METROPOLITAN COAL

SURFACE FACILITIES WATER MANAGEMENT PLAN






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Revision Status Register

Section/Page/ Annexure	Revision Number	Amendment/Addition	Distribution	DPE Approval Date
All	SFWMP-R01-A	Original	DECCW, NSW Office of Water and DoP	-
All	SFWMP-R01-B	Minor amendments and formatting	DoP	-
All	SFWMP-R01-C	Minor amendments and formatting	DoP	14 April 2011
All	SFWMP-R01-D	Amendments and formatting following submission of the 2014 Annual Review and AEMR/Rehabilitation Report	DP&E	25 August 2015
3.2, 3.3, 4.2, 11	SFWMP-R01-E	Amendments to describe the current water management at Ventilation Shaft No. 3 and minor amendments	EPA, DI Water and DPIE	-
1	SFWMP-R01-F	Minor amendment to Figure 2 to include the Taj Mahal sump	DPIE	26 August 2019
1, 4.1, 74	SFWMP-R01-G	Amendments to the water management system and storage capacities at the Surface Facilities Area.	EPA, DPHI-Water and DPHI	10 November 2026

November 2025

TABLE OF CONTENTS

Section			Page
1	INTRODUCTION		1
	1.1	PURPOSE AND SCOPE	1
	1.2	STRUCTURE OF THE SFWMP	1
2	SFWMP REVIEW AND UPDATE		5
	2.1	DISTRIBUTION REGISTER	5
3	STATUTORY REQUIREMENTS		6
	3.1	EP&A ACT APPROVAL	6
	3.2	LICENCES, PERMITS AND LEASES	8
	3.3	OTHER LEGISLATION	9
4	DESCRIPTION OF SURFACE FACILITIES WATER MANAGEMENT SYSTEM		10
	4.1	MAJOR SURFACE FACILITIES AREA	10
		4.1.1 Simulated Performance of Water Management System	13
	4.2	VENTILATION SHAFT SITES	15
5	BASELINE DATA		17
	5.1	METEOROLOGY	17
	5.2	WATER USE AND LICENSED DISCHARGE	19
	5.3	WATER QUALITY	19
	5.4	MINE WATER MAKE	22
6	WATER MANAGEMENT PERFORMANCE INDICATORS		23
7	MONITORING PROGRAM		24
	7.1	METEOROLOGY	24
	7.2	WATER USE AND LICENSED DISCHARGE	24
	7.3	WATER QUALITY	24
	7.4	MINE WATER MAKE	25
	7.5	OVERALL SYSTEM INTEGRITY	26
	7.6	ASSESSMENT AGAINST PERFORMANCE INDICATORS	26
8	MANAGEMENT MEASURES		28
	8.1	SYSTEM WATER AUDIT	28
	8.2	EROSION CONTROL	28
	8.3	CONTAINMENT AND ISOLATION MEASURES	28
	8.4	LICENSED DISCHARGE TO CAMP GULLY	28
	8.5	SYSTEM INTEGRITY	29

TABLE OF CONTENTS (continued)

9	CONTINGENCY PLAN		29
10	ANNUAL REVIEW AND IMPROVEMENT OF ENVIRONMENTAL PERFORMANCE		30
11	REPORTING		31
	11.1	INCIDENTS	31
	11.2	COMPLAINTS	31
	11.3	NON-COMPLIANCES WITH STATUTORY REQUIREMENTS	32
12	REFERENCES		33

LIST OF TABLES

Table 1	Management Plan Requirements
Table 2	Water Balance Predicted System Inflows and Outflows
Table 3	Existing Meteorological Monitoring Station Locations and Recording Periods
Table 4	Stream Water Quality Monitoring Sites - Camp Gully
Table 5	Statistical Summary of Water Quality Data – Camp Gully
Table 6	Statistical Summary of Water Quality Data – EPL No. 767 Monitoring Point 9
Table 7	Summary of Surface Facilities Water Management Performance Indicators
Table 8	Monitoring of Environmental Consequences against Performance Indicators

LIST OF FIGURES

Figure 1	Project Longwalls 20-27 and Longwalls 301-317 Layout
Figure 2	General Arrangement of the Major Surface Facilities Area
Figure 3	Environmental Management Structure
Figure 4	Major Surface Facilities Area Water Management Schematic
Figure 5	Site Dam Approximate Catchment Areas
Figure 6	Meteorological Sites
Figure 7	Metropolitan Coal's Water Sources and Key Infrastructure
Figure 8	Mine Water Balance - January 2008 to November 2009

1 INTRODUCTION

Metropolitan Coal is a wholly owned subsidiary of Peabody Energy Australia Pty Ltd (Peabody). Metropolitan Coal was granted approval for the Metropolitan Coal Project (the Project) under Section 75J of the New South Wales (NSW) *Environmental Planning and Assessment Act, 1979* (EP&A Act) on 22 June 2009 (the Approval). A copy of the Project Approval is available on the Peabody website (http://www.peabodyenergy.com.au).

The Project comprises continuation, upgrade and extension of underground coal mining operations and surface facilities at Metropolitan Coal. The Approved underground mining Project layout is shown on Figure 1. The extent of the mine's Major Surface Facilities Area is shown on Figure 2.

1.1 PURPOSE AND SCOPE

This Surface Facilities Water Management Plan (SFWMP) has been prepared for the Project in accordance with Condition 15, Schedule 4 of the Project Approval.

The relationship of this SFWMP to the Metropolitan Coal Environmental Management Structure is shown on Figure 3.

This SFWMP has been prepared with input by Gilbert & Associates Pty Ltd and Metropolitan Coal.

1.2 STRUCTURE OF THE SFWMP

The remainder of the SFWMP is structured as follows:

Section 2: Describes the review and update of the SFWMP.

Section 3: Outlines the statutory requirements applicable to the SFWMP.

Section 4: Provides a description of the water management system (major surface facilities area and ventilation shaft sites), including a description of the water balance model of the major surface facilities area water management system and the predicted water balance.

Section 5: Provides the detailed baseline data.

Section 6: Details the performance indicators that will be used to assess the Project.

Section 7: Describes the monitoring program.

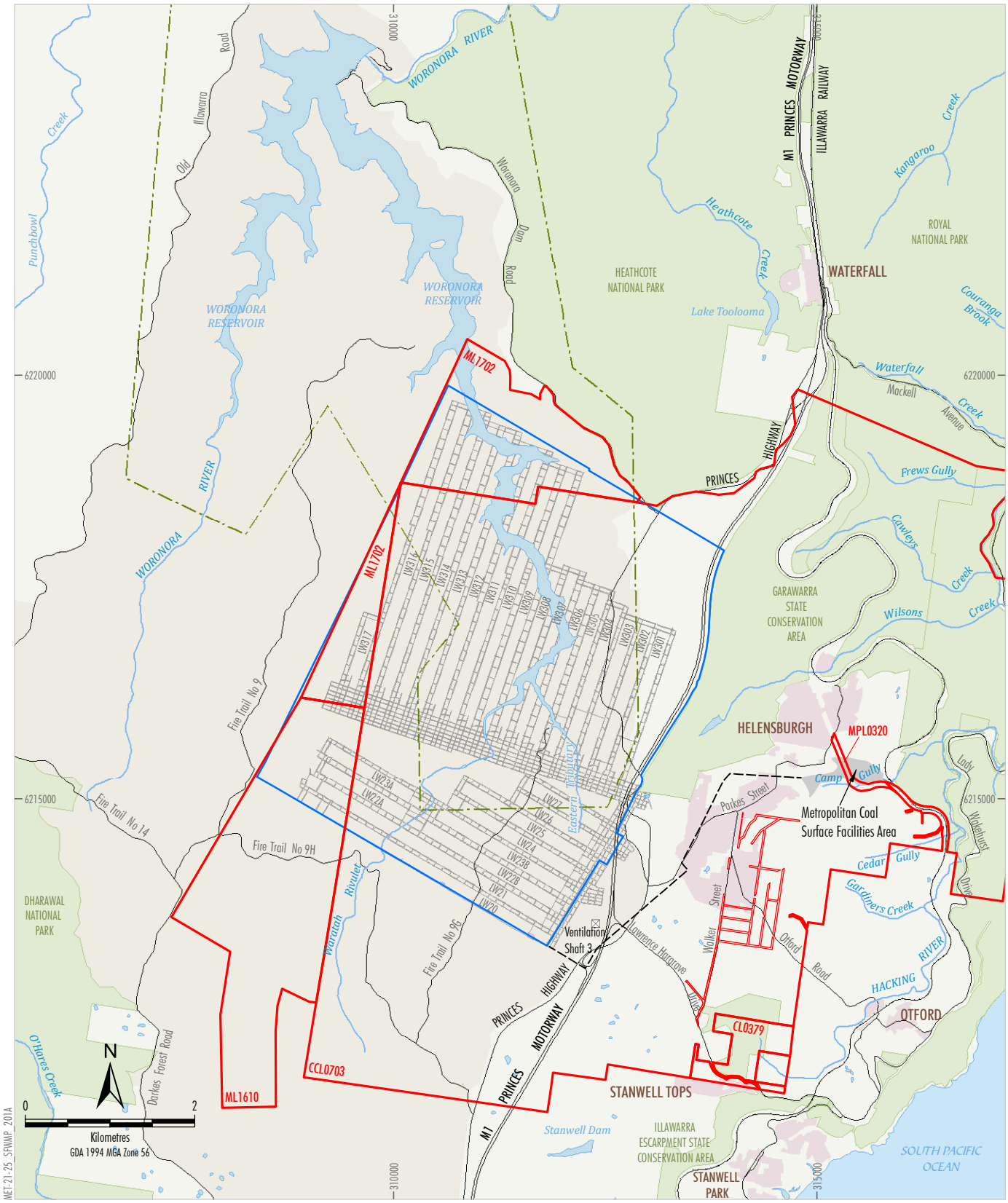
Section 8: Describes the water management measures.

