



issues in receiving increased rail and port allocations in a timely manner. However, this scenario could rapidly change with relatively minor increases to the current FOB Port of Newcastle revenues across the coal industry.

The proposed Terminal 4 expansion at Newcastle Port is on hold. Even without that project proceeding there are a number of efficiency upgrades underway at PWCS and NCIG that will increase the Port handling capacity over the short to medium term without the need to invest in a major upgrade like T4.

In the current climate it is difficult to predict when the next cycle of major rail and port expansion projects will proceed, however expansions of the HVCC are not seen as short to medium term risks to the implementation or timing of any expansion.

There always exists some confusion about medium to long term rail and port charges. However, at this point in time RPM considers there are some opportunities for coal miners to seek and obtain better deals across the HVCC.

12.4 QLD Rail Supply Chain

The Yarrabee and Middlemount mines are located in Queensland’s Bowen Basin. The mines of the Bowen Basin are connected to the ports by four separate rail networks; Moura, Blackwater, Goonyella and Newlands which collectively are referred to as the Central Queensland Coal Network (CQCN). The total network includes 2,670km of rail track and has a total capacity of approximately 360Mt per annum.

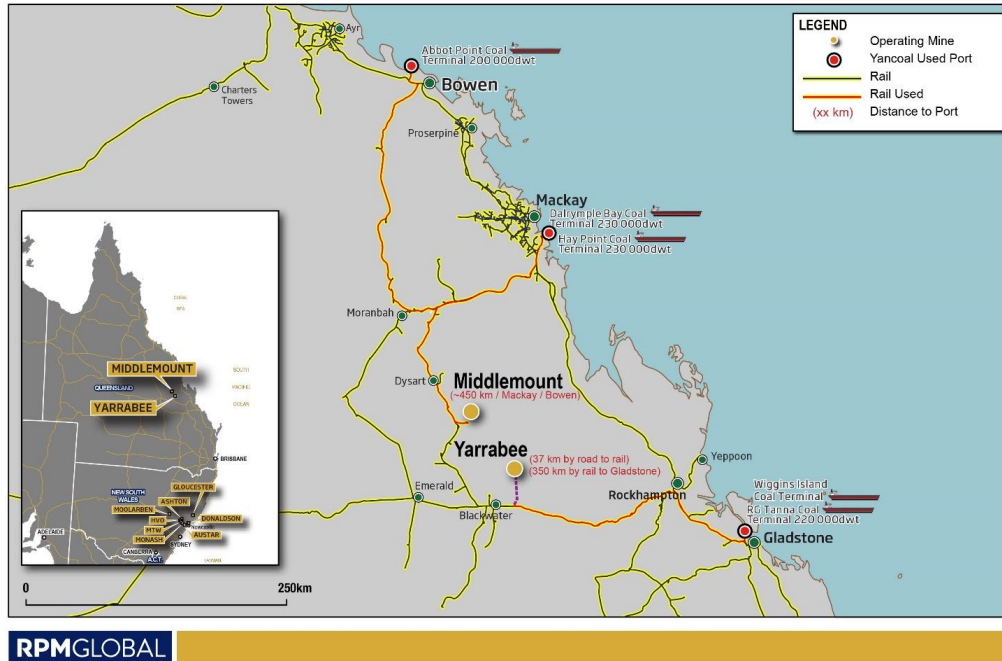
Coal from the Yarrabee mine is railed via the Blackwater System to the Port of Gladstone and coal from Middlemount is railed via the Goonyella System to the Port of Hay Point and via the Newlands network to the Port of Abbot Point.

The below rail infrastructure of the CQCN is owned and managed by Aurizon Network. Aurizon Network’s operations are governed by 99 year lease arrangements with the State of Queensland. Access to the rail network is managed under a detailed process approved by the competition regulator, the Queensland Competition Authority. The CQCN can be seen in **Figure 12-3**

There are currently two above rail operators on the CQCN; Aurizon Operations and Pacific National. Middlemount Mine has above rail contracts in place with Pacific National and Yarrabee with Aurizon Operations.



Figure 12-3 Queensland Rail Networks and Ports



12.5 QLD Port Facilities

The Bowen Basin is serviced by five coal terminals across three ports. Between the two Queensland based operations coal is exported via four of the coal terminals: Yarrabee has contracts with Wiggins Island Coal Terminal and RG Tanna Coal Terminal. Both of the terminals are based at the Port of Gladstone. Middlemount Coal has contracts with Abbot Point Coal Terminal at the Port of Abbot Point and with Dalrymple Bay Coal Terminal at the Port of Hay Point.

Abbot Point Coal Terminal

The Port of Abbot Point is Australia’s northernmost export facility located approximately 25 km North of Bowen in North Queensland, Australia. The T1 terminal has a nameplate capacity throughput of 50Mtpa. In fiscal Year 2016-2017, 25.4Mt was shipped through Abbott Point

The facilities at Abbot Point comprises coal handling and stockpile areas, a rail unloading facility, a single trestle jetty and a conveyor connected to a berth and shiploader 2.75 km offshore.

Dalrymple Bay Coal Terminal

Dalrymple Bay Coal Terminal (DBCT) is located 38km south of Mackay in the Port of Hay Point. The coal terminal has a nameplate capacity of 85Mtpa. DBCT was established by the Queensland Government in 1983 and in 2001 awarded a 50 year lease plus a 49 year option to DBCT Management Pty Ltd.

The facilities at the site include four berths, three ship loaders, train unloading facility and coal stockyards with a live capacity of 2.3Mt.

Wiggins Island Coal Export Terminal

The Wiggins Island Coal Export Terminal (WICET) is located to the west of the RG Tanna Terminal in the Port of Gladstone. WICET has a current capacity of 27Mtpa and a current throughput of 16Mtpa. The offshore wharf

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and loading facilities are situated north of Wiggins Island, adjacent to the Targinie Channel. The rail unloading facilities are located immediately south of the North Coast Line (NCL) and are connected to the Golding Point stockyard via a 5.6km long overland conveyor.

The facilities include a train unloader, stockyard with a capacity of 1.85Mt, wharf and shiploader.

RG Tanna Coal Terminal

RG Tanna Coal Terminal (RGCT) is located in the Port of Gladstone. The coal terminal has a nameplate capacity of 74Mtpa. The terminal is operated by the Gladstone Ports Corporation which is a Queensland Government owned corporation.

The facilities at the site include four berths, three ship loaders, three train unloading stations and coal stockyards with a live capacity of 5.8Mt in up to 22 separate stockpiles.



13. Site Infrastructure

Supporting regional and local infrastructure for the Assets is well established and has ample capacity for the continued support of the planned LOM operation. The Assets are located in close proximity to regional townships and serviced by national highways and good quality tarred roads. The surrounding towns provide suitable accommodation and supporting industries for the operations. Below is a description of the major infrastructure requirements of the Assets (other than rail and port transport infrastructure). RPM’s observations during the various site visits confirm each site has fit for purpose infrastructure in suitable condition to support the estimated project life.

13.1 Transportation Facilities

All of the mines are currently operating with the exception of Donaldson which is currently under care and maintenance. As part of the site visits, RPM observed that the installed transport infrastructure including rail loading facilities, site access roads and conveyors were generally in good working condition. Open cut projects will require periodic construction of haul roads and site access roads however this is standard practice for operating mines.

RPM make the following specific comments:

- MTW - A new heavy vehicle underpass (beneath the Putty road) has recently been completed to allow overburden to be hauled from Warkworth pits to Mt Thorley waste dumps. This is the second heavy vehicle road linking the two mines.
- Stratford and Duralie - two road diversions are required to achieve the life of mine plan. The roads are not main thoroughfares. The Wenham Cox Road diversion is required to access the Avon North pit which is due to commence in the next 12 months. The Johnsons Creek Road will be required to mine the Duralie East pits from 2024.
- The SEOC at Ashton will require a new ROM pad and overland conveyor for coal handling.
- Ashton currently relies on trains using the Ravensworth Operations rail loop which is managed by Glencore to turn trains around after loading at Ashton. The rail loop access agreement expires in 2024 and either a renewal or alternate strategy is required to complete the LOM Plan.

13.2 Buildings and Yards

The operations are equipped with the usual complement of facilities including parking areas, gate-houses, offices, warehouses, storage yards, workshops, scrap yards, laboratories, change rooms, lunch rooms, emergency-service facilities (medical clinics and fire-fighting), food-service facilities, etc. required to serve the mines and plants.

