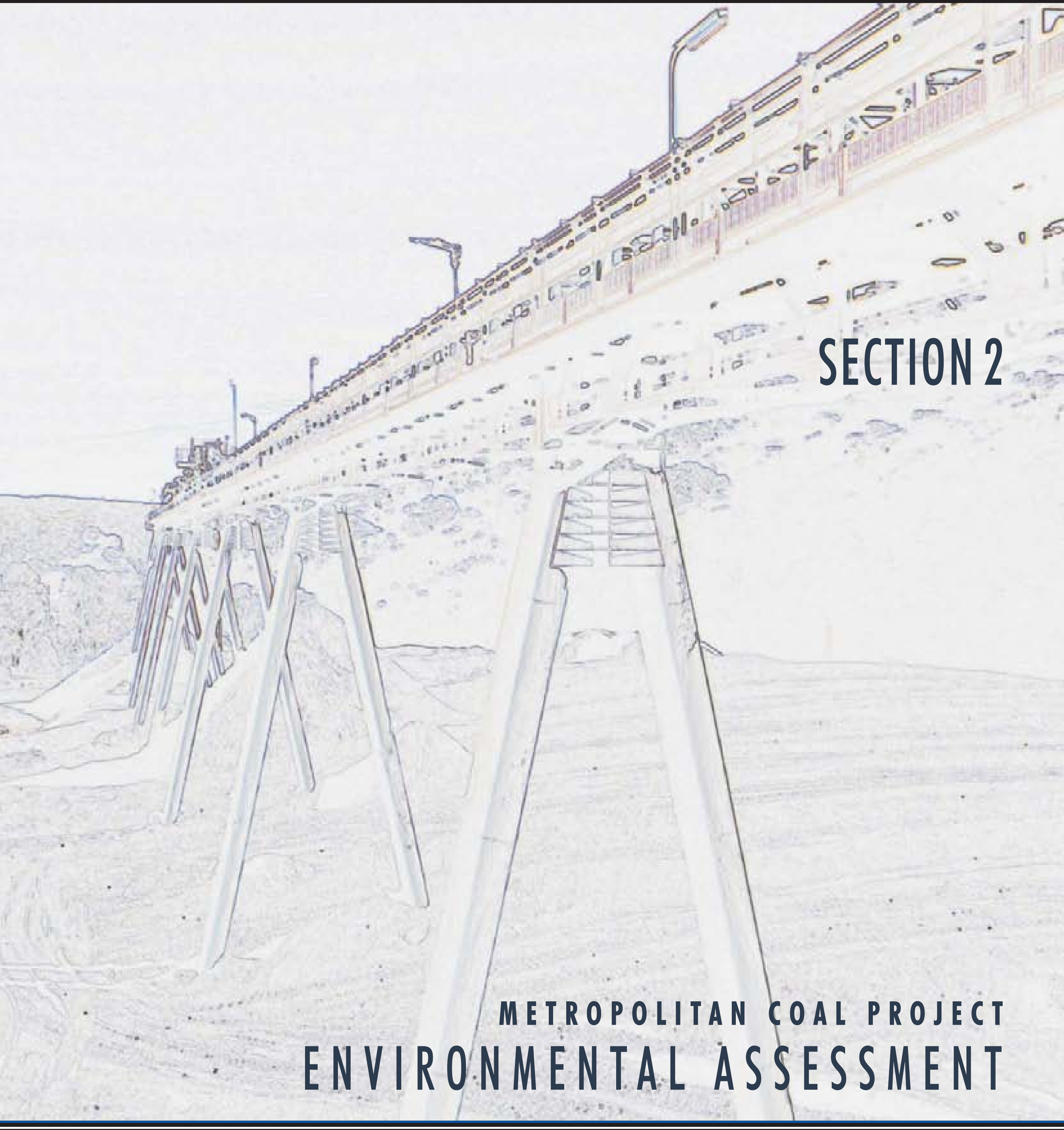

SECTION 2

METROPOLITAN COAL PROJECT

ENVIRONMENTAL ASSESSMENT

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2 PROJECT DESCRIPTION

2.1 OVERVIEW OF THE EXISTING METROPOLITAN COLLIERY

The operations at the Current Underground Mining Area are supported by the existing Metropolitan Colliery Major Surface Facilities Area which is situated off Parkes Street in Helensburgh (Figure1-3) and other supporting infrastructure. The relative locations of the Completed, Current and Project Underground Mining Areas are shown on Figure 2-1.

2.1.1 Underground Mining Operations

Conventional longwall coal mining methods are employed at the Metropolitan Colliery. Longwall panels are developed to create a void width of some 163 m (including gate roads). ROM coal extracted by the longwall miner is conveyed by the maingate conveyor to the main conveyor which transports the coal to the surface. The existing longwall miner and associated ROM coal conveyor systems operate at up to 1,200 tph and 650 tph, respectively.

Further description of the longwall mining method and ROM coal handling is provided in Section 2.5.2.

2.1.2 Major Surface Facilities Area and Supporting Infrastructure

The existing Metropolitan Colliery Major Surface Facilities Area is located off Parkes Street in Helensburgh (Figure 2-2). The complex includes administration, workshops, storerooms and the CHPP. Other surface facilities located outside of the existing Metropolitan Colliery Major Surface Facilities Area include an electrical switchyard and fan installations located at Ventilation Shaft No. 3, which is located to the west of the F6 Southern Freeway (Figure 1-2).

2.1.3 Coal Reclaim and Preparation

ROM coal is reclaimed, crushed, screened and washed at the CHPP. The CHPP has a washing capacity of approximately 400 tph of ROM coal. The CHPP comprises a range of components including crushers, screens, dense medium cyclones, flotation cells, separators, filters and thickeners to process the coal and separate coal reject materials.

The CHPP currently produces up to approximately 1.5 Mtpa of coking product coal. Once washed, product coal is conveyed to the 180,000 tonnes (t) product coal stockpile located adjacent to the rail spur to the east of the CHPP (Figure 2-2).

Coal reject is produced in two streams at the CHPP (coarse and fine rejects) and is stockpiled prior to being transported to Glenlee Washery by truck for emplacement (Section 2.1.6).

2.1.4 Product Coal Rail Transport

The majority of product coal (approximately 90%) is currently railed by train to the Port Kembla Coal Terminal (Figure 1-1) for transport to domestic and overseas customers. Train loading is conducted on a daily basis by front end loader (FEL) at the Metropolitan Colliery and is generally undertaken at the scheduled times of 5.00 am, 11.00 am and 7.00 pm.

2.1.5 Product Coal Road Transport

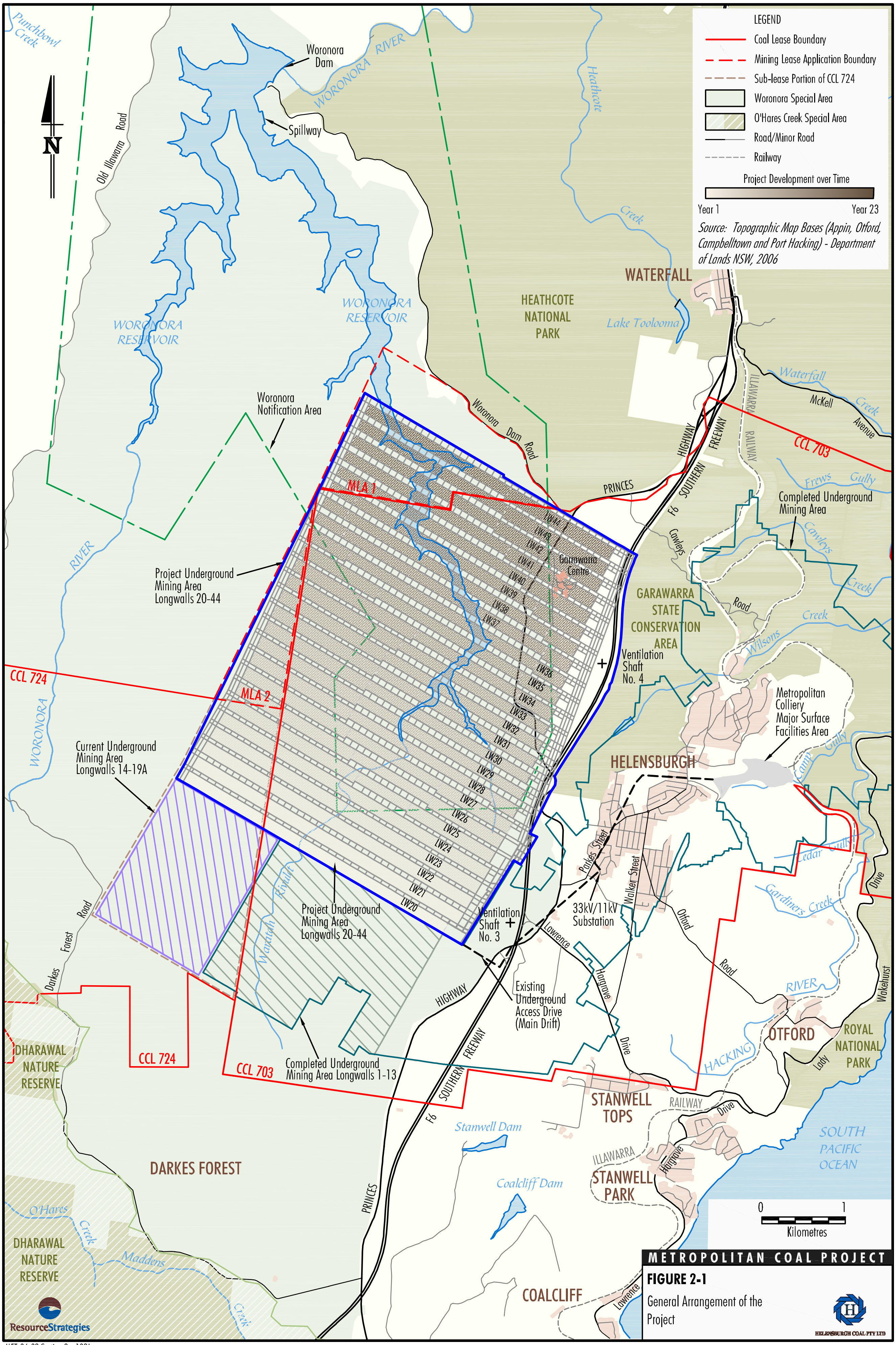
Up to 120,000 tonnes per annum (tpa) of product coal is currently transported by truck to the Corrimal and Coalcliff Coke Works (Figure 1-1). Product coal transport trucks generally operate between the hours of 7.00 am and 5.00 pm, five days per week.

The transport routes from the Metropolitan Colliery to the Corrimal and Coalcliff Coke Works are shown on Figure 1-1. Trucking of product coal to the Corrimal and Coalcliff Coke Works is undertaken by an independent transport contractor.

2.1.6 Coal Reject Management

A target of 15% of the ROM coal processed in the CHPP is separated to the coal reject streams. Coarse and fine coal reject from the CHPP is currently stockpiled temporarily prior to being transported by road to the Glenlee Washery (Figure 1-1). No coal reject is currently emplaced at the existing Metropolitan Colliery Major Surface Facilities Area, however HCPL currently holds an existing development consent granted by WCC for development of a Coal Reject Emplacement in Camp Gully (Section 2.8.5).

Trucking of coal reject is undertaken by an independent transport contractor from the Metropolitan Colliery to the Glenlee Washery along the road transport route shown on Figure 1-1.