Section 9: Provides a Contingency Plan to manage any unpredicted impacts and their consequences.

Section 10: Describes the annual review and improvement of environmental performance process.

Section 11: Describes the management and reporting of incidents, complaints and non-compliances.

Section 12: Lists the references cited.



LEGEND

- Mining Lease Boundary
- Woronora Special Area
- Railway
- Project Underground Mining Area Longwalls 20-27 and 301-317
- Woronora Notification Area
- Existing Underground Access Drive (Main Drift)

Source: Land and Property Information (2015); Department of Industry (2015); Metropolitan Coal (2020)

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Location of Surface Facilities Area and Underground Mining Area

Figure 1



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LEGEND

Approximate Extent of Major Surface Facilities Area

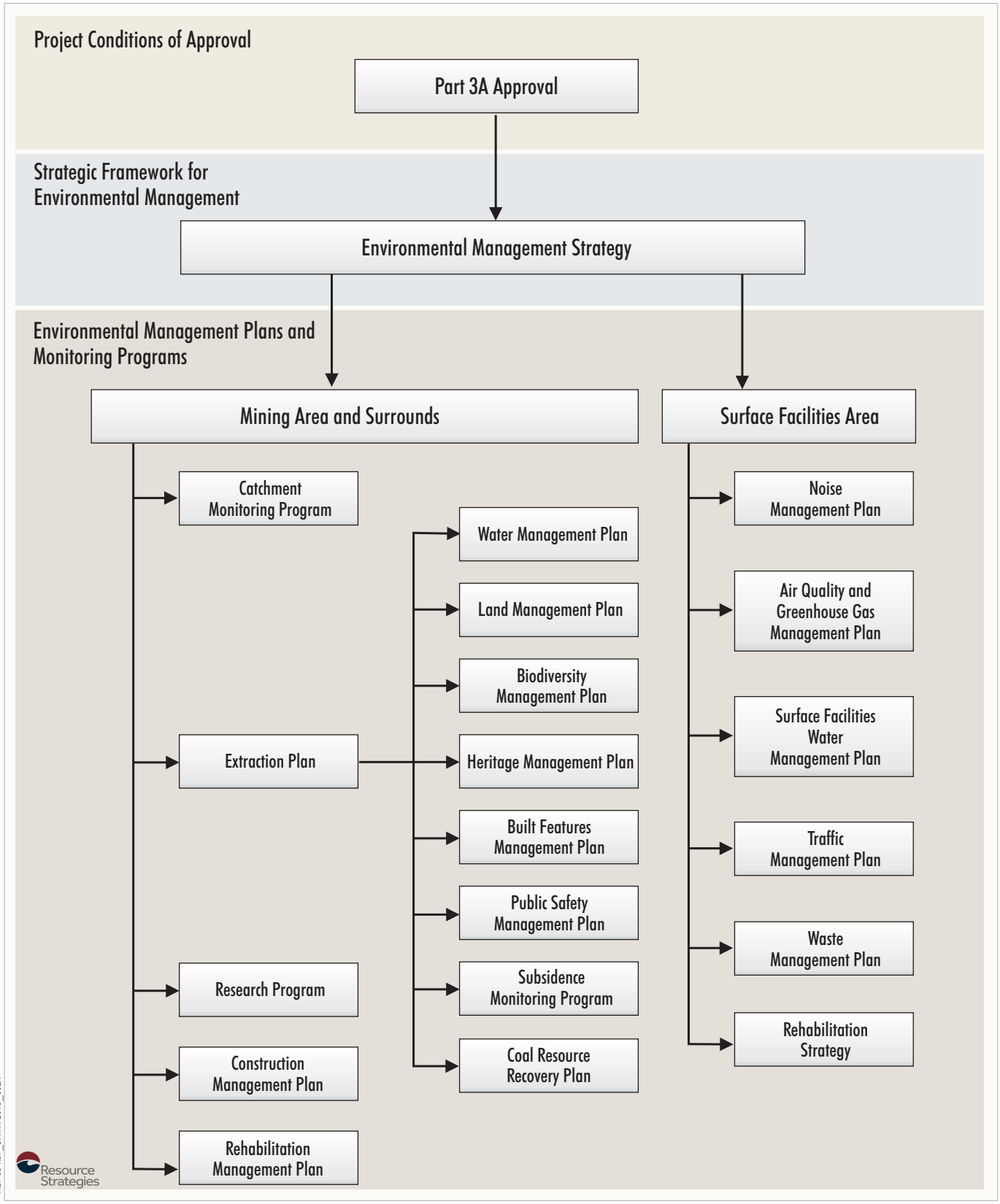
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General Arrangement of the Major Surface Facilities Area

Source: NSW Spatial Services (2020)
Orthophoto: Nearmap (2021)

Figure 2



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Environmental Management Structure

Figure 3

2 SFWMP REVIEW AND UPDATE

In accordance with Condition 4, Schedule 7 of the Project Approval, this SFWMP will be reviewed within three months of the submission of:

- an audit under Condition 8 of Schedule 7;
- an incident report under Condition 6 of Schedule 7; and
- an annual review under Condition 3 of Schedule 7.

if necessary, revised to the satisfaction of the Director-General (now Secretary) of the Department of Planning, Housing and Infrastructure (DPHI), to ensure the SFWMP is updated on a regular basis and to incorporate any recommended measures to improve environmental performance.

As described in the Metropolitan Coal Project Environmental Assessment (Helensburgh Coal Pty Ltd [HCPL], 2008), upgrade and/or extensions to the existing supporting infrastructure systems at the major surface facilities area, including the water management system have been required. Improvements to the water management system will be reported in each Annual Review and the SFWMP will be revised to reflect upgrades in accordance with the Annual Review process.

The SFWMP will also be reviewed within three months of approval of any Project modification and if necessary, revised to the satisfaction of the DPHI. The SFWMP will also be revised to the satisfaction of the DPHI in association with any future construction of the Camp Gully Emplacement.

The revision status of this SFWMP is indicated on the title page of each copy. The distribution register for controlled copies of the SFWMP is described in Section 2.1.

2.1 DISTRIBUTION REGISTER

In accordance with Condition 10, Schedule 7 ‘Access to Information’, Metropolitan Coal will make the SFWMP publicly available on the Peabody website. A hard copy of the SFWMP will also be maintained at the mine site.

Metropolitan Coal recognises that various regulators have different distribution requirements, both in relation to whom documents should be sent and in what format. An Environmental Management Plan and Monitoring Program Distribution Register will be established in consultation with the relevant agencies and infrastructure owners that indicates:

- to whom the Metropolitan Coal plans and programs, such as the SFWMP, will be distributed;
- the format (i.e. electronic or hard copy) of distribution; and
- the format of revision notification.

Metropolitan Coal will make the Distribution Register publicly available on the Peabody website.

Metropolitan Coal is responsible for maintaining the Distribution Register and for ensuring that the notification of revisions is sent by email or post as appropriate.

In addition, Metropolitan Coal employees with local computer network access will be able to view the controlled electronic version of this SFWMP on the Metropolitan Coal local area network. Metropolitan Coal will not be responsible for maintaining uncontrolled copies beyond ensuring the most recent version is maintained on Metropolitan Coal’s computer system and the Peabody website.

3 STATUTORY REQUIREMENTS

Metropolitan Coal's statutory obligations are contained in:

(i) the conditions of the Project Approval;

(ii) relevant licences and permits, including conditions attached to mining leases; and

(iii) other relevant legislation.

These are described below.

3.1 EP&A ACT APPROVAL

Condition 15, Schedule 4 of the Project Approval requires the preparation of a SFWMP for the Project. Approval Condition 15 states:

Surface Facilities Water Management Plan

15. The Proponent shall prepare and implement a Water Management Plan for the surface facilities area and two ventilation shaft sites to the satisfaction of the Director-General. This plan must be prepared in consultation with NOW[1] and OEH[2] by a suitably qualified expert/ whose appointment has been endorsed by the Director-General, and submitted to the Director-General for approval by the end of June 2010. In addition to the standard requirements for management plans (see condition 2 of schedule 7), this plan must:

(a) include a comprehensive water balance for the project; and

(b) ensure that suitable measures are implemented to minimise water use, control erosion, prevent groundwater contamination, and comply with any surface water discharge limits.

Note: The water balance in this plan must be suitably integrated with both the Catchment Monitoring Program and the Water Management Plans that form part of the Extraction Plan.

In addition, Condition 2, Schedule 7 of the Project Approval outlines management plan requirements that are applicable to the preparation of the SFWMP. Table 1 indicates where each component of this condition is addressed within this SFWMP.

[1] The NSW Office of Water (NOW) is now the Department of Industry – Water (DI – Water).
[2] The Office of Environment and Heritage (OEH) is now the Environment Protection Authority (EPA).