RPM have not completed a detailed audit of the facilities at each site. Given the majority of the sites are operating mines, RPM anticipate that the existing infrastructure is in place to support mining activities except for the following specific comments:

- Ashton LOM plan suggests the requirement of additional workshop due to the isolated location of the SEOC. Capital allowance is included in the LOM Plan for site infrastructure adjacent to the SEOC pit.

13.3 Water Supply and Storage

HVO

Water supply requirements for HVO differ depending on whether the area is a net user or producer of water during the various rain seasons as outlined in **Section 2**. The water management system for HVO, including the West Pit, operates through the separation of clean and dirty water via separate water circuits between the tails and CHPP facilities. The main consumption of water is for dust suppression on haul roads, mining areas and coal stockpiles and CHPP circuit losses. Water has historically been supplied from three sources:

- surplus mine water stored in pit (and subsequently pumped);

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- intercepted runoff water; and
- ground water percolation into the open-cuts.

HVO has an active water management strategy and manages surface and subsurface water according to key objectives:

- Ensure that statutory requirements and corporate standards are met;
- Manage catchments and water on the mine lease in a way that minimises surface water impacts to environment and downstream neighbours and limits interference to mining production;
- Maintain quality control and segregation of clean and mine affected water;
- Reduce reliance on fresh water usage; and
- Keep the local community and regulators informed of activities where required and to respond quickly and effectively to issues and complaints.

RPM is aware that HVO is not connected to the Singleton Shire town water supply with potable water trucked in from local suppliers in the Singleton and Muswellbrook area. Rehabilitated Class I and II land on the Alluvial Lands mining area is irrigated using an agricultural licence issued by NSW Office of Water (see **Section 14**). The licence and allocation were pre-existing and were purchased with the land before mining commenced.

MTW

Water supply and on-site storage at MTW was significantly upgraded by approvals for major out of pit dams in 2009 and is further secured by access to Hunter River entitlements and also supply supplement via HVO. The current operations and possibly the expanded operation should it occur, are adequately covered by raw water supply and storage infrastructure.

Following the internal and regulatory approvals being secured construction of two dams, South out of pit Dam and North out of pit Dam were completed to increase out of pit water storage capacity from 685MI to 2,340MI, thus allowing the Mt Thorley Pit to be returned to mining. The South out of pit Dam was constructed in 2010 and has a capacity of 2,110 MI.

If site water stocks are low or not available, fresh water is sourced from the Hunter River via the MTCV Water Supply Scheme. If MTW's allocation has been exceeded during periods of extended dry weather, MTW has historically purchased water from HVO to meet the surplus demand.

MTW has adequate water licences (3GL) to supply washeries and dust management systems across the mine site.

Moolarben

On-site water storage is largely associated with de-watering of the Underground 4 workings. The proposed mitigation strategies and RPM comment are outlined below:

- Making additional areas available for increased on site water retention and storage through modification of planned open cut mining sequence. This strategy potentially decreases the available open cut working room and may decrease mining efficiency or output.
- Desalination and discharge from site relies on achieving the requisite environmental discharge licences from relevant NSW Government department. These licences are typically only made available for the short term discharge of mine water associated with significant storm events.

RPM have not reviewed the detailed water balance modelling associated with the site water storage plan work is ongoing to understand the likely magnitude of impact to open cut mining associated with additional retention and the volume of discharge being proposed to ascertain the likelihood of approvals being granted in relation to existing approvals for other nearby mines.



Ashton

The Water Management Plan for Ashton was developed in association with the DPE and DPI. The plan was last approved in 2016 and was under review as at 26/06/2017. Underground water management is achieved via

- a series of pumps at low points;
- peak loads identified from the site groundwater model; and
- air operated at face to a series of electric staging pumps (25L/S) either pumped to sumps at the mine access portals or to vertical borehole pumps (40L/S).

Site water balance modelling indicates a progression to a surplus water supply however no detailed water modelling for the SEOC has been completed at this time. A water inventory risk monitoring program is completed monthly and risk around inflows from alluvium during underground mining of ULD seam is reviewed at six monthly intervals. Sufficient licences are in place for predicted water intakes with recent consolidation and simplification of licences. 2007 and 2008 flood events were successfully controlled.

Yarrabee

Yarrabee maintains a water management plan which aims to achieve the following:

- Maintain separation between mine affected water and clean surface water runoff.
- Capture surface water for use on site.
- Comply with statutory requirements.
- Protect local water resources.

The site water balance indicates that the mine has a water deficit of approximately 1,300ML per year. The site has 10 water storage areas of which 9 are mined out voids. Water is preferentially stored in voids with low predicted evaporation levels.

Yarrabee is not susceptible to flooding from the nearby Mackenzie River but has been impacted during periods of heavy rainfall by 12 Mile Creek which runs through the project. Flood diversion structures were developed to mitigate this issue in 2017. There is the requirement of the 12 Mile Creek to be relocated.

Stratford and Duralie

The Stratford and Duralie project has a number of contained water storages including the existing voids at the site, there are also the voids of planned pits as the project is developed. The project water management system is designed to achieve no overflow from contained water storages to downstream watercourses.

The main water requirement is for CHPP make-up supply and for dust suppression. The water balance at the Stratford complex has historically been in surplus. The Main Pit Void water storage is deemed suitable for water and tailings management at Stratford. The Duralie operation has multiple evaporator sprays in place to mitigate some of the excess water.

Austar

Austar has a Site Water Management Plan (SWMP) in place which covers the following aspects of the project:

- Underground mine water management,
- Pelton CHPP Site and
- Surface water storage and management.

There are a number of geographically separated and interrelated systems that are managed as a whole to ensure that the operational needs of the mine are met whilst also meeting licence requirements. There are a number of large water storage areas both on the surface and underground that effectively act as buffers to enable each of the areas listed above to act broadly as independent systems. The site has a water treatment plant which allows the mine to operate almost independently of the town potable water supply. The site only discharges treated water to Bellbird creek in accordance with approved conditions.

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Donaldson

A water management plan has been developed for Donaldson and was last updated in 2014. Water supply for the mine is made up from surface water runoff that is diverted to a storage dam on site and mine water from the underground mine. Excess water from the underground mine is currently transferred to Bloomfield CHPP under an agreement between the two parties. During the course of the Life of Mine Plan it is predicted that an excess of water will be produced at the site.

The surface water management plan is integrated with the Bloomfield Colliery plan that serves the mine and the CHPP through which Donaldson coal is planned to be processed. The surface water management system includes the following aspects:

- All surface water runoff is directed to the Big Kahuna dam from the mine facilities area
- Underground inflows may be stored in some areas of old workings, inflows from localised areas are to be transferred to Big Kahuna dam
- Water for underground operations is drawn from Hunter Water potable supply
- Water from Big Kahuna dam is used for onsite purposes
- Water is periodically transferred from Big Kahuna dam to Lake Kennerson at Bloomfield via pipeline
- Water may be periodically discharged off site from Big Kahuna dam to Four Mile Creek under approved conditions.

Middlemount

Middlemount mine is currently operating and has sufficient water supply to achieve current planned production at the site. A staged set of flood protection levies are planned at the southern end of the pit to protect the pit from inundation.

13.4 Power Supply

All of the operating sites have developed electrical reticulation systems in place. The sites have sufficient supply to achieve the proposed development plans. Routine ongoing maintenance is all that is anticipated. In addition to this RPM make the following specific comments:

HVO

Electricity is supplied to HVO via a 66kV transmission line and associated substations and switchyards. Electricity is supplied to mining equipment such as draglines, electric rope shovels, employee amenities and CHPP’s from the main grid. In addition, 330kV transmission lines pass through HVO.

MTW

As noted in **Section 2** the MTW is an amalgamation of Mount Thorley and Warkworth mines separated by the Putty Road. As a result two separate high voltage electrical supply and reticulation systems are in place with Mount Thorley having a capacity of 66kV, while 33kV was adopted at Warkworth. Both systems are fed from Ausgrid’s Mount Thorley 66kV switchyard located approximately 150m east of Warkworth’s main administration building.

Recent modifications have been completed to standardise reticulation to the mining fleet across MTW at 33kV. As such electrical supply to the mining fleet at Mount Thorley is supplied from Warkworth.

Moolarben

Power is supplied to the site via a 66kV transmission line from the Ulan Switchyard. The line runs adjacent to the road and rail corridor to the CHPP facilities where a 66/11kV substation is located. The site has sufficient power supply to support the planned operations.



Ashton

The proposed higher capacity longwall face necessitates the current electrical infrastructure to be upgraded to accommodate higher electrical load requirements. The SEOC requires the relocation of the 132kV powerline and additional aerial lines and transformers.