METROPOLITAN COAL PROJECT

FIGURE 2-1

General Arrangement of the Project

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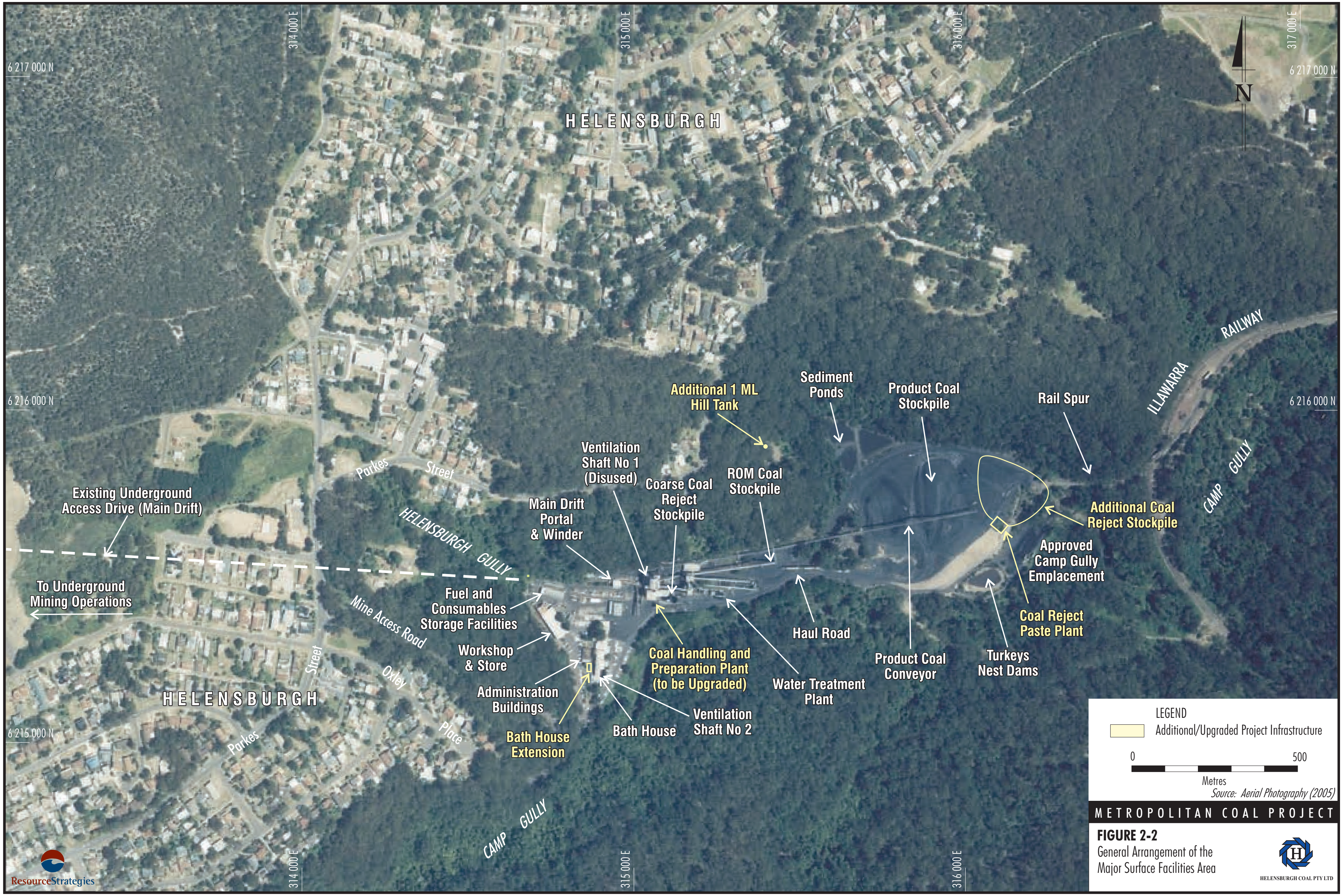


FIGURE 2-2
General Arrangement of the Major Surface Facilities Area

Emplacement and management of coal reject at the Glenlee Washery is undertaken in accordance with separate environmental approvals by SADA.

2.1.7 Electricity Supply and Distribution

Electricity to the Metropolitan Colliery is supplied via a 33 kilovolt (kV)/11 kV substation located south-west of Helensburgh (Figure 2-1). Electricity from the substation is reticulated to Ventilation Shaft No. 3 and the existing Metropolitan Colliery Major Surface Facilities Area by 11 kV overhead powerlines.

At the existing Metropolitan Colliery Major Surface Facilities Areas, the 11 kV supply is stepped down to suitable voltages for the CHPP, winder, conveyors and general electricity supply via a series of transformers.

The 11 kV supply is stepped down at Ventilation Shaft No. 3 via transformer for the ventilation fan supply (6.6 kV) and to supply the electrical demand of the underground mine operations via 6.6 kV cables down surface-to-seam boreholes. Underground electricity supply is generally stepped down to 3,300 volts (V) for machinery at the longwall face and 1,000 V for other mining activities.

2.1.8 Equipment Transport and Workforce Access to the Underground

In order to transfer major mobile or fixed equipment to the underground, the equipment is disassembled into component parts at the existing Metropolitan Colliery Major Surface Facilities Areas and transported underground via the dolly rail winder system in the main drift. The equipment is then re-assembled at a workshop underground or at the installation point.

Workforce access to the underground is obtained via the Koepe winder system which operates in Ventilation Shaft No. 2, located at the existing Metropolitan Colliery Major Surface Facilities Area (Figure 2-2). The winder provides direct access to the underground workings.

Workforce access to the underground is also available using cars on the man and materials winder system located at the main drift portal (Figure 2-2).

2.1.9 Historical Mining Areas

Mining at the Metropolitan Colliery commenced in the 1880s (Appendix I), after the Bulli Seam was identified during exploration in 1884. Prior to the commencement of longwall mining in 1995, bord and pillar underground mining methods were primarily employed at the Metropolitan Colliery. The history of the Metropolitan Colliery is further discussed in Section 2.1 of the Non-Aboriginal Heritage Assessment (Appendix I).

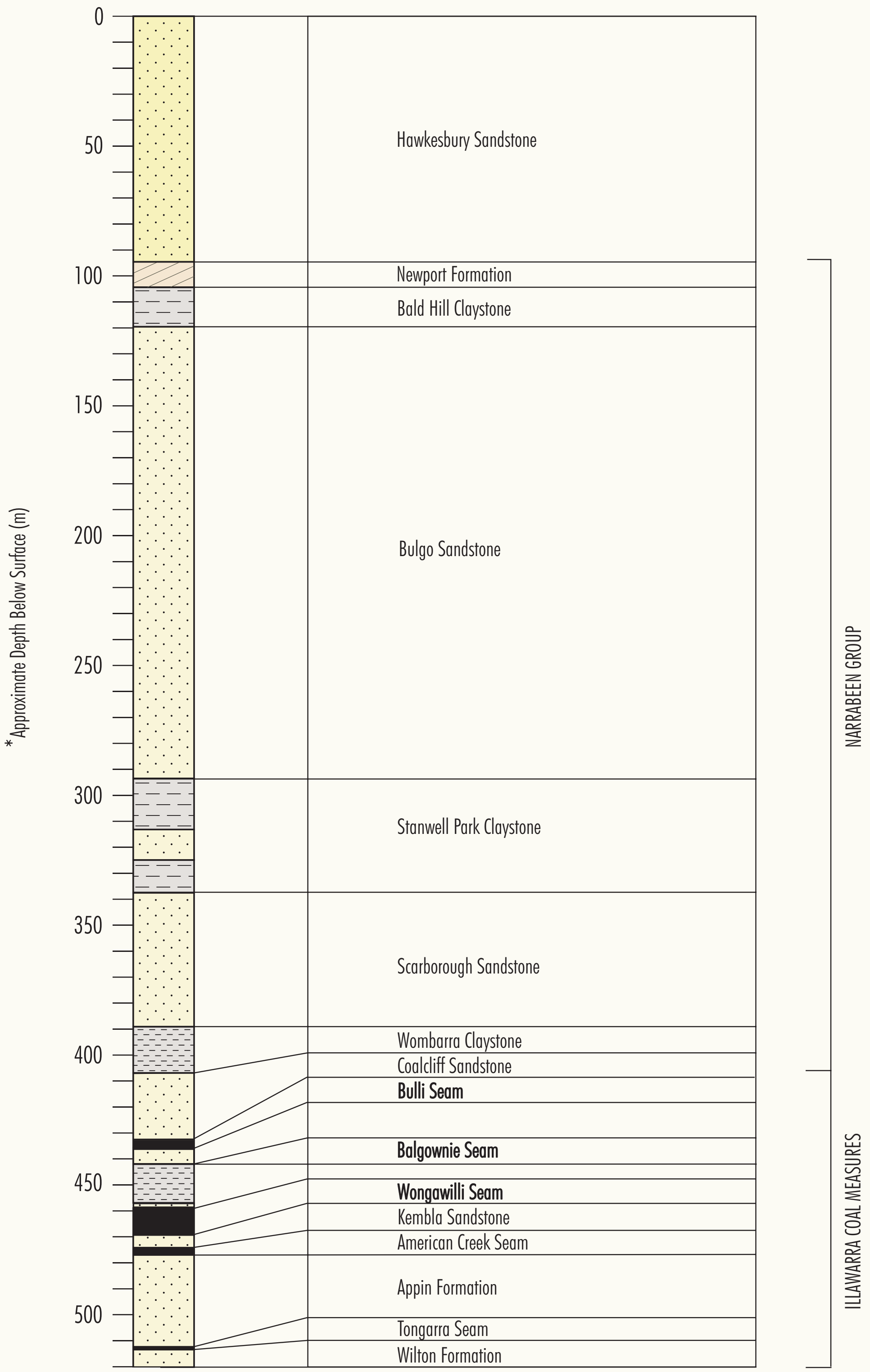
The Completed Underground Mining Area at the Metropolitan Colliery is shown on Figure 2-1 and includes a large area underlying the township of Helensburgh and surrounds. Access into these historical underground mining areas is generally restricted due to safety constraints and the presence of groundwater accumulated in sections of the old workings.

2.2 COAL RESOURCE AND MAJOR GEOLOGICAL FEATURES

The Metropolitan Colliery is located in the NSW Southern Coalfield. The economic coal seams in the Southern Coalfield are located within the Illawarra Coal Measures. The Illawarra Coal Measures comprise a sequence of interbedded sandstone, siltstone, claystone and coal with minor tuff, conglomerate and intrusions (NSW Department of Mineral Resources [DMR], 2000).

Three formally named coal seams of the Illawarra Coal Measures are present in the Southern Coalfield, namely the Bulli, Balgownie and Wongawilli Seams. Of these coal seams, only the Bulli Seam is presently considered to be of economic significance at the Metropolitan Colliery. Figure 2-3 provides a stratigraphic section showing the relative position of the Bulli, Balgownie and Wongawilli Seams.

The Project would involve the extension of existing underground mining operations in the Bulli Seam to north of the Current Underground Mining Area and the Completed Underground Mining Area to recover a coal reserve of approximately 63 million tonnes (Mt) of ROM coal from proposed Longwalls 20 to 44 (Figure 2-1).



After: MSEC (2007) and HCPL (2006)

*Note: Depths from surface to the Bulli Seam are based on a geological borehole log from proposed Longwall 23 (Refer Figure 2-1)

METROPOLITAN COAL PROJECT

FIGURE 2-3
Indicative Stratigraphy in the Project Area

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The Bulli Seam dips gently at a gradient of approximately 1:50 to the north-west, generally with minor infrequent faulting. The roof lithology of the Bulli Seam is predominantly mudstone (Appendix A), overlain by sandstone.