Table 1
Management Plan Requirements

Project Approval Condition	SFWMP Section
Condition 2, Schedule 7	
2. The Proponent shall ensure that the management plans required under this approval are prepared in accordance with any relevant guidelines, and include:	
a) detailed baseline data;	Section 5
b) a description of:	
• the relevant statutory requirements (including any relevant approval, licence or lease conditions);	Section 3
• any relevant limits or performance measures/criteria;	Not applicable
• the specific performance indicators that are proposed to be used to judge the performance of, or guide the implementation of, the project or any management measures;	Section 6
c) a description of the measures that would be implemented to comply with the relevant statutory requirements, limits, or performance measures/criteria;	Sections 7, 8 and 9
d) a program to monitor and report on the:	Sections 7, 8 and 9
• impacts and environmental performance of the project;	
• effectiveness of any management measures (see c above);	
e) a contingency plan to manage any unpredicted impacts and their consequences;	Section 9
f) a program to investigate and implement ways to improve the environmental performance of the project over time;	Section 10
g) a protocol for managing and reporting any;	
• incidents;	Section 11
• complaints;	Section 11
• non-compliances with statutory requirements; and	Section 11
• exceedances of the impact assessment criteria and/or performance criteria; and	Not applicable
h) a protocol for periodic review of the plan.	Section 2

3.2 LICENCES, PERMITS AND LEASES

In addition to the Project Approval, all activities at or in association with Metropolitan Coal will be undertaken in accordance with the following licences, permits and leases which have been issued or are pending issue.

- The conditions of mining leases issued by the NSW Division of Resources and Geoscience (DRG), under the NSW *Mining Act, 1992* (e.g. Consolidated Coal Lease [CCL] 703, Mining Lease [ML] 1610, ML 1702, Coal Lease [CL] 379 and Mining Purpose Lease [MPL] 320).
- The conditions of Environment Protection Licence (EPL) No. 767 issued by the NSW Environment Protection Authority (EPA) under the NSW *Protection of the Environment Operations Act, 1997*.
- The prescribed conditions of specific surface access leases within CCL 703 for the installation of surface facilities as required.
- Water Access Licences (WALs) issued by the NSW Department of Primary Industries – Water (now the Department of Industry – Water [DI - Water]) under the NSW *Water Management Act, 2000*, including WAL 36475 under the *Water Sharing Plan for the Greater Metropolitan Region Groundwater Sources 2011* and WAL 25410 under the *Water Sharing Plan for the Greater Metropolitan Region Unregulated River Water Sources 2011.*
- Mining and workplace health and safety related approvals granted by the NSW Resources Regulator and WorkCover NSW.
- Supplementary approvals obtained from WaterNSW for surface activities within the Woronora Special Area (e.g. fire road maintenance activities).

3.3 OTHER LEGISLATION

Metropolitan Coal will conduct the Project consistent with the Project Approval and any other legislation that is applicable to an approved Part 3A Project under the EP&A Act.

The following Acts may be applicable to the conduct of the Project (HCPL, 2008)[3]:

- *Biodiversity Conservation Act, 2016;*
- *Biosecurity Act, 2015;*
- *Contaminated Land Management Act, 1997;*
- *Crown Land Management Act, 2016;*
- *Dams Safety Act, 2015;*
- *Dangerous Goods (Road and Rail Transport) Act, 2008;*
- *Energy and Utilities Administration Act, 1987;*
- *Fisheries Management Act, 1994;*
- *Mining Act, 1992;*
- *Protection of the Environment Operations Act, 1997;*
- *Rail Safety (Adoption of National Law) Act, 2012;*
- *Roads Act, 1993;*
- *Water Act, 1912;*
- *Water Management Act, 2000;*
- *Water NSW Act, 2014;*
- *Work Health and Safety Act, 2011;* and
- *Work Health and Safety (Mines and Petroleum Sites) Act, 2013.*

Relevant licences or approvals required under these Acts will be obtained as required.

[3] The list of potentially applicable Acts has been updated to reflect changes to the Acts that were in force at the time of submission of the Metropolitan Coal Project Environmental Assessment (Project EA) (HCPL, 2008).

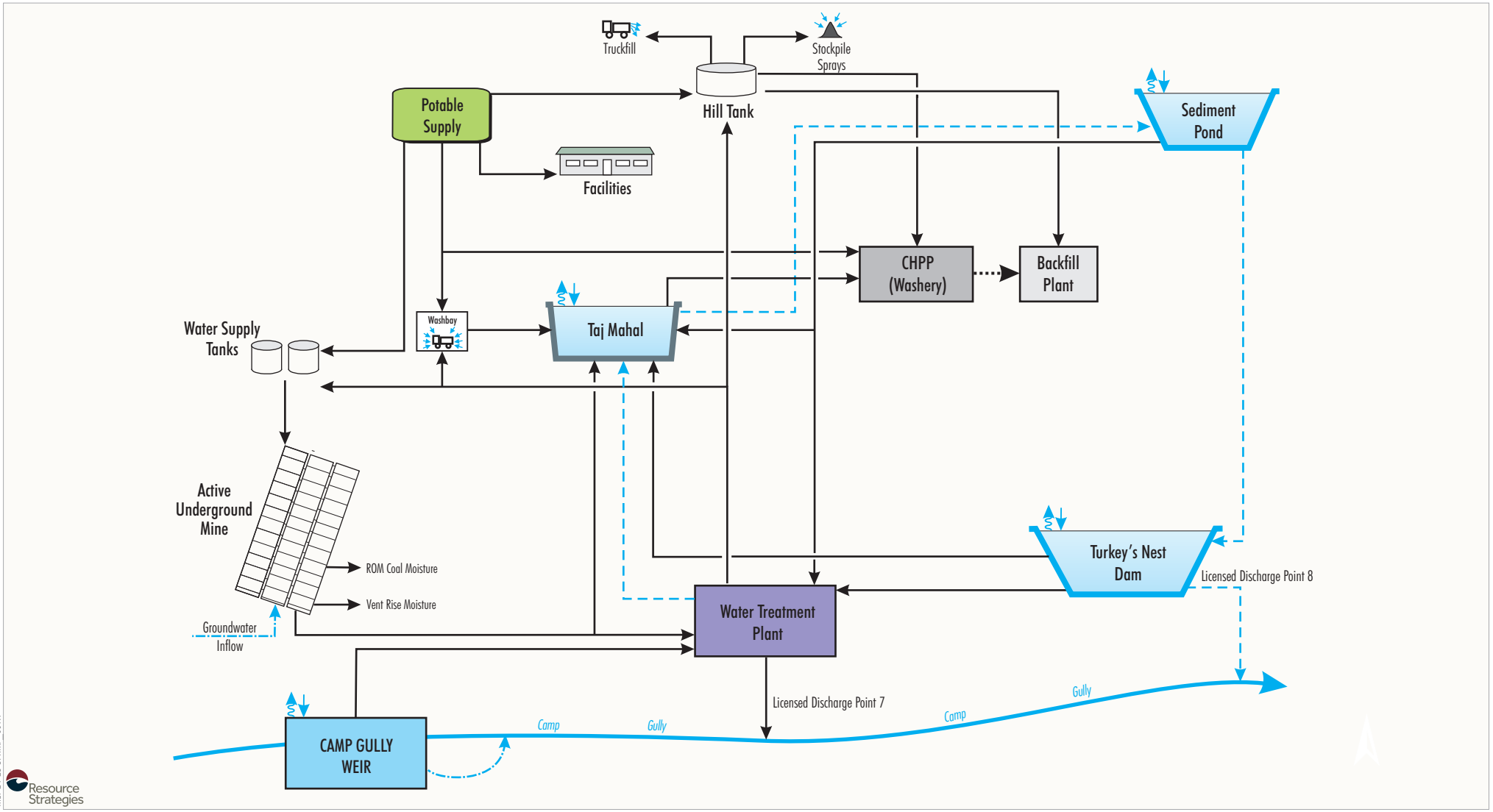
4 DESCRIPTION OF SURFACE FACILITIES WATER MANAGEMENT SYSTEM

4.1 MAJOR SURFACE FACILITIES AREA

The major surface facilities area, including the coal washery and load out facilities, is located in a steep-sided densely vegetated valley adjacent to the town of Helensburgh and next to Camp Gully Creek (Figures 2 and 6). Helensburgh Gully, to which some of the town drains, passes beneath the site via a tunnel and drains into Camp Gully. Runoff from the vast majority of the catchment upslope of the washery, workshop and stockpile areas, including the abandoned Helensburgh railway tunnel is diverted around the north of the site and either into Helensburgh Creek or Camp Gully Creek. Runoff from the administration/bathhouse area (from roofs and paved or grassed areas) drains directly to Camp Gully, while runoff from the washery, workshop and stockpile areas is collected in the site water management system. Water from surrounding catchment and discharged from the surface facilities area is received by Camp Gully Creek which flows into the Hacking River and the Royal National Park.

The site water management system comprises a series of collection dams, sumps and treatment systems. The system is operated to avoid mixing of clean water runoff and mine water, minimise off site release of site runoff and to provide water supply requirements on site. Figure 4 shows a schematic of the major surface facilities water management system, the key features of which are described below.

