672	4645	6975	5464	5684	8053	5276	6595	7691	5067	15500
23	3799	2714	4126	4806	6169	5414	6140	6999	6408	6196	7459	6617	15500
24	4426	3925	4407	5515	6828	6424	7286	6964	5925	7240	8009	5426	15500
25	4166	3893	5135	4431	6483	6524	6984	7649	6099	7149	6390	5154	15500
26	4155	3480	4910	4867	6948	6393	10174	7954	5182	7198	4949	5192	15500
27	3111	3706	4435	4555	5414	6602	8665	6944	5727	6946	5232	5480	15500
28	2580	4091	4015	5045	7987	5925	7457	7525	7150	6025	5558	4739	15500
29	2800	3861	4732	6474	9375	5537	5427	8583	6002	8664	4548	7368	15500
30	2450	NA	5218	6221	10317	5637	6821	7014	4072	8563	4547	8031	15500
31	2313	NA	7171	NA	11397	NA	6325	5201	NA	14059	NA	7714	15500
MIN	1805	1405	4015	786.4	2495	4453	4203	3156	4072	4057	4547	2791	
MAX	6517	24536	8733	6595	11397	8912	10174	9236	7355	14059	8741	8031	
AVERAGE	3993	6383	5895	4932	5821	5948	5874	6952	5880	6259	6662	5277	

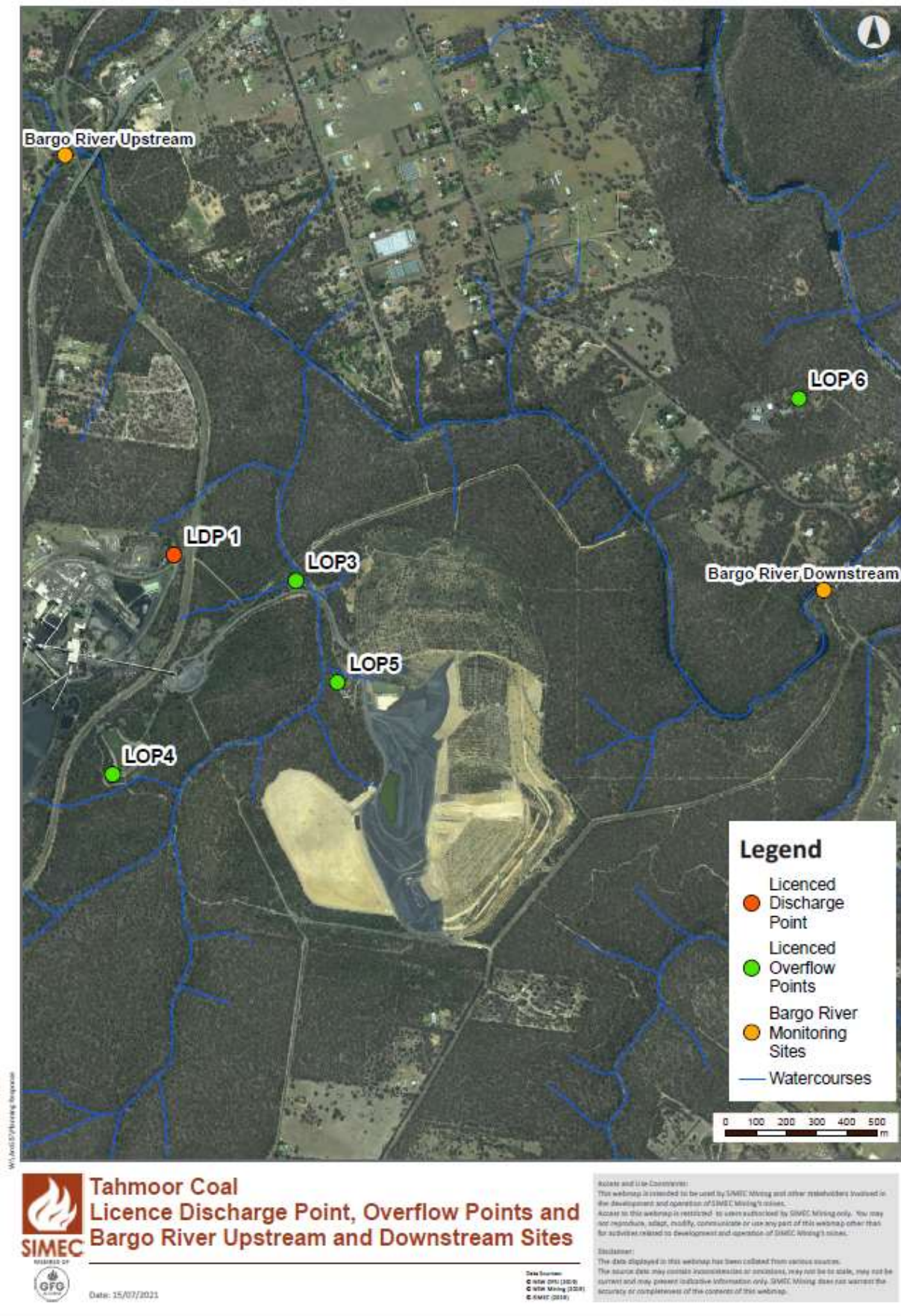


Figure 6 Locations of License Discharge Points and Overflow points at Tahmoor Coal, including Bargo River Water quality monitoring sites.

7.2 Water Quality

Water Quality monitoring is undertaken at Tahmoor Coal's Licenced Discharge Point 1, Licenced Overflow Points 3 to 6, and Bargo River Upstream and Downstream sites monthly and measures analytes relevant to Tahmoor Coal's Environmental Protection Licence EPL1389 as per below. These monitoring locations are presented in **Figure 6**. **Figures 7 to 12** below, show the results of the water sampling conducted since 2010 and the data shown in these figures is contained within **Appendix K**.

The following analytes are monitored monthly:

- pH
- Electrical Conductivity
- Total Suspended Solids (TSS)
- Turbidity
- Alkalinity suite
- Dissolved Metal suite
- Total Nitrogen
- Enterococci

The 'Bargo River Upstream' site is situated at Bargo River Reserve approximately 1.1km upstream of the Tea tree Hollow Creek confluence compared to the 'Bargo River Downstream' site, which is situated at Rockford Road bridge, 2.7km downstream of Tea tree Hollow confluence. Tea tree Hollow Creek *confluence* refers to the point Tea tree hollow creek and the Bargo River converge. Discharge water from Tahmoor Coal pit top and the REA are directed through a series of surface dams before being discharged from LDP1. This water then flows into Tea tree Hollow Creek and into the Bargo River.

The water quality trend for LDP1 is outlined in **Figures 7 to 12** and shows relatively consistent results from monthly data in the last 10 years of sample monitoring.

Tahmoor Coal has been issued with an updated EPL in December 2020 which includes additional analytes required for monthly monitoring and further requirements for the implementation of a Water Treatment Plant to treat mine effluent waters before being discharged into Tea Tree Hollow Creek. Additional requirements include Aquatic monitoring, Toxicity monitoring and a Sediment Contamination investigation to be conducted within the required timeframes.

For further Creek monitoring locations and information, please refer to **Section 4.3** and **Figure 2**.

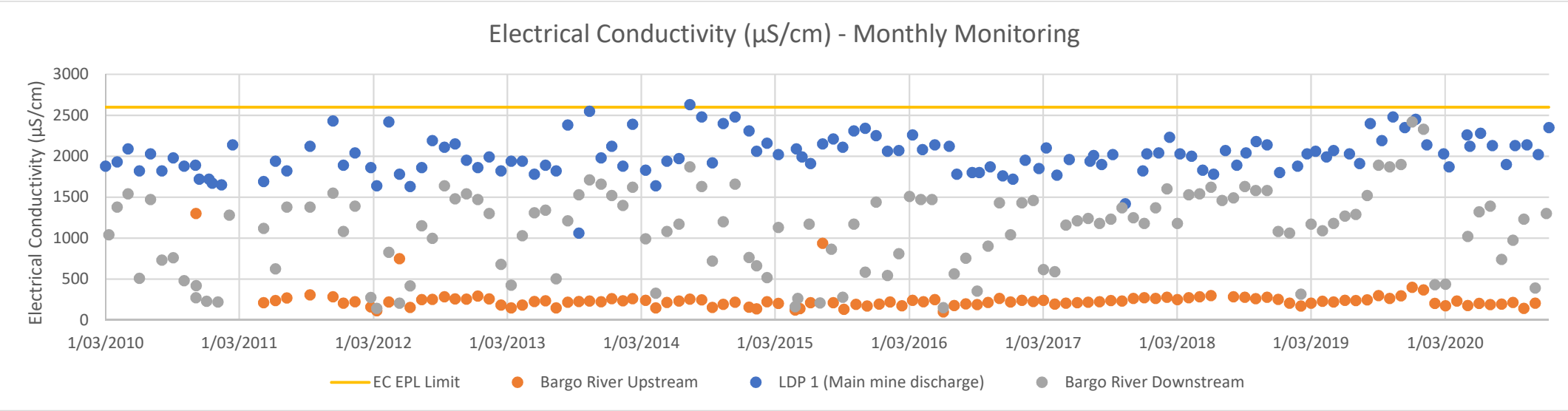
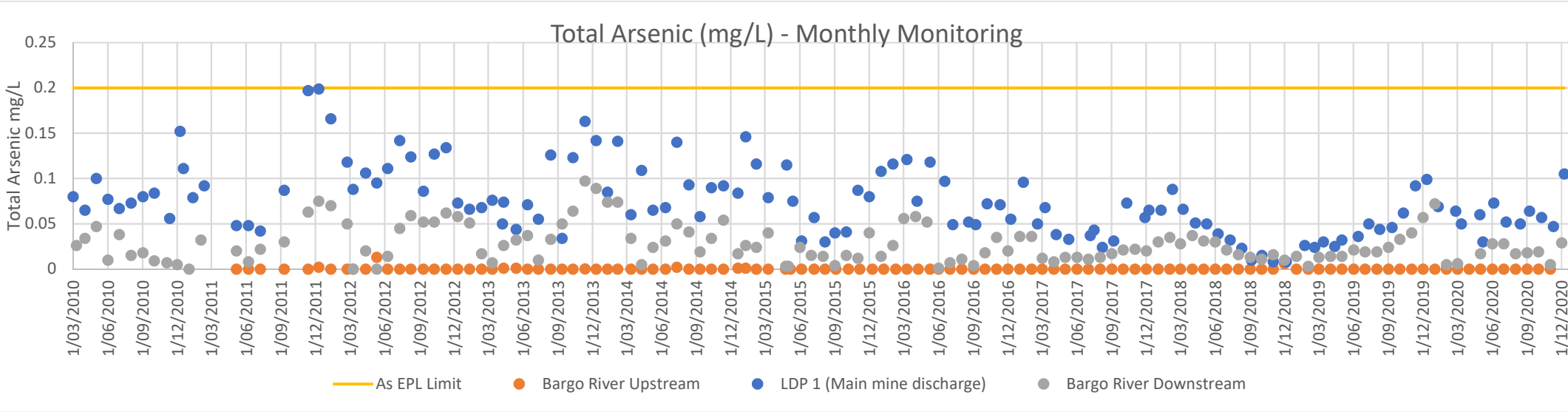


Figure 7 Total Arsenic and Electrical Conductivity Monthly Sampling since 2010 for LDP1 and Bargo River Upstream and Downstream.

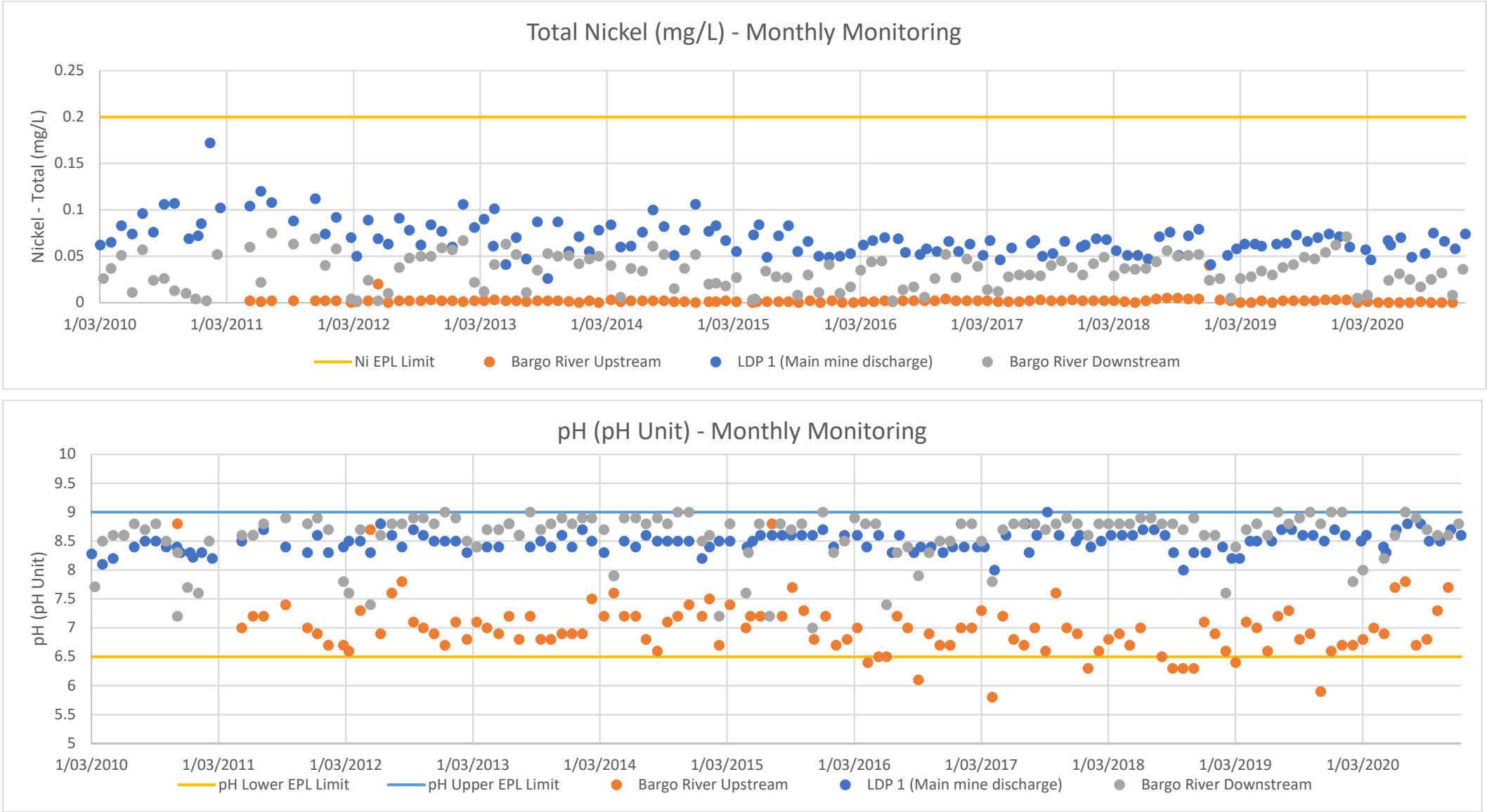


Figure 8 Total Nickel and pH Monthly Sampling since 2010 for LDP1 and Bargo River Upstream and Downstream.