Geological structures that are known either to exist in the underground mine workings or are inferred from current geological data that may extend into the Project Underground Mining Area have been identified for further investigation through surface mapping. These include (Geosensing Solutions, 2008):

- Metropolitan Fault (also known as Pit Bottom Fault);
- Powell Fault;
- Main West Fault;
- Freeway Fault;
- Long Hole Fault; and
- Madden Fault Zone.

In addition to the known structures exposed in the underground mine workings, other structures are inferred from the review of existing data. These include (Geosensing Solutions, 2008):

- AMEG Fault; and
- Mini Sosie Fault.

In general, individual structural features located on the floor of the Bulli Seam have not been identified at surface despite focussed searches over several decades, nor have individual surface features been successfully projected and proven at the Bulli Seam horizon at depth (Geosensing Solutions, 2008).

Tertiary age igneous intrusions in the form of dykes post date the sedimentary strata in the Project Underground Mining Area. Igneous dykes are present as generally thin (less than 1 m) altered clays at outcrop. No igneous sills are known to occur in the Project Underground Mining Area (Geosensing Solutions, 2008). No diatremes have been identified in the Project Underground Mining Area (Geosensing Solutions, 2008).

The dykes and faults have the potential to adversely affect underground longwall mine development and would require specific management measures (e.g. dyke extraction by road header and installation of additional ground support as required).

During the life of the Project, mine exploration activities including in-seam and surface-to-seam drilling would continue to be undertaken ahead of the underground mining operation to investigate geological structures, coal quality and seam morphology as input to detailed mine planning and engineering studies.

Surface-to-seam exploration activities would generally require only small surface disturbance areas and would involve the use of surface drilling rigs and supporting equipment above the Project Underground Mining Area (Figure 2-1) and surrounds.

2.3 PROJECT GENERAL ARRANGEMENT

The general arrangement of the Project has been designed to maximise the utilisation of the existing Metropolitan Colliery Major Surface Facilities Areas and existing Metropolitan Colliery infrastructure. The Project general arrangement and progressive development of the Project longwalls (i.e. Longwalls 20 to 44) over the life of the Project are shown on Figure 2-1. The general arrangement of the Metropolitan Colliery Major Surface Facilities Area is shown on Figure 2-2.

The main activities associated with development of the Project would include:

- ongoing surface and underground exploration activities in the Project Underground Mining Area and surrounds;
- continued development of underground mining operations within the existing HCPL coal lease (and associated sub-lease) and two new MLA areas (MLA 1 and MLA 2) (Figure 2-1);
- upgrades of the existing mining and materials handling systems (e.g. longwall machinery and conveyors) to facilitate an increased ROM coal production rate (up to approximately 3.2 Mtpa);
- upgrades of the CHPP to facilitate increased production of washed coal, addition of a beneficiation circuit, and to progressively attenuate noise emissions;
- continued transport of coal reject to the Glenlee Washery which is owned and operated by SADA (with annual road movements capped at the existing maximum rate);

- continued transport of product coal by road to Coalcliff and Corrimal Coke Works (Figure 1-1);
- construction of a coal reject paste plant and associated coal reject stockpile, pumping, pipeline and underground delivery systems to facilitate the underground backfilling of the mine void using coal reject materials as an integrated component of the longwall mining operation;
- train loading and train movements associated with the transport of product coal to Port Kembla Coal Terminal 24 hours per day, seven days per week;
- surface access within the Woronora Special Area (Figure 2-1) and surrounds that is required for the environmental monitoring, management and remediation of mine subsidence;
- upgrades and/or extension of the existing supporting infrastructure systems (e.g. underground access, water management system, yard area, conveyor transfers and drives, ventilation, gas management and electrical systems) as required;
- extension of the life of the Metropolitan Colliery by approximately 23 years; and
- other associated minor infrastructure, plant, equipment and activities.

The provisional timing of the development of Longwalls 20 to 44 is shown on Figure 2-1. The mining sequence indicated on Figure 2-1 is based on planned maximum production and may vary to take account of localised geological features, detailed mine design, market conditions, mining economics or relevant Project Approval conditions that are imposed by the NSW Minister for Planning.

The mining sequence over any given period would be documented in the relevant Mining Operations Plan (MOP) and/or Subsidence Management Plan (SMP) as required by the NSW Department of Primary Industries – Mineral Resources (DPI-MR).

2.4 PROJECT CONSTRUCTION/ DEVELOPMENT ACTIVITIES

As described in Section 2.3, the Project has been designed to maximise the utilisation of the existing Metropolitan Colliery Major Surface Facilities Area and existing Metropolitan Colliery infrastructure. As a result, Project construction/development activities would generally be limited to the following key components during the initial stages of the Project:

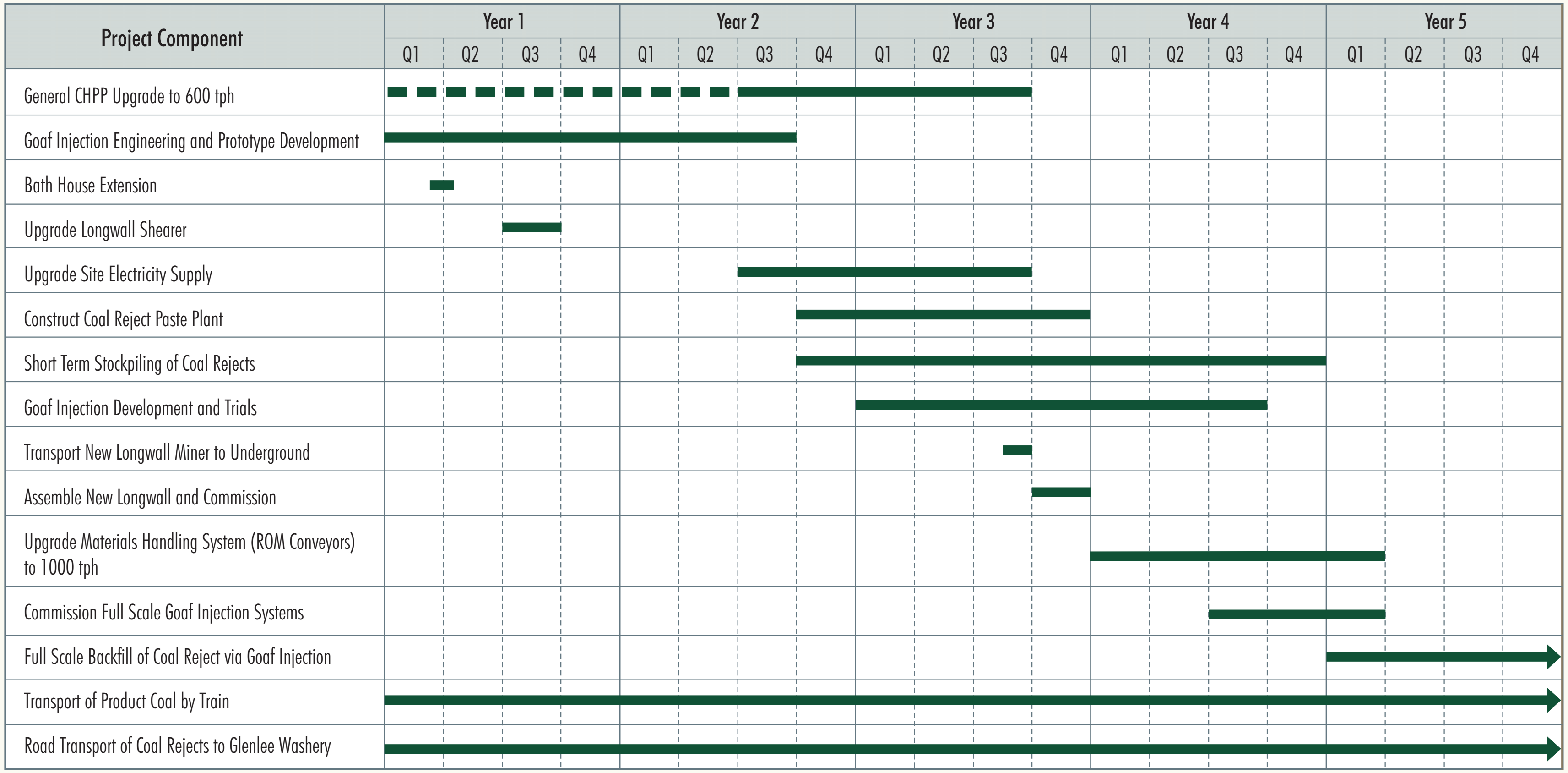
- longwall mining machinery upgrades;
- upgrades of underground materials handling systems;
- upgrades of the CHPP to facilitate increased coal washing and production, addition of a beneficiation circuit (to produce thermal coal) and progressively attenuate noise emissions;
- electricity supply upgrades; and
- development of a coal reject paste plant and underground goaf injection system to facilitate the underground backfilling of the mine void using coal reject material.

The Project construction/development activities would be progressively developed in parallel with ongoing mining operations at the Metropolitan Colliery. A description of these activities is provided in the following sub-sections. The Project development schedule for the first five years of the Project is shown on Figure 2-4.

Surface construction/development activities would generally be undertaken during daytime hours up to seven days per week.

Additional mobile equipment would be required for short-periods during the Project construction/ development activities. As surface construction works would be undertaken intermittently over a period of up to five years (Figure 2-4), the number and type of equipment would be expected to vary depending on the activity being undertaken. Table 2-1 provides an indicative mobile fleet that would be required for short-term construction activities.

Initial Development Schedule



METROPOLITAN COAL PROJECT

FIGURE 2-4
Initial Development Schedule

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Table 2-1
Provisional Surface Mobile Fleet for Construction/Development Works

Fleet Item	Number
30 t Mobile Crane	1
50 t Mobile Crane	1
30 t Excavator	1
Concrete Delivery Truck	2
Semi-Trailer Low Loader	2

Source: HCPL (2008)

2.4.1 Longwall Mining Machinery Upgrades

The current longwall mining machine shears coal at a rate of up to approximately 1,200 tph. The Project would include upgrades of the longwall machinery to increase the coal mining rate to approximately 1,500 tph.

An initial upgrade would include the replacement of the longwall shearer within the first six months of the Project. This would involve the delivery of the new components to the Metropolitan Colliery Major Surface Facilities Area and underground transport to the longwall face for assembly.

Over the life of the Project it is anticipated that a range of underground mining equipment would be replaced or upgraded as a component of general maintenance or to increase efficiency. It is anticipated that a complete replacement of longwall machinery would be required within the first five years of the Project life (Figure 2-4).

2.4.2 Materials Handling System Upgrades

Coal from the underground mining operation is conveyed to the surface directly to the CHPP crusher tower or stacked to the 25,000 t ROM coal stockpile located at the existing Metropolitan Colliery Major Surface Facilities Area to the east of the CHPP buildings (Figure 2-2). The current capacity of the underground materials handling system is approximately 650 tph.

The capacity of the materials handling system from the underground to the surface would be increased to approximately 1,000 tph through replacement or upgrades of conveyors, sizers, drives and supporting systems (Figure 2-5).

The upgrades would take approximately 12 to 15 months to install and commission and are planned for completion in Year 5 of the Project (Figure 2-4). The majority of upgrade works would be undertaken to coincide with a new longwall relocation, however some components of the upgrades would be undertaken progressively during routine maintenance activities.