- An excavated **"Turkey's Nest" dam** at the most downhill (easterly) point of the site. This collects runoff from the product coal stockpile area. Any overflow from the sediment pond (refer below) also reports to the Turkey's Nest dam. Water is pumped from the Turkey's Nest dam to the water treatment plant for subsequent re-use on site and to the Taj Mahal sump (refer below). Overflow from the Turkey's Nest dam (i.e. >160mm over a five day period) flows to Camp Gully Creek at Licenced Discharge Point 8 (LDP8 EPL No.767). The catchment area of the Turkey's Nest dam is estimated at 5.7 hectares (ha), with a design storage capacity of 9.50 megalitres (ML) (Figure 5).
- A **sediment pond** is located on the northern side of the site. This collects runoff from the run-of-mine (ROM) coal stockpile and truck wash areas. Water is pumped from the sediment pond to the water treatment plant and to the Taj Mahal sump (refer below). Any overflow from the sediment pond reports to the Turkey's Nest dam. The catchment area of the sediment pond is estimated at 2.6 ha, with a design storage capacity of 8.2 ML.
- A concrete-lined sump, known as the "**Taj Mahal**" captures runoff from the majority of the washery and workshop areas. The catchment area reporting to the Taj Mahal is estimated to be 2.7 ha, while the sump has a storage capacity of 0.5 ML. The Taj Mahal also receives pumped inflow from the underground mine and drainage from the truckwash facility. Water from the Turkey's Nest dam and sediment pond can also be pumped to the Taj Mahal. Water from the Taj Mahal is used to supply make-up water to the washery tailings thickener. Any overflow from the Taj Mahal flows to the sediment pond.
- A number of small (ie: less than 0.1 ML) **underground storage** areas are used for temporary storage of water accumulating in underground operations prior to pumping to the surface.
- The **Water Treatment Plant** (WTP) processes water pumped from the underground storages, the sediment pond, the Turkey's Nest dam and other sources. The plant comprises a flocculant-dosed thickener and a sand filters to remove solids, acid dosing to adjust pH and a discharge tank. Water from the discharge tank is either pumped as recycled water to the two Water Supply Hill Tanks (thus minimising the use of potable water from the Sydney Water network) or, where necessary to maintain site water storage capacities, released to Camp Gully Creek when pH and Total Suspended Solids are within acceptable criteria to minimise impacts to water quality under discharge licence point 7 (EPL No. 767).



LEGEND

- Pumped Flow
- Gravity Flow
- Seepage
- Coal Rejects
- Evaporation
- Catchment Run-off

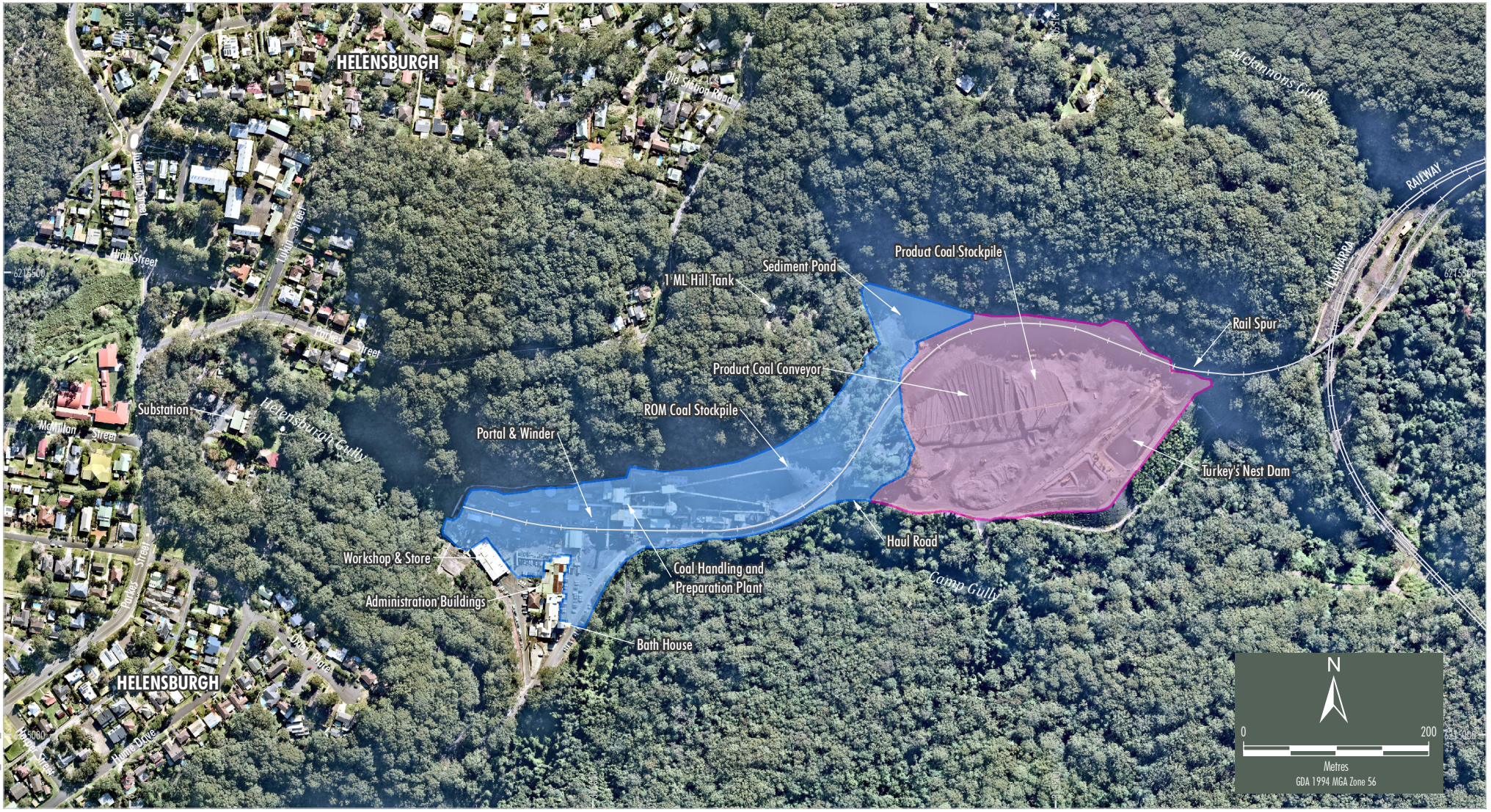
Source: Gilbert & Associates (2015)

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Major Surface Facilities Area
Water Management Schematic

Figure 4



MET-21-25_SFWMP_205A

LEGEND
Sediment Pond Catchment
Turkey's Nest Catchment

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Site Dam Approximately Catchment Areas

Source: NSW Spatial Services (2020), Peabody (2023)
Orthophoto: Nearmap (2021)

Figure 5

- A **concrete weir** exists on **Camp Gully.** Licensed extraction of water is possible via a pump which supplies water to the water treatment plant, only when there is water in the weir (i.e. when Camp Gully is flowing). The catchment area of the weir is estimated at 150 ha.
- The **washery** requires water to make-up losses to water exported with product coal, coarse and fine rejects (tailings), as well as for flocculant dosing and general wash-down. Water is recovered internally within the washery from tailings via a thickener and a belt filter press.
- The **Hill Tanks** with a capacity of 0.5 ML, provides water for the washery, truck fill (road dust suppression), stockpile sprays and to the backfill plant which is used to generate tailings for underground disposal. The Hill Tanks receives supply from the water treatment plant and make-up from town water.
- **Water Supply Tanks** with a capacity of 0.4 ML, supply water to underground mining operations (for underground mining plant cooling and dust suppression). These also receive supply from the Hill Tanks. A dedicated tank is kept filled to provide emergency water supply for firefighting.
- Supply from local **Town Water** which, apart from providing make-up to the tanks and washery, provides direct supply to the bath house/potable water and for truck wash.

The Water Access Licence (WAL25410) provisions for extraction of 130 units per annum in the Southern Sydney Rivers water source, under the greater metropolitan region unregulated river water sources.

The main uses of water on site are to supply underground mining operations and for the coal washery. Water is recycled from underground operations to the Taj Mahal, with some water lost through ventilation. Minimal make-up is produced by mine groundwater inflow as the underground mine is essentially dry.

4.1.1 Simulated Performance of Water Management System

In accordance with Condition 15 (a), Schedule 4 of the Project Approval, a sub-daily time step water balance model of the major surface facilities area water management system has been developed. The model is based on the water management system described in Section 4.1 and shown on Figure 4. The water balance model (for a range of climatic scenarios):

- predicts the water balance for the future life of the Project;
- predicts system controlled release/overflow rates; and
- predicts make-up requirements for predicted future production rates.

The model operates on a less than daily time-step and has been developed to run over a large number of different daily climate "realizations[4]" compiled from the 126 year record of available data. Each realization comprised an 18 year period (2015-2032 inclusive). The realizations were formed by moving along the historical record one year at a time with the first realization comprising the first 18 years in the record. The second realization comprised years 2 to 19 in the record while the third realization comprised years 3 to 20 and so on. At the end of the record, 17 years of data from the start of the record was added from the beginning, so that data at the beginning and end of the record were used in as many realizations as data from the rest of the record. Using this methodology, 126 mine life realizations were simulated and used to generate statistics relating to mine water supply and overflow/controlled release events. This method effectively includes all historical climatic events in the water balance model, including extreme high and low rainfall periods and all the recorded rainfall in between these periods.

[4] 'Realization' is a term used in the water balance model for different climatic periods.