13.5 Internal Services

Internal services provided by the operations include medical, fire-protection, purchasing, accounting, human-relations, community-relations, environmental-safety-health (ESH), legal and marketing. For the larger sites, these facilities are located onsite and are sufficient for the operation of the mines. The smaller sites have services such as legal, marketing and accounting offsite in the head office. A proportion of these costs are reallocated to the smaller sites in economic modelling.

13.6 Personnel

The management organisation is conventional and considerable effort appears to be devoted to planning, to resolving foreseeable problems ahead of time and taking advantage of opportunities. RPM considers the current structure suitable to manage the operations. Given the majority of the assets are operating mines and have existing workforces in place, RPM anticipate that the main requirement for ongoing recruitment will be for maintaining workforce levels as a result of typical levels of turnover.

The exceptions are that a workforce will be required to run the planned South East open Cut at Ashton and underground operators will be required at Donaldson.



14. LOM Operating and Capital Costs

The Capital and Operating costs outlined below reflect the Operating Assets Consolidated Production Schedule which is summarized in **Section 9** and detailed by operation in **Section 10**. The forecast costs assume all Inferred Resources are included as coal. All costs are assumed to be Australian Dollars unless denoted otherwise.

RPM notes that the consolidated cost forecast excludes Donaldson (which is presented in **Section 14.3**, as this is a re-start project with start date not confirmed due to internal project development priorities of the Company.

This section provides an overview of the annualised costs for each project on a Free on Board and Free on Rail basis as well as CAPEX, however detailed annualised forecasts (broken into those centres in **Section 14.1**) are provided in **Appendix G** for reference. The detailed breakdowns in **Appendix G** include the

14.1 Operating Costs

Operating costs for the Projects are reported as Free on Rail (“FOR” or “Onsite Costs”) and Free of Board (“FOB” or “FOR plus off site costs”) cash costs. These cost centres incorporate the following costs:

- **FOR or Onsite costs:** include all costs to produce the product from mining to the rail loading facilities and incorporate the following:
 - **Open cut mining of waste and coal:** This includes the drill and blast costs, dragline, excavators, trucks and haulage costs to the waste dumps and CHPP’s.
 - **Site Administration (G & A costs):** This includes technical services and administration labour costs etc.
 - **CHPP:** All costs associated with washing of the coal and transport to the rail loading facilities.
- **FOB costs:** includes all costs to transport the coal products to the ship for transfer to customers. These costs include the following:
 - **Rail:** Costs associated with third party rail freight from the rail loading facilities to the port terminals
 - **Port:** Costs associated with transfer of coal product from rail freight to boat via the coal handling terminals at the Port of Newcastle.
 - **Other costs:** These include royalties (unless otherwise noted) and levies, corporate management and demurrage at the port.

RPM highlights that all costs presented are real costs with no inflation included.

Historical Costs

The historical costs per costs centre and operation as shown in **Table 14-1** show a general decrease from 2016 through to 2017. This decrease was primarily due to the cost saving measures the Company implanted across the majority of their operations. The exception to this are Yarrabee and Ashton where increases are due to short term mining difficulties which are isolated in the schedule.

Forecast Operating Costs

Estimated LOM average operating costs for the Assets are summarized in **Table 14-2** while the LOM yearly operating costs are summarised in **Table 14-3**. RPM notes that the unit costs presented in **Table 14-2** and **Table 14-3**, while sourced from information provided by the Company, were adjusted where considered appropriate to reflect RPM’s independent review and LOM schedule presented in this Report. Review of the forecasts clearly highlights the differentiation between the HVO, MTW and Moolarben low cost operations versus the remainder with these assets having significantly lower FOB and FOR costs than the other operations.



Table 14-1 Historical Average Operating Costs

Operation	Center	Unit	2016	2017	H1 2018
HVO	FOR	AUD/Product t	NA ¹	50.9	53.2
	FOB	AUD/Product t		72.3	77.3
MTW	FOR	AUD/Product t	NA ¹	52.1	52.3
	FOB	AUD/Product t		72.0	71
Moolarben	FOR	AUD/Product t	32.5	29.2	22.4
	FOB	AUD/Product t	56.6	54.4	48.9
Yarrabee	FOR	AUD/Product t	62.5	73.3	101.3
	FOB	AUD/Product t	94.7	122.0	146.3
Ashton	FOR	AUD/Product t	82.7	87.0	128.8
	FOB	AUD/Product t	104.4	120.1	166.1
Austar	FOR	AUD/Product t	91.6	67.6	157.3
	FOB	AUD/Product t	120.7	95.8	196.5
Stratford and Duralie	FOR	AUD/Product t	86.0	66.2	124.2
	FOB	AUD/Product t	123.8	101.4	160.6
Donaldson	FOR	AUD/Product t	153.9	Note 2	Note 2
	FOB	AUD/Product t	235.7		
Middlemount	FOR	AUD/Product t	62.40	74.485-	84.60
	FOB	AUD/Product t	113.018	-137.17	149.67

Source: Total Costs Supplied by the Company with Unit Costs based on total reported tonnages.

Notes: ¹ HVO/MTW was purchased in 2017, ² while no production occurred during 2017 and H1 2018 for Donaldson and production during 2016 was limited.

Further analysis shows that the 2017 costs are generally in line with the 2018 forecasts costs for Moolarben and Yarrabee as expected due to the steady state production, however Ashton is significantly lower while Austar and Stratford and Duralie are higher. As outlined in **Section 11**, RPM expects improvement in the Plant Yield at Ashton due to decreased dilution as such will reduce the FOB costs, however an increase in dilution is expected at Stratford and Duralie, hence the increase in costs.

Austars’ increasing costs are a reflection of the changes in operating procedures onsite and production limitations in relation to the management of coal bursts. RPM considers the forecasts reasonable and achievable however notes that the mine is currently not operating with all staff being relocated to nearby mines in the district to minimise OPEX during the shutdown. RPM notes that the FOR cost during H2 2018 are associated with placing the mine of care and maintenance and not operations, while the FOB costs are associated with the Take or Pay contracts for the rail and port.

At MTW and HVO, the 2018 LOM plans were scheduled during 2016 with certain assumptions on equipment and labour efficiency gains as part of the Company’s plans. The transaction with Coal and Allied was delayed from January to September 2017 which delayed the ability to achieve meaningful efficiency gains in 2017. As such RPM anticipate that cost savings will begin to be realised at MTW and HVO during 2018 and more so in 2019. RPM also notes that due to multiple pits the OPEX changes over the long life of the projects as such the 2018 H1 numbers do not reflect the LOM averages in most cases as noted in **Table 14-3**.



Table 14-2 LOM Average Operating Costs

Operation	Centre	Unit	LOM Average Cost
HVO	FOR	AUD/t prod	45.8
	FOB	AUD/t prod	67.2
MTW	FOR	AUD/t prod	49.3
	FOB	AUD/t prod	67.1
Moolarben	FOR	AUD/t prod	25.9
	FOB	AUD/t prod	50.4
Yarrabee	FOR	AUD/t prod	85.2
	FOB	AUD/t prod	124.8
Ashton	FOR	AUD/t prod	67.1
	FOB	AUD/t prod	91.3
Austar	FOR	AUD/t prod	70.5
	FOB	AUD/t prod	95.6
Stratford and Duralie	FOR	AUD/t prod	80.4
	FOB	AUD/t prod	107.1
Donaldson	FOR	AUD/t prod	34.1
	FOB	AUD/t prod	93.8
Middlemount	FOR	AUD/t prod	87.5
	FOB	AUD/t prod	133.1

Source: Unit Costs were provided by the Company however were adjusted to reflect RPM independent Consolidated Production schedule. Unit costs were calculated based on total costs which vary to the Company's due to unit costs changes and production schedule variations.

14.2 Capital Costs

Capital Costs for the project are separated into the following Cost Centres:

- Growth Capital: Includes capital required for the upgrades of the CHPP's and site infrastructure.
- Sustaining capital: Includes capital required to replace mobile and fixed plant as part of ongoing maintenance and production requirements as well as closure costs. This includes all site infrastructure production fleets and CHPP's and Tails Storage Facilities and other CAPEX items. This also includes land purchases required for Ashton.
- A summary of the CAPEX is shown in **Table 14-3**, while further asset by asset breakdowns are provided in **Appendix G**.