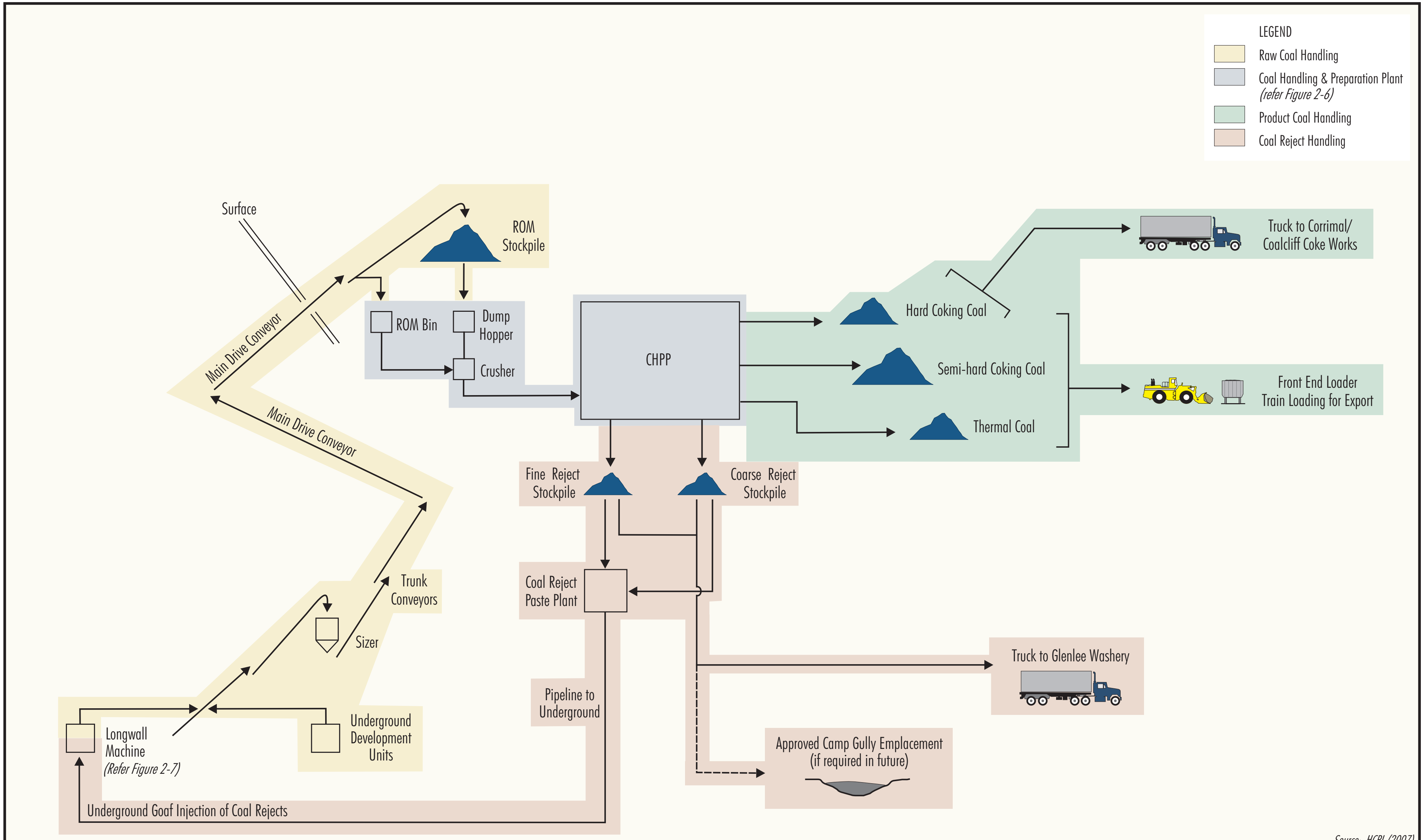
2.4.3 Coal Handling and Preparation Plant Upgrades

The CHPP has an existing throughput capacity of approximately 400 tph. The Project would include upgrades of the CHPP generally within its current footprint by replacing, upgrading or adding components as required. A schematic flowsheet of the CHPP, including the major processing components that would be replaced, added or upgraded is provided on Figure 2-6.

The upgrades would increase the capacity of the CHPP up to approximately 600 tph of ROM feed and is expected to be completed during Year 3 of the Project (Figure 2-4). Works would be staged during the first couple of years of the Project to reduce the need for CHPP downtime while the upgrades are being undertaken. The provisional mobile fleet to undertake the CHPP upgrades is provided in Table 2-1.

Prior to the upgrading of the CHPP, detailed feasibility and design work would be undertaken to confirm the capacities and equipment required. The general CHPP capacity upgrades would include (Figure 2-6):

- replacing the following major components with higher capacity equipment:
  - dump hopper feeders;
  - scalping screen;
  - raw coal crusher;
  - desliming screen;
  - small coal drain and rinse screen;
  - teetered bed separator reject screen;



Source: HCPL (2007)

METROPOLITAN COAL PROJECT

FIGURE 2-5
Materials Handling Schematic Flowsheet

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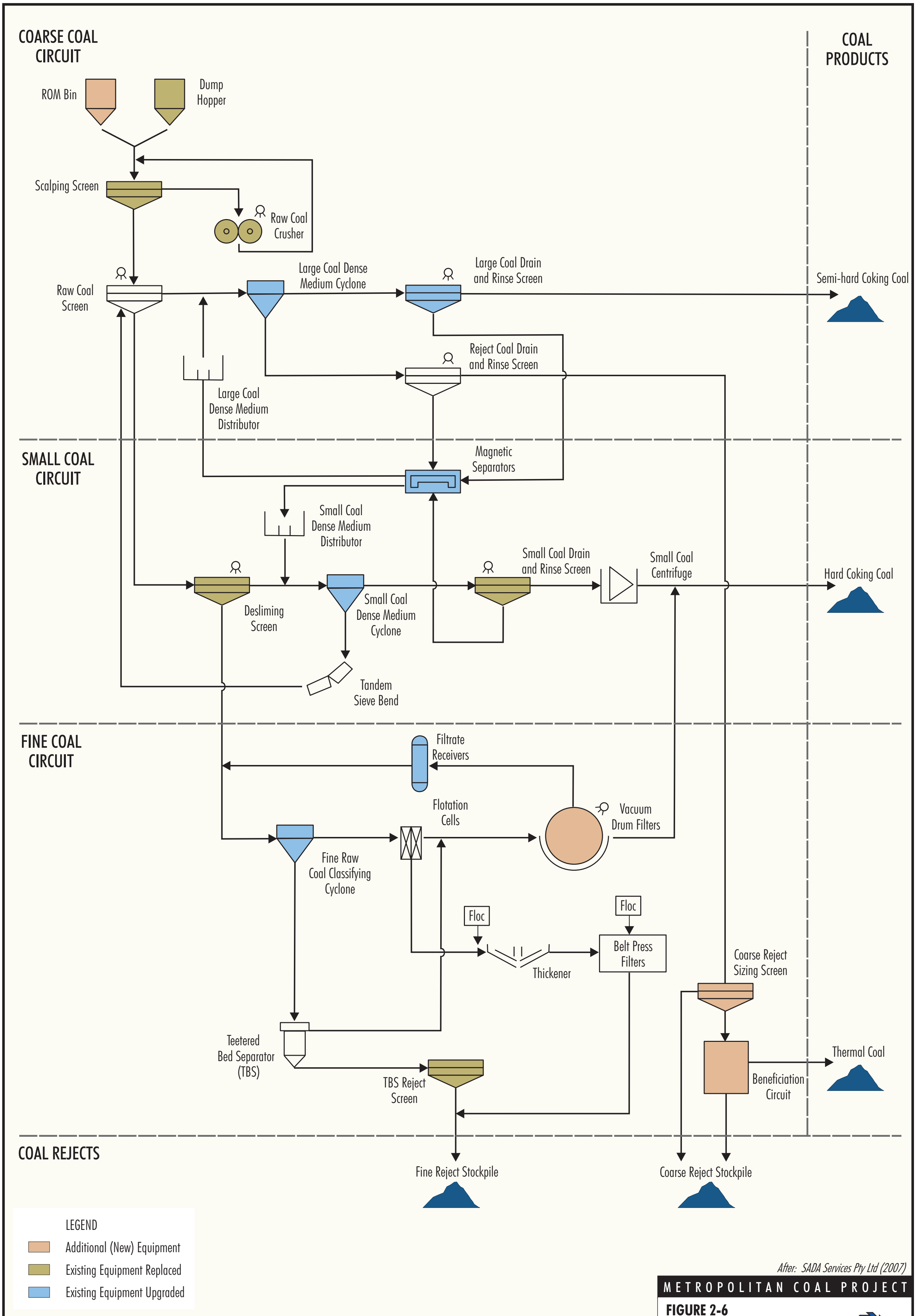

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After: SADA Services Pty Ltd (2007)

METROPOLITAN COAL PROJECT

FIGURE 2-6
CHPP Schematic Flowsheet

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- installation of an additional ROM bin feeder, vacuum drum filters and associated vacuum drum pumps;
- upgrading equipment such as the cyclones, screens, magnetic separators and filtrate receivers;
- providing additional capacity or replacement of conveyors and surge bins;
- upgrading of CHPP power supply systems (Section 2.4.4) to provide additional capacity and back-up supply systems;
- upgrades of CHPP structural elements, piping, pumps, sumps, safety and auxiliary systems as required to support the CHPP upgrades; and
- progressive implementation of noise attenuation measures (e.g. sound insulation and/or cladding) and/or progressively replacing components with modern (low noise) equipment as required to reduce the overall noise emissions of the CHPP in accordance with the requirements of the ongoing Pollution Reduction Programme being undertaken in accordance with EPL No. 767 (Section 4.10).

2.4.4 Electricity Supply Upgrades

The total electricity demand for the Project is estimated to be 20 megawatts (MW) at the maximum (3.2 Mtpa) ROM coal production rate.

The electricity system upgrades would include components that would be undertaken by HCPL, and electricity transmission line extensions that would be undertaken by the electricity provider.

The existing electricity supply to the Metropolitan Colliery would be upgraded to facilitate the increased underground mining and coal production rate and include:

- upgrade of the electricity supply to the underground mine via the surface-to-seam boreholes located at Ventilation Shaft No. 3;
- upgrade of the electricity supply to the existing Metropolitan Colliery Major Surface Facilities Area via a new 11 kV underground cable to be installed in the Helensburgh street network (subject to separate approvals by electricity suppliers and therefore not included as part of the Project or assessed in this EA);
- installation of a new substation at the corner of the Princes Highway and Parkes Street and connecting aerial transmission line back to the existing 33 kV/11kV Substation in Helensburgh (Figure 2-1) (subject to separate approvals and therefore not included as part of the Project or assessed in this EA);
- duplication of the Ventilation Shaft No. 3 electricity supply and distribution systems at Ventilation Shaft No. 4 later in the Project life (Section 2.5.4) (associated overhead electricity transmission line extensions would be subject to separate approvals by electricity suppliers and therefore not included as part of the Project or assessed in this EA); and
- upgrade of other general underground and surface electricity supply and distribution systems as required (e.g. additional transformer/switchyard equipment and electrical cabling and distribution).

2.4.5 Coal Reject Paste Plant and Underground Backfill Infrastructure

As described in Section 2.3, in order to reduce the volume of coal reject that requires off-site transport, underground backfilling of the mine void would be undertaken using a proportion of the coal reject produced over the Project life.

A description of the underground goaf injection method is provided in Section 2.8.4. A description of the alternative on-site and off-site coal reject management measures that have been considered for the Project is provided in Section 3.9.2.