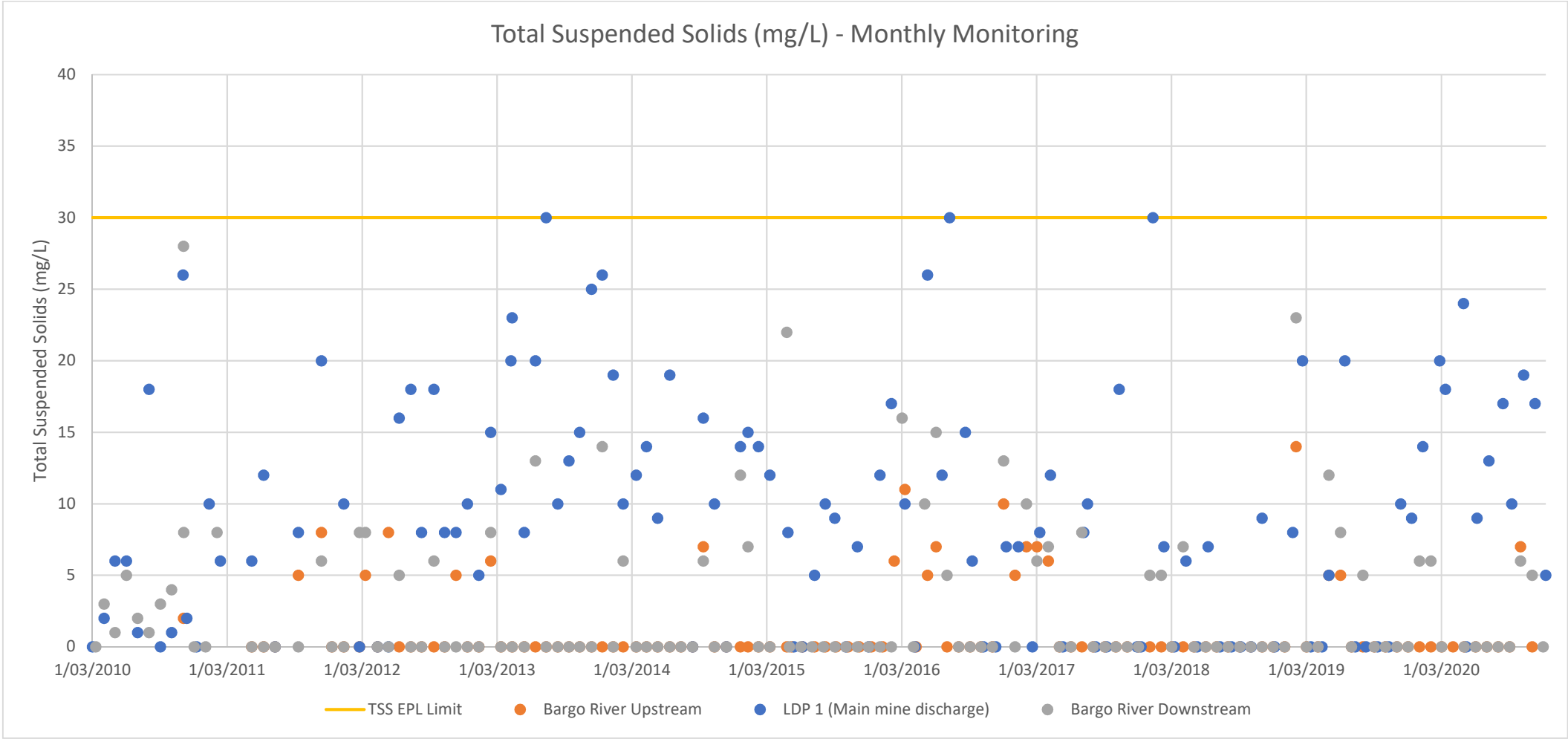


Figure 9 Total Suspended Solids Monthly Sampling since 2010 for LDP1 and Bargo River Upstream and Downstream.

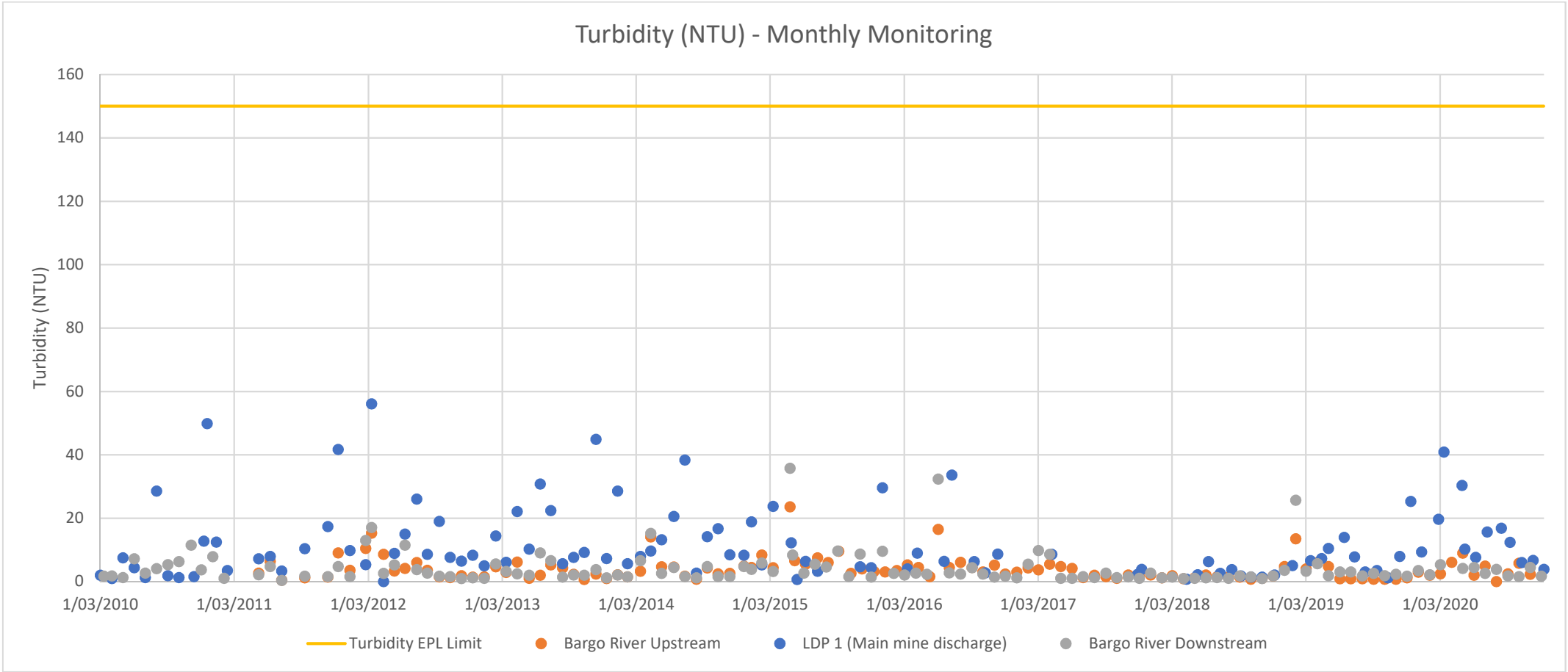


Figure 10 Total Turbidity Monthly Sampling since 2010 for LDP1 and Bargo River Upstream and Downstream.

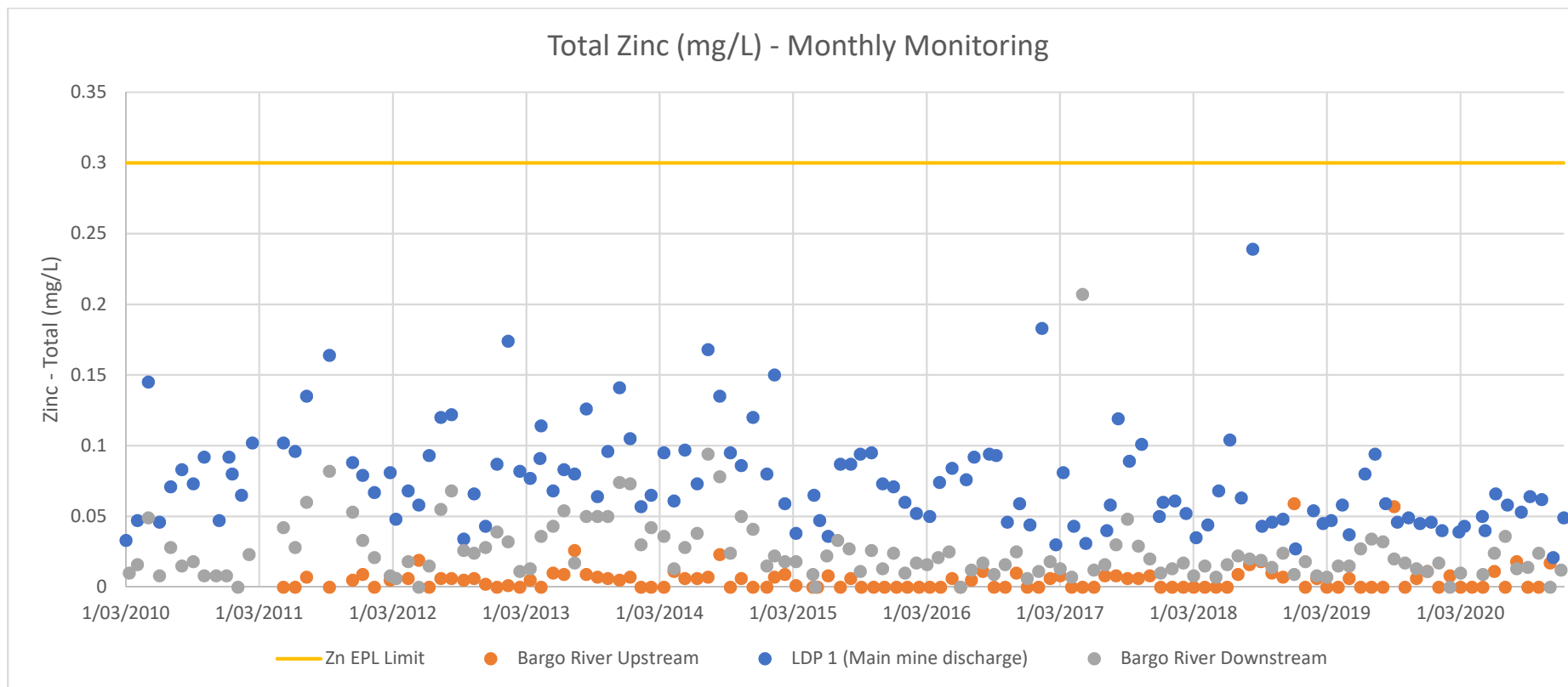


Figure 11 Total Zinc Monthly Sampling since 2010 for LDP1 and Bargo River Upstream and Downstream.

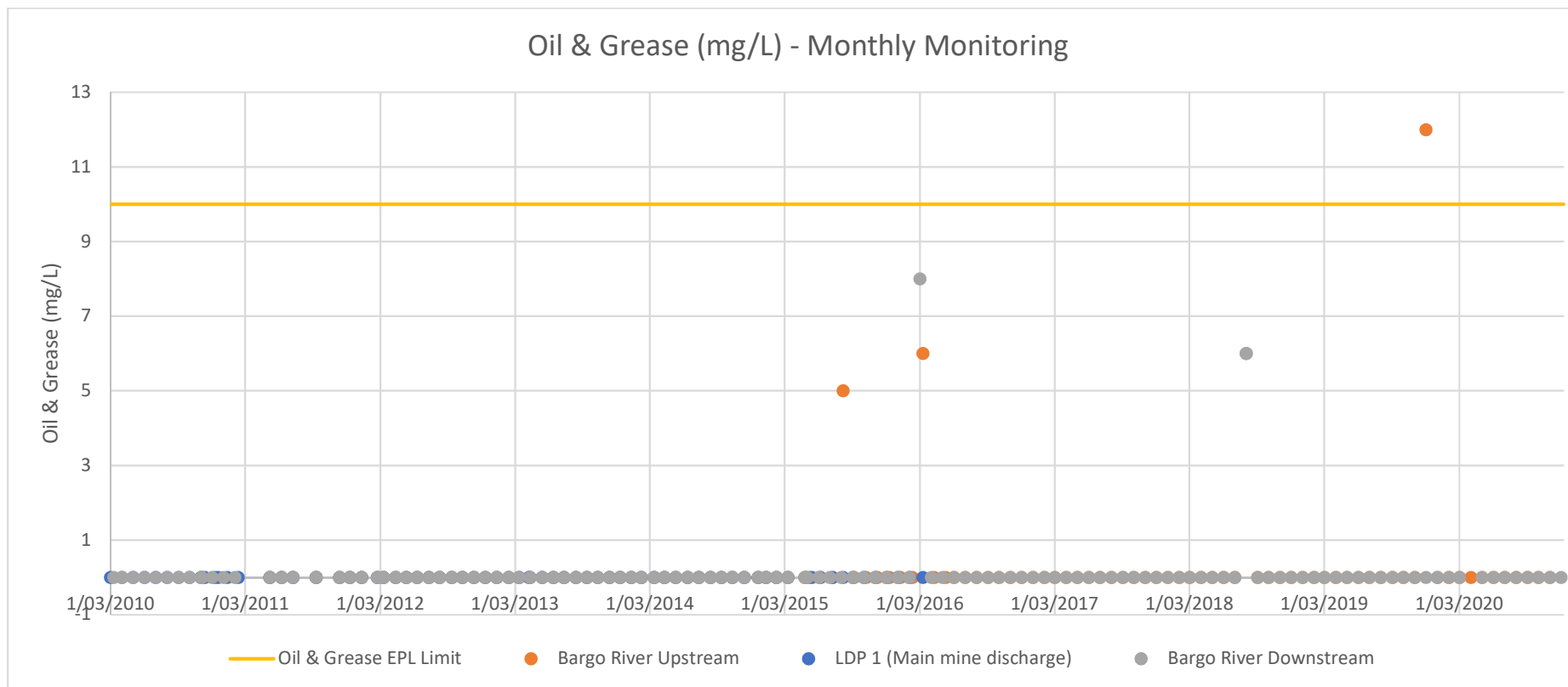


Figure 12 Oil and Grease Monthly Sampling since 2010 for LDP1 and Bargo River Upstream and Downstream. Note above, LDP1 consistently remains at <5mg/L every month since 2010.

8 Surface and Groundwater Response Plans

In the event of an incident involving potential or actual impacts to surface or groundwater, employees and contractors may be required to take immediate actions to prevent or mitigate impacts. A *Surface and Groundwater Trigger Action Response Plan (TARP)* (**Appendix F**) has been developed for surface and groundwater management to provide potential scenarios and recommended actions to guide site personnel in responding to surface and groundwater incidents. The main focus of these TARPs is on environmental or community impacts to surface and groundwater.

Tahmoor Coal has developed *TAH-HSEC-00154 Pipeline Management Procedure* for specific management of pipelines.

Specific TARPs are developed for each management plan including the longwall and are managed through the subsidence approvals process. A Surface and Groundwater Management TARP is attached as **Appendix F**.

8.1 Surface Water Incident

On the 17th April 2020, an unexpected clay material was unable to be processed by the Coal Handling Preparation Plant (CHPP) efficiently, which caused highly turbid water to be discharged into Tahmoor Coal's surface water dams and eventually discharged via LDP1 into Tea Tree Hollow Creek. This caused elevated levels for TSS and turbidity on 17th and 18th April 2020. Immediate mitigation actions were undertaken which were effective in reducing the turbidity. Further long-term initiatives have been implemented at site to effectively identify and mitigate a repeat incident from occurring again. The Independent Environmental Audit 2020 recommended the inclusion of the following table (**Table 9**) outlining the status of follow up actions from the incident in accordance with EPL1389 Condition L1.

A revised TARP was implemented for turbidity detection in Surface Dams and is included in **Appendix J M3 Dam Clarity Trigger Action Response Plan**. All actions were successfully implemented and completed in accordance with *TAH-HSEC-00129 Environmental Monitoring Program*.

Table 9 Follow-up actions from water incident of 17th April 2020

Follow up Actions	Status
Trial of a real time turbidity monitor on the thickener overflow	Completed
Install real time water turbidity monitoring of thickener overflow	Completed
Develop and implement Trigger Action Response Plan (TARP) for the thickener overflow	Completed
Trial of water turbidity meter within the dam system	Completed
Real time monitoring equipment and TARP for water turbidity levels for dam level readings	Completed
Documented process for the regular inspection and monitoring of dams	Completed
Alternate flocculent product as recommended by independent consultant	Completed

Follow up Actions	Status
A review of the chemical products used throughout the process – from underground, to the CHPP to the discharge point and ensure their usage is compatible and efficient	Completed
Review of communication between underground operations and CHPP	Completed
Purchase portable turbidity meter to assist with water management	Completed
Updated documents relating to water management at site	Completed
Training on updated Water management system	Completed

9 Measurement and Evaluation

9.1 Maintenance and Inspections

9.1.1 Maintenance Activities

Maintenance activities are to be conducted, as required, to provide that the components of the soil and water management plan are operated in a proper and efficient condition. One of the primary maintenance activities involves the removal of excess sediment from the dams on site, which should be conducted on a regular basis.

9.1.2 Inspections and Monitoring

Inspections of erosion and sediment control structures and the water management system are carried out in order to achieve effective environmental management of the working areas at Tahmoor Coal. Inspections are carried out according to Tahmoor Coal *TAH-HSEC-00114 Area of Responsibility* which includes inspection report forms for pit top, washery and water management.