An average of 228 Million AUD is required per year for Growth and Sustaining CAPEX over the LOM of the group's assets ranging between 258 Million AUD in 2021 to 535 Million AUD in 2020 over the next 10 years. As shown in **Table 14-3**, the relatively large increases in 2021 and 2024 are due to equipment purchases at Yarrabee and the commencement of SEOC respectively. The majority of the CAPEX is spent at HVO, MTW and Moolarben while ~~Yarrabee~~Yarrabee, due to its mine life, also requires significant CAPEX.

Growth Capital Expenditure

As the Assets are operating site limited capital development expenditure is required in the near term with the only forecast CAPEX in the next five years for updates to the CHPP's. Growth capital is required for the establishment of the SEOC at Ashton which is planned to commence in 2024.

Sustaining Capital

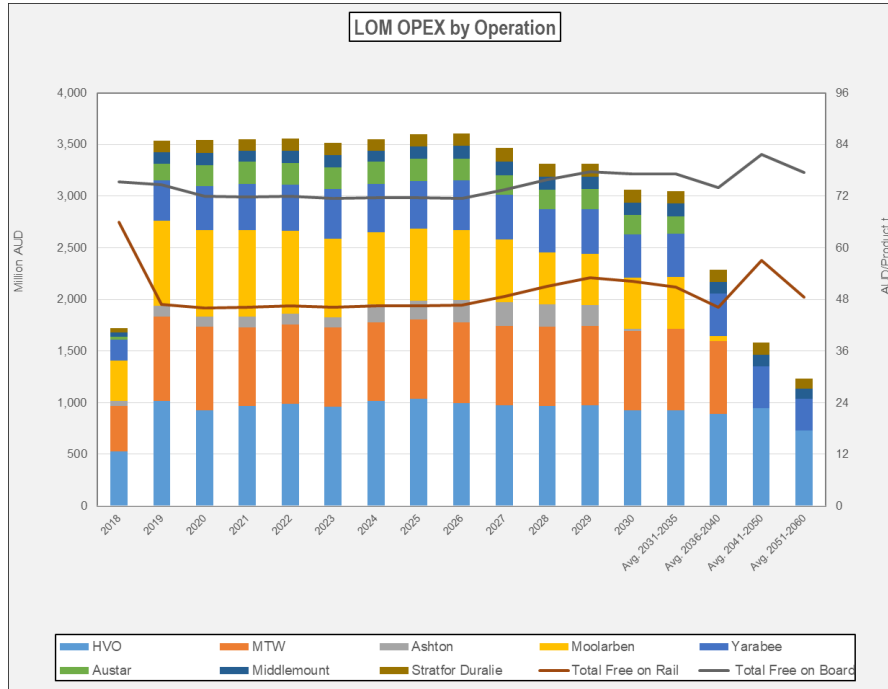
A variety of sustaining capital levels are required over the remainder of the operational life for of the assets. These vary (as shown in **Table 14-3 and Figure 14-2**) depending on the development sequences, fleet

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requirements and life of the Projects. As outlined in **Section 10**, the operations require continued replacement and sustained maintenance for both mobile and fixed plant to ensure the required production performance and processing yield are met. New and replacement production fleet (shovels, trucks, excavators, UG equipment) capital encompasses the majority of the sustaining capital for all operation (approximately 60%). The remainder of the capital includes maintenance of the CHPP’s and site infrastructure construction etc. RPM considers the forecast reasonable to support the LOM mine life plans.

Figure 14-1- Graphical Representation of the LOM OPEX



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APPENDIX III

COMPETENT PERSON’S REPORT



Table 14.4 Annual (calendar) LOM Capital Cost Estimate (Average Per Year)

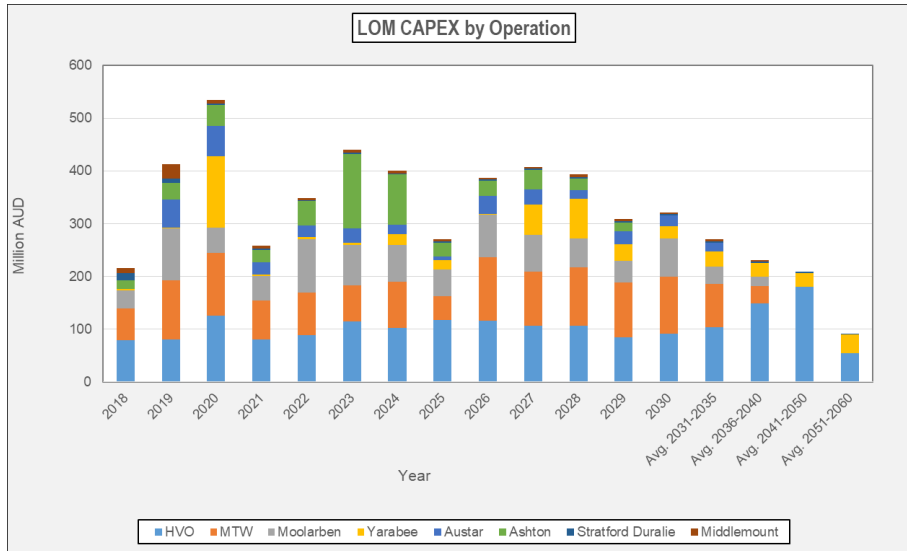
Operation	H2 2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	Avg. 2031-2035	Avg. 2036-2040	Avg. 2041-2050	Avg. 2051-2060	Total LOM
HVO	79.1	80.1	125.5	79.6	88.2	114.8	102.8	116.8	116.2	106.2	106.1	84.1	91.6	102.9	148.1	180.4	54.2	4,892.1
MTW	59.7	113.0	119.7	74.7	80.6	68.2	86.7	45.9	120.3	103.2	111.5	104.7	108.1	83.4	33.4	0.0	0.0	1,780.1
Moolarben	34.2	97.4	46.7	46.8	101.4	76.7	70.2	50.0	80.6	69.3	53.7	40.3	72.0	32.5	17.6	0.0	0.0	1,019.2
Yarrabee Yarrabee	3.5	2.0	136.2	2.0	5.0	4.0	20.4	18.4	2.0	57.5	76.4	31.7	23.7	28.5	26.0	25.9	35.3	1,020.2
Austar	0.0	53.1	57.5	24.2	21.7	27.0	18.0	7.3	33.4	29.3	15.6	25.0	19.9	16.7	0.0	0.0	0.0	365.3
Ashton	16.4	31.6	39.0	23.3	45.8	141.3	95.0	25.5	28.2	36.0	22.8	16.6	0.0	0.0	0.0	0.0	0.0	521.6
Strafford and Duralle	12.9	7.9	2.6	2.5	2.5	2.5	2.5	2.7	2.9	3.1	2.8	2.7	2.5	2.7	2.4	2.4	1.8	105.6
Middlemount	10.5	27.7	8.1	5.3	3.1	5.9	4.7	4.4	3.3	3.0	5.3	3.7	3.6	4.3	3.9	0.0	0.0	125.7
Total	216.3	412.8	535.4	258.3	348.3	440.4	400.3	271.0	387.0	407.6	394.2	308.6	321.5	271.0	231.4	208.8	91.3	9,829.5

Source: CAPEX Costs Provided by the Company and utilised by RPM in the Coal LOM Schedule

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Figure 14-2 Graphical Representation of LOM CAPEX



14.3 Donaldson

Based on the LOM plan, the forecast OPEX and CAPEX for Donaldson are presented in **Table 14-5** and **Figure 14-3**. RPM highlights that as there is no start date as yet, the dates are set by year only.