In order to facilitate the underground backfilling of the mine void using coal reject material, a range of new infrastructure would be required, including:

- a coal reject paste plant located at the existing Metropolitan Colliery Major Surface Facilities Area (Figure 2-2);
- an additional (short-term) 50,000 t coal reject stockpile located in the eastern portion of the existing product coal stockpile area adjacent to the coal reject paste plant and partially within the area of WCC approved Coal Reject Emplacement at Camp Gully (Section 2.8.5) (Figure 2-2);
- surface and underground pump and pipeline installations; and
- additional underground mobile and fixed equipment and infrastructure (e.g. equipment stockpiles and underground mobile equipment).

The coal reject paste plant and underground backfill infrastructure would be designed and built progressively during the initial stages of the Project.

It is anticipated that the coal reject paste plant and goaf injection systems would be fully operational by Year 5 of the Project (Figure 2-4).

2.5 UNDERGROUND MINING OPERATIONS

Underground mining operations would continue at the Metropolitan Colliery with development to extend to the west and north of the Current and Completed Underground Mining Areas (Figure 2-1). Underground mining operations would continue to be conducted 24 hours a day, seven days a week.

2.5.1 Provisional Mine Schedule

The provisional mine schedule for underground mining operations presented in Table 2-2 is based on the planned maximum production rate.

Longwalls 20 to 44 are bounded by the Current and Completed Underground Mining Areas to the south and the Garawarra State Conservation Area and the F6 Southern Freeway to the east. To the west and north, the longwalls are bounded by the Woronora Special Area and MLA 1 and MLA 2 and the Heathcote National Park (Figure 2-1).

Table 2-2
Provisional Mine Schedule

Year	Total ROM Coal (Mtpa)	Total Coking Coal (Mtpa)	Total Thermal Coal (Mtpa)	Total Coal Reject (Mtpa)
1	1.80	1.53	0.03	0.24
2	1.91	1.62	0.03	0.26
3	2.13	1.81	0.03	0.29
4	2.50	2.12	0.04	0.34
5	2.45	2.08	0.04	0.33
6	2.60	2.21	0.04	0.35
7	2.61	2.22	0.04	0.35
8	2.61	2.22	0.04	0.35
9	2.72	2.31	0.04	0.37
10	2.86	2.43	0.04	0.39
11	2.91	2.48	0.04	0.39
12	3.06	2.60	0.05	0.41
13	3.10	2.63	0.05	0.42
14	2.99	2.54	0.05	0.40
15	3.19	2.71	0.05	0.43
16	3.02	2.56	0.05	0.41
17	3.03	2.58	0.04	0.41
18	2.86	2.43	0.04	0.39
19	2.97	2.53	0.04	0.40
20	3.03	2.58	0.04	0.41
21	3.15	2.68	0.04	0.43
22	2.80	2.38	0.04	0.38
23	2.60	2.21	0.04	0.35
Total	**62.90**	**53.46**	**0.94**	**8.50**

Source: HCPL (2008)

The existing roadways which run along the northern edge of the completed and current Longwalls 1 to 19A would be used as the tailgate roadway for the first longwall with the new east-west alignment (Longwall 20) (Figure 2-1). Longwalls 20 to 44 would generally be extracted in order (subject to geological conformity), with development of the first workings for each longwall occurring in parallel with the extraction of the previous longwall.

As described above, the provisional mine schedule in Table 2-2 (over 23 years) is based on the planned maximum production. The timing may however vary to take account of localised geological features, detailed mine design, market conditions, mining economics or relevant Project Approval conditions that are imposed by the NSW Minister for Planning.

2.5.2 Coal Mining and ROM Coal Handling

The operational methodology and equipment currently in use at Metropolitan Colliery for Longwalls 14 to 19A would also be used for Longwalls 20 to 44, subject to equipment upgrades and/or replacement as described in Section 2.4 over the life of the Project.

The Bulli Seam varies from approximately 2.6 m to 3.5 m in thickness and it is expected that its full thickness would be extracted during the Project underground mining operations.

Layout of the Underground Mining Area

As shown on the Project general arrangement (Figure 2-1), the Project Underground Mining Area comprises a rectangular area approximately 3.5 km wide and 5 km long.

Longwall panels 20 to 44 run parallel to the existing main roads for Longwalls 1 to 19A and shorten in length slightly as the mine moves north (Figure 2-1).

Mine Access and Development Works

Access to underground Longwalls 20 to 44 from the existing Metropolitan Colliery Major Surface Facilities Area would continue to be via the main drift which extends from the portal at the surface to the completed and current Longwall 1 to 19A underground mining areas (Figures 2-1 and 2-2).

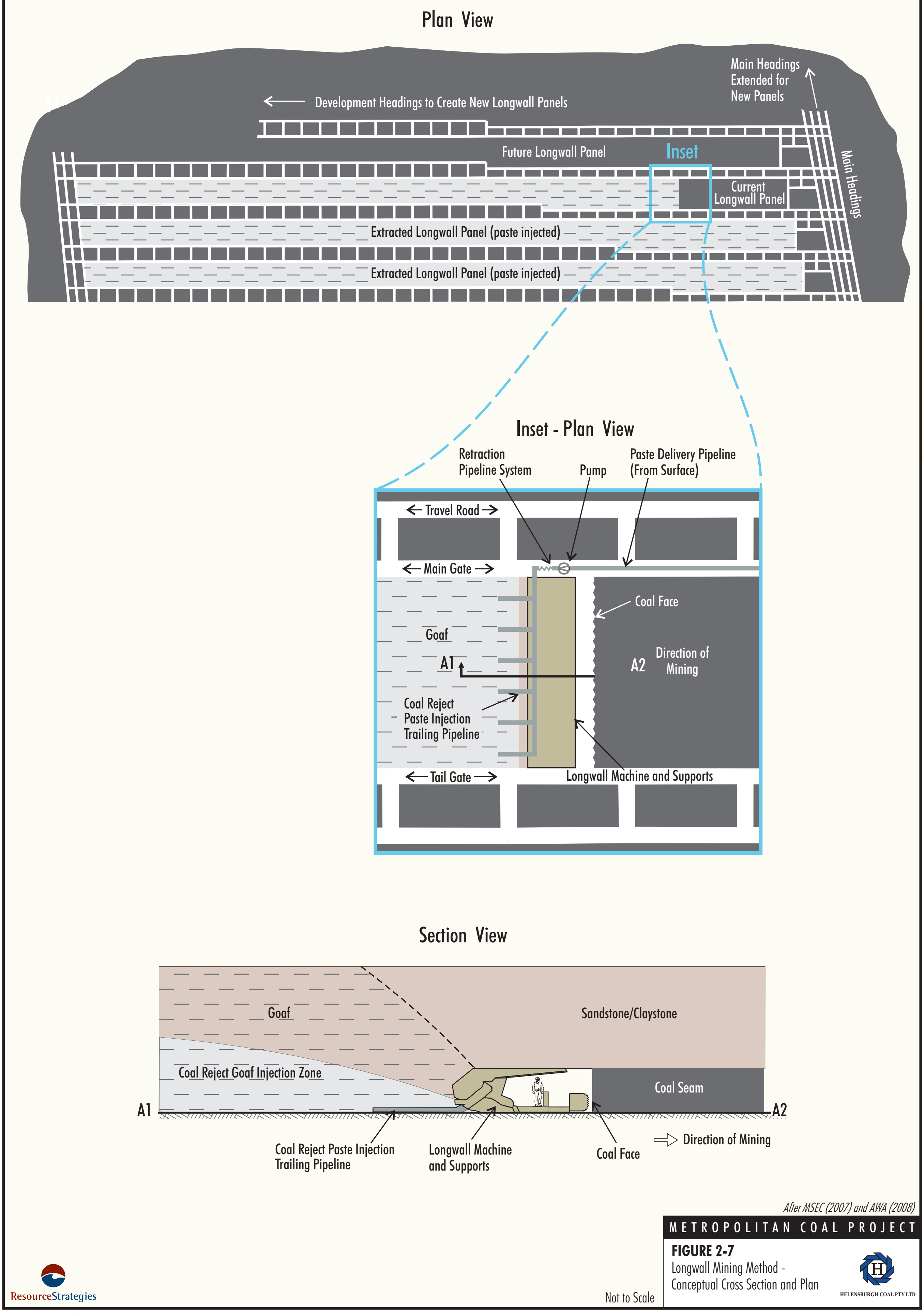
A drift extension would be developed once the longwalls have progressed to approximately Longwall 30 (Figure 2-1) to shorten the length required for underground coal transport.

Underground main roads would be developed on the eastern boundary of the new longwall panels (i.e. for access, ventilation and main coal conveyors). The underground main roads layout has been designed to minimise potential interaction of the underground mining operations with the F6 Southern Freeway, and therefore do not run parallel to the eastern boundary of the longwalls (Figure 2-1).

Each longwall panel would be formed by developing gate roads (the tail gate and main gate roads). To construct the gate roads, two roadways (headings) would be driven parallel to each other using continuous miners (Figure 2-7). The dimensions of the headings or roadways would be approximately 5 m wide and 3.2 m in height. The headings would be connected approximately every 90 m by driving a cut-through from one heading to the other. This leaves a series of pillars of coal along the length of the gate road which support the overlying strata (Figure 2-7).

Within the Woronora Notification Area (Figure 2-1), the longwall layout has been varied to conform with the preliminary guideline provided by the Dams Safety Committee (DSC) *Mining in Notification Areas of Prescribed Dams* (DSC, 1998). For mining near stored waters, where the depth of cover is greater than 120 m, these guidelines prescribe the following:

- panel width should be less than one third of the depth of cover;
- pillar width should be greater than 15 times the height of the extraction and one fifth of the depth of cover; and
- pillar length should be not less than its width.



After MSEC (2007) and AWA (2008)

METROPOLITAN COAL PROJECT

FIGURE 2-7
Longwall Mining Method - Conceptual Cross Section and Plan

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The minimum depth of cover above the Project Underground Mining Area within the Woronora Notification Area is approximately 400 m. In accordance with the DSC guideline, longwall panel and chain pillar widths would be varied within the Project Underground Mining Area depending on the proximity to the Woronora Reservoir (Figure 2-1) as follows:

- **Within 495 m (horizontal distance) of the Woronora Reservoir full water storage level** - pillars would be 70 m wide (measured rib to rib) and longwall panels would create a void width of 133 m (including gate roads).
- **Greater than 495 m (horizontal distance) from the Woronora Reservoir full water storage level** - pillars would generally be 40 m wide (measured rib to rib) and longwall panels would create a void width of 163 m (including gate roads).

Longwall Mining Operation

The longwall miner utilises a shearer to cut a slice of coal from the coal face (generally up to 1 m thick) and the broken coal is then transferred to the main gate conveyor via an armoured face conveyor. The longwall miner utilises a series of hydraulic roof supports to provide a working area for the shearer and the machine operators. Once each slice of coal is removed from the longwall face, the hydraulic roof supports are moved forward, allowing the roof and a section of the overlying strata to collapse behind the longwall machine (referred to as forming the “goaf”) (Figure 2-7).

Figure 2-7 illustrates the development of the roadways prior to mining, the longwall mining method and coal reject paste injection behind the longwall machine (via trailing pipelines). Coal reject goaf injection behind the longwall machine is described in Section 2.8.4.

In order to start each new longwall panel, the longwall machine is separated into components and re-assembled in the installation roadway of the next panel. This longwall relocation process takes approximately one month.

Materials Handling

ROM coal is conveyed by the main gate conveyor to the main drive conveyors which carry the ROM coal to the surface. ROM coal from the underground mining operations would be conveyed directly to the ROM coal bin or would be stacked to the ROM coal stockpile adjacent to the CHPP (Figure 2-5).