- The groundwater inflow rate to the underground commencing at 0.15 ML/d (consistent with estimates for late 2015, Metropolitan Coal [2015]) and increasing to the final (2032) upper bound value of 1.3 ML/d predicted in Heritage Computing (2009).
- 126 years of rainfall data (1889-2014 inclusive) was obtained for the Bureau of Meteorology (BoM) rain gauge at Helensburgh (Station Number 68028) from the Queensland Department of Science, Information Technology and Innovation's SILO Patched Point Data Set (refer http://www.longpaddock.qld.gov.au/silo/)[5]. A 126 year evaporation data set for the site was also obtained from this source.
- The Australian Water Balance Model (AWBM)[6] was used to simulate runoff from rainfall on the various sub-catchments across the major surface facilities area, with four different sub-catchment types modelled and catchment areas as outlined in Section 4.1.
- Evaporative losses from water storages were estimated on the basis of the above pan evaporation rates multiplied by a pan factor and storage surface areas derived from storage area-volume relationships.
- The following pump rates for pumping of water from given storages:
  - Turkey's Nest : 40 Litres per second (L/s);
  - Sediment Pond: 12 L/s[7];
  - Camp Gully Weir[8]: 16 L/s;
  - Water Treatment Plant: 45 L/s under typical operating conditions;
  - Underground Storages: 16 L/s; and
  - Maximum Town Water supply rate: 54 L/s.
- The following system demands:
  - Washery make-up: 30 L/ROM tonne;
  - Underground demand: 1.0 to 1.2 Megalitres per day (ML/day);
  - Coal stockpile dust suppression demand: 10 L/ROM tonne washed;
  - Truck fill (dust suppression) demand: 144 kL/day;
  - Truck wash: 24 kL/day;
  - Bath house: 27 kL/day; and
  - Backfill Plant: 222 L/tonne of reject.

Table 2 summarises model results in terms of system inflows and outflows. Results are expressed as averages over the 18 year simulated period: averaged over all realizations, the 10th percentile highest values in any 18 year realization and the 10th percentile lowest values in any 18 year realization.

[5] The Patched Point Dataset uses original Bureau of Meteorology measurements for a particular meteorological station, but with interpolated data from surrounding stations used to fill ("patch") any gaps in the observation record.

[6] Boughton W.C. (2004) *The Australian Water Balance Model.* Environmental Modelling & Software, Vol. 19, pp 943-956.

[7] The pumping rate for the sediment ponds has since been upgraded to 35 L/s.

[8] Camp Gully Weir has an annual licensed extraction limit of 130 ML (Licence No. WAL25410).

Table 2
Water Balance Predicted System Inflows and Outflows

	10%ile Lowest Values (ML/yr)	Average Values (ML/yr)	10%ile Highest Values (ML/yr)
Inflows			
Rainfall Capture	85	97	110
From Camp Gully Weir	72	78	85
From Underground	292	292	292
Town Water Supply	105	111	118
*Outflows**			
Turkey's Nest Overflow	0.0	0.8	1.6
Water Treatment Plant Controlled Release	31	37	48
Washery Make-up	87	87	87
Underground Supply	394	394	394
Stockpile Dust Suppression	23.0	23.5	23.7
Road Watering	42.9	43.7	44.2
Paste Plant	92.4	93	93.7
Bath House	9.8	9.8	9.8
Evaporation	4.4	4.6	4.9

* Differences in total outflows when compared to total inflows are due to changes in stored volume in the model.

A copy of the water balance model will be held by Metropolitan Coal personnel and used as a forward planning tool. The water balance model will be upgraded in accordance with planned and actual water management changes and upgrades. It will also be used to assess the effectiveness of planned water management upgrades.

4.2 VENTILATION SHAFT SITES

A ventilation shaft (known as Ventilation Shaft No. 3) and gas drainage plant exists outside the major surface facilities area, located near the Old Princes Highway south-west of Helensburgh (Figure 1). The area drains north to the Eastern Tributary of the Woronora Reservoir. Surface facilities include the ventilation rise itself (enclosed in a building) along with fans, power transformers, two small sheds water tanks, vacuum pumps and a cooling tower. The area around the fans and gas drainage plant are paved and/or gravelled and the power transformers are secured inside buildings and bunded. The remaining area is either grassed (majority) or sheeted with gravel. The area is located near the head of the catchment on a ridge line.

In addition to an existing vegetated stormwater bund downslope of the site the manage runoff, during construction activities associated with the installation of the gas drainage plant, Metropolitan Coal took the opportunity to improve surface water management at the site. This included:

- construction of an upslope diversion drain to prevent water flowing onto the site from the entrance road:
- the use of mulch, logs, vegetation and gravel to stabilise previously disturbed surfaces; and
- the installation of sediment fences where required.

During 2023 Metropolitan further improved facilities at the No. 3 shaft site with the sealing of the access road into the site for all weather access, including asphalt around the main access points into the fan and gas drainage plant compounds. Combined with installing physical barriers to create non trafficable grass areas (asset protection zone) the potential for sediment generation at No.3 shaft is considered low.

Ventilation Shaft No. 3 is inspected weekly to confirm the surface water management controls are operating effectively.

As the Project underground mining operations extend further to the north, extension of the existing ventilation system will be required to maintain a safe working environment within the underground mine. Development will include the installation of a new upcast shaft and associated fan installation (Ventilation Shaft No. 4) adjacent to the main roadways to the west of the M1 Southern Freeway (Figure 1). The SFWMP will be revised to address water management at Ventilation Shaft No. 4 prior to its construction. It is anticipated that surface water management at Ventilation Shaft No. 4 will be similar to the measures currently in place at Ventilation Shaft No. 3.

5 BASELINE DATA

Sections 5.1 to 5.3 describe the baseline data available of relevance to surface facilities water management.

5.1 METEOROLOGY

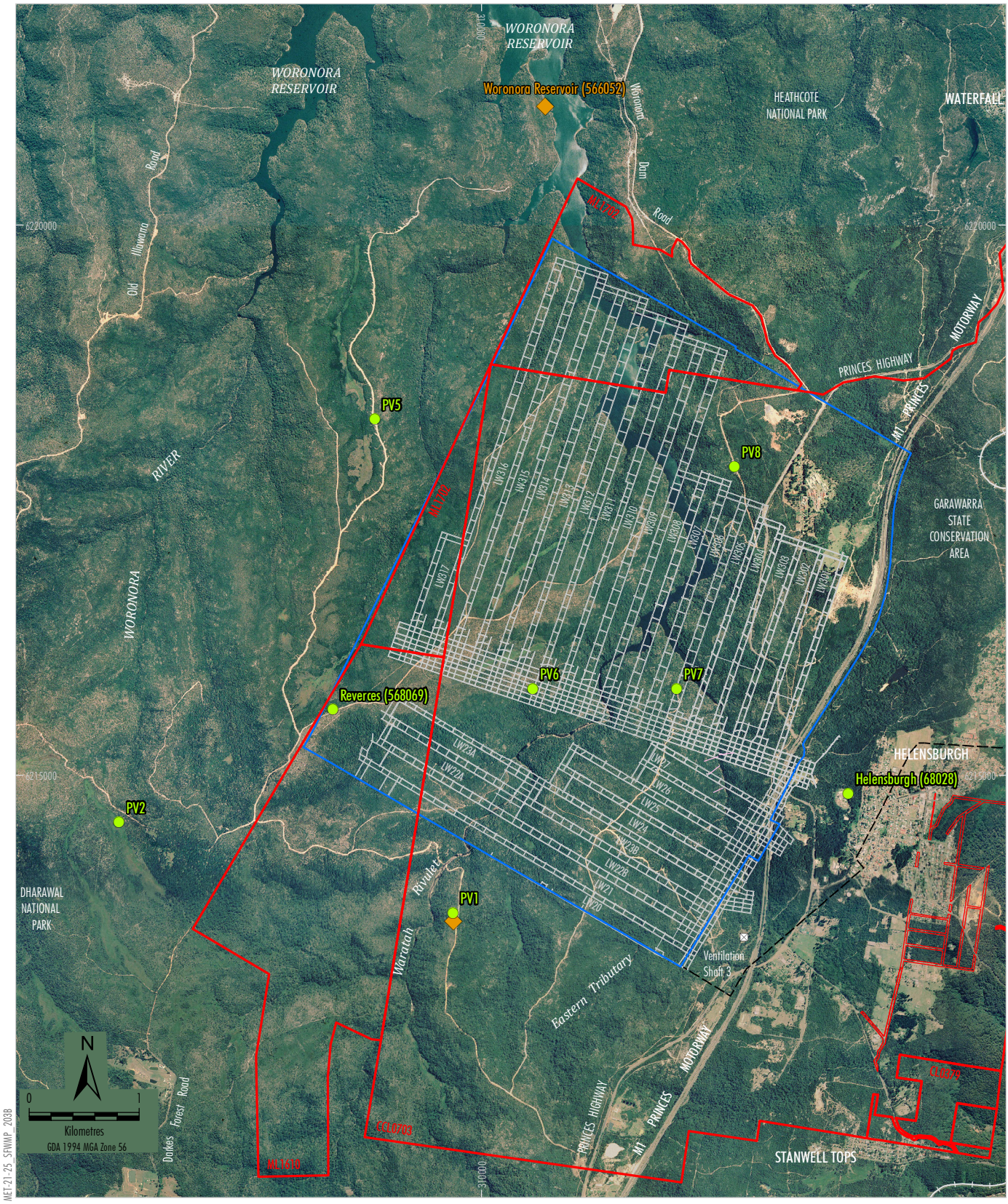
Regional and local meteorological data is available from the BoM weather stations at Lucas Heights (Station Number 66078), Helensburgh (Station Number 68028), Darkes Forest (Station Number 68024), and 'Reverces' (Station Number 568069) (Table 3). Rainfall data is also available from Metropolitan Coal pluviometers situated in the Waratah Rivulet catchment (site PV1) and Woronora River catchment (site PV2) (Figure 6). Evaporation data is available from the discontinued WaterNSW station at the Woronora Dam (Table 3 and Figure 6). On average, the area experiences approximately 1400 mm of rainfall annually, with a record high daily rainfall total of 415 mm occurring on 19 November 1961.