Routine inspections are to be completed for each dam on site on a monthly basis and during or immediately following a flood and will typically review:

- a) Any physical defects (piping, cracking, slumping, bulging or heaving);
- b) That critical controls are functional (outlet pipes and spillways);
- c) No changes to the structure that would affect performance;
- d) Water levels;
- e) Seepage rates; and
- f) Maintenance works needed.

Surveillance inspections are to be carried out by a SQE engineer for the purpose of identifying physical defects in the structure. They are required to be carried out at a maximum of every 5 years and will typically include:

- a) Review the routine inspection reports;
- b) Assess the monitoring data;
- c) Document the results of the physical inspection;
- d) Assessment of the operation of any critical controls;
- e) Provide clear recommendations of any maintenance works that are required and the priority of the works;
- f) Review the hazard rating and consequence category for the structure; and
- g) The report is to be certified.

The inspections will typically be carried out by a member of the Tahmoor Coal Environment and Community Department who have appropriate training.

9.2 Further Improvement

Tahmoor Coal has demonstrated a significant reduction in historical non-compliances with EPL water conditions, with the performance improvement attributed to the implementation of water management Pollution Reduction Programs (PRPs) at Tahmoor Coal from 2011 to present.

Monthly inspections of Tahmoor Coal's operations are undertaken by the Environmental Co-ordinator and provide to a report on environmental performance and compliance against regulatory conditions as well as outlining recommendations aimed at continual improvement of the environmental management system.

10 Community Consultation and Complaints Protocol

All complaints relating to noise are to be managed in accordance with TAH-HSEC-00120 Community Complaint & Enquiry Procedure.

The complaint will be recorded using either the *TAH-HSEC-00172 – Community Complaint Enquiry or Communication Form* and should be entered directly into the compliance management database used by Tahmoor Coal (Cority Database and Consultation Manager) with further investigations by the Environment & Community Department. Where possible, corrective actions should be implemented and tracked, and completion outcomes documented using the Cority Database system in accordance with DA67/98 Condition 44 (g).

Community complaints must be responded to within 24 hours of receiving the complaint, however the outcome may take longer with considerations accounted to the length of investigation required.

A record of all community complaints in relation to activities undertaken by the licensee must be kept in a legible form and be in accordance to Tahmoor Coal's Environmental Protection Licence 1389.

The following information will also be kept in the event of a community complaint; as required by Section M4 in Tahmoor Coal's EPL 1389:

- a) The date and time of the complaint;
- b) The method by which the complaint was made;
- c) Any personal details of the complainant which were provided by the complainant or a note to that effect;
- d) The nature of the complaint;
- e) The action taken by the licensee in relation to the complaint, including any follow-up contact with the complainant; and
- f) If no action was taken by the licensee, the reasons why no action was taken.

These records must be kept for at least 4 years after the complaint was made and be able to be produced to any authorised officer who asks to see them.

11 Reporting Protocol

11.1 Incident Reporting and record keeping

As per the Surface Water TARP, any water related incident is reported to the Environmental department and/or Environment Coordinator immediately. Within 2 weeks of obtaining monitoring results showing an exceedance of the relevant criteria in Tables 1-3 in DA 67/98, the Applicant must notify the affected landowner and tenants in writing of the exceedance, and provide monitoring results to each of these parties until the Tahmoor Mine is complying with the relevant criteria again. All monitoring records required to be kept by Tahmoor Coal will be in a legible form, or in a form that can readily be reduced to a legible form and kept for at least four years.

The following records will also be kept in respect to *TAH-HSEC-00129 Environmental Monitoring Program* in accordance with DA67/98 Condition 44 (g):

- a) Date;
- b) Time;
- c) Category Type;
- d) Who was directed to investigate (name and position);

- e) Any findings from the investigation; and
- f) Any other relevant information.

Some possible water pollution sources and hazards were identified in the 2020 E&C Broad-brush risk assessment shown in **Appendix H**.

Any non-compliances with statutory requirements, exceedances of the impact assessment/performance criteria, complaints and/or incidents shall be reported and managed in accordance with Tahmoor Coal's *TAH-HSEC—00129 Environmental Monitoring Program* and *TAH-HSEC-00224 Notification of Environmental Pollution Incidents*.

11.2 External Performance Reporting

Water performance for Tahmoor Coal is documented each year in the Annual Environmental Management Review (AEMR) or Annual Review and is distributed among relevant government agencies in accordance with DA67/98 Condition 44 (g) and this is uploaded to the Tahmoor Coal website. Information reported in the document relates to any water related incidents, water related community complaints, water make volume for the year, water quality and discharge volumes from site.

Further external reporting is uploaded to the Tahmoor Coal website, containing updated community complaints in respect to water and other issues related to mining operations. In accordance with Tahmoor Coal's Environmental Protection Licence from the EPA, water quality results and discharge volumes are uploaded on a monthly basis.

12 Definitions

Term	Meaning
ECBBRA	Environment and Community Broad Brush Risk Assessment/Aspects and Impacts Register
EPA	Environment Protection Authority
EPL1389	Tahmoor Coal's Environment Protection Licence
POEO Act	<i>Protection of the Environment Operations Act 1997</i> (including amendments made in 2011)
TARP	Trigger Action Response Plan
WTP	Water Treatment Plant

13 Accountabilities

Role	Accountabilities for this document
Operations Manager Production Manager CHPP Manager	Provide adequate site or process area resources to allow for the implementation of the soil and water management plan at the mine and washery areas.
Environment & Community Manager	Ensure that soil and water management systems are operated and maintained in accordance with this management plan.
Environment Specialist	Develop and implement appropriate systems to comply with the requirements of this management plan, regulatory requirements and internal standards and guidelines. Conduct a review of this management plan at least every three years or as required. Prepare and deliver training programs for appropriate personnel in regards to this management plan. Conduct a monthly inspection to determine the integrity of the components of the soil and water management systems at Tahmoor Coal.
All employees and contractors	Understand and comply with the requirements of this management plan.

14 Risk Management

The risk assessment that was conducted in relation to this management plan has been entered into the Tahmoor Coal's compliance management system.

15 Review and Improvement

15.1 Audit

Audits of the **Soil and Groundwater Management Plan** shall be conducted in consultation with the plan owner and nominated individuals and shall focus on the content and implementation.

Audits on the content shall consist of a determination of understanding of the **Soil and Groundwater Management Plan** by the individual's allocated responsibility under this plan.

Audits on the implementation shall consist of reviews of the safe working procedures and risk assessments developed to ensure safe operation of the **Soil and Groundwater Management Plan**, they may also involve discussions with personnel involved in the management plan to determine understanding and compliance.

Should an audit of the **Soil and Groundwater Management Plan** determine that a deficiency is evident in the content or implementation; a corrective action must be developed and implemented. Actions will be assigned to a nominated individual and tracked in Tahmoor Coal's compliance management system.

The **Environment Coordinator** is responsible to verify that the nominated corrective action has been implemented by way of a follow up audit.

Any changes **Soil and Groundwater Management Plan** are to be managed and communicated to all personnel in line with the Change Management Process.

15.2 Review

This **Soil and Groundwater Management Plan** will be reviewed:

- Event based:** a review will be triggered following any event or finding that identifies an inadequacy in the **Soil and Groundwater Management Plan**, risk assessment or associated documents to continue to effectively manage the identified hazard; a change to the workplace itself or any aspect of the work environment, a change to a system of work, a process or a procedure; or
- Time based:** in the absence of regular event-based reviews, a **3 yearly** review's will be conducted to determine that there are not changes to the hazards and issued being managed in the **Soil and Groundwater Management Plan** and that they system and procedures detailed in the **Soil and Groundwater Management Plan** are being complied with.

If deemed appropriate, external service providers may be included in the review process. All reviews are to be documented.

16 Document Information

Relevant legislation, standards and other reference information must be regularly reviewed and monitored for updates and should be included in the site management system. Related documents and reference information in this section provides the linkage and source to develop and maintain site compliance information.

16.1 Related Documents

Related documents, listed in the below table, are internal documents directly related to or referenced from this document.

Number	Title
NA	2020 Tahmoor Coal Environment & Community Broad Brush Risk Assessment (ECBBRA)
NA	Water Licence 10BL602333
TAH-HSEC-00114	Area of Responsibility
TAH-HSEC-00154	Pipeline Management Procedure
TAH-HSEC-00229	Risk Management
TBA	Ground Disturbance Permit
TBA	Work Authorisation Form

16.2 Reference Information

Reference information, listed in the below table, is information that is directly related to the development of this document or referenced from within this document.

Title
2020 Tahmoor Coal Environment & Community Broad Brush Risk Assessment (ECBBRA)
CH2M Hill (2008) Site Water Balance
CH2M Hill (2008) Stormwater Consolidation Project Design Report
Development Consent DA57/93
Environmental Protection Licence 1389
Landcom (2004) Managing Urban Stormwater, Soils and Construction – Volumes 1 & 2
NSW Dams Safety Act, 1978
NSW DECC (2008) Managing Urban Stormwater, Soils and Construction, Volume 2E: Mines and Quarries (Blue Book) Guideline
NSW Water Management Act 2000
Protection of the Environment Operations Act 1997
The Water Sharing Plan for Greater Metropolitan Region Unregulated River Water Sources (the WSP)

17 Change Information

17.1 Change Information

Full details of the document history are recorded in the document control register, by version

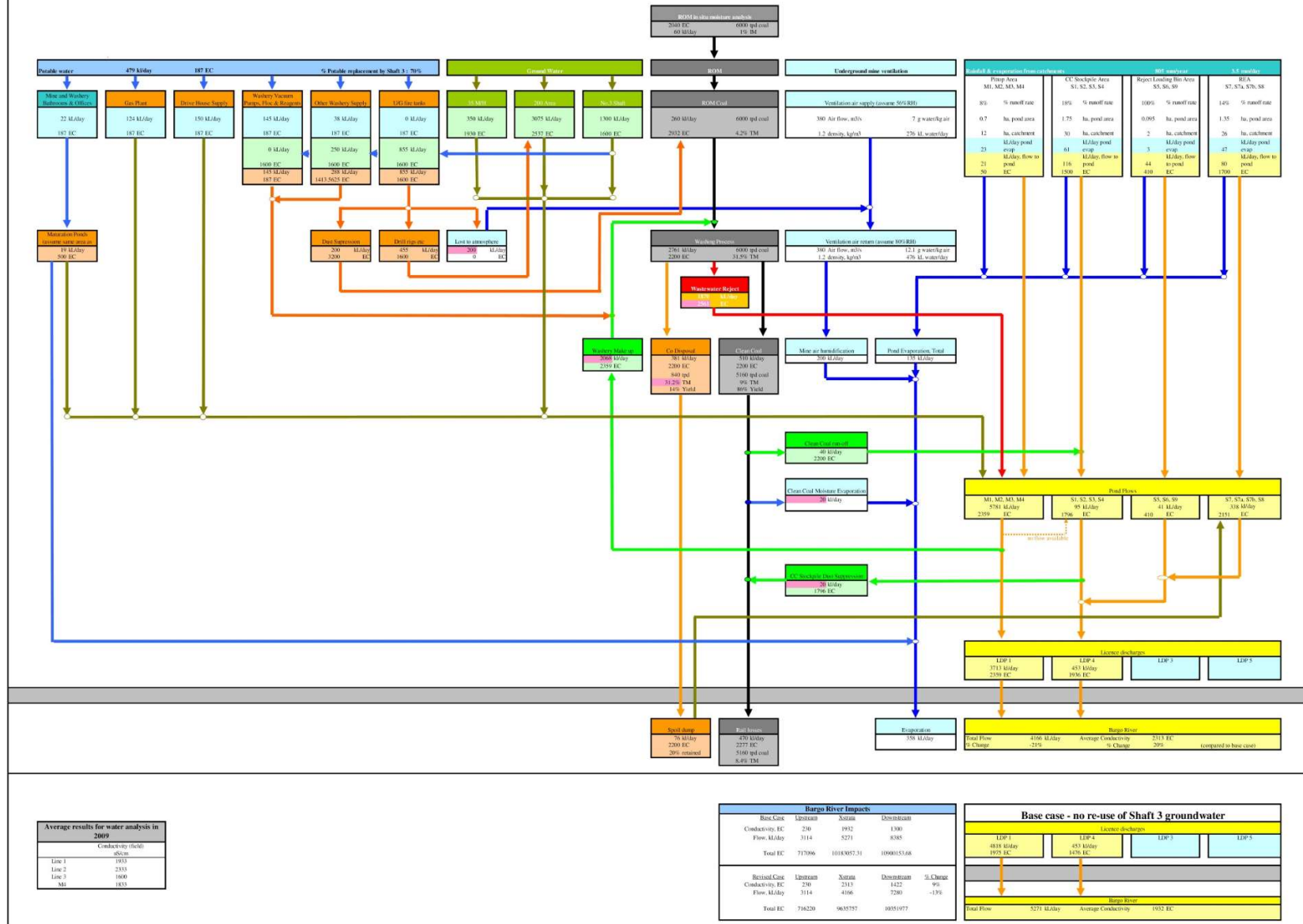
Version	Date Reviewed	Review team (Consultation)	Change Summary
1.0	June 2008	Paul Amidy	Draft document developed.
2.0	November 2008	Ben de Somer	Draft updated and approved for document control.
3.0	16 th February 2012	Katie Hendry	Updated document to new XCN document template. Updated detail to include changes to stormwater management, water recycling and discharge treatment systems. Appended water balance and new Water Efficiency Plan (previous 2011 SD Annual Plan requirement). Updated all references to internal standards and management plans.
4.0	20 th April 2013	Jarith Young	Updated document with Appendix 4. Highlighted section 3.1.1 for requiring updating at completion of current pipeline works.
5.0		Chris Standing, Fiona Robinson, Ian Sheppard	Annual document review. Formatted into new GCAA template.
6.0	22 nd December 2015	Fiona Robinson, Samantha Beresford, Jessica Ainslie, Holly Harrison	Update document in line with GCAA HSEC Water Management Protocol.
7.0	2 nd June 2016	Jessica Ainslie, Ian Sheppard, Fiona Robinson	Further update document in line with GCAA HSEC Dams and Diversion Protocol.
8.0	8 th November 2019	Dane Fogliada (Cardno), Fiona Robinson	Update to SIMEC template. Update legislation and references.
9.0	31 st January 2020	Abby Uljanic	Updated to new template. No change to document content.
10.0	22 nd September 2020	Alex Parro, April Hudson, Natalie Brumby	General review and update, remove Glencore references and standards.
11.0	22 nd January 2021	Natalie Brumby, April Hudson	Reviewed in accordance with Condition 46 of DA67-98 (2020) following submission of the 2020 Independent Environmental Audit to DPIE. Updated Section 4.1.2 Environmental Protection Licence with variation to Licence EPL 1389 (Dec 2020). Updated Appendix F and Appendix H.
12.0	12 th April 2021	Natalie Brumby	Reviewed in accordance with Condition 46 of DA67-98 (2020) following submission of the 2020 Annual Review. Implement NC REC 12 from 2020 Independent Audit (see Section 6.1).
12.1	25 th June 2021	Natalie Brumby	Update in accordance with request from the DPIE to provide additional information. Updated Appendix A. Added Appendix C. Updated Appendix D.

12.2	16 th July 2021	Natalie Brumby	Updated Section 7 in accordance with DPIE comments for further baseline data. Updated Figure 5 and Included Figure 2. Included Section 4.3.
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Appendix A – Site Water Balance

XSTRATA TAHMOOR MINE WATER BALANCE

(CH2M Hill review of mass balance produced by Richard Porteous, updated 29 October 2009 with 2009 water analysis.)