2.5.3 Major Underground Equipment and Mobile Fleet

The existing and provisional Project major underground equipment and mobile fleet is provided in Table 2-3.

Table 2-3
Major Underground Equipment and Mobile Fleet

Description	Existing (1.8 Mtpa ROM)	Project (3.2 Mtpa ROM)
Longwall Machine	1,200 tph	1,500 tph
EDW 300/380 Shearer	1	-
7Ls Shearer (or equivalent)	-	2
15SC Shuttle Cars	3	4
Domino PET	2	2
Remote Control Miners	2	1
Roof Bolters	2	-
Bolter-Miner	-	3
913 LHD Transporters	2	-
E130 LHD Transporters	4	9
Man Transporters	6	9
14-Man Cars	6	6
Locos	4	2
Versatrac	3	3
Loader	1	1
Grader	1	1
Feeder Breakers	4	4
Cram Drill Rig	1	-
LM55 Drill Rigs	2	3
Crusher	1	2
Mains Conveyor System to Surface	650 tph	1,000 tph

Source: HCPL (2008)

2.5.4 Ventilation Systems

The existing ventilation system at the Metropolitan Colliery comprises two major intakes comprising a vertical shaft 4.5 m in diameter (Ventilation Shaft No. 2) and the main drift (Figure 2-2). Ventilation Shaft No. 1 located at the existing Metropolitan Colliery Major Surface Facilities Area is currently disused and would be recommissioned as an intake airway. The shaft collar would be fitted with a protective intake to draw fresh air from outside the upgraded CHPP building.

The upcast shaft, Ventilation Shaft No. 3 is 5 m in diameter and located to the west of the F6 Southern Freeway (Figure 2-1). The upcast shaft currently exhausts approximately 240 cubic metres per second (m^3/s) and is currently being upgraded with the installation of an additional fan, which will increase the upcast ventilation exhaust to 305 m^3/s.

As the Project underground mining operations extend further to the north, extension of the existing ventilation system would be required to maintain a safe working environment within the underground mine. Development would include the installation of an additional upcast shaft and associated fan installation (Ventilation Shaft No. 4) adjacent to the main roadways to the west of the F6 Southern Freeway (Figure 2-1). Installation of the new upcast ventilation shaft is anticipated to be required at the commencement of Longwall 30.

In-situ rock material from the construction of Ventilation Shaft No. 4 would be used to build a site pad and/or bunding around the ventilation shaft and supporting infrastructure.

2.5.5 Coal Seam Gas Management

For occupational health and safety reasons, coal seam gas quantities in the ventilation system are monitored and managed. In order to maintain suitable gas concentrations, the gas is drained from the longwall blocks prior to mining via the construction of a series of in-seam gas drainage holes. The extracted gas is piped to the return roadways where it is then directed to Ventilation Shaft No. 3 and exhausted to the surface.

If necessary to facilitate safer production systems, a surface vacuum plant for gas drainage would be installed at the corner of the Princes Highway and Parkes Street. The current pipe system would be connected to the surface and vacuum pressure applied to encourage greater gas flows.

The need for this facility would be dependent on future gas test work, mining rates achieved and efficiency improvements to the existing ventilation system. If required, the surface vacuum plant would be subject to separate assessment and approval. Accordingly, any such surface vacuum plant is not included as part of the Project or assessed in this EA.

HCPL has previously obtained conditional approval for the receipt of funding from the Australian Greenhouse Office (AGO) for the design and construction of a methane flare unit which would allow flaring of the coal seam gas in a controlled manner at the surface. HCPL would install the methane flare unit during the early years of the Project if gas compositions within the Project Underground Mining Area are considered amenable. As part of the methane flaring system, gas would be conveyed to the methane flare unit via a surface-to-seam borehole located adjacent to Ventilation Shaft No. 3.

Methane flaring is not expected to be amenable later in the Project life because the percentage of methane in coal seam gas is expected to fall as mining progresses north (i.e. the percentage of carbon dioxide [CO_2] in the coal seam gas would increase to almost 90%). The extracted gas would be piped to the return roadways where it would be exhausted to the surface either via Ventilation Shaft No. 3 or Ventilation Shaft No. 4.

2.5.6 Mine Dewatering

Whilst the volume of groundwater that is expected to report to the underground mine workings would be minor (Section 4.3), water used for dust suppression and cooling of underground mining equipment would continue to accumulate in sumps and drains in the underground workings. The accumulated water is pumped to the Metropolitan Colliery Major Surface Facilities Area for treatment and re-use. Further details of the Project water management system is provided in Section 2.9.

Underground water management systems would be upgraded and extended as required to return accumulated water to the surface for treatment and recycling when mining Longwalls 20 to 44.

2.6 COAL RECLAIM AND PREPARATION

The CHPP would operate up to 24 hours per day, seven days a week with an upgraded capacity of approximately 600 tph (of ROM coal feed). A summary description of the operation of the CHPP is provided below and a schematic diagram of the upgraded CHPP is shown on Figure 2-6.

2.6.1 Coal Reclaim, Crushing and Screening

ROM coal from the underground mining operations would either be conveyed directly to the ROM coal bin or stacked to the 25,000 t ROM coal stockpile for later reclaim (Figures 2-5 and 2-6, and Section 2.5.2).

The ROM coal bin would feed via a conveyor to the crusher located in the crusher tower adjacent to the CHPP. Alternatively, ROM coal would be reclaimed from the ROM stockpile by FEL and loaded directly to the crusher via the dump hopper (Figure 2-6). The crushed ROM coal is screened and oversize material is re-sized in the crusher prior to being fed to the CHPP (Figure 2-6).

2.6.2 Coal Handling and Preparation Plant

As described in Section 2.4.3, the CHPP would be upgraded to facilitate the processing of approximately 600 tph of ROM coal.

The upgraded CHPP would comprise a range of components that can be generally classified into three major circuits, the coarse coal, small coal, and fine coal circuits (Figure 2-6). Each of these circuits would include components that separate coal materials on the basis of size (e.g. screens) and on the basis of material type (e.g. cyclones, flotation cells). Each circuit has links to each of the other circuits for recycling of undersize or oversize material (Figure 2-6).

The small coal and fine coal circuits also include components that are used to dewater coal products (e.g. vacuum drum filters) and coal reject (e.g. belt press filters).

The upgraded CHPP would produce two main product streams (comprising semi-hard coking coal and hard coking coal) and two reject streams (comprising coarse rejects and fine rejects) (Figure 2-6). A third (thermal) coal product would also be produced from the new beneficiation circuit as described in Section 2.6.3 (Figure 2-6). Each of these product and reject streams would exit the CHPP via conveyor and would be stockpiled separately (Figure 2-6).

Flocculants and other reagents currently used at the CHPP would continue to be managed and stored in appropriately bunded areas (Section 2.11).

2.6.3 Beneficiation Circuit

A beneficiation circuit would be installed in the CHPP to produce a thermal coal product from the CHPP coarse coal reject stream (Figure 2-6). The beneficiation process would reduce the volume of coarse coal reject by up to 15%, and hence the overall coal reject volume requiring management reduced by some 10 to 13% (Allan Watson and Associates [AWA], 2007).

Analysis of pilot scale thermal coal recoveries by SCL Environmental Services Pty Ltd indicates that thermal coal recoveries for the larger fractions (i.e. greater than 18 millimetres [mm]) are not economical. Therefore a sizing screen would be installed to separate coarse reject material under 18 mm in size for treatment in the beneficiation circuit (Figure 2-6).

The beneficiation circuit could utilise a number of separation technologies such as a dense medium cyclone circuit or suitable alternative technology to separate out the thermal coal product. The final system to be used would be determined by further detailed design. The beneficiation circuit would be included within the existing CHPP footprint and would commence operation early in the Project life (Figure 2-4).

Coal reject from the beneficiation circuit would report to the coarse coal reject stockpile, for trucking to Glenlee Washery (Section 2.8.2) or transfer to the coarse reject paste plant and/or short-term stockpile (Section 2.8.4 and Figure 2-2). The thermal coal produced by the beneficiation plant (up to 50,000 tpa) would report to the 180,000 t product coal stockpile (Figure 2-2).

2.6.4 Surface Mobile Plant

The general surface mobile fleet is described below. The general surface mobile fleet required for the Project construction/development activities are described in Section 2.4 and included in Table 2-1.

General Surface Fleet

The existing surface mobile fleet at the Metropolitan Colliery would be largely unchanged for the Project, with the addition of some extra mobile plant to address the increased ROM coal production rate. The existing surface fleet and the number anticipated for the Project at full production is provided in Table 2-4.

Table 2-4
Major Surface Mobile Fleet

Description	Existing Number	Project Number
988 Cat FEL	3	4
980 Cat FEL	1	1
WA470-3 Komatsu FEL	1	1
Street Sweeper	1	1
D7 Cat Dozer	1	1
D8 Cat Dozer	1	1
Water Cart	1	2
Grader	1	1
Bobcat	1	1
Screen	1	1
Off-road 30 t Truck	-	3

Source: HCPL (2008)

Product Coal/Reject Road Transport Fleet

Product coal road transport and coal reject road transport is undertaken by independent transport contractors. As described in Section 2.3, the annual number of truck movements for coal reject would be capped at the existing maximum rate. The fleet of trucks used would however vary according to the equipment that is available. The potential noise impacts associated with changes in the truck fleet would be considered when selecting the fleet providers.

2.7 PRODUCT COAL TRANSPORT

As discussed in Section 2.1.4, the Metropolitan Colliery primarily transports product coal by train to Port Kembla Coal Terminal, with a lesser volume of coal being transported by truck to the Corrimal and Coalcliff Coke Works. As a component of the Project, transport of coal products would increase with saleable (washed) coal production to increase from 1.5 Mtpa to approximately 2.8 Mtpa (Sections 2.3 and 2.7.2).

2.7.1 Road Transport

As described in Section 2.1.5, up to 120,000 tpa of product coal is currently transported by truck to the Corrimal and Coalcliff Coke Works (Figure 1-1). Coal transport trucks generally operate between the hours of 7.00 am and 5.00 pm, five days per week and are operated by an independent transport contractor.

The transport of up to 120,000 t of product coking coal to the Corrimal and Coalcliff Coke Works would continue as a component of the Project.

2.7.2 Rail Transport

The current FEL train loading system would continue to be utilised to facilitate the rail transport of product coal. The increase in coal production and the requirements of train scheduling indicate that 24 hour train loading would be required up to seven days per week.

It is anticipated that the number of trains would increase from 1.5 trains per day to three trains per day on average over a year. The maximum number of trains is likely to increase from three trains per day to six trains per day during peak periods.

2.8 COAL REJECT MANAGEMENT

A description of the coal reject geochemical and physical characteristics is provided in Section 4.4. The results of geochemical testwork undertaken by Environmental Geochemistry International (EGI) (2008) on coal reject samples from the Metropolitan Colliery correlated with the findings of other investigations into the nature of coal rejects from the washing of coal from the Bulli Seam, indicate that the coal reject material is generally inert.

2.8.1 Coal Reject Production

Approximately 8.5 Mt of coal reject would be produced over the life of the Project (Table 2-2).

HCPL commissioned AWA (2007) to conduct a technical review of coal reject management options that had previously been investigated at the Metropolitan Colliery and to develop a coal reject management strategy for the life of the Project. The AWA review and other previous studies examined a number of coal reject management methods including: ongoing emplacement at Glenlee Washery (Section 2.8.2); coal beneficiation (Section 2.8.3); underground goaf injection (Section 2.8.4); and the development of the approved Camp Gully Coal Reject Emplacement (Section 2.8.5). Further discussion of the coal reject management alternatives that were investigated and considered by HCPL is provided in Section 3.2.1.