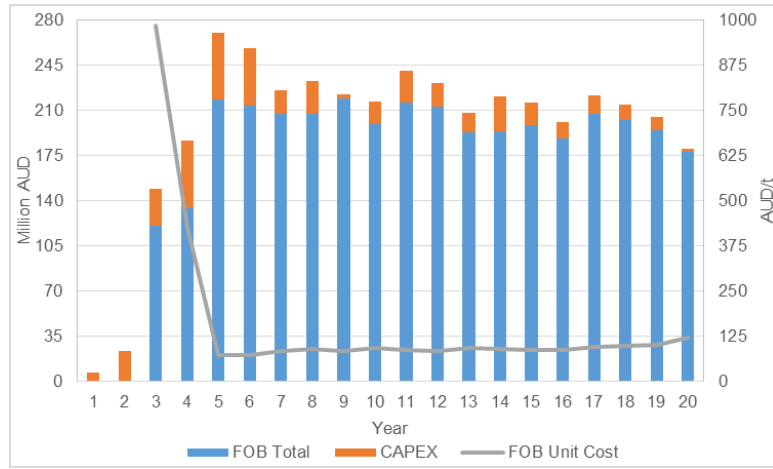
Table 14-5- Donaldson LOM OPEX and CAPEX

Centre	Unit	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15	Year 16	Year 17	Year 18	Year 19	Year 20
OPEX	FOR MIII AUD			90.6	98.5	152.9	151.8	149.2	147.5	155.3	145.0	156.3	159.8	146.8	147.5	149.3	141.9	140.6	136.9	131.3	120.4
	AUD/ ROM t			399.6	184.4	30.9	31.0	31.3	31.0	28.5	32.0	28.3	27.6	32.3	31.6	30.4	33.4	34.0	35.8	37.9	45.1
OPEX	FOB MIII AUD			120.3	134.2	218.7	213.6	207.2	207.0	219.0	199.1	216.1	212.6	192.8	193.7	198.6	188.2	207.3	202.3	194.5	177.8
	AUD/Prod t			986.3	425.4	72.4	73.0	82.7	89.8	83.3	93.5	86.8	82.7	92.1	91.0	86.1	88.2	94.6	97.0	101.5	121.6
CAPEX	MIII AUD	6.7	23.4	29.1	52.4	51.8	45.0	18.1	25.9	3.9	17.7	24.4	18.9	15.6	27.1	17.9	12.9	14.4	12.5	10.6	2.6

Source: Unit Costs were provided by the Company however were adjusted to reflect RPM independent LOM schedule. Unit costs vary to the Company’s due to unit costs changes and production schedule variations. Total Free on Board includes Royalties
 CAPEX Costs Provided by the Company and utilised by RPM in the Coal Reserve Schedule



Figure 14.3- Graphical Representation of Donaldson LOM OPEX and CAPEX





15. Overview of Permitting, Environmental Impact and Social & Community Impact

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15.1 HSE Assessment Overview

The objective of the HSE assessment is to provide an independent evaluation of potential environment, health and safety issues related to the Company's assets that could pose a material risk to future investors. The material threshold agreed for the Project is ~~AUS\$10M~~AUD10M per issue per site. In addition, ERM has identified the following key issues for the assets:

- Key non-material issues associated with recent non-compliances and / or regulatory action;
- ~~issues~~Issues subject to actual or imminent prosecution by the environmental or safety regulatory authorities; and
- ~~reasonably~~Reasonably foreseeable issues within scope that could cause imminent significant delays (i.e. risk of delays associated with non-issue of approvals).

The aspects reviewed in this Assessment were as follows:

- **Environmental, Safety and Social Management:** Through review of available documentation, ERM assessed the Company's current EHS management across each asset to identify material HSE risks and data gaps, identify potential liabilities and obligations in terms of HSE risks and / or HSE issues that may significantly constrain the Company's future development;
- **Environmental Approvals:** ERM conducted the following:
 - a review of key environmental permits and permit applications; and
 - an assessment of environmental, health and safety and social regulatory and compliance issues associated with Project components, based on currently available information.

15.2 Approach

The HSE review of environmental, health and safety issues that could pose a material risk to future investors consisted of the following tasks:

- Review of documents made available by the Company in the Virtual Data Room (VDR);
- Submission of Project questions to the client and Requests for Information (RFI) via the agreed communication process; and
- Review of available public information.

15.3 HSE Governance and Management System

Organisational HSE structure

Yancoal's Health, Safety, Environment Committee sets the direction for the Company's continuing commitment to the highest safety, environmental management and community engagement standards. Working with Yancoal's executive and senior management teams, the Committee helps ensure Yancoal has the leadership, capabilities, systems and reporting procedures required to achieve zero harm.

The Health, Safety and Environment Committee assists the Board in overseeing Yancoal's health, safety and environmental responsibilities, with the following objectives:



- Fulfil its responsibilities in relation to the health, safety and environment (collectively HSE) matters arising out of the activities of the Company;
- Consider, assess and monitor whether or not the Company has in place the appropriate policies, standards, systems and resources required to meet the Company's HSE commitments; and
- Provide necessary focus and guidance on HSE matters across the Company and
- The Committee makes recommendations to the Board.

HSE performance at the Assets is delivered by means of the overarching Yancoal Environment and Community Relations Policy (E&C Policy) which provides the governing principles for environmental and community management.

Environmental Management

Each Asset has an Environmental Management Strategy (EMS), which in turn is supported by a range of procedures, strategies, plans and programmes, designed to deliver compliance with applicable regulatory Commitments, Obligations, Undertakings and Requirements (COURs), which are a function of Project Approval conditions and Environmental Protection Licence conditions for NSW operations and Environmental Authority conditions for QLD operations. These include:

- Strategies, Plans and Programmes (Environmental Assessments, management strategies, management plans and monitoring programmes); and
- Support Documents (environmental work instructions, training manuals, single point lessons, forms, permits, checklists, registers and risk assessments).

The key building blocks of the EMS are the Environmental Management Plans (EMPs) which have been prepared to guide the day to day management of environmental aspects on the mines. Critical review of a selection of these management plans from all assets indicated that in general, they were of a standard consistent with the size and nature of the development and fit for purpose. In NSW, the conditions of Project Approval require management plans to be prepared to the satisfaction of and / or approved by the consent authority and / or other relevant regulators.

A team of environmental advisors are employed to implement the management plans and maintain the EMS. This team currently consists of 17.5 personnel, as well as two contractors, in addition to corporate support and includes specialists in the fields of environmental approvals and mine rehabilitation and community liaison. This level of resourcing is considered appropriate for the size, complexity and maturity of the mining operations.

The Company is proactively engaged in the local communities in which it operates. In 2017, Yancoal invested more than **\$+AUD1.3** million into local initiatives, including environmental projects; employment education and training; community event sponsorship; funding for technology and equipment purchases used by hospitals and regional rescue services; and educational and social initiatives for disadvantaged groups. Yancoal continues to work co-operatively with its community stakeholders, relying upon community consultative committees, local newsletters, community days and site-specific websites to engage and inform stakeholders of relevant matters related to nearby operations.

Health and Safety Management

Yancoal has a set of values and a code of conduct appropriate for a business of its size. Each region has a Health and Safety Management System (HSMS) designed in typical structure for the key elements (based on Australian Standard 4801: Occupational Health and Safety Management Systems) and to cover any specific regulatory issue. The integrated health and safety management system (HSMS) is structured on 13 System elements (leadership & accountability; document control; risk & change management; engineering & design; contractor management & suppliers; consultation & communication; training & competence; operational controls; health & hygiene; emergency management; incident reporting & investigation; measure, monitor & record; and audit & review). The HSMS is audited every two years for regulatory compliance and effectiveness.

The HSMS also requires a site to develop principle hazard management and principle control plans. These plans are reviewed on a 3 yearly basis and fall into two groups depending on the nature of the risk;



- Principle hazard management plans: used to manage risks that have potential to result in multiple deaths in a single incident or a series of recurring incidents;
- Principle control plans: an integrated approach to hazards across different aspects of the operation.

Yancoal has been developing a set of corporate principle hazards and associated control plans for the business. To date they have developed and implemented 4. In 2018/2019 they are implementing a further 9 and conducting two control plan/bow tie workshops. These principle hazard control plans are being developed to ensure consistency of control across the business, effective measurement of effectiveness and overview. This process is being adopted across mining industries as a way to focus on fatality prevention. Although not all of the corporate set of controls have not implemented, the sites will already have controls in place that may be identical (as principle hazard management plans or principle control plans) but are not articulated in a standard way.

Not all risk assessments were available for review. The broad-brush risk assessments are high level and may not identify specialist risks for a specific site (geotechnical associated risks primarily). To identify key safety performance for the purposes of this review, total recordable injury frequency rate (TRIFR) has been used as the key lag performance indicator. The TRIFR numbers quoted against each site are the 12 month moving average from the April 2018 Management report. The comparison figures are taken from the latest regulatory reports as follows:

- UG NSW average 15/16 was 30.4
- UG QLD average 16/17 was 23.8
- OC NSW average 15/16 was 6.6
- OC QLD average 16/17 was 12.6

HSE budgets

Detailed analysis of HSE budgets has not been undertaken in the course of this study, however complementary information, including review of HSE staff numbers and information provided regarding environmental controls implemented in recent years have been used to assess the general adequacy of the EHS budgets of the Assets. The HSE budget for the Assets mines includes provision for 19.5 full time equivalent staff within the mining operations (including two contractors), as well as additional corporate HSE support which is considered adequate. Rehabilitation rates have broadly approximated those nominated in the relevant Mining Operations Plans (MOPs) for NSW sites and Plan of Operations for QLD sites over recent years and progressive rehabilitation budgets are therefore assumed to be adequate. Major projects, such as the retrofitting of mobile plant with noise attenuation measures and the installation of additional noise and dust monitoring equipment have also been funded in recent years, further supporting the view of satisfactory HSE budgeting in recent years.