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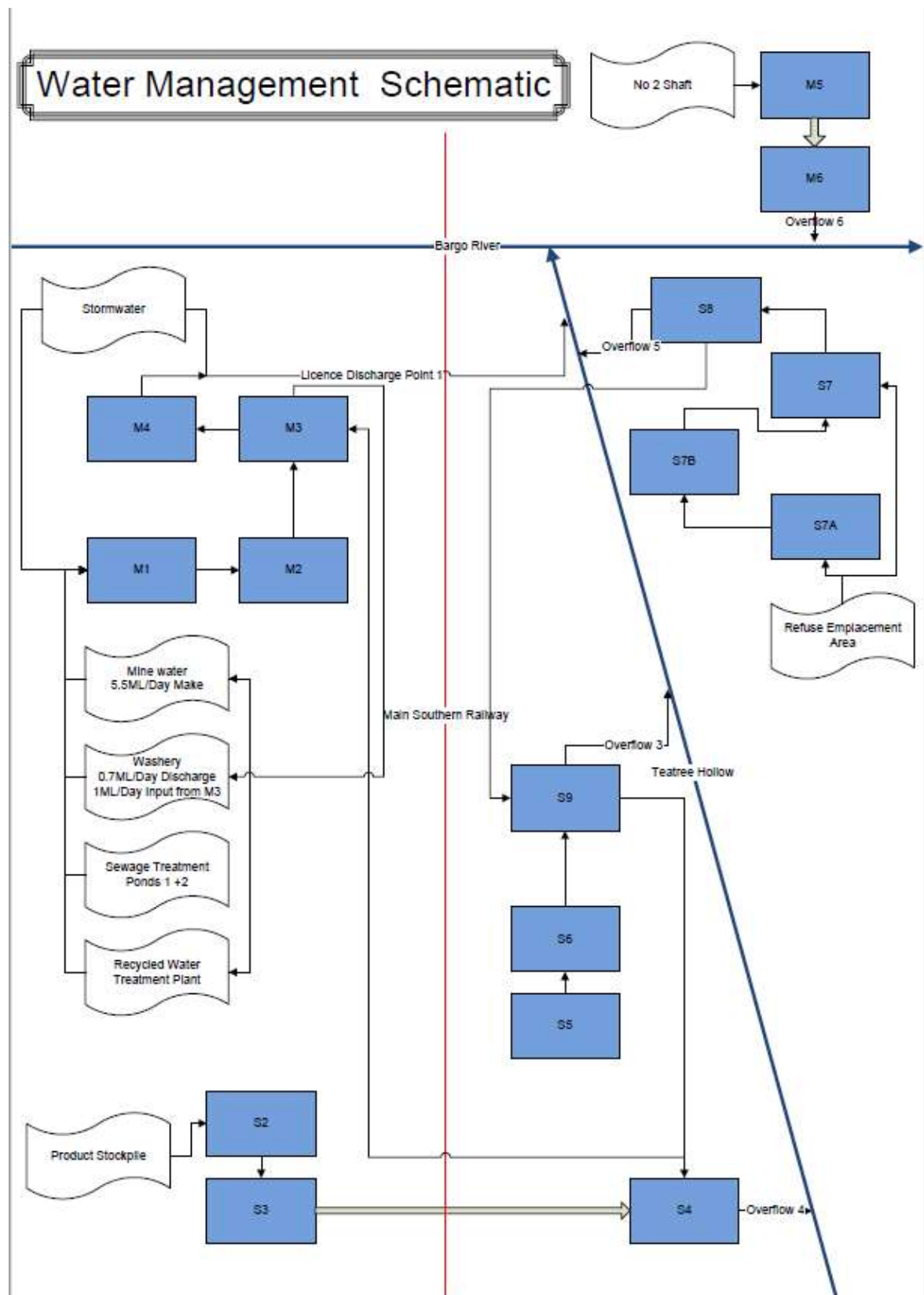
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Version: «RevisionNumber»

Effective: «Document.CurrentRevision.EffectiveDate»
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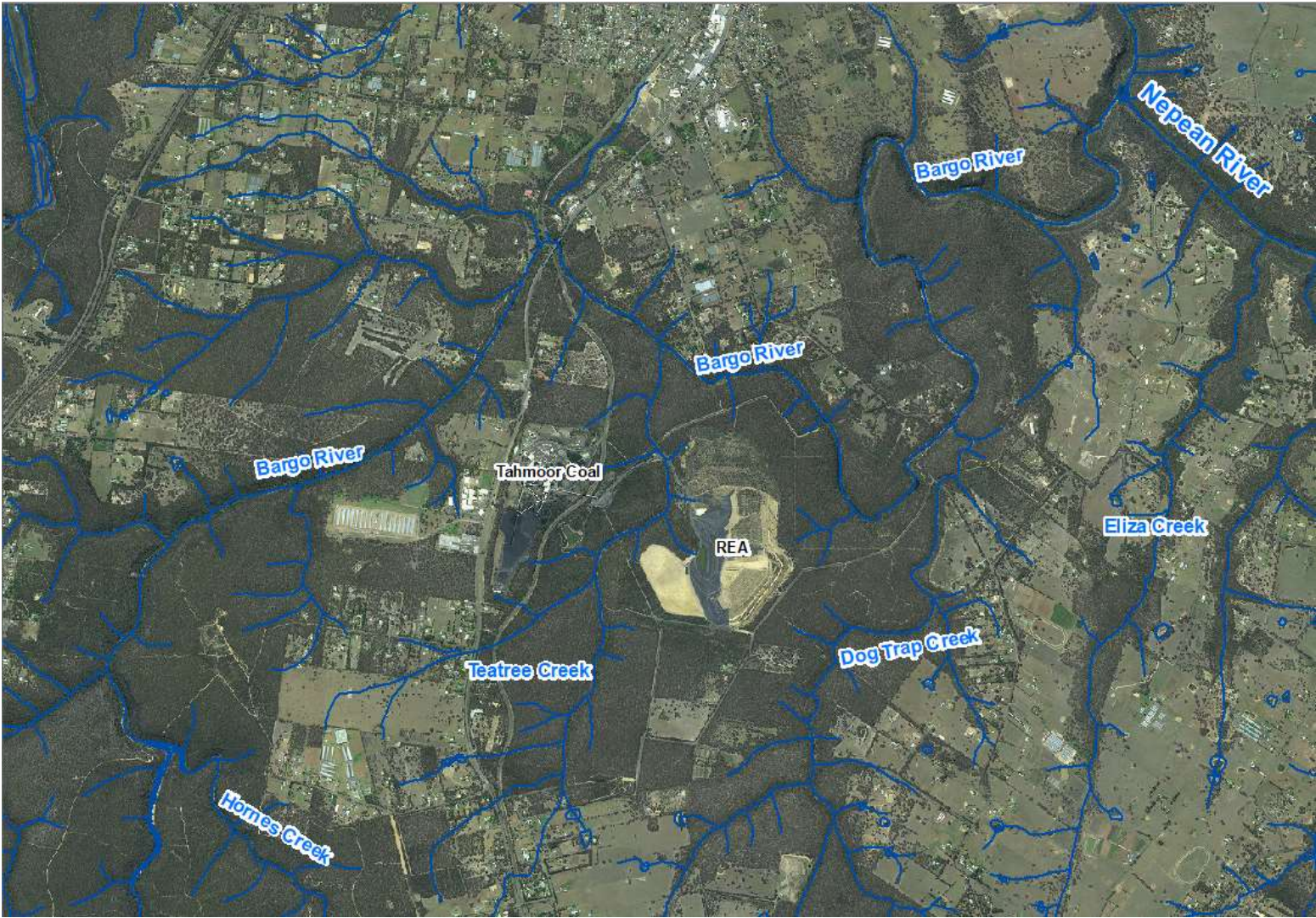
Appendix B – Site Water Pathways



Appendix C – Water Management Schematic



Appendix D – Local Watercourses



Appendix E – Water Efficiency Plan

	2011	2012	2013	2014	2015	2016 (Actual)	2017 (Actual)	2018 (Actual)	2019 (Actual)	2020 (Actual)
Potable Water (ML)	390	229	287	315	295	402	259	133	414	396
Recycled Water (ML)	20	385	385	385	385	308	200	388	291	187

Appendix F – Surface and Groundwater Management Trigger Action Response Plan

Objective	To assist personnel to identify
Trigger Level	To assist personnel to identify events which may cause actual or potential material harm to the environment, namely surface waters. To provide guidance as to appropriate action to take in the event that an incident occurs.
TARP	Trigger Action Response Plan. A TARP identifies the specific changes or trigger levels and recommended actions to be taken.
General Guidance Notes	This TARP should be used by all personnel to gauge actions required to manage various situations related to surface water management, and actual/potential environmental incidents. Triggers resulting in a change than is not normal should be reported by personnel to their immediate supervisor (i.e. Task Coordinator, Shift Supervisor, Deputy, Undermanager, etc) to determine an appropriate course of action as per the TARP or other site procedures. For guidance on the assessment and notification of serious environmental pollution incidents, refer to TAH HSEC 00224 Notification of Environmental Pollution Incidents. All notifications must be made in accordance with this procedure, and in accordance with TAH HSEC 00155 Pollution Incident Response Management Plan (PIRMP) and Part 5.7 of the POEO Act 1997. If you are unsure about the appropriate course of action for responding to or reporting an environmental incident, you are advised to refer to the procedure TAH HSEC 00224 Notification of Environmental Pollution Incidents and phone the nominated contacts to seek guidance. Nothing within this TARP should limit or prevent appropriate action being taken by personnel to prevent potential or actual material harm to the environment from occurring.
Abbreviations	EPA – Environment Protection Authority POEO Act – Protection of the Environment Operations Act 1997 (including amendments made in 2011) TARP – Trigger Action Response Plan

General hydrocarbon or chemical spill	Normal State	Level 1 Triggers	Level 2 Triggers	Level 3 Triggers
	No spill	Spill of <20L	Spill of 20-205L	Spill of >205L

Persons Affected	Action / Response	Action / Response	Action / Response	Action / Response
All personnel	Undertake work as normal	Immediately remediate using spill kit. Investigate cause of spill/leak. Arrange for disposal of contaminated material. Complete incident report form (Category 0).	Immediately remediate using spill kit. Investigate cause of spill/leak. Immediately report to E&C Representative. Arrange for disposal of contaminated material. Complete incident report form (Category 1).	Immediately remediate using spill kit. Investigate cause of spill/leak. Immediately report to E&C Representative. Arrange for disposal of contaminated material. Complete incident report form (Category 2).
E&C representative		Review incident report form and classification.	Review incident report form and classification. Notify EPA if required.	Review incident report form and classification. Notify EPA if required.

Water storage dam compromised or fails	Normal State	Level 1 Triggers	Level 2 Triggers	Level 3 Triggers
	Dams functional	Minor cracks, slumping or other damage detected in dams	Major cracks, slumping or other damage detected in dams	Dam failure resulting in uncontrolled discharge of water to environment

Persons Affected	Action / Response	Action / Response	Action / Response	Action / Response
All personnel	Undertake work as normal	Investigate cause and solutions to repair damage. Provide hazard or inspection report to E&C Representative with planned actions to remediate.	Immediately report to E&C Representative. If possible (within limits of EPL Approval) divert water to other storage areas to reduce water level in damaged dam. Investigate options to repair damage. Record findings and actions on hazard or inspection report form.	Immediately report to E&C Representative. If possible (within limits of EPL Approval) divert water to other storage areas to reduce water level in damaged dam. Investigate options to repair damage.
E&C representative	Continue routine monitoring	Review hazard or inspection report form, and assist in investigation.	Review hazard or inspection report form, provide guidance and assist in investigation	

Tailings storage dam compromised or fails	Normal State	Level 1 Triggers	Level 2 Triggers	Level 3 Triggers
	Tailings dams functional	Evidence of possible dam leaks	Evidence of possible leaks or damage that could lead to failure	Dam failure

Persons Affected	Action / Response	Action / Response	Action / Response	Action / Response
E&C representative	Continue operating as normal.	Assist in investigation and mitigation. Investigate cause of leak and solutions.	Assist in investigation and mitigation. Notify EPA if applicable. Investigate cause of leak and solutions. Notify Environment Coordinator.	Assist in investigation and mitigation. Notify EPA if applicable. Notify Environment Coordinator immediately. Divert water or if possible bypass water from dam. Seek outside assistance if required.

	Normal State	Level 1 Triggers	Level 2 Triggers	Level 3 Triggers
Drift diesel supply line compromised or fails	No loss of diesel detected in diesel drop reconciliation from surface to pit bottom	Minor loss of diesel detected in diesel drop reconciliation from surface to pit bottom - <44L (2%)	Major loss of diesel detected in diesel drop reconciliation from surface to pit bottom – 45-110L (<5%)	Significant loss of diesel detected in diesel drop reconciliation from surface to pit bottom - >110L (>5%)

Persons Affected	Action / Response	Action / Response	Action / Response	Action / Response
E&C representative	Continue work as planned – complete routine inspection of drift conveyor/pipelines.	Inspect pipeline to locate leak and action for repair.	Inspect pipeline to locate leak and action for immediate repair. Use pit bottom spill kit to collect any diesel which may have collected in the drift bottom sump located near the drift belt loop take up. If leak occurred above the mid-drift pump , inspect the mid-drift pump sump located near 35 manhole and implement controls there (or allow sump to overflow to drift bottom)	Inspect pipeline to locate leak and action for immediate repair. Do not use diesel drop pipeline until repairs are completed.

	Normal State	Level 1 Triggers	Level 2 Triggers	Level 3 Triggers
Drift diesel supply line compromised or fails	No loss of diesel detected in diesel drop reconciliation from surface to pit bottom	Minor loss of diesel detected in diesel drop reconciliation from surface to pit bottom - <44L (2%)	Major loss of diesel detected in diesel drop reconciliation from surface to pit bottom – 45-110L (<5%)	Significant loss of diesel detected in diesel drop reconciliation from surface to pit bottom - >110L (>5%)

Persons Affected	Action / Response	Action / Response	Action / Response	Action / Response
E&C representative	Continue work as planned – complete routine inspection of drift conveyor/pipelines.	Inspect pipeline to locate leak and action for repair.	Inspect pipeline to locate leak and action for immediate repair. Use pit bottom spill kit to collect any diesel which may have collected in the drift bottom sump located near the drift belt loop take up. If leak occurred above the mid-drift pump , inspect the mid-drift pump sump located near 35 manhole and implement controls there (or allow sump to overflow to drift bottom)	Inspect pipeline to locate leak and action for immediate repair. Do not use diesel drop pipeline until repairs are completed.

Process water pipeline compromised or fails	Normal State	Level 1 Triggers	Level 2 Triggers	Level 3 Triggers
	Line is functioning normally	Evidence of possible leaks or damage that could lead to line failure	Evidence of possible line failure detected	Line failure

Persons Affected	Action / Response	Action / Response	Action / Response	Action / Response
All personnel	Continue operating as normal.	Assist in investigation and mitigation.	Assist in investigation and mitigation.	Assist in investigation and mitigation.
E&C representative		Investigate cause of leak and solutions.	Investigate cause of leak and solutions. Notify Environmental Coordinator.	Isolate ruptured line. Notify Environment Coordinator immediately. Divert water or if possible bypass water from line failure Seek outside assistance if required.

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Rainfall events	Normal State	Level 1 Triggers	Level 2 Triggers	Level 3 Triggers
	Dams below capacity and structures intact	Rain event (<10mm) in the next 24 hours and/or evidence of minimal erosion or sedimentation	Significant rain event imminent (>10mm) and dam storage at or near capacity	Significant rain event imminent (>10mm) and dam storage at capacity or structurally diminished

Persons Affected	Action / Response	Action / Response	Action / Response	Action / Response
All personnel	Undertake work as normal	Monitor rainfall on BOM. Assess quality of erosion and sediment control measures	Continue to monitor rainfall. Identify high priority pumping areas.	Continue to monitor rainfall. Conduct inspection of high priority dams regularly with appropriate personnel
E&C representative	Undertake work as normal. Continue with monthly environmental inspections	Implement controls as required.	Implement controls as required. Inspect all dams and record observations. In particular, monitor M3-M4 low level dam wall section.	Implement controls as required.

Sewage treatment plant/pipeline compromised or fails	Normal State	Level 1 Triggers	Level 2 Triggers	Level 3 Triggers
	Sewerage system operating normally	STP dams close to capacity	Spill detected	Major spill detected

Persons Affected	Action / Response	Action / Response	Action / Response	Action / Response
All personnel	Continue operating as normal.	Investigate solutions for reducing capacity. Notify Environment Coordinator.	Sample to confirm leak. Isolate leak and avoid contact with water. Investigate cause of leak and solutions. Notify Environment Coordinator.	Notify Environment Coordinator immediately. Divert water or if possible bypass water from treatment plant. Seek outside assistance if required.
E&C representative		Assist with investigation and mitigation.	Notify EPA/NSW Health if applicable. Assist with investigation and mitigation.	Notify EPA/NSW Health if applicable.

Water monitoring – elevated faecal coliform level 8 in mine water	Normal State	Level 1 Triggers	Level 2 Triggers	Level 3 Triggers
	Routine testing shows levels of 0-150 CFU/100mL at sample point	Routine testing shows levels of >150 CFU/100mL at sample point	Routine testing shows levels of >1000 CFU/100mL at sample point	Median >1000 CFU/100mL and/or more than one result >4000 CFU/100mL at sample point

Persons Affected	Action / Response	Action / Response	Action / Response	Action / Response
All personnel	Continue operating as normal.	Advise Environment Coordinator. Investigate cause and mitigate.	Investigate supply. Immediately resample water. Advise Environment Coordinator. Determine if chlorine dosing is required.	Determine if chlorine dosing is required. Request outside assistance if necessary.
E&C representative	Continue routine testing.	Assist with investigation and mitigation.	Notify EPA/NSW Health if applicable. Assist with investigation and mitigation.	Notify EPA/NSW Health if applicable. Assist with investigation and mitigation.