Table 2-5 provides an indicative schedule of the coal reject produced annually and the combination of coal reject management methods that HCPL has adopted as the provisional coal reject management strategy for the Project.

Whilst the total coal reject quantities are based on the planned maximum production, the actual quantity produced in any one year may vary to take account of localised geological features, detailed mine design and the commissioning of the coal beneficiation circuit.

If in the event that the quantity of coal reject is greater than anticipated or commissioning of the underground goaf injection technique is delayed, residual storage capacity would also be provided by emplacement into the old underground workings via Ventilation Shaft No. 1.

The management measures for coal reject outlined in Table 2-5 are described further below.

2.8.2 Emplacement at Glenlee Washery

As described in Section 2.1.6, all the coal reject produced at the CHPP is currently stockpiled adjacent to the CHPP prior to being transported by road to the Glenlee Washery (Figure 1-1).

HCPL has contracted SADA (the owner and operator of the Glenlee Washery) for the emplacement of approximately 3.5 Mt of coal reject (or approximately 12 more years of coal reject emplacement at the current rate). Based on this, road transport of coal reject to Glenlee Washery would cease in Year 12 of the Project (Table 2-5).

2.8.3 Beneficiation Circuit

As described in Section 2.6.3 as a component of the Project, a beneficiation circuit would be installed in the CHPP. The installation of the beneficiation circuit in the CHPP would reduce the volume of coal reject requiring management by some 10% to 13% (or approximately 1 Mt) over the life of the Project by producing a thermal coal product.

2.8.4 Underground Goaf Injection

As described in Section 3.2.1, a number of underground coal reject management alternatives were considered for the Project. Of these, the method adopted for management of a large volume of coal reject was underground goaf injection of the mine void. Significant capacity is available over the life of the Project if backfilling, using coal reject paste, is undertaken directly into the goaf (i.e. broken rock) behind the longwall machine. AWA (2007) estimate that up to approximately 700,000 tpa of coal reject could be injected into the underground mine void via this method, which is well above the annual coal reject management requirements of the Project (Table 2-5).

The underground goaf injection technique was developed in Germany and involves the placement of high density paste via trailing pipelines which inject the coal reject paste material into the voids and spaces that occur in the unconsolidated goaf material, some 20 to 30 m behind the longwall machine. The injection pipes would be integrated with the longwall supports at a spacing of 10 to 15 m apart and would discharge sequentially to maintain uniform distribution of the coal reject paste material in the broken rock material within the goaf (AWA, 2007). A conceptual cross section and plan view of the goaf cavity injection method is provided on Figure 2-7.

Table 2-5
Provisional Project Coal Reject Management Strategy

Year	Total Coal Reject (Mtpa)#	Temporary Coal Reject Stockpile (Mtpa)	Road Transport to Glenlee Washery for Emplacement (Mtpa)	Underground Goaf Injection (Mtpa)
1	0.24	-	0.24	-
2	0.26	0.01	0.25	-
3	0.29	0.04	0.25	-
4	0.34	-	0.32	0.03*
5	0.33	-	0.32	0.03*
6	0.35	-	0.32	0.05*
7	0.35	-	0.30	0.05
8	0.35	-	0.30	0.05
9	0.37	-	0.30	0.07
10	0.39	-	0.30	0.09
11	0.39	-	0.30	0.09
12	0.41	-	0.30	0.11
13	0.42	-	-	0.42
14	0.40	-	-	0.40
15	0.43	-	-	0.43
16	0.41	-	-	0.41
17	0.41	-	-	0.41
18	0.39	-	-	0.39
19	0.40	-	-	0.40
20	0.41	-	-	0.41
21	0.43	-	-	0.43
22	0.38	-	-	0.38
23	0.35	-	-	0.35
Total	**8.50**	**0.05**	**3.50**	**5.00**

After: AWA (2007) and HCPL (2008)
* Includes drawdown of the short-term 50,000 t coal reject stockpile.
# Actual quantities produced in any one year may however vary to take account of localised geological features, detailed mine design and commissioning of the coal beneficiation circuit.

In order to facilitate underground goaf injection, some modifications to the longwall machine would be required, including attachment of the paste feeder pipelines to the longwall roof supports. In addition, the coal reject paste supply pipeline would also need to include a pipeline retraction system to allow progressive uptake as the longwall advances. A similar pipeline retraction system is currently utilised for the supply of operational water to the underground mining operations.

As described in Section 2.4, a coal reject paste plant would be installed at the Metropolitan Colliery Major Surface Facilities Area with a suitable capacity to accommodate the entire coal reject stream from the CHPP (i.e. 80 tph).

In order for the underground goaf injection technique to be successful, the coal reject paste material would be supplied in a form that liberates little water once deposited. The coal reject paste plant would comprise a two stage crusher to reduce the maximum particle size of the rejects to 5 to 10 mm, a ball mill, a thickener and a paste mixer to establish suitable paste density and flow attributes. The coal reject paste would be stored in an agitator tank and additives may also be required to maintain paste properties in the transfer pipelines.

Pumping of the coal reject paste for extended distances underground would require a suitable solids pumping system (and would also require a relay pumping station underground). It is anticipated that double piston pumps would be utilised to facilitate the transport of the coal reject paste at high solids concentrations.

The existing portal and main drift (Figure 2-2) or a surface-to-seam borehole near the CHPP would be used to run the pipelines from the surface to the underground mine workings. The coal reject paste distribution system would also include a range of pipeline clearing and maintenance systems to maintain the pipelines and to avoid or manage pipeline blockages.

While underground goaf injection has been successfully implemented with longwall coal mining operations in Germany, a number of site specific aspects of the technique would need to be examined and systems designed for the Metropolitan Colliery conditions and equipment. Such aspects that would be further examined as part of the detailed design process include (AWA, 2007):

- optimum paste properties, including suspension grading and slurry density;
- optimum pumping techniques and systems;
- management and integration of underground goaf injection activities with general operation of the Metropolitan Colliery longwall machine; and
- management of occupational health and safety aspects of paste production, transport and underground goaf injection in accordance with NSW regulations and Australian Standards.

The estimated lead time for prototype development and full scale operational commissioning is approximately four years (AWA, 2007), therefore the full scale implementation of underground goaf injection is likely to be available from Year 4 or 5 of the Project (Figure 2-4). As indicated in Table 2-5, a small volume of coal reject material would need to be stockpiled at the Metropolitan Colliery Major Surface Facilities Area during the first few years of the Project, prior to commissioning of the full scale underground goaf injection system.

The relative contribution of underground goaf injection to the overall Project coal reject management strategy would increase proportionally with the ROM coal production rate increases over the Project life and be a function of the remaining approved capacity of the Glenlee Washery.

2.8.5 Approved Camp Gully Emplacement

HCPL holds an existing development consent granted by WCC for development of a Coal Reject Emplacement in Camp Gully adjacent to the existing product coal stockpiles (Section 3.2.1) (Figure 2-2) with a capacity of some 1 Mt of coal reject.

A portion of the area of the approved Coal Reject Emplacement would be utilised for the short-term coal reject stockpile to be constructed adjacent to the coal reject paste plant (Figure 2-2). While the Coal Reject Emplacement is approved, HCPL does not currently intend to develop the Coal Reject Emplacement as a component of the Project, and therefore it is not included as part of the Project and is not assessed in this EA. However, the existing development consent would be retained in case a need for the approved Camp Gully Emplacement arises in the future.

2.9 WATER MANAGEMENT

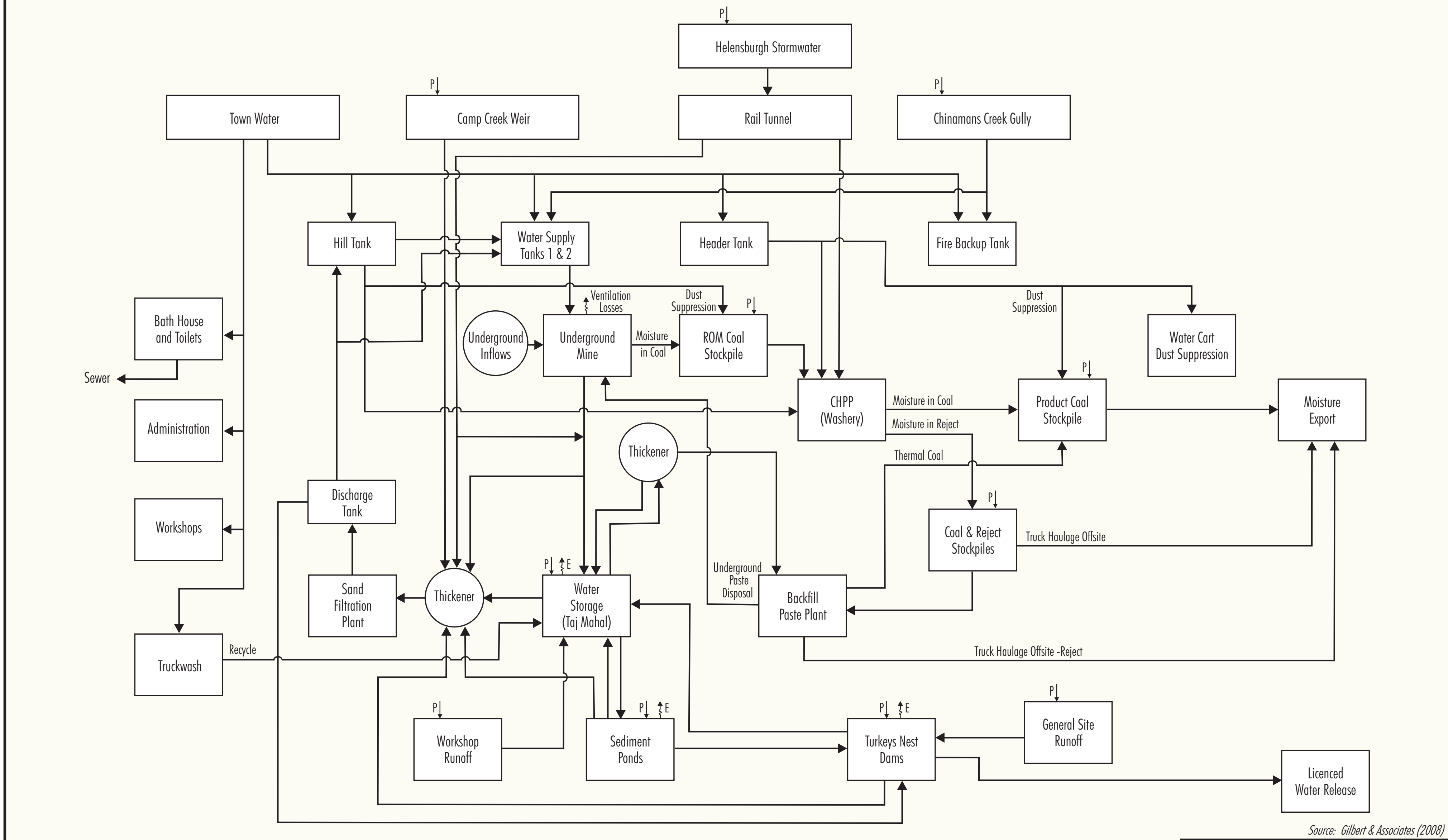
The existing water management system would be progressively augmented as water management requirements change over the Project life. Figure 2-8 provides a schematic of the water management system.

A detailed description of the Project water management system is provided in Appendix C.