In summary, the HSE management system at the Assets is generally considered satisfactory for the size, complexity, degree of regulation and risk profile represented by these mines. The HSE management system is comprehensive, adequately resourced and has proven to be broadly effective in managing health, safety and environmental risks. Key asset specific issues are discussed further in **Section 15.4**.

There is an inherent risk in having contaminated tailings present on-site. It is understood rehabilitation of these materials by encapsulation is planned for the assets, however the variables associated with successful rehabilitation are many and existing budgets available can become insufficient if rehabilitation failures occur. ERM has not considered material risk of contamination tailings and rehabilitation failure, however it is understood that ongoing monitoring of these risks are undertaken by each asset to ensure they do not become material. Closure of any mine before the end of their mine life (e.g. due to environmental and/or health and safety issues), could trigger significant employee redundancy costs, closure and rehabilitation expense and other costs or loss of revenues. Many of these costs will also be incurred where mines are closed at the end of their planned mine life or placed on care and maintenance. ERM has not considered material risk of any unexpected or unplanned mine closures however it is understood that these costs are factored into the mine cashflows.

15.4 Assets

All other assets assessed are currently operational and or under care and maintenance. These assets are discussed further in the following section.



HUNTER VALLEY OPERATIONS AND MT THORLEY WARKWORTH

EHS Setting and Context

The Upper Hunter region is a rural landscape characterised by irrigated agriculture on the alluvial flats of the Hunter River, transitioning to pastoral ~~land use~~ and nature conservation reserves on the more marginal soil landscapes found in the surrounding hills. The region also includes a number of coal mining operations and two coal fired power stations, situated predominantly on the valley floor. Given the large scale of the project there are a number of potential receptors associated with mining activities in the area. Where possible these are monitored by the company on site. The Hunter Valley Operations (HVO) is bounded by the localities of Howick, Warkworth, Ravensworth and Jerry’s Plains, which is situated 4.5km south east of the closest HVO mining pit.

The Mt Thorley Warkworth (MTW) mine is located immediately to the south of HVO mine. A number of rural residences are located in the vicinity and are potential receptors of dust, noise and light emissions from the mines. The village of Bulga is situated 4km west of the current active mining area at MTW (noting that approved pit limits under the Warkworth Continuation Project are 2.5km from Bulga). These Assets are situated in close proximity to public roads including the Golden Highway (separating the Assets), Putty Road (separating Mt Thorley and Warkworth) and Wallaby Scrub and Charlton Roads which bound the MTW mine to the West. The altered land form is visible to motorists utilising these public roads. Visual amenity is enhanced by the presence of an earthen bund placed on the northern side of Putty Road, to visually screen the mine. This visual screening bund is complemented by a programme of aerially seeding of un-rehabilitated waste dumps that are visible from public roads. Visible waste dumps now have a good cover of grass and shrubs which results in suitable aesthetics, however noting that these waste areas will be rehabilitated in the future, consistent with the MTW Mine Operations Plan (MOP).

The 2016 Annual Review report for HVO identifies a total of 26 complaints during 2016, representing a decrease of 10 community complaints from the previous year. Complaints related to noise, dust and blasting. The 2016 Annual Review report for MTW identifies a total of 463 complaints, down 29% compared to 2015. The 463 complaints were registered by 58 people, 61% were received from 10 individuals, most ~~complaints received of which~~ were from Bulga residents, making up 83% of the complaints record.

Heritage Values

MTW and HVO both have comprehensive policies, standards and protocols in place to guide Aboriginal Cultural Heritage management across all of their operations. These policies are applied consistently and in close consultation with the Aboriginal community stakeholders who have interests in this region including the Upper Hunter Valley Aboriginal Cultural Heritage Working Group (CHWG) which was established in September 2005. The CHWG oversees all aspects of Aboriginal Cultural Heritage management associated with MTW and HVO.

The MTW Aboriginal Heritage Management Plan (2017) including the Warkworth Operations Aboriginal Cultural Heritage Zoning Scheme (CHZS) and Aboriginal Cultural Heritage Management Database (ACHMD) is a comprehensive document that guides mine and land use activities.

A separate Conservation Management Plan for the Wollombi Brook Aboriginal Cultural Heritage Conservation Area (WBACHCA) was developed in June 2017 for the conservation and protection, in perpetuity, of significant Aboriginal cultural heritage landscapes and sites and in particular, the Bulga Bora Ground area, by and for the Aboriginal people of the Upper Hunter. Yancoal will seek to register covenants on the land titles for all of the lands located within the WBACHCA which will prohibit development activities including all mining (open cut, underground, highwall), exploration drilling, mining infrastructure, overburden/top soil dumps and any other associated mining development disturbance. Covenants for each lot that are binding on current and future owners of these lands will be established pursuant to section 88 of the Conveyancing Act 1919 (NSW). The future arrangements for Aboriginal community ownership and control of the WBACHCA lands, including any funding requirements are yet to be determined although it is unlikely to reach the material threshold in any calendar year.



Native Title Claims

NC2013/006 (Scott Franks and Anor on behalf of the Plains Clan of the Wonnarua People) was registered on 16 January 2015. Native Title has not been extinguished for some areas (including crown land, water ways and access roads) and Native Title may still exist. The majority of the Assets holdings are however not subject to native title and future material risk associated with currently approved projects is not anticipated as a result of the Native Title. It is noted no native title issues occur in the current LOM.

Emission Discharges

Air Emissions

Emissions at HVO and MTW are predominantly a combination of windblown dust and direct emissions from off-road diesel vehicles. Air quality criteria for Total Suspended Particulates, PM10 and deposited dust are detailed in the Project Approvals for the respective operations. Air quality is managed in accordance with site based Air Quality and Greenhouse Gas Management Plans which identify statutory obligations and air quality criteria from the operation’s Project Approvals and EPLs, as well as air quality monitoring, management measures and reporting requirements.

Air quality monitoring includes a combination of real time and supplementary dust monitoring. This includes use of real time investigation triggers for ongoing performance assessment, which informs pre-emptive management actions to maintain compliance with criteria. PM10 and meteorological monitoring is a requirement within the site EPLs and additional dust deposition monitoring is undertaken. HVO has previously undertaken studies into best practice control implementation for wheel generated dust and for disturbing and handling overburden in adverse weather conditions as part of a series of completed Pollution Reduction Programs imposed by the EPA on previous versions of EPL 640 (now all complete). The most recent HVO Independent Environmental Audit (ERM, 2016) concluded that for the audit period HVO complied with all air quality criteria. The most recent MTW Independent Environmental Audit (Horn, 2016) concluded that for the audit period MTW complied with all commitments of the MTW Air Quality and Greenhouse Gas Management Plan. Under EPL 1976, EPL 1376 and EPL 640, HVO / MTW were required to undertake dust risk forecasting (by measurement of daily total tonnes moved and timestamped PM 10 concentrations form upwind and downwind of the premises from 1 September 2017 to 30 November 2017. These were to be reported to the EPA by 19 January 2018. Ongoing EPA requirements relating to the trial are unknown.

Current air emissions from the Assets are not considered likely to pose a regulatory risk, given the efficacy of the dust management procedures and process currently in place. These include a real time monitoring and reporting system, paired with a policy of progressively shutting down mobile plant (primarily trucks and drag-lines) in response to elevated dust emissions. Dust emissions from roadways are minimised through regular watering by a water cart fleet, while emissions from other exposed surfaces are reduced by progressive clearing and rehabilitation, aided by aerial seeding of waste dumps that are not proposed for immediate rehabilitation. The potential for ongoing equipment downtime as a result of management responses to elevated dust emissions needs to be managed, particularly as downtime hours are expected to increase as mining at MTW continues in the direction of the town of Bulga (and the current buffer distance is reduced).