Water monitoring – exceedance of EPL quality criteria	Normal State	Level 1 Triggers	Level 2 Triggers	Level 3 Triggers
	Variables below licence condition	Variables at licence condition	Variables above licence condition	Variables significantly above licence condition

Persons Affected	Action / Response	Action / Response	Action / Response	Action / Response
All personnel	Continue routine testing.	Notify Environment Coordinator. pH – investigate and minimise human exposure	Review exceedance notification. Conduct site inspection and initiate investigation to determine source of impact and provide recommendations for corrective actions	Review exceedance notification. Conduct site inspection and initiate investigation to determine source of impact and provide recommendations for corrective actions
E&C representative		Review exceedance notification. Conduct site inspection and initiate investigation to determine source of impact and provide recommendations for corrective actions	Notify Environment Coordinator immediately. Complete incident investigation. Eliminate source of exceedance if possible. Monitor as required. pH – avoid human contact, begin neutralisation treatment.	Immediately resample. Notify Environment Coordinator immediately. pH – prevent human contact and begin neutralisation treatment. Request outside assistance if necessary.

Appendix G – EPL 1389 Discharge Water Quality Concentration Limit

The following table Details the Water and/or land concentration limits for offsite discharge as per condition L2.4 of Environmental Protection Licence 1389 (revised 2nd December 2020).

Pollutant Point 1	Units of Measure	100 percentile concentration limit LDP1
Aluminium	Micrograms per litre	110
Arsenic	Micrograms per litre	200
Barium	Micrograms per litre	6440
Copper	Micrograms per litre	5
Electrical Conductivity	Micro siemens per centimetre	2600
Enterococci	colony forming units per 100 millilitres	1700
Nickel	Micrograms per litre	200
Nitrogen (total)	Milligrams per litre	8
pH	pH	6.5-9.0
Total Suspended Solids	Milligrams per litre	30
Turbidity	Nephelometric turbidity units	150
Zinc	Micrograms per litre	300

Appendix H – Soil and Water Hazards and Controls Identified in 2020 E & C BBRA Review

Aspects & Impacts (Hazards)	Control
Mine subsidence impacting Groundwater causing water losses / contamination.	Alternative Water Supplies (to provide to affected stakeholders) Post-mining restoration of water supply Monitoring and TARP's Community Consultation Incident Response Complaints Procedure Groundwater licence is in place
Mine subsidence impacting surface water causing water losses / contamination.	Environmental Management Plan (reporting, monitoring, consultation, communication and cooperation) Subsidence monitoring program. Community consultation Remediation Plan as required. Adaptive Management Plan (if impacts are noted option to change position of LW)
Subsidence damage to potable water reticulation system resulting in loss of water supply	Sydney Water Potable Subsidence Management Plan. Subsidence monitoring program. Community consultation. Subsidence Advisory NSW
Subsidence damage to sewer system causing loss of serviceability	Sydney Water Sewer Subsidence Management Plan. Subsidence monitoring program. Community consultation. Subsidence Advisory NSW

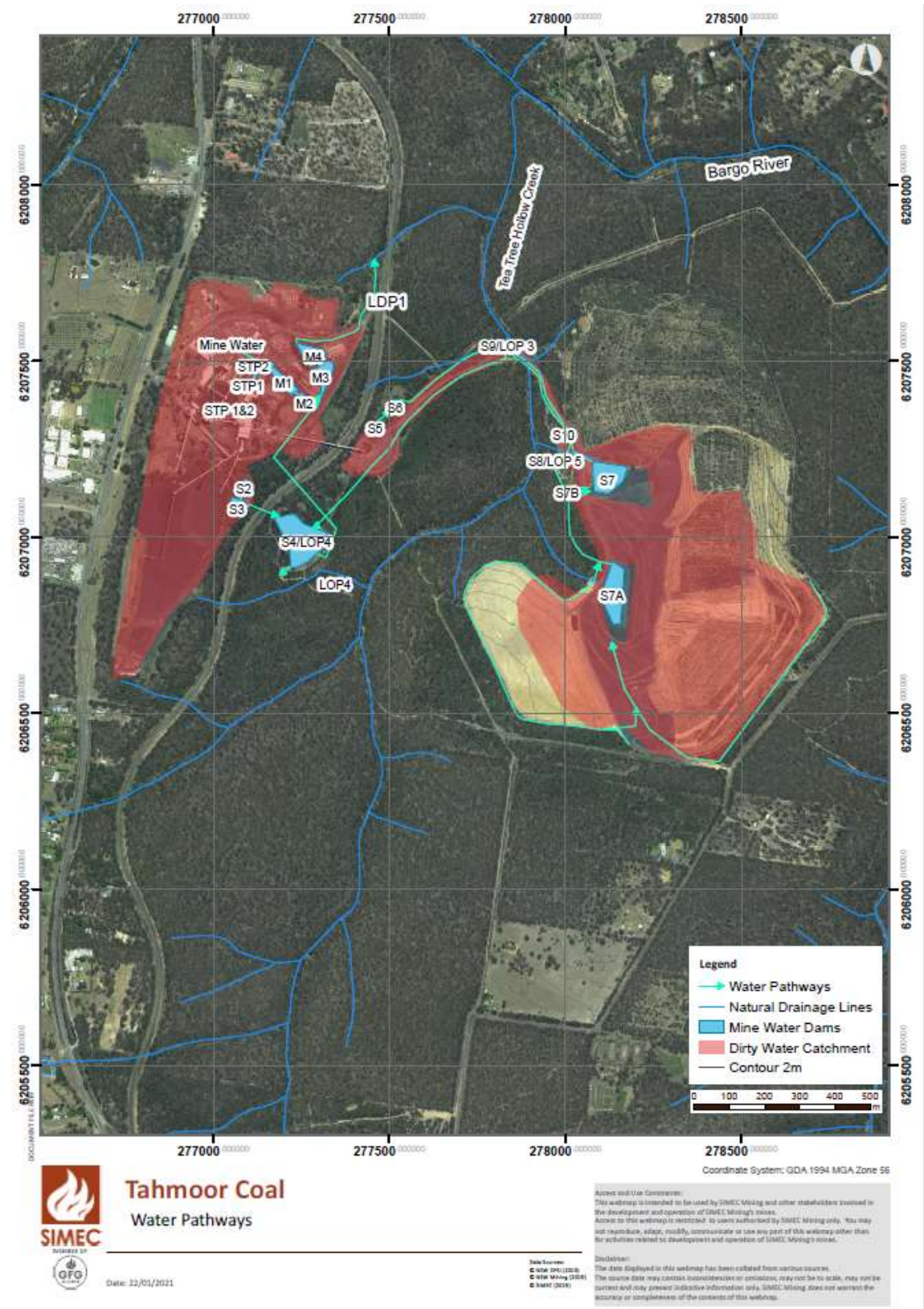
Aspects & Impacts (Hazards)	Control
Diesel leaks and spills in the transfer area resulting in water contamination, which is pumped to surface	Tie-down Procedures Dual-skinned pods Dilution of pumped water Banlaw Fittings and cut off Spill kits Employee training Maintenance Procedures Operator awareness monitoring during transfers Diesel measurement quantity top and bottom of the drift Employee training on use & Instruction signage Regular inspections (dolly-car driver) Transfer Procedures for diesel Gross account of diesel transfers. Employee training Maintenance Procedures Operator awareness monitoring during transfers
Diesel leaks and spillage on the Surface Yard, REA and Stockpiles leading to contaminated water being discharged off site	Known capacity of surface diesel tank Double skin and bunded tanks Overfill protection on the tank (REA and Stockpiles) Employee training Site Environmental awareness Maintenance/ Filling Procedures Operator awareness monitoring during transfers Dilution of pumped water Spill kits
Contaminated water from Oil or chemical spill underground being pumped out to surface dams	Surface water monitoring Water pumped through goaf areas for filtering Diesel fuel bays underground dual skin tank and bunded. Limited volume of fuel and oil storage Environmental awareness training Floating sock in M3 dam captures oil and contaminants before going into M4 and off site.

Aspects & Impacts (Hazards)	Control
Ground contamination from spills underground Spills across site including: - Quintolubric (soluble oil) leaks and spills as a result of activities associated with long wall mining resulting in ground contamination - Spill of concentrated Quintolubric from transport and transfer systems resulting in ground and/or water contamination - Rocsil & PUR waste/leftovers associated with activities of long wall mining resulting in impacts on environment or people (incl employees & off-site) - Spills and leaks of the 20 Lt gear oil drums used in long wall mining activities resulting in water contamination - Spills & leaks from OLD re-agent tanks (Conditioner and Frother) due to major equipment failure or re-filling operations resulting in ground/water contamination off-site Water (surface) - contamination - Critical spills/leaks from the Aerating Sewerage Treatment Plant (incl sludge) resulting in ground or water contamination - Oil contamination in unsealed areas from parked vehicles	Underground spills are drained via goaf systems Transported UG via bunded pods Total Waste Management System on surface Waste management contractor onsite Waste sorting contractors Surface water monitoring Water pumped through goaf areas for filtering Diesel fuel bays underground dual skin tank and bunded. Limited volume of fuel and oil storage Environmental awareness training Floating sock in M3 dam captures oil and contaminants before going into M4 and off site. Monthly Environmental visual inspections Daily visual checks on M3 dam and LDP1
Coal fines causing increased suspended solids due to: - Rain event - Non communication with CHPP Uncontrolled release (failure / overflow) outside contained catchment going off site	Pollution Control Dams Drain Maintenance Coagulant dosing De-silting Program Stockpile Management Plan Stormwater management system. Work order system to check drains on a weekly basis. Soil and water management plan. Automatic monitoring device installed at S8 to prevent uncontrolled overflow into Teatree creek.
Major failure of equipment or procedures while refuelling of locomotives onsite using road tanker	Designating Refuelling Location Quick break Refuelling Procedure Training Competencies for Contractors

Aspects & Impacts (Hazards)	Control
Catastrophic storm event leading to critical failure of dam(s) and tailings dams resulting in discharge of mine water to the environment	Capacity of dams is maximum of 50ML Dams Risk Assessment reviewed, identified current dam condition and controls adequate by third party. Geotech review the tailings dam on an annual basis for integrity Monthly Env Inspections

Appendix I – Catchment Areas

The following map details dirty water catchment areas on site. All areas not indicated as dirty water catchments are to be treated as clean water catchments.



Appendix J – M3 Dam Clarity Trigger Action Response Plan (TARP)

Instructions

Objective: To assist Personnel to identify deteriorating conditions at the Tailings Overflow to mitigate poor water quality at LDP1

Trigger Level: A condition that is not normal. It must be able to be measured or observed and on being reached predetermined action must be taken.

TARP: (Trigger Action Response Plan)

A TARP identifies the Personnel and specifies the Trigger Levels (Notification Periods) and actions to be taken from the notification of incidents.

General Guidance Notes: If unsure you are advised to phone as a courtesy and seek guidance of the E&C or CHPP Managers.

Internal notifications within SIMEC Mining are best summarised as follows:

- Immediate phone call where event is of a serious nature such as a fatality or serious injury or serious environmental breach
 - Courtesy call within 12 hours for LTI's or RWI's
 - Written notification within 24 hours for all classes of incidents

In all cases there are SIMEC Mining reporting guidelines however as a general rule the above will manage the requirement

Abbreviations: **TARP** = Trigger Action Response Plan

DII refers to the Mines Inspectorate - The Specific contact will be aligned to the nature of the issue to be reported. For example, a Mechanical issue will be

reported to the DII Mechanical Inspector, a mining issue to the Mining Inspector etc.

ICI - refers to the Industry Check Inspector

HSR – Health and Safety Representative

SM – SIMEC Mining

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‘X’ – measured value

	Normal State	Level 1 Triggers	Level 2 Triggers	Level 3 Triggers
Trigger Action Response Plan for M3 Dam Clarity	M2/M3 Overflow discharge clarity clear	M2/M3 Overflow discharge clarity medium	M2/M3 Overflow discharge clarity low	M2/M3 Overflow discharge clarity DARK/BLACK
	- Can see the bottom of the pipe through the water steam - Trend in Citect measuring ‘X’ < 55NTU	- Water murky and hard to see bottom of the pipe through the water steam - Trend in Citect measuring 55NTU < ‘X’ <=75NTU	- Water dark and almost cannot see bottom of the pipe through the water steam - Trend in Citect measuring 75NTU < ‘X’ <=90NTU	- Water is dark brown to black and cannot see bottom of the pipe through the water steam - Trend in Citect measuring 90NTU < ‘X’

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Persons Affected	Action / Response	Action / Response	Action / Response	Action / Response
1. Shift Leading Hand/Operators	- Continue working normally. - Monitor Overflow clarity for any change	- Investigate plant parameters for any change - Look for any colour change in Feed from washery, mine, M1 and M2 - Floc added to M2 to contain turbidity	- Floc increased to M1 to contain turbidity - Floc added and increased to M2 to contain turbidity - Water from Washery and Underground checked for clarity - Measure turbidity at approx. 100m outbye of LDP1 at rail underpass water-way tunnel for turbidity to record and understand effect near streams/creeks.	STOP the plant - Review strategy with Production Coordinator and E&C Coordinator - Check All 'S' Washery dams for issues in water - Close valves between M3 and M4 - Over-ride Stockpile dam high level alarm to enable Supply pumps to continue pumping and overflow to S4 at REA. - Measure turbidity at approx. 100m outbye of LDP1 at rail underpass water-way tunnel for turbidity to record and understand effect near streams/creeks. - Inform Production and E&C Coordinators of this setup.

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Persons Affected	Action / Response	Action / Response	Action / Response	Action / Response
2. E&C Manager & Surface Superintendent & CHPP Manager	Nil	Nil	- Review M3 turbidity trends and monitor for change in clarity - Measure turbidity at LDP1	- Inform E&C Manager for advice - Continue to monitor at LDP1 at hourly intervals and log - Liaise with CHPP Production Coordinator to continue testing dams and LDP1

Persons Affected	Action / Response	Action / Response	Action / Response	Action / Response
6. CHPP Manager	Nil	Nil	Nil	• Agree on recovery plan. • Monitor situation as required • Liaise with E&C Manager and SNF representative.
E&C Manager	Nil	Nil	Nil	• Inspect site and liaise with CHPP Manager and SNF to determine best course of action. • Contact the EPA if statutory limits have been breached. • Contact General Manager for status updates.