Table 3
Existing Meteorological Monitoring Station Locations and Recording Periods

Station Number	Data Type	Period of Record
Lucas Heights (BoM Station Number 66078)	Evaporation, ground minimum temperature, air maximum temperature, air temperature, dew point, mean sea level pressure, total cloud amount, wind speed, maximum wind gust speed, rainfall and rainfall intensity	1958 to present
Darkes Forest (BoM Station Number 68024)	Rainfall (BoM daily read converted to pluviometer)	1894 to present
Helensburgh (BoM Station Number 68028)	Rainfall (BoM daily read converted to pluviometer)	1889 to 2005
'Reverces' (BoM Station Number 568069)	Rainfall (pluviometer)	2000 to present
Waratah Rivulet (site PV1)	Rainfall (Metropolitan Coal pluviometer)	2006 to present
Woronora River (site PV2)	Rainfall (Metropolitan Coal pluviometer)	2007 to present
Woronora Reservoir (566052)	Evaporation data (WaterNSW station)	from 1976 (discontinued)t

A meteorological station is installed at Robertson Street in Helensburgh, approximately 500 metres west of the major surface facilities area.

Additional pluviometers are installed within the Honeysuckle Creek catchment (site PV5), Waratah Rivulet catchment (site PV6) and Eastern Tributary catchment (site PV7) (Figure 6).



LEGEND

- Mining Lease Boundary
- Railway
- Project Underground Mining Area
  Longwalls 20-27 and 301-317
- Existing Underground Access Drive (Main Drift)
- Evaporimeter
- Pluviometer

Notes:
1. The Bureau of Meteorology pluviometer at Darkes Forest (68024) is not shown. It is located approximately 3.75 km south of the Metropolitan Coal pluviometer (PV2).
2. The Bureau of Meteorology pluviometer at Lucas Heights (66078) is not shown. It is located approximately 12.5 km north of the Metropolitan Coal pluviometer (PV8).

Source: Land and Property Information (2015); Date of Aerial Photography 1998; Department of Industry (2015); Metropolitan Coal (2020)

Peabody

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Meteorological Sites

Figure 6

5.2 WATER USE AND LICENSED DISCHARGE

A database of continuous water usage (monitored via flow meters) is maintained at the major surface facilities area using an electronic system. Water use is recorded hourly. Monitoring of water flows has been conducted at the following sites:

- water pumped from underground storages to surface;
- water pumped from surface tanks to underground operations;
- extraction from Camp Gully Weir;
- discharge from Water Treatment Plant to Camp Gully;
- water pumped from the Turkey's Nest dam;
- water pumped from the Sediment Pond; and
- town water supplied.

5.3 WATER QUALITY

Water quality data has been collected in Camp Gully downstream of the major surface facilities area as part of a Landcare study conducted between 1997 and 2000. Metropolitan Coal has also monitored water quality at four sites on Camp Gully (sites A to D). Water quality is also monitored at the EPL No. 767 monitoring point (Point 9) – the clean water tank at the Water Treatment Plant. The site locations are summarised in Table 4 and are shown on Figure 7.

Table 4
Stream Water Quality Monitoring Sites - Camp Gully

Site Number	Sampling Period	Number of Observations
Landcare Site (LS)	Jan 1997 – Feb 2000	28
A	Dec 2008 – Jul 2009	24
B	Dec 2008 – Jul 2009	13
C	Dec 2008 – Jul 2009	21
D	Dec 2008 – Jul 2009	18
EPL No. 767 Point 9	Jan 2007 - ongoing	39

A statistical summary of the water quality parameters monitored at each of the above sites is provided in Tables 5 and 6.

Table 5
Statistical Summary of Water Quality Data – Camp Gully

Site	Number of Samples	pH (pH Units)				Electrical Conductivity (µS/cm)				Dissolved Oxygen (% Saturation)			
		Min	Max	Mean	Std. Dev	Min	Max	Mean	Std. Dev	Min	Max	Mean	Std. Dev
Landcare Site (LS)	33	6.2	8.3	7.5	0.5	90	360	235	59	75	110	92	8.3
A	24	6.1	8.4	7.8	0.4	29	341	260	79	5.5	106	69	23
B	13	6.6	8.2	7.8	0.4	33	1432	555	382	51	101	76	17
C	21	7.0	8.7	8.2	0.4	129	755	496	166	29	169	83	28
D	18	7.5	8.4	7.9	0.3	24	498	291	98	12	113	78	23

µS/cm = microSiemens per centimetre.

Table 6
Statistical Summary of Water Quality Data – EPL No. 767 Monitoring Point 9

Number of Samples	39				
Parameter	**Minimum**	**Maximum[1]**	**Mean**	**Standard Deviation**	**EPL Limit**
pH (pH Units)	7.1	8.9	8.1	0.4	6.5-8.5
Total Suspended Solids (mg/L)	1	80	6.3	12.6	30
Oil and Grease (mg/L)	<0.1	7	0.4*	1.6	10

* For determination of mean value, results of "<0.1 mg/L" were taken as 0.1 mg/L.
[1] Note, when the quality of water is not within with the EPL discharge limits, water is not discharged to Camp Gully.
mg/L = milligrams per litre.



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LEGEND

- Water Pipeline
- Camp Gully Water Extraction Pipeline
- Licensed Discharge Point
- Water Quality Monitoring
- Volume Monitoring

Source: NSW Spatial Services (2020)
Orthophoto: Nearmap (2021)

METROPOLITAN COAL

Metropolitan Coal's Water Sources and Key Infrastructure

Figure 7

5.4 MINE WATER MAKE

Mine water make (i.e. groundwater that is captured in the underground mine workings) is calculated from the difference between total mine inflows (reticulated water into the mine, moisture in the downcast ventilation and moisture in backfill pumped underground) and mine outflows (reticulated water out of the mine, moisture in the exhaust ventilation, and moisture in the ROM coal).

Given the large fluctuations in daily water usage and the cycle period for water entering the mine and for assessment of environmental performance of the mine, a 20-day average is used by Metropolitan Coal to provide a more reliable estimate of water make. The 20-day average daily mine water make has been below 0.5 ML/day (Figure 8). The increased water make during the period April 2011 to July 2011 was a result of dewatering of old workings in advance of the 200 Mains Panel. From January 2009 to September 2022, the mine water make has averaged 0.09 ML/day[9].

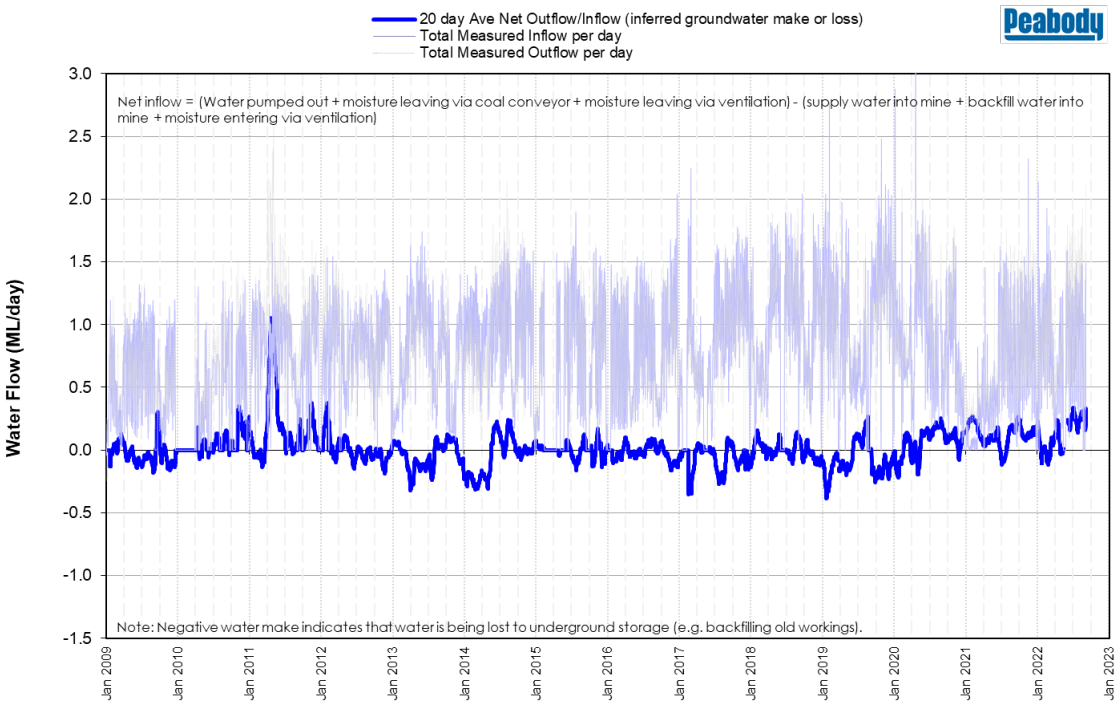


Figure 8 Mine Water Balance - January 2008 to September 2022

[9] Woronora Reservoir Strategy Panel – Stage 1 Report 2017

6 WATER MANAGEMENT PERFORMANCE INDICATORS

Consistent with Condition 2, Schedule 7 and Condition 15, Schedule 4 of the Project Approval, Table 7 outlines the performance indicators that will be used to assess the performance of the SFWMP, and in particular whether suitable measures are in place to:

- minimise water use at the major surface facilities area;
- control erosion;
- prevent groundwater contamination; and
- comply with licensed discharge limits (i.e. EPL No. 767).