2.9.1 Existing Water Management System

The existing water management system is based on the following key components:

- separation of undisturbed area runoff from operational areas via the upslope diversion and underdrain network;
- collection of surface runoff from operational areas to facilitate deposition of sediments and water treatment and re-use on-site; and
- controlled release of excess water in accordance with conditions of EPL No. 767 as required during wet periods.



METROPOLITAN COAL PROJECT

FIGURE 2-8
Project Water Management Schematic

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The existing water management system comprises a series of collection dams, sumps, storages, settlement ponds and a water treatment system. It is operated to minimise off-site release of site runoff and to provide a water supply for non-potable requirements on-site.

The existing Metropolitan Colliery Major Surface Facilities Area is located across the drainage line known as Helensburgh Gully. Stream flows in Helensburgh Gully are conveyed beneath the surface facilities to Camp Gully via a brick arch culvert (Figure 2-2). Runoff from most of the catchment upslope of the Metropolitan Colliery Major Surface Facilities Area is diverted around the north of the site and either into Helensburgh Gully or Camp Gully (Figure 2-2).

Runoff from the administration/bath house area (from roofs and paved or grassed areas) drains to Camp Gully, while runoff from the CHPP, workshop and stockpile areas is collected in the site water management system. The key features of the site water management system comprise:

- two downslope Turkeys Nest storages;
- three sediment ponds;
- the Taj concrete-lined sump system; and
- a water treatment plant.

Runoff within the existing Metropolitan Colliery Major Surface Facilities Area currently reports to a number of storages within the site including the Taj and Turkeys Nest storages (Figure 2-2). Sediment ponds are used to reduce the level of sediment in site water and to provide additional balancing storage capacity.

During periods of heavy rainfall, overflow from the sediment ponds report to the downslope Turkeys Nest storages.

Float level switches have been installed at the Turkeys Nest storages to control the operation of the pumps and storage water levels. When the level in the Turkeys Nest storages reaches 15% capacity, the water is pumped automatically to the water treatment plant. Water from the water treatment plant is either re-used in the underground mine and CHPP or discharged to Camp Gully (in accordance with EPL No. 767 licence conditions).

During 2006 and 2007, HCPL has undertaken a significant upgrade of the operational water management system to increase recycling and reduce make-up water demand from Sydney Water in accordance with the *Metropolitan Colliery Water Savings Action Plan* (NSW Department of Commerce [DoC], 2007).

Recommended water conservation and water saving initiatives in the *Metropolitan Colliery Water Savings Action Plan* include:

- permanent monitoring, meter replacement and ongoing water management;
- underground leak detection and repair;
- repair of baseflow in truck wash;
- repair of baseflow in header to washery;
- repair of baseflow in stockpile sprays; and
- disconnection of non-potable uses in machinery.

2.9.2 Project Water Management System

The Project water management system would generally be based on the existing water management system. An additional water storage capacity (approximately 1 megalitre [ML]) would be provided with the installation of an additional hill tank (Figure 2-2).

The Project would continue to build on the Metropolitan Colliery initiatives undertaken to date under the *Metropolitan Colliery Water Savings Action Plan* (DoC, 2007) to increase the efficiency of water use and minimise the requirement for make-up water and off-site water releases from the Metropolitan Colliery Major Surface Facilities Area.

2.9.3 Water Consumption and Water Supply

The main uses of water on-site are to supply underground mining operations (for cooling and dust suppression) and for the CHPP. Water is recycled from the underground mining operations to the Taj, with some water lost through ventilation. Minimal make-up water is produced by mine groundwater inflow as the underground mine is essentially dry. Water is exported from the CHPP in product coal and coal rejects.

Where practicable, Project make-up water supply would be prioritised as follows (Figure 2-8):

1. Recycling of water from the underground mining operations and CHPP.
2. Capture of incident rainfall and runoff across surface operational areas.
3. Extraction of water from the disused railway tunnel (which collects Helensburgh stormwater runoff).
4. Extraction of water from the Camp Gully weir.
5. Metered extractions from the Sydney Water mains.

Extractions from Chinamans Creek Gully would only occur in emergency situations (e.g. a fire at the Metropolitan Colliery Major Surface Facilities Area).

Potable water would continue to be drawn from the Sydney Water mains for use in ablutions at the Metropolitan Colliery Major Surface Facilities Area.

A predictive assessment of the performance of the Project water supply system is presented in Appendix C. The key findings of the assessment are summarised in Table 2-6 including the predicted site water management system discharge/spills and make-up requirements for the Project maximum production rates for a range of different climatic scenarios.

2.10 OTHER INFRASTRUCTURE AND SUPPORTING SYSTEMS

The existing surface infrastructure would continue to be utilised throughout the life of the Project, with additions and upgrades as required.

The heritage values of existing surface infrastructure would be managed during all additions and upgrades as described in Section 4.9 (non-Aboriginal heritage assessment) and Appendix I.

2.10.1 Administration

Existing administration facilities are located in the administration building and the main bath house building (Figure 2-2) and include general HCPL offices and offices for the CHPP contract operator.

No significant alteration to the existing administration facilities is currently anticipated, however, minor upgrades or extension of facilities would be undertaken as required over the Project life.

Table 2-6
Project Water Supply System Performance

	10%-ile Dry 23-Year Period	Median 23-Year Period	10%-ile Wet 23-Year Period
Inflows (ML/year)			
Rainfall Runoff	112	122	136
From Underground	55	55	55
From Camp Gully Weir	567	563	561
From Rail Tunnel	13	13	13
Town Water	114	115	112
TOTAL	861	868	877
Outflows (ML/year)			
Coal Washing	418	418	418
Other Site Use	395	395	395
Evaporation	12	12	12
Licensed Discharge	33	39	45
Turkeys Nest Spill	3	4	7
TOTAL	861	868	877
Licensed Discharge Days/year	16	18	20
Turkeys Nest Spill Days/year	1	1	2

Source: Appendix C

2.10.2 Bath House and Lamproom

The existing bath house is located in the main surface facilities building (Figure 2-2) and comprises places for some 323 people.

As a component of the Project, an additional demountable bath house building would be constructed adjacent to the existing bath house building (Figure 2-2). The new building would provide overflow capacity to accommodate an additional 50 places.

The additional bath house building would be installed during the first year of the Project (Figure 2-4).

2.10.3 Workshops

No significant changes to workshop facilities (Figure 2-2) are anticipated for the Project, however minor upgrades would be undertaken as required over the Project life.

2.10.4 Access Road

Access to the Metropolitan Colliery Major Surface Facilities Area would continue to be via the existing Mine Access Road which intersects Parkes Street in Helensburgh (Figure 2-2). No significant alteration to the existing access is anticipated, however, maintenance works would be undertaken as required over the Project life.

2.10.5 Potable Water

Potable water for the Metropolitan Colliery is currently sourced from the Sydney Water mains on a metered basis. The existing potable water supply system would continue to service the Project.

2.10.6 Sewage and Waste Disposal

Sewage

The existing sewage disposal arrangements would continue to be used for the Project. Sewage from the Metropolitan Colliery surface operations is disposed of through the domestic sewage system administered by Sydney Water. Any sewage generated during surface activities within the Woronora Special Area is removed off-site for disposal by a licensed contractor. Sewage from the underground mining operations is removed by a licensed contractor.

Wastes

The Project would generate waste streams that would be similar in nature to the existing Metropolitan Colliery. The key waste streams would continue to comprise:

- coal reject (estimated coal reject production rates, management measures and characteristics are described in Sections 2.8 and 4.4.1);
- general domestic waste and recyclables associated with the Project workforce and administration and workshop facilities at the Major Surface Facilities Area; and
- waste oils, scrap metal, used tyres and other wastes from the workshops and mining activities that are periodically removed for recycling or disposal by appropriately licensed contractors.

Operational water management, including the off-site release system and estimated release volumes are described in Section 2.9 and Appendix C.

All domestic waste and general recyclable products would continue to be collected weekly by an appropriately licensed contractor. Waste batteries and scrap metals would continue to be stockpiled in a designated area and recycled by a scrap metal contractor. Waste oil would continue to be collected by a licensed contractor for off-site disposal or recycling. Used tyres would continue to be periodically collected by the tyre supplier, for recycling or disposal. No on-site rubbish disposal or landfill is proposed.

Potential waste types estimated to be produced over the life of the Project include those listed in Table 2-7.

HCPL would continue to apply general waste minimisation principles (i.e. re-use and recycling where practicable) to reduce the quantity of wastes that require off-site disposal. For example, waste hydrocarbons from the workshops may be utilised in the CHPP as a consumable to aid in coal washery flotation, in place of purchasing diesel for this purpose.

Table 2-7
Wastes Likely to be Generated by the Project

Example of Waste	Indicative Waste Type[1]	Estimated Annual Quantity to be Removed From Site	Management Method
Tyres	Special	10 used tyres[#]	Removed from site by appropriately licensed contractor.
Asbestos materials (if present in some existing structures) at the Major Surface Facilities Area.		*	
Used oils/hydrocarbons.	Liquid	5,000 L	
Explosives, lead acid batteries, containers that have not been cleaned and that have contained dangerous goods.	Hazardous	< 1t	
Waste that includes putrescible organics from crib rooms, workshops and administration areas.	General Solid Waste (putrescible)	5 t	
Glass, plastic, rubber, plasterboard, ceramics, bricks, metal, paper, cardboard, etc.	General Solid Waste (non-putrescible)	10 t	
Building and demolition wastes.		as required	
Workshop wastes (i.e. drained oil filters [mechanically crushed] and rags and oil-absorbent materials that only contain non-volatile petroleum hydrocarbons and do not contain free liquids).		15 t	

1 Indicative only – described or pre-classified wastes in *Waste Classification Guidelines Part 1: Classifying Waste* (DECC, 2008a).
* Limited quantity as required (if identified during Project upgrade works).
# Collected by tyre supplier.

2.11 MANAGEMENT OF DANGEROUS GOODS

The transportation, handling and storage of all dangerous goods at the Metropolitan Colliery is conducted in accordance with the requirements of the *Storage and Handling of Dangerous Goods – Code of Practice 2005* (WorkCover, 2005).

Hydrocarbon Storage

Hydrocarbons used would include fuels (diesel and petrol), oils, greases, degreaser and kerosene. All fuel storage facilities are constructed and operated in accordance with the requirements of Australian Standard (AS) 1940:2004 *The Storage and Handling of Flammable and Combustible Liquids*.

Explosives Storage

Explosives would continue to be stored in a purpose built magazine located at Metropolitan Colliery Major Surface Facilities Area. The explosives storage has been designed and constructed in accordance with the requirements of AS 2187:1998 *Explosives - Storage, Transport and Use – Storage*. HCPL currently holds a Licence to Store Explosives issued by WorkCover NSW.

Material Safety Data Sheets and Chemical Storages

No chemical or hazardous material would be permitted on-site unless a copy of the appropriate Material Safety Data Sheet (MSDS) is available on-site or, in the case of a new product, it is accompanied by a MSDS. Relevant MSDSs are stored at two locations at Metropolitan Colliery, the Mine Safety Officer maintains one set, and SADA maintains a second set in the CHPP office.

2.12 WORKFORCE

In 2007, the total workforce at the Metropolitan Colliery (comprising HCPL staff and on-site contractors) was approximately 320 people. The operational workforce would be maintained during the Project with increases in efficiency allowing the proposed increases in ROM coal and product coal production. The current shift arrangements (3 x 10 hour shifts on weekdays and 2 x 12 hour shifts on weekends) would be retained.

During the construction/development activities required for the Project, an additional workforce of up to 50 people would be required during peak periods of construction. Surface construction/ development activities would generally be restricted to daylight hours. Underground construction works would be undertaken up to 24 hours per day.