Normal:

Code Green

GO ok

Level 1:

Code Yellow

Small deviation OK to go but note for change

Level 2:

Code Orange

Take caution and prepare to correct but generally OK to proceed

Level 3:

Code Red

Stop and correct

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Appendix K – Baseline data – LDP1, Bargo River Upstream and Bargo River Downstream

Sample Point	Date	Arsenic - Total (mg/L)	Electrical Conductivity (µS/cm)	Nickel - Total (mg/L)	pH (pH Unit)	Total Suspended Solids (mg/L)	Turbidity (NTU)	Zinc - Total (mg/L)	Oil & Grease (mg/L)	As EPL Limi	EC EPL Limi	Ni EPL Limi	Upper EPL	Lower EPL	SS EPL Limi	idity EPL	Zn EPL Limi	Grease EPL
LDP 1 (Main mine	1/03/2010	0.08	1880	0.062	8.28	<1	2	0.033	<5	0.2	2600	0.2	9	6.5	30	150	0.3	10
LDP 1 (Main mine	1/04/2010	0.065	1930	0.065	8.1	2	1	0.047	<5	0.2	2600	0.2	9	6.5	30	150	0.3	10
LDP 1 (Main mine	1/05/2010	0.1	2090	0.083	8.2	6	7.5	0.145	<5	0.2	2600	0.2	9	6.5	30	150	0.3	10
LDP 1 (Main mine	1/06/2010	0.077	1820	0.074	8.6	6	4.4	0.046	<5	0.2	2600	0.2	9	6.5	30	150	0.3	10
LDP 1 (Main mine	1/07/2010	0.067	2030	0.096	8.4	1	1.3	0.071	<5	0.2	2600	0.2	9	6.5	30	150	0.3	10
LDP 1 (Main mine	1/08/2010	0.073	1820	0.076	8.5	18	28.6	0.083	<5	0.2	2600	0.2	9	6.5	30	150	0.3	10
LDP 1 (Main mine	1/09/2010	0.08	1980	0.106	8.5	<1	1.9	0.073	<5	0.2	2600	0.2	9	6.5	30	150	0.3	10
LDP 1 (Main mine	1/10/2010	0.084	1880	0.107	8.4	1	1.3	0.092	<5	0.2	2600	0.2	9	6.5	30	150	0.3	10
LDP 1 (Main mine	1/11/2010		1890		8.4	26			<5	0.2	2600	0.2	9	6.5	30	150	0.3	10
LDP 1 (Main mine	11/11/2010	0.056	1720	0.069	8.3	2	1.6	0.047	<5	0.2	2600	0.2	9	6.5	30	150	0.3	10
LDP 1 (Main mine	8/12/2010	0.152	1720	0.072	8.3	<5	12.8	0.092	<5	0.2	2600	0.2	9	6.5	30	150	0.3	10
LDP 1 (Main mine	17/12/2010	0.111	1670	0.085	8.22	55	49.9	0.08	<5	0.2	2600	0.2	9	6.5	30	150	0.3	10
LDP 1 (Main mine	11/01/2011	0.079	1650	0.172	8.3	10	12.5	0.065	<5	0.2	2600	0.2	9	6.5	30	150	0.3	10
LDP 1 (Main mine	10/02/2011	0.092	2140	0.102	8.2	6	3.5	0.102	<5	0.2	2600	0.2	9	6.5	30	150	0.3	10
LDP 1 (Main mine	6/05/2011	0.048	1690	0.104	8.5	6	7.2	0.102	<5	0.2	2600	0.2	9	6.5	30	150	0.3	10
LDP 1 (Main mine	7/06/2011	0.048	1940	0.12	8.6	12	8	0.096	<5	0.2	2600	0.2	9	6.5	30	150	0.3	10
LDP 1 (Main mine	8/07/2011	0.042	1820	0.108	8.7	<5	3.4	0.135	<5	0.2	2600	0.2	9	6.5	30	150	0.3	10
LDP 1 (Main mine	9/09/2011	0.087	2120	0.088	8.4	8	10.4	0.164	<5	0.2	2600	0.2	9	6.5	30	150	0.3	10
LDP 1 (Main mine	11/11/2011	0.197	2430	0.112	8.3	20	17.4	0.088	<5	0.2	2600	0.2	9	6.5	30	150	0.3	10
LDP 1 (Main mine	9/12/2011	0.199	1890	0.074	8.6	51	41.7	0.079	<5	0.2	2600	0.2	9	6.5	30	150	0.3	10
LDP 1 (Main mine	10/01/2012	0.166	2040	0.092	8.3	10	9.8	0.067	<5	0.2	2600	0.2	9	6.5	30	150	0.3	10
LDP 1 (Main mine	22/02/2012	0.118	1860	0.07	8.4	<5	5.4	0.081	<5	0.2	2600	0.2	9	6.5	30	150	0.3	10
LDP 1 (Main mine	9/03/2012	0.088	1640	0.05	8.5	44	56.1	0.048	<5	0.2	2600	0.2	9	6.5	30	150	0.3	10
LDP 1 (Main mine	11/04/2012	0.106	2420	0.089	8.5	<5	<0.1	0.068	<5	0.2	2600	0.2	9	6.5	30	150	0.3	10
LDP 1 (Main mine	10/05/2012	0.095	1780	0.069	8.3	<5	8.9	0.058	<5	0.2	2600	0.2	9	6.5	30	150	0.3	10
LDP 1 (Main mine	8/06/2012	0.111	1630	0.063	8.8	16	15	0.093	<5	0.2	2600	0.2	9	6.5	30	150	0.3	10
LDP 1 (Main mine	10/07/2012	0.142	1860	0.091	8.6	18	26.1	0.12	<5	0.2	2600	0.2	9	6.5	30	150	0.3	10
LDP 1 (Main mine	8/08/2012	0.124	2190	0.078	8.4	8	8.6	0.122	<5	0.2	2600	0.2	9	6.5	30	150	0.3	10
LDP 1 (Main mine	10/09/2012	0.086	2110	0.062	8.7	18	19	0.034	<5	0.2	2600	0.2	9	6.5	30	150	0.3	10
LDP 1 (Main mine	9/10/2012	0.127	2150	0.084	8.6	8	7.7	0.066	<5	0.2	2600	0.2	9	6.5	30	150	0.3	10
LDP 1 (Main mine	9/11/2012	0.134	1950	0.077	8.5	8	6.5	0.043	<5	0.2	2600	0.2	9	6.5	30	150	0.3	10
LDP 1 (Main mine	10/12/2012	0.073	1860	0.06	8.5	10	8.3	0.087	<5	0.2	2600	0.2	9	6.5	30	150	0.3	10
LDP 1 (Main mine	10/01/2013	0.066	1990	0.106	8.5	5	5	0.174	<5	0.2	2600	0.2	9	6.5	30	150	0.3	10
LDP 1 (Main mine	11/02/2013	0.068	1820	0.081	8.3	15	14.4	0.082	<5	0.2	2600	0.2	9	6.5	30	150	0.3	10
LDP 1 (Main mine	11/03/2013	0.076	1940	0.09	8.4	11	6.1	0.077	<5	0.2	2600	0.2	9	6.5	30	150	0.3	10
LDP 1 (Main mine	7/04/2013	0.05		0.061		20		0.091	<5	0.2	2600	0.2	9	6.5	30	150	0.3	10
LDP 1 (Main mine	10/04/2013	0.074	1940	0.101	8.4	23	22.1	0.114	<5	0.2	2600	0.2	9	6.5	30	150	0.3	10
LDP 1 (Main mine	13/05/2013	0.044	1780	0.041	8.4	8	10.3	0.068	<5	0.2	2600	0.2	9	6.5	30	150	0.3	10
LDP 1 (Main mine	12/06/2013	0.071	1890	0.07	8.8	20	30.8	0.083	<5	0.2	2600	0.2	9	6.5	30	150	0.3	10
LDP 1 (Main mine	11/07/2013	0.055	1820	0.047	8.6	30	22.4	0.08	<5	0.2	2600	0.2	9	6.5	30	150	0.3	10
LDP 1 (Main mine	12/08/2013	0.126	2380	0.087	8.4	10	5.7	0.126	<5	0.2	2600	0.2	9	6.5	30	150	0.3	10
LDP 1 (Main mine	11/09/2013	0.034	1060	0.026	8.5	13	7.7	0.064	<5	0.2	2600	0.2	9	6.5	30	150	0.3	10
LDP 1 (Main mine	10/10/2013	0.123	2550	0.087	8.4	15	9.2	0.096	<5	0.2	2600	0.2	9	6.5	30	150	0.3	10
LDP 1 (Main mine	11/11/2013	0.163	1980	0.0552	8.6	25	44.9	0.141	<5	0.2	2600	0.2	9	6.5	30	150	0.3	10
LDP 1 (Main mine	10/12/2013	0.142	2120	0.071	8.4	26	7.3	0.105	<5	0.2	2600	0.2	9	6.5	30	150	0.3	10
LDP 1 (Main mine	9/01/2014	0.085	1880	0.055	8.7	19	28.6	0.057	<5	0.2	2600	0.2	9	6.5	30	150	0.3	10
LDP 1 (Main mine	5/02/2014	0.141	2390	0.078	8.5	10	5.7	0.065	<5	0.2	2600	0.2	9	6.5	30	150	0.3	10
LDP 1 (Main mine	12/03/2014	0.06	1830	0.084	8.3	12	8	0.095	<5	0.2	2600	0.2	9	6.5	30	150	0.3	10
LDP 1 (Main mine	9/04/2014	0.109	1640	0.06	7.9	14	9.7	0.061	<5	0.2	2600	0.2	9	6.5	30	150	0.3	10
LDP 1 (Main mine	9/05/2014	0.065	1940	0.061	8.5	9	13.2	0.097	<5	0.2	2600	0.2	9	6.5	30	150	0.3	10
LDP 1 (Main mine	11/06/2014	0.068	1970	0.076	8.4	19	20.6	0.073	<5	0.2	2600	0.2	9	6.5	30	150	0.3	10
LDP 1 (Main mine	11/07/2014	0.14	2630	0.1	8.6	43	38.4	0.168	<5	0.2	2600	0.2	9	6.5	30	150	0.3	10
LDP 1 (Main mine	12/08/2014	0.093	2480	0.082	8.5	<5	2.7	0.135	<5	0.2	2600	0.2	9	6.5	30	150	0.3	10
LDP 1 (Main mine	10/09/2014	0.058	1920	0.051	8.5	16	14.2	0.095	<5	0.2	2600	0.2	9	6.5	30	150	0.3	10
LDP 1 (Main mine	10/10/2014	0.09	2400	0.078	8.5	10	16.7	0.086	<5	0.2	2600	0.2	9	6.5	30	150	0.3	10
LDP 1 (Main mine	11/11/2014	0.092	2480	0.106	8.5	<5	8.5	0.12	<5	0.2	2600	0.2	9	6.5	30	150	0.3	10
LDP 1 (Main mine	19/12/2014	0.084	2310	0.077	8.2	14	8.3	0.08	<5	0.2	2600	0.2	9	6.5	30	150	0.3	10
LDP 1 (Main mine	9/01/2015	0.146	2060	0.083	8.4	15	18.9	0.15	<5	0.2	2600	0.2	9	6.5	30	150	0.3	10
LDP 1 (Main mine	6/02/2015	0.116	2160	0.067	8.5	14	5.3	0.059	<5	0.2	2600	0.2	9	6.5	30	150	0.3	10
LDP 1 (Main mine	9/03/2015	0.079	2020	0.055	8.5	12	23.8	0.038	<5	0.2	2600	0.2	9	6.5	30	150	0.3	10
LDP 1 (Main mine	27/04/2015	0.115	2090	0.073	8.4	8	12.3	0.065	<5	0.2	2600	0.2	9	6.5	30	150	0.3	10
LDP 1 (Main mine	13/05/2015	0.075	1990	0.084	8.5	<5	0.7	0.047	<5	0.2	2600	0.2	9	6.5	30	150	0.3	10
LDP 1 (Main mine	5/06/2015	0.031	1910	0.049	8.6	<5	6.4	0.036	<5	0.2	2600	0.2	9	6.5	30	150	0.3	10
LDP 1 (Main mine	8/07/2015	0.057	2150	0.072	8.6	5	3.3	0.087	<5	0.2	2600	0.2	9	6.5	30	150	0.3	10
LDP 1 (Main mine	6/08/2015	0.03	2210	0.083	8.6	10		0.087	<5	0.2	2600	0.2	9	6.5	30	150	0.3	10
LDP 1 (Main mine	1/09/2015	0.04	2110	0.055	8.6	9		0.094	<5	0.2	2600	0.2	9	6.5	30	150	0.3	10
LDP 1 (Main mine	1/10/2015	0.041	2310	0.066	8.6	<5		0.095	<5	0.2	2600	0.2	9	6.5	30	150	0.3	10
LDP 1 (Main mine	1/11/2015	0.087	2340	0.05	8.6	7	4.7	0.073	<5	0.2	2600	0.2	9	6.5	30	150	0.3	10
LDP 1 (Main mine	1/12/2015	0.08	2250	0.049	8.7	<5	4.4	0.071	<5	0.2	2600	0.2	9	6.5	30	150	0.3	10
LDP 1 (Main mine	1/01/2016	0.108	2060	0.05	8.4	12	29.6	0.06	<5	0.2	2600	0.2	9	6.5	30	150	0.3	10