Table 7
Summary of Surface Facilities Water Management Performance Indicators

Aspect	Objective	Performance Indicator
Water use.	To minimise the use of potable water (i.e. town water) and maximise the use water recycled from underground and water captured on-site.	The use of potable water (i.e. megalitres of town water used per tonne of coal produced) does not increase over time, after taking into consideration climatic conditions. Potable water has not been used in circumstances where there is a viable alternative.
Erosion control.	To implement measures to effectively control erosion.	Inspections of the major surface facilities area and ventilation shaft(s) indicate the measures implemented are effectively controlling erosion.
Containment of contaminants.	To implement effective isolation and containment systems to prevent contaminants from impacting on groundwater resources.	Effective containment and/or isolation measures are in place for potential contaminants on site.
Licensed discharge.	To comply with the licensed discharge limits for surface water discharges to Camp Gully.	Surface water discharges comply with the requirements of EPL No. 767.
System integrity.	To regularly check that key components of the water management system are operating effectively.	Inspections of system components indicate the integrity of the system is not at risk of being compromised.

Monitoring that will be conducted to assess the performance indicators is described in Section 7.

The monitoring program includes the monitoring of:

- rainfall (Section 7.1);
- water usage and licensed discharge (Section 7.2);
- water quality (Section 7.3);
- mine water make (Section 7.4); and
- overall system integrity (Section 7.5).

7 MONITORING PROGRAM

A monitoring program will be implemented to monitor the performance of the water management system. The monitoring program is described in Sections 7.1 to 7.5 below. Section 7.6 describes the assessment of the monitoring results against the performance indicators.

7.1 METEOROLOGY

Daily rainfall totals and rainfall intensity will be measured at the Metropolitan Coal meteorological station at Robertson Street in Helensburgh. This data will be supplemented by data from nearby Bureau of Meteorology stations or Metropolitan Coal monitoring equipment (Section 5.1) as required.

Collected rainfall data will be used as input to the water balance model.

7.2 WATER USE AND LICENSED DISCHARGE

Installed flow meters at key points in the water management system will monitor the flow rates listed in Section 5.2 via the electronic system and manual (weekly) readings.

Water discharged from the Water Treatment Plant to Camp Gully will be monitored at site 10 (flow meter on the pipeline discharging from the clean water tank in the water treatment plant) in accordance with EPL 767 (Figure 7).

The data will be maintained on a computer spreadsheet or database.

7.3 WATER QUALITY

Surface water quality monitoring will be conducted at the following sites (Figure 7):

- EPL No. 767 LDP 7 (clean water tank of the water treatment plant);
- EPL No. 767 LDP 8 (clean water tank of the water treatment plant);
- Realtime Camp Creek water quality monitoring at EPL monitoring points 18, 19, 20 and 21 and
- Sites A, B, C and D on Camp Gully.

Water quality sampling will be scheduled at monthly intervals at sites A, B, C and D, however this will be flow permitting for the sites on Camp Gully, and if discharge is occurring to Camp Gully from the water treatment plant for the EPL No. 767 monitoring point. More frequent (i.e. event-based) sampling will be conducted at the Camp Gully sites during larger rainfall events (i.e. greater than 25 mm/day).

Water quality parameters for EPL No. 767 monitoring point 9 will include: pH (pH units), metals and total suspended solids (mg/L). Water quality parameters for the Camp Gully sites will include: pH (pH units), electrical conductivity (µS/cm), total suspended solids (mg/L), dissolved oxygen (% Saturation and mg/L) and oxygen reduction potential (mV).

7.4 MINE WATER MAKE

Monitoring of mine water make will comprise:

- Metered water reticulated into the mine (recorded continuously).
- Metered water reticulated out of the mine (recorded continuously).
- Manual measurement of moisture content into and out of the mine through the mine ventilation system using a digital psychrometer. The frequency of readings will be as follows:
  - every hour over a 9-hour period on two occasions during a 12-month period;
  - daily (week day) except public holidays or other circumstances (access, fan maintenance, etc.) that prevent readings to be taken); and
  - once per week as a minimum.
- Measurement of the *in-situ* moisture content of the coal during channel sampling for coal quality.
- Measurement of the moisture content of ROM coal conveyed out of the mine at the drift portal using an automated moisture scanner (recorded continuously).
- Measurement of the moisture content in backfill pumped into the mine, (recorded continuously).

The inferred mine water make (i.e. groundwater that has seeped into the mine through the strata) will be calculated from the difference between total mine inflows (reticulated water into the mine, moisture in the downcast ventilation, and the *in-situ* coal moisture content) and total mine outflows (reticulated water out of the mine, moisture in the exhaust ventilation, and moisture in the ROM coal).

Given the large fluctuations in daily water usage and the cycle period for water entering the mine, being used by machinery and draining to sumps for return pumping to the surface, a 20-day average will be used to provide a more reliable estimate of water make.

The mine water make water balance has been suitably integrated with the Metropolitan Coal Catchment Monitoring Program, the current Metropolitan Coal Water Management Plan and current Extraction Plan.

7.5 OVERALL SYSTEM INTEGRITY

The following items will be visually inspected and reported in accordance with the mine's maintenance system.

- Integrity of all water management system pipelines and pumps for leaks and general serviceability (daily inspection).
- Integrity of all concrete bunded areas (hydrocarbon storages) for integrity and signs of leakage (weekly inspection).
- Integrity of main water storages (i.e. Turkey's Nest, Sediment Pond and Taj Mahal) and status of sediment accumulation (daily inspection).
- Signs of discharge of site runoff to Camp Gully or Helensburgh Gully, other than via licensed discharge points (daily inspection).
- Integrity of upslope diversions at site perimeter (weekly inspection).
- Integrity and effectiveness of erosion control measures (weekly inspection).

The environmental personnel will inspect the site weekly. The Water Treatment Plant will also be checked daily by the site's maintenance personnel.

7.6 ASSESSMENT AGAINST PERFORMANCE INDICATORS

The monitoring results will be used to assess the Project against the performance indicators detailed in Table 8. If data analysis indicates a performance indicator has been exceeded or is likely to be exceeded, management measures will be implemented and Metropolitan Coal will continue to monitor.

Table 8
Monitoring of Environmental Consequences against Performance Indicators

Aspect	Performance Indicator(s)	Monitoring of Environmental Consequences			Relevant Management and Contingency Measures
		Sites	Parameters	Frequency	
Water use.	The use of potable water (i.e. megalitres of town water used per tonne of coal produced) does not increase over time, after taking into consideration climatic conditions. Potable water has not been used in circumstances where there is a viable alternative.	Town water (i.e. potable water).	Monitored flows.	Daily monitoring. Six monthly analysis.	• System water audit. • Implementation of system modifications (e.g. pump sizes, storage capacities).
Erosion control.	Inspections of the major surface facilities area and ventilation shaft(s) indicate the measures implemented are effectively controlling erosion.	Major surface facilities area and ventilation shafts.	Visual inspection of the integrity and effectiveness of existing erosion control measures. Visual inspection for areas requiring the implementation of erosion control measures.	Weekly and opportunistic visual observations conducted during routine activities. Inspections following significant rainfall events (>25 mm/day).	• Maintenance of existing erosion control measures to maintain integrity and effectiveness. • Implementation of additional erosion control measures.
Containment of contaminants.	Effective containment and/or isolation measures are in place for potential contaminants on site.	Major surface facilities area.	Visual inspection of existing containment measures. Visual inspection for areas requiring containment measures.	Weekly.	• Maintenance of existing containment measures to maintain integrity and effectiveness. • Implementation of additional containment measures.
Licensed discharge.	Surface water discharges comply with the requirements of EPL No. 767.	EPL No. 767 Point 9 (clean water tank of the water treatment plant).	• pH. • Metals • Total suspended solids (TSS).	Monthly.	• System water audit. • Review/revision of key infrastructure in the system (e.g. pump sizes, storage capacities). • Implementation of system modifications.
System integrity.	Inspections of system components indicate the integrity of the system is not at risk of being compromised.	Visual check of pumps/pipelines, concrete bunded areas, main water storages for sediment build-up, upslope diversions and discharges off-site.	• Integrity and effectiveness of key water management system components.	As described in Section 7.5.	• Maintenance of existing system components to maintain integrity and effectiveness. • Implementation of additional system components to improve and/or maintain system integrity and effectiveness. • Implementation of system modifications.

8 MANAGEMENT MEASURES

The Project comprises continuation, upgrade and extension of underground coal mining operations and surface facilities at Metropolitan Coal. The actual timing of the implementation of some of the water management measures will be dependent on the timing of mine upgrades and replacement/upgrade of existing water management infrastructure.