Noise

HVO and MTW manage noise and vibration in accordance with site specific Noise Management Plans (NMP) and Blast Management Plans, including real time monitoring, attended monitoring and complaints handling system for noise. The most recent HVO Independent Environmental Audit (ERM, 2016) identified two exceedances that were considered non-compliant with the project approval criteria. Further, three blast events returned airblast overpressure results greater than the 0% allowable criterion of 120.0dB(L). Incidents reports were prepared and submitted to regulators. It is understood there have been no regulatory action by the regulator. The most recent MTW Independent Environmental Audit (Horn, 2016) identified an exceedance of blasting criteria associated with one airblast overpressure result greater than the 0% allowable criterion of 120.0dB(L). The report also noted that MTW generally has a history of noise complaints ~~totaling~~totaling approximately 85% of all complaints during the audit period, suggesting noise is a significant concern for the surrounding community. There were some major exceedances of noise criteria recorded during routine compliance monitoring during 2011 - 2013 which were addressed in accordance with proper procedure at the time. It is reported that independent noise monitoring conducted in 2011 (SKM)



and 2015 (WMPL) found general compliance with noise criteria and no formal noise criteria exceedances have occurred during routine attended compliance monitoring since March 2013. Noise complaints for 2015 were considerably less than for the previous three years. Noise requires continued focus as the mining at the Warkworth operation moves towards Bulga village. This is well noted by the Company with plans to address this concern in place.

Water

The most recent HVO Independent Environmental Audit (ERM, 2016) stated that there are four surface water discharge points identified in the EPL 640. Only one licensed discharge occurred during the audit period from Points 4 and 8 and that the discharge met the relevant water quality criteria and was within the allowable volume/mass limits set by the EPL. The most recent MTW Independent Environmental Audit (Horn, 2016) states that during the audit period there were a number of discharges from the MTW complex that were outside the discharge criteria and that MTW was investigating options to reduce the turnaround for laboratory analysis to facilitate a more robust monitoring protocol. It is understood actions have been implemented to address these concerns

Emission discharges are unlikely to represent a material risk based on the documentation reviewed along with the implemented procedures.

Land Tenure and Permitting

HVO and MTW operate under a range of current Mining Leases: HVO: MLs 1406, 1428, 1465, 1474, 1482, 1500, 1526, 1560, 1589, 1622, 1634, 1682, 1704, 1705, 1706, 1707, 1732, 1734, 1748, 1753; MTW: MLs 1412, 1590, 1751 and 1752

The HVO mine is permitted under two planning approvals, HVO North development consent DA 450-10-2003 and HVO South Project Approval PA 06-0261. HVO North has been subject to seven modifications and HVOS has been subject to five modifications to date. The HVO North is permitted to extract up to 22Mtpa of ROM coal until 2025 and HVO South is permitted to extract up to 20Mtpa of ROM coal until 2030. HVO operates under one Environment Protection Licence (EPL) 640. Hunter Valley Operations are subject to one EPBC Act Controlled Action Approval 2016/7640. An EPBC Act referral (2016/7641) for water related impacts at HVOS was determined to be 'not a controlled action'.

The MTW operations are permitted under two planning approvals, Mt Thorley SSD 6465 was approved 26 November 2015 for a period of 21 years, with an annual extraction rate of up to 10Mtpa ROM coal. Warkworth SSD 6464 was approved 26 November 2015 (after various appeals and public objection) for a period of 21 years with an annual production rate of 18Mtpa ROM coal. Three Environment Protection Licences (EPLs) apply: EPL 1376 (Warkworth), EPL 24 (Mount Thorley Loading Area) and EPL 1976 (Mount Thorley Operations). Warkworth operations are also subject to two EPBC Act Controlled Action Approvals (EPBC 2002/629 and EPBC 2009/5081).

The assets also operate under a number of other approvals, including for the storage of explosives, storage of dangerous goods and water licences, as well as under a number of operational and management plans approved by relevant regulators.

One approval in relation to the Warkworth Mine expansion is understood to be outstanding at the time of writing, being local council approval for the closure of Wallaby Scrub Road to facilitate the West pit westward advance, RPM has advised that agreement has now been established between the local council and MTW in relation to the closure of Wallaby Scrub Road. It is understood that finalisation of the agreement is pending monetary negotiations and it is expected to be completed well in advance of the required mining activities. Based on this, it is considered unlikely to be a material issue.

Operations EHS Performance

Environmental Performance

An Independent Environmental Audit for HVO in December 2016 (ERM 2016) demonstrated a high degree of compliance with respect to statutory requirements and internal management plans, reporting out of 363 instruments, 14 non-conformances (2 high, 7 medium and 5 low) and 9 administrative non-conformances. An independent review of MTW in May 2016 (covering the period 11 November 2010 to 22 January 2016)



(Horn, 2016), reported 41 non-compliances (none being high risks and some being administrative only). The key identified non-compliances were associated with noise/blasting, dust and water related issues. MTW have progressed in the areas of noise and dust management through the audit period though these are still areas of concern with the community (data from complaints). As the mining operation moves towards Bulga village, attention to key elements in the management of noise and dust will ensure ongoing improvement in environmental performance. This is well noted by the Company with limitations on production as well as noise muffling on mobile equipment being included in the LOM plan to mitigate any potential risk.

Environment Protection Authority (EPA) compliance audits were undertaken at HVO and MTW (EPA, March 2017). The sites were audited as part of a joint Department of Planning and Environment (DPE), Department of Industry - Resources Regulator (DIRR) and EPA compliance audit program focusing on the management of tailings, wastewater holding and sedimentation dams ('mine dams') at NSW mines. For HVO, the audit identified 61 compliant findings, two non-compliant (low environmental impact / environmental harm rating), five administrative non-compliance and three undetermined. For MTW the audit identified 57 compliant findings, five non-compliant (low environmental impact / environmental harm rating), 17 administrative non-compliance and one undetermined. An Action Plan was included in the audit findings for each operation, requiring HVO and MTW to implement measures with respect to controlling stormwater run-on to the tailing dam, maintenance of plant and equipment at the wastewater holding dams, as well as address the administrative and reporting matter. It is understood the issues have been addressed and therefore do not pose a material risk.

EPA compliance audits were also undertaken at HVO and MTW in 2014 as part of EPA compliance audit program on coal train loading and unloading facilities with a focus on management methods and procedures in place to prevent or minimise coal lost (in the form of leaks, spills and dust emissions) during rail transport. The audits identified a number of non-compliances and provided Action Plans and Pollution reduction Program conditions on the EPLs, which have since been closed out and no longer remain as conditions on the EPLs.

Noise impacts on surrounding residents have been a key driver of complaints from the community over recent years, particularly at MTW. A program to progressively reduce noise impacts from mining at the Assets has been implemented over recent years, consisting of enhanced sound attenuation for mobile plant combined with enhanced predictive noise monitoring and real time telemetry of data, combined with progressive shutting down of noisy plant. The MTW 2016 AEMR indicates work was completed in attenuating 100% of MTW's Heavy Mobile Equipment fleet. The AEMR also reported no non-compliances against consented noise limits and that there was a 62% reduction in the number of attended noise measurements which exceedance the trigger for action compared to 2015.

There were a number of surface water related incidents between 2013 and 2017. These incidents generally involved unauthorised or low quality water discharges into the environment, either as a result of overflows from water storages during high rainfall events or failures of plant and infrastructure. It is understood that one incident that occurred in October 2014 resulted in MTW entering into an enforceable undertaking with the EPA to improve water management practices on site. Further, a Clean Up Notice from the EPA issued January 2016 followed by a Prevention Notice dated 1 February 2016 was issued to MTW in relation to a separate water-related incident that occurred in January 2016 (partial dam wall failure resulting in release of water from the premises). The EPA subsequently prosecuted in the NSW Land and Environment (L&E) Court, with the Court handing down a fine of ~~\$50~~AUD50,000 to Warkworth Mining Limited in August 2017.

Three penalty notices for non-compliance with requirements of HVO's EPL 640 have been issued by the EPA during 2017 and 2018. A Penalty Notice was issued 28 February 2017 for contravention of a licence condition (date of offence 4 November 2016). A Penalty notice was issued 18 August 2017 for pollution of waters (date of offence 30 March 2017). A Penalty notice was issued 2 May 2018 for the contravention of a licence condition (date of offence 17 January 2018). The latest penalty notice was related to exceedances of air blast overpressure at two monitoring points and resulted in ~~a \$15~~an AUD15,000 infringement being issued. The above infringements are not material to the assets nor impact the LOM plan.

Blasting over-pressure incidents have occurred on the Assets, as have blast fume incidents. Whilst these incidents are generally infrequent and with procedures in place to manage any potential impact there have been some exceedances of criteria resulting in penalty notices. These however are unlikely to be material. As noted previously blasting is monitored and non-compliance is reported.



Current air, noise and water management and compliance of the Assets are not considered likely to pose an ongoing material risk, given the efficacy of the environmental management procedures and processes currently in place.

H&S Performance

HVO

The key comparable statistic of TRIFA is running at 6 is marginally lower than the NSW coal mining open cut industry average (2015/16) of 6.6. There was no safety and health management system audit or system documentation available for review. There were no risk assessments provided for this operation. With little data available the assessment of materiality could not be completed.