LDP 1 (Main mine	1/02/2016	0.116	2070	0.053	8.6	17		0.052	<5	0.2	2600	0.2	9	6.5	30	150	0.3	10
LDP 1 (Main mine	9/03/2016	0.121	2260	0.062	8.6	10	4	0.05	<5	0.2	2600	0.2	9	6.5	30	150	0.3	10
LDP 1 (Main mine	5/04/2016	0.075	2080	0.067	8.4	<5	9	0.074		0.2	2600	0.2	9	6.5	30	150	0.3	10
LDP 1 (Main mine	9/05/2016	0.118	2140	0.07	8.6	26		0.084	<5	0.2	2600	0.2	9	6.5	30	150	0.3	10
LDP 1 (Main mine	17/06/2016	0.097	2120	0.069	8.3	12	6.4	0.076	<5	0.2	2600	0.2	9	6.5	30	150	0.3	10
LDP 1 (Main mine	8/07/2016	0.049	1780	0.054	8.6	30	33.6	0.092	<5	0.2	2600	0.2	9	6.5	30	150	0.3	10
LDP 1 (Main mine	19/08/2016	0.052	1800	0.052	8.3	15		0.094	<5	0.2	2600	0.2	9	6.5	30	150	0.3	10
LDP 1 (Main mine	7/09/2016	0.049	1800	0.058	8.4	6	6.3	0.093	<5	0.2	2600	0.2	9	6.5	30	150	0.3	10
LDP 1 (Main mine	7/10/2016	0.072	1870	0.055	8.4	<5	2.8	0.046	<5	0.2	2600	0.2	9	6.5	30	150	0.3	10
LDP 1 (Main mine	10/11/2016	0.071	1760	0.066	8.3	<5	8.7	0.059	<5	0.2	2600	0.2	9	6.5	30	150	0.3	10
LDP 1 (Main mine	8/12/2016	0.055	1720	0.055	8.4	7		0.044	<5	0.2	2600	0.2	9	6.5	30	150	0.3	10
LDP 1 (Main mine	10/01/2017	0.096	1950	0.063	8.4	7		0.183	<5	0.2	2600	0.2	9	6.5	30	150	0.3	10
LDP 1 (Main mine	17/02/2017	0.05	1850	0.051	8.4	<5		0.03	<5	0.2	2600	0.2	9	6.5	30	150	0.3	10
LDP 1 (Main mine	9/03/2017	0.068	2100	0.067	8.4	8		0.081	<5	0.2	2600	0.2	9	6.5	30	150	0.3	10
LDP 1 (Main mine	7/04/2017	0.038	1770	0.046	8	12	8.6	0.043	<5	0.2	2600	0.2	9	6.5	30	150	0.3	10
LDP 1 (Main mine	10/05/2017	0.033	1960	0.059	8.6	<5		0.031	<5	0.2	2600	0.2	9	6.5	30	150	0.3	10
LDP 1 (Main mine	6/07/2017	0.037	1940	0.064	8.8	8		0.04	<5	0.2	2600	0.2	9	6.5	30	150	0.3	10
LDP 1 (Main mine	16/07/2017	0.043	2010	0.067	8.3	10		0.058	<5	0.2	2600	0.2	9	6.5	30	150	0.3	10
LDP 1 (Main mine	7/08/2017	0.024	1900	0.05	8.6	<5		0.119	<5	0.2	2600	0.2	9	6.5	30	150	0.3	10
LDP 1 (Main mine	6/09/2017	0.031	2020	0.053	9	<5		0.089	<5	0.2	2600	0.2	9	6.5	30	150	0.3	10
LDP 1 (Main mine	10/10/2017	0.073	1420	0.066	8.6	18		0.101	<5	0.2	2600	0.2	9	6.5	30	150	0.3	10
LDP 1 (Main mine	27/11/2017	0.057	1820	0.06	8.5	<5	2.3	0.05	<5	0.2	2600	0.2	9	6.5	30	150	0.3	10
LDP 1 (Main mine	8/12/2017	0.065	2030	0.062	8.6	<5	3.9	0.06	<5	0.2	2600	0.2	9	6.5	30	150	0.3	10
LDP 1 (Main mine	9/01/2018	0.065	2040	0.069	8.4	30		0.061	<5	0.2	2600	0.2	9	6.5	30	150	0.3	10
LDP 1 (Main mine	8/02/2018	0.088	2230	0.068	8.5	7		0.052	<5	0.2	2600	0.2	9	6.5	30	150	0.3	10
LDP 1 (Main mine	8/03/2018	0.066	2030	0.056	8.6	<5		0.035	<5	0.2	2600	0.2	9	6.5	30	150	0.3	10
LDP 1 (Main mine	9/04/2018	0.051	2000	0.051	8.6	6	0.8	0.044	<5	0.2	2600	0.2	9	6.5	30	150	0.3	10
LDP 1 (Main mine	9/05/2018	0.05	1830	0.051	8.6	<5	2.2	0.068	<5	0.2	2600	0.2	9	6.5	30	150	0.3	10
LDP 1 (Main mine	8/06/2018	0.039	1780	0.047	8.7	7	6.3	0.104	<5	0.2	2600	0.2	9	6.5	30	150	0.3	10
LDP 1 (Main mine	10/07/2018	0.032	2070	0.071	8.7	<5	2.6	0.063	<5	0.2	2600	0.2	9	6.5	30	150	0.3	10
LDP 1 (Main mine	10/08/2018	0.023	1890	0.076	8.6	<5	3.8	0.239	5	0.2	2600	0.2	9	6.5	30	150	0.3	10
LDP 1 (Main mine	4/09/2018	0.01	2040	0.051	8.3	<5	1.8	0.043		0.2	2600	0.2	9	6.5	30	150	0.3	10
LDP 1 (Main mine	2/10/2018	0.015	2180	0.072	8	<5	1.4	0.046		0.2	2600	0.2	9	6.5	30	150	0.3	10
LDP 1 (Main mine	1/11/2018	0.008	2140	0.079	8.3	9	1.4	0.048		0.2	2600	0.2	9	6.5	30	150	0.3	10
LDP 1 (Main mine	5/12/2018	0.008	1800	0.041	8.3	<5	2.1	0.027		0.2	2600	0.2	9	6.5	30	150	0.3	10
LDP 1 (Main mine	23/01/2019	0.026	1880	0.051	8.4	8	5.1	0.054	<5	0.2	2600	0.2	9	6.5	30	150	0.3	10
LDP 1 (Main mine	18/02/2019	0.024	2030	0.058	8.2	20		0.045	<5	0.2	2600	0.2	9	6.5	30	150	0.3	10
LDP 1 (Main mine	13/03/2019	0.03	2060	0.063	8.2	<5	6.6	0.047	<5	0.2	2600	0.2	9	6.5	30	150	0.3	10
LDP 1 (Main mine	12/04/2019	0.025	1990	0.063	8.5	<5	7.3	0.058	<5	0.2	2600	0.2	9	6.5	30	150	0.3	10
LDP 1 (Main mine	1/05/2019	0.032	2070	0.061	8.5	5	10.5	0.037		0.2	2600	0.2	9	6.5	30	150	0.3	10
LDP 1 (Main mine	13/06/2019	0.036	2030	0.063	8.5	20	14	0.08	<5	0.2	2600	0.2	9	6.5	30	150	0.3	10
LDP 1 (Main mine	11/07/2019	0.05	1910	0.064	8.7	<5	7.8	0.094	<5	0.2	2600	0.2	9	6.5	30	150	0.3	10
LDP 1 (Main mine	9/08/2019	0.044	2400	0.073	8.7	<5	3.1	0.059	<5	0.2	2600	0.2	9	6.5	30	150	0.3	10
LDP 1 (Main mine	10/09/2019	0.046	2190	0.066	8.6	<5	3.5	0.046	<5	0.2	2600	0.2	9	6.5	30	150	0.3	10
LDP 1 (Main mine	10/10/2019	0.062	2480	0.07	8.6	<5	1.2	0.049	<5	0.2	2600	0.2	9	6.5	30	150	0.3	10
LDP 1 (Main mine	11/11/2019	0.092	2350	0.074	8.5	10	8	0.045	<5	0.2	2600	0.2	9	6.5	30	150	0.3	10
LDP 1 (Main mine	11/12/2019	0.099	2450	0.071	8.7	9	25.3	0.046	<5	0.2	2600	0.2	9	6.5	30	150	0.3	10
LDP 1 (Main mine	10/01/2020	0.069	2140	0.06	8.6	14	9.4	0.04	<5	0.2	2600	0.2	9	6.5	30	150	0.3	10
LDP 1 (Main mine	25/02/2020	0.064	2030	0.057	8.5	20	19.7	0.039	<5	0.2	2600	0.2	9	6.5	30	150	0.3	10
LDP 1 (Main mine	11/03/2020	0.05	1870	0.046	8.6	18	40.9	0.043	<5	0.2	2600	0.2	9	6.5	30	150	0.3	10
LDP 1 (Main mine	29/04/2020	0.06	2260	0.067	8.4	24	30.4	0.05		0.2	2600	0.2	9	6.5	30	150	0.3	10
LDP 1 (Main mine	7/05/2020	0.03	2120	0.062	8.3	<5	10.3	0.04	<5	0.2	2600	0.2	9	6.5	30	150	0.3	10
LDP 1 (Main mine	5/06/2020	0.073	2280	0.07	8.7	9	7.7	0.066	<5	0.2	2600	0.2	9	6.5	30	150	0.3	10
LDP 1 (Main mine	7/07/2020	0.052	2130	0.049	8.8	13	15.7	0.058	<5	0.2	2600	0.2	9	6.5	30	150	0.3	10
LDP 1 (Main mine	14/08/2020	0.05	1900	0.053	8.8	17	16.9	0.053	<5	0.2	2600	0.2	9	6.5	30	150	0.3	10
LDP 1 (Main mine	7/09/2020	0.064	2130	0.075	8.5	10	12.4	0.064	<5	0.2	2600	0.2	9	6.5	30	150	0.3	10
LDP 1 (Main mine	9/10/2020	0.057	2140	0.066	8.5	19	6	0.062	<5	0.2	2600	0.2	9	6.5	30	150	0.3	10
LDP 1 (Main mine	9/11/2020	0.047	2020	0.058	8.7	17	6.7	0.021	<5	0.2	2600	0.2	9	6.5	30	150	0.3	10
LDP 1 (Main mine	8/12/2020	0.105	2350	0.074	8.6	5	3.9	0.049	<5	0.2	2600	0.2	9	6.5	30	150	0.3	10

Sample Point	Date	Arsenic - Total (mg/L)	Electrical Conductivity (µS/cm)	Nickel - Total (mg/L)	pH Unit (pH Unit)	Total Suspended Solids (mg/L)	Turbidity (NTU)	Zinc - Total (mg/L)	Oil & Grease (mg/L)
Bargo River Upstre:	2/11/2010		1300		8.8	2			<5
Bargo River Upstre:	6/05/2011	<0.001	210	0.002	7	<5	2.7	<0.005	<5
Bargo River Upstre:	7/06/2011	<0.001	236	0.001	7.2	<5	6.4	<0.005	<5
Bargo River Upstre:	8/07/2011	<0.001	269	0.002	7.2	<5	0.5	0.007	<5
Bargo River Upstre:	9/09/2011	<0.001	308	0.002	7.4	5	1.2	<0.005	<5
Bargo River Upstre:	11/11/2011	<0.001	283	0.002	7	8	1.4	0.005	<5
Bargo River Upstre:	9/12/2011	0.002	206	0.002	6.9	<5	9.1	0.009	<5
Bargo River Upstre:	10/01/2012	<0.001	222	0.002	6.7	<5	3.6	<0.005	<5
Bargo River Upstre:	22/02/2012	<0.001	158	<0.001	6.7	<5	10.5	0.005	<5
Bargo River Upstre:	9/03/2012	<0.001	113	0.001	6.6	5	15.3	0.006	<5
Bargo River Upstre:	11/04/2012	<0.001	221	0.002	7.3	<5	8.6	0.006	<5
Bargo River Upstre:	10/05/2012	0.013	748	0.02	8.7	8	3.4	0.019	<5
Bargo River Upstre:	8/06/2012	<0.001	154	<0.001	6.9	<5	4.2	<0.005	<5
Bargo River Upstre:	10/07/2012	<0.001	250	0.002	7.6	<5	6	0.006	<5
Bargo River Upstre:	8/08/2012	<0.001	252	0.002	7.8	<5	3.6	0.006	<5
Bargo River Upstre:	10/09/2012	<0.001	283	0.002	7.1	<5	1.5	0.005	<5
Bargo River Upstre:	9/10/2012	<0.001	257	0.003	7	<5	1.3	0.006	<5
Bargo River Upstre:	9/11/2012	<0.001	254	0.002	6.9	5	1.9	0.002	<5
Bargo River Upstre:	10/12/2012	<0.001	292	0.002	6.7	<5	1.4	<0.005	<5
Bargo River Upstre:	10/01/2013	<0.001	257	0.001	7.1	<5	1.5	0.001	<5
Bargo River Upstre:	11/02/2013	<0.001	182	0.002	6.8	6	4.7	<0.005	<5
Bargo River Upstre:	11/03/2013	<0.001	148	0.002	7.1	<5	2.9	0.005	<5
Bargo River Upstre:	10/04/2013	0.001	181	0.003	7	<5	6.2	<0.005	<5
Bargo River Upstre:	13/05/2013	0.001	227	0.002	6.9	<5	1.1	0.01	<5
Bargo River Upstre:	12/06/2013	<0.001	233	0.002	7.2	<5	2	0.009	<5
Bargo River Upstre:	11/07/2013	<0.001	149	0.001	6.8	<5	5.3	0.026	<5
Bargo River Upstre:	12/08/2013	<0.001	216	0.002	7.2	<5	4.3	0.009	<5
Bargo River Upstre:	11/09/2013	<0.001	226	0.002	6.8	<5	2.3	0.007	<5
Bargo River Upstre:	10/10/2013	<0.001	231	0.002	6.8	<5	0.7	0.006	<5
Bargo River Upstre:	11/11/2013	0.0002	224	0.0014	6.9	<5	2.4	0.005	<5
Bargo River Upstre:	10/12/2013	<0.001	260	<0.001	6.9	<5	1	0.007	<5
Bargo River Upstre:	9/01/2014	<0.001	233	0.002	6.9	<5	2.2	<0.005	<5
Bargo River Upstre:	5/02/2014	<0.001	259	<0.001	7.5	<5	1.5	<0.005	<5
Bargo River Upstre:	12/03/2014	<0.001	241	0.003	7.2	<5	3.3	<0.005	<5
Bargo River Upstre:	9/04/2014	<0.001	147	0.001	7.6	<5	14.1	0.011	<5
Bargo River Upstre:	9/05/2014	<0.001	215	0.002	7.2	<5	4.7	0.006	<5
Bargo River Upstre:	11/06/2014	<0.001	231	0.002	7.2	<5	4.6	0.006	<5
Bargo River Upstre:	11/07/2014	0.002	255	0.002	6.8	<5	1.7	0.007	<5
Bargo River Upstre:	12/08/2014	<0.001	245	0.002	6.6	<5	0.8	0.023	<5
Bargo River Upstre:	10/09/2014	<0.001	154	0.001	7.1	7	4.3	<0.005	<5
Bargo River Upstre:	10/10/2014	<0.001	192	0.001	7.2	<5	2.5	0.006	<5
Bargo River Upstre:	11/11/2014	<0.001	218	<0.001	7.4	<5	2.6	<0.005	<5
Bargo River Upstre:	19/12/2014	0.001	156	0.001	7.2	<5	4.9	<0.005	<5
Bargo River Upstre:	9/01/2015	0.001	137	0.001	7.5	<5	4.5	0.007	<5
Bargo River Upstre:	6/02/2015	<0.001	224	0.002	6.7	<5	8.4	0.009	<5
Bargo River Upstre:	9/03/2015	<0.001	204	0.001	7.4	<5	4.4	0.001	<5
Bargo River Upstre:	24/04/2015	<0.001	121	<0.001	7	<5	23.6	<0.005	<5

Bargo River Upstre:	7/05/2015	<0.001	138	0.001	7.2	<5	6.6	<0.005	<5
Bargo River Upstre:	5/06/2015	<0.001	211	0.001	7.2	<5	5.5	0.008	<5
Bargo River Upstre:	8/07/2015	<0.001	938	0.001	8.8	<5	7.5	<0.005	<5
Bargo River Upstre:	6/08/2015	<0.001	212	0.001	7.2	<5	6	0.006	5
Bargo River Upstre:	4/09/2015	<0.001	130	<0.001	7.7	<5	9.6	<0.005	<5
Bargo River Upstre:	7/10/2015	<0.001	190	0.002	7.3	<5	2.6	<0.005	<5
Bargo River Upstre:	6/11/2015	<0.001	170	<0.001	6.8	<5	4	<0.005	<5
Bargo River Upstre:	9/12/2015	<0.001	195	0.002	7.2	<5	3.2	<0.005	<5
Bargo River Upstre:	8/01/2016	<0.001	220	<0.001	6.7	<5	3.1	<0.005	<5
Bargo River Upstre:	9/02/2016	<0.001	174	<0.001	6.8	6	3.5	<0.005	<5
Bargo River Upstre:	9/03/2016	<0.001	241	0.001	7	11	5.3	<0.005	6
Bargo River Upstre:	8/04/2016	<0.001	222	0.001	6.4	<5	4.5	<0.005	<5
Bargo River Upstre:	9/05/2016	<0.001	248	0.002	6.5	5	1.6	0.006	<5
Bargo River Upstre:	1/06/2016	<0.001	98	0.001	6.5	7	16.5	<0.005	<5
Bargo River Upstre:	1/07/2016	<0.001	177	0.002	7.2	<5	4.5	0.005	<5
Bargo River Upstre:	1/08/2016	<0.001	196	0.002	7	<5	6.1	0.011	<5
Bargo River Upstre:	1/09/2016	<0.001	187	0.002	6.1	<5	4.5	<0.005	<5
Bargo River Upstre:	1/10/2016	<0.001	213	0.002	6.9	<5	3.1	<0.005	<5
Bargo River Upstre:	1/11/2016	<0.001	262	0.004	6.7	<5	5.2	0.01	<5
Bargo River Upstre:	1/12/2016	<0.001	219	0.002	6.7	10	2.4	<0.005	<5
Bargo River Upstre:	1/01/2017	<0.001	240	0.002	7	5	3	<0.005	<5
Bargo River Upstre:	1/02/2017	<0.001	226	0.002	7	7	4.3	0.006	<5
Bargo River Upstre:	1/03/2017	<0.001	241	0.002	7.3	7	3.7	0.008	<5
Bargo River Upstre:	1/04/2017	<0.001	194	0.001	5.8	6	5.5	<0.005	<5
Bargo River Upstre:	1/05/2017	<0.001	205	0.001	7.2	<5	4.8	<0.005	<5
Bargo River Upstre:	1/06/2017	<0.001	210	0.001	6.8	<5	4.2	<0.005	<5
Bargo River Upstre:	1/07/2017	<0.001	217	0.002	6.7	<5	1.3	0.008	<5
Bargo River Upstre:	1/08/2017	<0.001	223	0.003	7	<5	2	0.008	<5
Bargo River Upstre:	1/09/2017	<0.001	236	0.002	6.6	<5	1.6	0.006	<5
Bargo River Upstre:	1/10/2017	<0.001	232	0.002	7.6	<5	1.1	0.006	<5
Bargo River Upstre:	1/11/2017	<0.001	264	0.003	7	<5	2.1	0.008	<5
Bargo River Upstre:	1/12/2017	<0.001	271	0.002	6.9	<5	1.6	<0.005	<5
Bargo River Upstre:	1/01/2018	<0.001	264	0.002	6.3	<5	2.1	<0.005	<5
Bargo River Upstre:	1/02/2018	<0.001	277	0.002	6.6	<5	1.2	<0.005	<5
Bargo River Upstre:	1/03/2018	<0.001	250	0.002	6.8	<5	1.9	<0.005	<5
Bargo River Upstre:	1/04/2018	<0.001	272	0.001	6.9	<5	0.9	<0.005	<5
Bargo River Upstre:	1/05/2018	<0.001	284	<0.001	6.7	<5	1.2	<0.005	<5
Bargo River Upstre:	1/06/2018	<0.001	298	0.002	7	<5	2.1	<0.005	<5
Bargo River Upstre:	1/07/2018	<0.001		0.004		<5	1.5	0.009	<5
Bargo River Upstre:	1/08/2018	<0.001	283	0.005	6.5	<5	1.4	0.016	6
Bargo River Upstre:	1/09/2018	<0.001	279	0.005	6.3	<5	1.4	0.018	<5
Bargo River Upstre:	1/10/2018	<0.001	261	0.004	6.3	<5	0.8	0.01	<5
Bargo River Upstre:	1/11/2018	<0.001	278	0.004	6.3	<5	1.1	0.007	<5
Bargo River Upstre:	1/12/2018	0.006	251	0.04	7.1	<5	1.8	0.059	<5
Bargo River Upstre:	1/01/2019	<0.001	206	0.003	6.9	<5	4.8	<0.005	<5
Bargo River Upstre:	1/02/2019	<0.001	172	0.002	6.6	14	13.5	0.006	<5
Bargo River Upstre:	1/03/2019	<0.001	206	<0.001	6.4	<5	4	<0.005	<5
Bargo River Upstre:	1/04/2019	<0.001	228	<0.001	7.1	<5	6	<0.005	<5