Follow-up inspections will be conducted to assess the effectiveness of implemented management measures and the requirement for any additional management measures. Management measures will be reported in the Annual Review (Section 10).

8.1 SYSTEM WATER AUDIT

In the event that the performance indicator for water use is exceeded, a system water audit will be conducted to identify the potential for additional improvements to the re-use of site water. The likely effectiveness of identified potential measures can be assessed by simulation using the water balance model. The implementation of any system modifications (e.g. pump sizes, storage capacities etc.) will continue to be monitored against the performance indicator.

8.2 EROSION CONTROL

Routine inspections will be conducted to check the integrity and effectiveness of erosion control measures at the Major Surface Facilities Area and at the Ventilation Shafts. Particular attention will be paid to perimeter areas and batters of the product coal stockpile area.

If erosion controls are found to be defective, or if there is visible erosion detected that threatens to progress and not self-stabilise, management measures will be implemented as soon as practicable. Erosion controls will be designed in accordance with DECCW (2008) *Managing Urban Stormwater: Soils and Construction Volume 2E Mines and Quarries*.

If areas of erosional instability were to develop on-site, an accredited geotechnical engineer would be engaged to investigate and design stabilisation measures sufficient to re-establish long term stability of the affected area. These works would be implemented by an earthworks contractor with the works being certified by the geotechnical engineer.

8.3 CONTAINMENT AND ISOLATION MEASURES

Routine inspections will be conducted to confirm the existence and suitability of physical control measures designed to contain and/or isolate potential contaminants on site. Where containment measures are identified as not being effective, upgrades or additional controls will be implemented. Examples of controls include improvements to bunding systems and clean-up methods.

8.4 LICENSED DISCHARGE TO CAMP GULLY

Metropolitan Coal will report any exceedances of the licensed discharges to Camp Gully in accordance with EPL No. 767. In the event of an exceedance, an investigation will be conducted to identify the factors contributing to the exceedance. Corrective measures would be identified to rectify the causal factors. Measures may include upgrades and/or operational changes to the water treatment system, increased capacity of containment systems or changes to operational water management procedures. The implementation of any system modifications will continue to be monitored against the performance indicator.

8.5 SYSTEM INTEGRITY

In addition to the measures described in Sections 8.1 to 8.4, a number of additional measures will be implemented as required to maintain the effectiveness and integrity of the water management system. Examples include:

- equipment repair or replacement (e.g. pipelines and pumps);
- control of any leaks;
- servicing of equipment;
- equipment or storage upgrades;
- de-silting of water storages;
- removal of temporarily stockpiled refuse material (waste drums, scrap metal, etc) from site to avoid contamination of runoff off-site; and
- structural improvements to upslope diversions.

A water management infrastructure audit will be conducted annually to identify areas for system improvement and to replace critical infrastructure as required.

9 CONTINGENCY PLAN

In the event the management measures described in Section 8 are not considered to have been effective, Metropolitan Coal will conduct an investigation into the cause of the unpredicted impact and identify and assess potential rectification measures.

Potential rectification measures may include:

- audit of water management system, reviewing system performance in conjunction with water balance model predictions;
- identification of potential system improvements such as upgrade of key infrastructure (pumps, pipelines, storage capacities, diversions);
- implementation of upgrades/modifications to the water management system;
- conduct of review of erosion control measures focussing on causal factors, the reasons for the measures being ineffective and implementation of identified improved or expanded control measures;
- implementation of upgrades/modifications to the contaminant system;
- the conduct of additional monitoring (e.g. increase in monitoring frequency or additional sampling) to inform the proposed contingency measures; and
- review design of treatment system and investigate means of modifying treatment to improve water quality.

10 ANNUAL REVIEW AND IMPROVEMENT OF ENVIRONMENTAL PERFORMANCE

In accordance with Condition 3, Schedule 7 of the Project Approval, Metropolitan Coal will conduct an Annual Review of the environmental performance of the Project by the end of March each year.

The Annual Review will specifically address the environmental performance of the SFWMP and will:

- describe the works carried out in the past year, and the works proposed to be carried out over the next year;
- include a comprehensive review of the monitoring results and complaints records of the Project over the past year, including a comparison of these results against the:
  - relevant statutory requirements, limits or performance measures/criteria;
  - monitoring results of previous years; and
  - relevant predictions in the EA, Preferred Project Report and Extraction Plan;
- identify any non-compliance over the last year, and describe what actions were (or are being) taken to ensure compliance;
- identify any trends in the monitoring data over the life of the Project;
- identify any discrepancies between the predicted and actual performance of the Project, and analyse the potential cause of any significant discrepancies; and
- describe what measures will be implemented over the next year to improve the system environmental performance of the Project.

In addition, Metropolitan maintains a publicly available real time water quality monitoring page which shows water quality in Camp Gully Creek and any discharges through LDP7 and LDP 8.

As described in Section 2, this SFWMP will be reviewed within three months of the submission of an Annual Review, and revised where appropriate.

11 REPORTING

11.1 INCIDENTS

An incident is defined as a set of circumstances that causes or threatens to cause material harm to the environment, and/or breaches or exceeds the limits or performance measures/criteria in the Project Approval.

The reporting of incidents will be conducted in accordance with Condition 6, Schedule 7 of the Project Approval. Metropolitan Coal will notify the Secretary of the DPHI and any other relevant agencies of any incident associated with the Project as soon as practicable after Metropolitan Coal becomes aware of the incident. Within seven days of the date of the incident, Metropolitan Coal will provide the Secretary and any relevant agencies with a detailed report on the incident.

Metropolitan Coal maintains a Pollution Incident Response Management Plan which will be activated in the event of an incident which results in, or may result in, material harm to the environment or people.

Metropolitan also maintains a Coal Discharge Monitoring and Response Plan (CDMRP) which has been developed to facilitate a rapid response to and prompt clean-up of any future incidents involving the unexpected discharge of coal from the premises.

11.2 COMPLAINTS

A protocol for the managing and reporting of complaints has been developed as a component of Metropolitan Coal's Environmental Management Strategy and is described below.

The Environment & Community Superintendent is responsible for maintaining a system for recording complaints.

Metropolitan Coal maintains public signage advertising the telephone number (1800 115 003) on which environmental complaints can be made. The Environment & Community Superintendent is responsible for ensuring that the currency and effectiveness of the service is maintained. Notifications of complaints received are to be provided as quickly as practicable to the Environment & Community Superintendent.

Complaints and enquiries do not have to be received via the telephone line and may be received in any other form. Any complaint or enquiry relating to environmental management or performance is to be relayed to the Environment & Community Superintendent as soon as practicable. All employees are responsible for ensuring the prompt relaying of complaints. All complaints will be recorded in a complaints register.

For each complaint, the following information will be recorded in the complaints register:

- date and time of complaint;
- method by which the complaint was made;
- personal details of the complainant which were provided by the complainant or, if no such details were provided, a note to that effect;
- nature of the complaint;

- the action(s) taken by Metropolitan Coal in relation to the complaint, including any follow-up contact with the complainant; and
- if no action was taken by Metropolitan Coal, the reason why no action was taken.

The Environment & Community Superintendent is responsible for ensuring that all complaints are appropriately investigated, actioned and that information is fed back to the complainant, unless requested to the contrary.

In accordance with Condition 10, Schedule 7 of the Project Approval, the complaints register will be made publicly available on the Peabody website and updated on a monthly basis. A summary of complaints received and actions taken will be presented to the Community Consultative Committee as part of the operational performance review.

11.3 NON-COMPLIANCES WITH STATUTORY REQUIREMENTS

A protocol for the managing and reporting of non-compliances with statutory requirements has been developed as a component of Metropolitan Coal's Environmental Management Strategy and is described below.

Compliance with all approvals, plans and procedures will be the responsibility of all personnel (staff and contractors) employed on or in association with Metropolitan Coal, and will be developed through promotion of Metropolitan Coal ownership under the direction of the General Manager.

The Manager – Technical Services and/or Environment & Community Superintendent will undertake regular inspections, internal audits and initiate directions identifying any remediation/rectification work required, and areas of actual or potential non-compliance.

As described in Section 11.1, Metropolitan Coal will notify the Secretary of the DPHI and any other relevant agencies of any incident associated with Metropolitan Coal as soon as practicable after Metropolitan Coal becomes aware of the incident. Within seven days of the date of the incident, Metropolitan Coal will provide the Secretary of the DPHI and any relevant agencies with a detailed report on the incident.

A review of Metropolitan Coal's compliance with all conditions of the Project Approval, mining leases and all other approvals and licences will be undertaken prior to (and included within) each Annual Review. The Annual Review will be made publicly available on the Peabody website.

Additionally, in accordance with Condition 8, Schedule 7 of the Project Approval, an independent environmental audit was undertaken by the end of December 2011, and is undertaken a minimum of once every three years thereafter. A copy of the audit report will be submitted to the Secretary of the DPHI and made publicly available on the Peabody website. The independent audit will be undertaken by an appropriately qualified, experienced and independent team of experts whose appointment has been endorsed by the Secretary of the DPHI.

12 REFERENCES

Helensburgh Coal Pty Ltd (2008) *Metropolitan Coal Project Environmental Assessment.*

Heritage Computing (2009) *Metropolitan Coal Project Groundwater Assessment: Recalibration of Metropolitan Colliery Groundwater Model Using MODFLOW-SURFACT*. Report HC 2009/6 for Helensburgh Coal Ltd, 22p.

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