Bargo River Upstre:	1/05/2019	<0.001	219	0.002	7	5	4.8	0.006	<5
Bargo River Upstre:	1/06/2019	<0.001	239	<0.001	6.6	5	0.9	<0.005	<5
Bargo River Upstre:	1/07/2019	<0.001	236	0.002	7.2	<5	0.9	<0.005	<5
Bargo River Upstre:	1/08/2019	<0.001	247	0.002	7.3	<5	0.9	<0.005	<5
Bargo River Upstre:	1/09/2019	<0.001	297	0.002	6.8	<5	0.8	0.057	<5
Bargo River Upstre:	1/10/2019	<0.001	262	0.002	6.9	<5	0.8	<0.005	<5
Bargo River Upstre:	1/11/2019	<0.001	295	0.003	5.9	<5	0.8	0.006	<5
Bargo River Upstre:	1/12/2019	<0.001	398	0.003	6.6	<5	1.2	0.011	12
Bargo River Upstre:	1/01/2020	<0.001	366	0.003	6.7	<5	3	<0.005	<5
Bargo River Upstre:	1/02/2020	<0.001	204	<0.001	6.7	<5	2	0.008	<5
Bargo River Upstre:	1/03/2020	<0.001	173	0.001	6.8	<5	2.5	<0.005	<5
Bargo River Upstre:	1/04/2020	<0.001	231	<0.001	7	<5	6.1	<0.005	<5
Bargo River Upstre:	1/05/2020	<0.001	176	<0.001	6.9	<5	9	<0.005	<5
Bargo River Upstre:	1/06/2020	<0.001	204	<0.001	7.7	<5	2	0.011	<5
Bargo River Upstre:	1/07/2020	<0.001	188	<0.001	7.8	<5	4.9	<0.005	<5
Bargo River Upstre:	1/08/2020	<0.001	194	0.001	6.7	<5	<5	0.018	<5
Bargo River Upstre:	1/09/2020	<0.001	214	<0.001	6.8	<5	2.5	<0.005	<5
Bargo River Upstre:	1/10/2020	<0.001	143	<0.001	7.3	7	5.8	<0.005	<5
Bargo River Upstre:	1/11/2020	<0.001	206	<0.001	7.7	<5	2.3	0.017	<5

Sample Point	Date	Arsenic - Total (mg/L)	Electrical Conductivity (µS/cm)	Nickel - Total (mg/L)	pH Unit (pH Unit)	Total Suspended Solids (mg/L)	Turbidity (NTU)	Zinc - Total (mg/L)	Oil & Grease (mg/L)
Bargo River Downstream	10/03/2010	0.026	1040	0.026	7.71	<1	1.7	0.01	<5
Bargo River Downstream	1/04/2010	0.034	1380	0.037	8.5	3	1.8	0.016	<5
Bargo River Downstream	1/05/2010	0.047	1540	0.051	8.6	1	1.3	0.049	<5
Bargo River Downstream	1/06/2010	0.01	510	0.011	8.6	5	7.2	0.008	<5
Bargo River Downstream	1/07/2010	0.038	1470	0.057	8.8	2	2.7	0.028	<5
Bargo River Downstream	1/08/2010	0.015	730	0.024	8.7	1	4.1	0.015	<5
Bargo River Downstream	1/09/2010	0.018	760	0.026	8.8	3	5.4	0.018	<5
Bargo River Downstream	1/10/2010	0.009	480	0.013	8.5	4	6.3	0.008	<5
Bargo River Downstream	2/11/2010		272		7.2	28			<5
Bargo River Downstream	3/11/2010	0.007	420	0.01	8.3	8	11.5	0.008	<5
Bargo River Downstream	1/12/2010	0.005	230	0.004	7.7	<5	3.7	0.008	<5
Bargo River Downstream	1/01/2011	<0.001	220	0.002	7.6	<5	7.9	<0.005	<5
Bargo River Downstream	1/02/2011	0.032	1280	0.052	8.5	8	1.1	0.023	<5
Bargo River Downstream	6/05/2011	0.02	1120	0.06	8.6	<5	2.2	0.042	<5
Bargo River Downstream	7/06/2011	0.008	624	0.022	8.6	<5	4.8	0.028	<5
Bargo River Downstream	8/07/2011	0.022	1380	0.075	8.8	<5	0.4	0.06	<5
Bargo River Downstream	9/09/2011	0.03	1380	0.063	8.9	<5	1.7	0.082	<5
Bargo River Downstream	11/11/2011	0.063	1550	0.069	8.8	6	1.6	0.053	<5
Bargo River Downstream	9/12/2011	0.075	1080	0.04	8.9	<5	4.8	0.033	<5
Bargo River Downstream	10/01/2012	0.07	1390	0.058	8.7	<5	1.6	0.021	<5
Bargo River Downstream	22/02/2012	0.05	275	0.004	7.8	8	13	0.008	<5
Bargo River Downstream	9/03/2012	<0.001	143	0.002	7.6	8	17.1	0.006	<5
Bargo River Downstream	11/04/2012	0.02	828	0.024	8.7	<5	2.6	0.018	<5
Bargo River Downstream	10/05/2012	<0.001	205	0.002	7.4	<5	5.3	<0.005	<5
Bargo River Downstream	8/06/2012	0.014	415	0.01	8.6	5	11.5	0.015	<5
Bargo River Downstream	10/07/2012	0.045	1150	0.038	8.8	<5	3.8	0.055	<5
Bargo River Downstream	8/08/2012	0.059	996	0.048	8.8	<5	2.7	0.068	<5
Bargo River Downstream	10/09/2012	0.052	1640	0.05	8.9	6	1.7	0.026	<5
Bargo River Downstream	9/10/2012	0.052	1480	0.05	8.9	<5	1.6	0.024	<5
Bargo River Downstream	9/11/2012	0.062	1540	0.059	8.8	<5	1	0.028	<5
Bargo River Downstream	10/12/2012	0.058	1470	0.057	9	<5	1.2	0.039	<5
Bargo River Downstream	10/01/2013	0.051	1300	0.067	8.9	<5	1.1	0.032	<5
Bargo River Downstream	11/02/2013	0.017	679	0.022	8.5	8	5.6	0.011	<5
Bargo River Downstream	11/03/2013	0.007	426	0.012	8.4	<5	3.2	0.013	<5
Bargo River Downstream	10/04/2013	0.026	1030	0.041	8.7	<5	2.5	0.036	<5
Bargo River Downstream	13/05/2013	0.032	1310	0.063	8.7	<5	2	0.043	<5
Bargo River Downstream	12/06/2013	0.037	1340	0.052	8.8	13	9.1	0.054	<5
Bargo River Downstream	11/07/2013	0.01	504	0.011	8.6	<5	6.6	0.017	<5
Bargo River Downstream	12/08/2013	0.033	1210	0.035	9	<5	1.4	0.05	<5
Bargo River Downstream	11/09/2013	0.05	1530	0.053	8.7	<5	2.1	0.05	<5
Bargo River Downstream	10/10/2013	0.064	1710	0.05	8.8	<5	2	0.05	<5
Bargo River Downstream	11/11/2013	0.0972	1660	0.0506	8.9	<5	3.8	0.074	<5
Bargo River Downstream	10/12/2013	0.089	1520	0.042	8.8	14	1.2	0.073	<5
Bargo River Downstream	9/01/2014	0.074	1400	0.047	8.9	<5	2.1	0.03	<5
Bargo River Downstream	5/02/2014	0.074	1620	0.05	8.9	6	1.5	0.042	<5
Bargo River Downstream	12/03/2014	0.034	992	0.04	8.7	<5	6.6	0.036	<5
Bargo River Downstream	9/04/2014	0.005	328	0.006	7.9	<5	15.2	0.013	<5
Bargo River Downstream	9/05/2014	0.024	1080	0.037	8.9	<5	2.6	0.028	<5
Bargo River Downstream	11/06/2014	0.031	1170	0.034	8.9	<5	4.5	0.038	<5

Bargo River Downstream	11/07/2014	0.05	1870	0.061	8.8	<5	1.6	0.094	<5
Bargo River Downstream	12/08/2014	0.041	1630	0.052	8.9	<5	1.2	0.078	<5
Bargo River Downstream	10/09/2014	0.019	721	0.015	8.8	6	4.8	0.024	<5
Bargo River Downstream	10/10/2014	0.034	1200	0.037	9	<5	1.6	0.05	<5
Bargo River Downstream	11/11/2014	0.054	1660	0.052	9	<5	1.6	0.041	<5
Bargo River Downstream	19/12/2014	0.017	762	0.02	8.5	12	4.8	0.015	<5
Bargo River Downstream	9/01/2015	0.026	663	0.021	8.6	7	3.9	0.022	<5
Bargo River Downstream	6/02/2015	0.024	519	0.018	7.2	<5	5.9	0.018	<5
Bargo River Downstream	9/03/2015	0.04	1130	0.027	8.8	<5	3.2	0.018	<5
Bargo River Downstream	24/04/2015	0.003	163	0.003	7.6	22	35.8	0.009	<5
Bargo River Downstream	1/05/2015	0.003	263	0.004	8.3	<5	8.4	<0.005	<5
Bargo River Downstream	1/06/2015	0.024	1170	0.034	8.8	<5	2.7	0.022	<5
Bargo River Downstream	1/07/2015	0.015	209	0.028	7.2	<5	5.5	0.033	<5
Bargo River Downstream	1/08/2015	0.014	864	0.027	8.8	<5	4.6	0.027	<5
Bargo River Downstream	1/09/2015	0.004	279	0.008	8.7	<5	9.7	0.011	<5
Bargo River Downstream	1/10/2015	0.015	1170	0.03	8.8	<5	1.6	0.026	<5
Bargo River Downstream	1/11/2015	0.012	585	0.011	7	<5	8.7	0.013	<5
Bargo River Downstream	1/12/2015	0.04	1440	0.041	9	<5	1.4	0.024	<5
Bargo River Downstream	1/01/2016	0.014	545	0.01	8.3	<5	9.6	0.01	<5
Bargo River Downstream	1/02/2016	0.026	808	0.017	8.5	<5	2.6	0.017	<5
Bargo River Downstream	1/03/2016	0.056	1510	0.035	8.9	16	2.1	0.016	8
Bargo River Downstream	1/04/2016	0.058	1470	0.044	8.8	<5	2.7	0.021	<5
Bargo River Downstream	1/05/2016	0.052	1470	0.045	8.8	10	2.3	0.025	<5
Bargo River Downstream	1/06/2016	0.001	152	0.002	7.4	15	32.4	<0.005	<5
Bargo River Downstream	1/07/2016	0.007	565	0.014	8.3	5	2.8	0.012	<5
Bargo River Downstream	1/08/2016	0.011	754	0.017	8.4	<5	2.4	0.017	<5
Bargo River Downstream	1/09/2016	0.004	354	0.006	7.9	<5	4.4	0.009	<5
Bargo River Downstream	1/10/2016	0.018	901	0.026	8.3	<5	2.4	0.016	<5
Bargo River Downstream	1/11/2016	0.035	1430	0.052	8.5	<5	1.4	0.025	<5
Bargo River Downstream	1/12/2016	0.02	1040	0.027	8.5	13	1.7	0.006	<5
Bargo River Downstream	1/01/2017	0.036	1430	0.047	8.8	<5	1.2	0.011	<5
Bargo River Downstream	1/02/2017	0.036	1460	0.039	8.8	10	5.5	0.018	<5
Bargo River Downstream	1/03/2017	0.012	615	0.014	8.5	6	9.8	0.013	<5
Bargo River Downstream	1/04/2017	0.008	589	0.012	7.8	7	8.6	0.007	<5
Bargo River Downstream	1/05/2017	0.013	1160	0.028	8.7	<5	1.1	0.207	<5
Bargo River Downstream	1/06/2017	0.013	1210	0.03	8.8	<5	1.1	0.012	<5
Bargo River Downstream	1/07/2017	0.011	1240	0.03	8.8	8	1.6	0.016	<5
Bargo River Downstream	1/08/2017	0.013	1180	0.029	8.8	<5	1.3	0.03	<5
Bargo River Downstream	1/09/2017	0.017	1230	0.04	8.7	<5	2.7	0.048	<5
Bargo River Downstream	1/10/2017	0.021	1370	0.045	8.8	<5	1.3	0.029	<5
Bargo River Downstream	1/11/2017	0.022	1250	0.038	8.9	<5	1.5	0.02	<5
Bargo River Downstream	1/12/2017	0.02	1180	0.03	8.8	<5	1.1	0.01	<5
Bargo River Downstream	1/01/2018	0.03	1370	0.042	8.6	5	2.7	0.013	<5
Bargo River Downstream	1/02/2018	0.035	1600	0.049	8.8	5	1.2	0.017	<5
Bargo River Downstream	1/03/2018	0.028	1180	0.029	8.8	<5	1.4	0.008	<5
Bargo River Downstream	1/04/2018	0.037	1530	0.037	8.8	7	1	0.015	<5
Bargo River Downstream	1/05/2018	0.031	1540	0.036	8.8	<5	1.1	0.007	<5
Bargo River Downstream	1/06/2018	0.03	1620	0.037	8.9	<5	1.2	0.016	<5
Bargo River Downstream	1/07/2018	0.021	1460	0.044	8.9	<5	1.3	0.022	<5
Bargo River Downstream	1/08/2018	0.016	1490	0.056	8.8	<5	1.1	0.02	6

Bargo River Downstream	1/09/2018	0.013	1630	0.05	8.8	<5	1.8	0.019	<5
Bargo River Downstream	1/10/2018	0.011	1580	0.051	8.7	<5	1.5	0.014	<5
Bargo River Downstream	1/11/2018	0.016	1580	0.052	8.9	<5	1	0.024	<5
Bargo River Downstream	1/12/2018	0.01	1080	0.024	8.6	<5	1.8	0.009	<5
Bargo River Downstream	1/01/2019	0.014	1060	0.026	8.6	<5	3.6	0.018	<5
Bargo River Downstream	1/02/2019	0.003	314	0.005	7.6	23	25.7	0.008	<5
Bargo River Downstream	1/03/2019	0.013	1170	0.026	8.4	<5	3.3	0.007	<5
Bargo River Downstream	1/04/2019	0.014	1090	0.028	8.7	<5	5.7	0.015	<5
Bargo River Downstream	1/05/2019	0.014	1180	0.034	8.8	12	1.9	0.015	<5
Bargo River Downstream	1/06/2019	0.021	1270	0.03	8.6	8	3.1	0.027	<5
Bargo River Downstream	1/07/2019	0.019	1290	0.038	9	<5	3.1	0.034	<5
Bargo River Downstream	1/08/2019	0.019	1520	0.041	8.8	5	1.8	0.032	<5
Bargo River Downstream	1/09/2019	0.024	1890	0.049	8.9	<5	2.6	0.02	<5
Bargo River Downstream	1/10/2019	0.033	1870	0.047	9	<5	1.9	0.017	<5
Bargo River Downstream	1/11/2019	0.04	1900	0.054	8.8	<5	2.3	0.013	<5
Bargo River Downstream	1/12/2019	0.057	2420	0.062	9	<5	1.7	0.011	<5
Bargo River Downstream	1/01/2020	0.072	2330	0.071	9	6	3.5	0.017	<5
Bargo River Downstream	1/02/2020	0.005	432	0.005	7.8	6	2.2	<0.005	<5
Bargo River Downstream	1/03/2020	0.006	437	0.008	8	<5	5.4	0.01	<5
Bargo River Downstream	1/05/2020	0.017	1020	0.024	8.2	<5	4.2	0.009	<5
Bargo River Downstream	1/06/2020	0.028	1320	0.031	8.6	<5	4.5	0.024	<5
Bargo River Downstream	1/07/2020	0.028	1390	0.025	9	<5	2.6	0.036	<5
Bargo River Downstream	1/08/2020	0.017	741	0.017	8.9	<5	3.9	0.013	<5
Bargo River Downstream	1/09/2020	0.018	973	0.025	8.7	<5	1.8	0.014	<5
Bargo River Downstream	1/10/2020	0.019	1230	0.032	8.6	6	1.6	0.024	<5
Bargo River Downstream	1/11/2020	0.005	390	0.008	8.6	5	4.5	<0.005	<5
Bargo River Downstream	1/12/2020	0.029	1300	0.036	8.8	<5	1.7	0.012	<5