MTW

The key comparable statistic of TRIFA is running at 7.2 is marginally higher than the NSW coal mining open cut industry average (2015/16) of 6.6. The MTW risk register provided dated September 2017 was a broad risk register covering all the classic hazards (safety and health) in Open cut mining. There was no indication of who was involved or closure of outstanding actions. There was no safety and health management system audit or system documentation available for review. With limited data available the assessment of materiality did not indicate an issue.

While limited information was provided it was noted no material issues or concerns or occurrences have occurred under the current or previous owners in the past 3 years.

Water Management

HVO

The site is subject to the conditions of EPL 640 and includes the following relating to water management:

- Discharge points and monitoring locations;
- Concentration limits and sampling frequency; and
- Volume limits and monitoring for certain discharge points.

A Water Management Plan has been prepared by a NSW DP&E approved, suitably qualified expert to meet conditions of consent relating to water management. The WMP was approved on 19 May 2014. Water management at the mine includes clean water diversion, dewatering bores, sediment basins and a network of infrastructure, including dams, pipelines, channels and contour banks that have been established to enable the transfer of water around the site.

Groundwater and surface water access licences for take of surface and groundwater water exist for the site. With take occurring in 2016, in volumes below the allowable limits. The water balance found that HVO is typically a net generator of water (i.e. the site runs at a surplus).

As outlined in the environmental performance - water section above, there has been penalty notices issued by the EPA though no environmental harm resulted, this demonstrates previous issues with water management on-site. Previous issues have the potential to compound fines resulting from any future incidents, however this is unlikely to be of material significance unless a catastrophic incident.

No issue of material significance was identified relating to current water management practices from review of the documents outlined.

MTW

The site is subject to the conditions of EPL 24, EPL 1976, and EPL 1376 including the following relating to water management:

- Locations of monitoring and discharge points (EPL 1976 and 1376);
- Concentration and discharge volume limits (EPL 1976 and 1376);

A Water Management Plan has been prepared by a NSW DP&E approved, suitably qualified expert to meet conditions of consent relating to water management. The WMP was approved in January 2016. Water



management includes clean water diversion, sedimentation ponds and a network of infrastructure (i.e. dams, pipelines, contour banks) to control the movement of water around site.

The water balance simulation modelling identified that there is a 50% chance that between 1,500 to 2,000 ML/year of external water would be required. The current allocation is 1,012 ML/year (at 100% Available Water Determination). It is likely that additional water licenses will need to be sought and purchased over the life of the project to meet external raw water demands; though this is unlikely to be of material significance.

Flood management measures are incorporated into the site and includes a flood levee. The 100 year ARI design flood event peaks at approximately 3.5 m below the crest levee. The levee was constructed to protect the mine from floods to the 500 year ARI design flood event, on this basis there is significant freeboard to mitigate flood impacts and thus alleviate any potential material issue.

Groundwater and surface water access licences are held to account for take of surface and groundwater. With take occurring in 2016, in volumes below the allowable limits. The 2016 Annual review identified one incident involving water that required notification to government agencies when a sediment dam had a partial embankment failure. The incident is resulted in a ~~\$50an~~ AUD50,000 fine from proceedings in the Land and Environment Court in 2017. While this is not considered material ongoing monitoring as site personnel are aware, is prudent. It is noted that site personnel are aware of these issues.

The 2016 Independent audit identified that events occurred in the period resulting in non-compliances relating to water discharges and quality criteria not being met. It is noted that overflows have occurred although the review could not confirm if the overflows were greater than design basin design criteria. It was also found that discharge events did not meet Total Suspended Solids (TSS) criteria, with laboratory results being received the day after discharge occurred, hence release occurred prior to water quality being confirmed. On-going management issues could result in fines from Government agencies, with fines compounding with each incident. Review of site management could potentially identify opportunities for improved management, such as developing a TSS-Turbidity correlation to allow for immediate, in the field water quality results prior to commencing discharge. RPM is aware that the HVO was only recently under the Company’s control as such further review of system and procedures are taking place.

Issues reviewed are of concern however individually are not material and are being managed by site personnel.

Soils and Contamination

During previous discussions and reviews of the HVO/MTW site detailed that the site contains a range of potential sources of contamination, including bulk fuel storages, tailings disposal facilities, wastewater treatment plants and washdown bays, mechanical workshops and associated waste oil storages. The majority of which do not pose a material risk.

Review of the HVO contamination register (2015) indicates 12 sites listed as ‘contaminated’ are present within the HVO operational area. Another 89 sites are listed as having various likelihoods of contamination, some of which have been remediated to various extents. An equivalent register prepared for MTW indicates three contaminated sites at the mine and 81 other sites have the potential to be contaminated. A firefighting training area is located on the MTW mine. Whilst not listed on the register, this area has a high likelihood of being impacted by perfluorinated compounds, which are a contaminant associated with the use of Aqueous Fire Fighting Foams (AFFF). It is further noted that the use of AFFF containing perfluorinated compounds has been phased out. RPM notes that the identified and potential contaminated sites could be investigated and remediated progressively as new facilities are constructed to replace older infrastructure, or following cessation of mining in that location. Accordingly, potential contamination from the sources outlined above is not deemed likely to pose a material risk.

In line with similar operations in the region, a contamination risk is potentially posed by the current and historic tailings storage facilities. RPM is aware that due to the processing methods, heavy metals are stored in these facilities. These can lead to contamination if not contained appropriately. Data held on the National Pollutant Inventory database indicates the HVO mine deposited a total of 1,785 tonnes of potentially hazardous heavy metals (including lead, mercury, chromium, arsenic and cadmium) into on-site tailings storage facilities during the 2016-15 reporting period.

The MTW mine disposed of a total of 1,122 tonnes of heavy metals into tailings facilities over the same reporting period. It is therefore evident that a significant reservoir of potential contaminants is present within



the tailings storage facilities at the Assets. RPM has not been provided detailed information to quantify the potential risk, however notes that no breaches have been filed against the Company or instances of contamination of the groundwater have been publically reported. It is understood that all reporting requirements have been met.

There is an inherent risk in having contaminated tailings present on-site. It is understood rehabilitation of these materials by encapsulation is planned, however the variables associated with successful rehabilitation are many and existing budgets available can become insufficient if rehabilitation failures occur. ERM has not considered material risk of contamination from tailings and rehabilitation failure, however it is understood that ongoing monitoring of these risks are undertaken by the asset to ensure they do not become material.

Ecology

HVO

The HVO South mine holds 140 ha of offsets in the Goulburn River Biodiversity Area, triggered by approval 06_0261. EPBC 2016/7640 approval (last modified in August 2017), also requires additional offsets including Central Hunter Valley Eucalypt Forest (CHVEF) - 61ha, Swift Parrot (*Lathamus discolor*) foraging habitat - 68.1ha, Regent Honeyeater (*Anthochaera phrygia*) breeding and foraging habitat - 68.4ha and Green and Golden Bell Frog (*Litoria aurea*) breeding (2.6ha) and foraging habitat (102.7ha).

The approved Offset Strategy as reported EPBC 2016/7640 Annual Compliance Report (2017) includes:

- Wandewoi Biodiversity Area BA - To offset approximately 63% of the action's impacts on Central Hunter Valley Eucalypt Forest (CHVEF) and 100% of the action's impacts on the Swift Parrot.
- Mitchelhill BA - To offset the residual 37% of the action's impacts on CHVEF and 53.9% of the Regent Honeyeater impacts.
- Condon View BA - To offset the remaining 46.1% of the Regent Honeyeater impacts.
- Crescent Head BA - To offset 99.25% of the action's impacts on the Green and Golden Bell Frog.
- The residual 0.75% offset for the Green and Golden Bell Frog will be provided through other compensatory measures, which are likely to comprise contribution to a research program.

The EPBC 2016/7640 Annual Compliance Report (2017) has not reported any non-compliance although it is noted that the offset sites at Mitchelhill BA, Condon View BA, and Crescent Head BA are to be secured in perpetuity, with legally binding agreements in place by 23 October 2018. Additionally, the Wandewoi BA is required to be secured in perpetuity by 10 October 2019.

Ongoing costs of note are associated with the management and maintenance of the biodiversity areas and the rehabilitation of degraded vegetation communities in the BAs. These costs have not been reviewed by ERM and potential material risk cannot be confirmed although it is unlikely to reach the material threshold of ~~\$10M~~AUD10M in any given year.

MTW

The EPBC 2002/629 approval (last modified in November 2016) requires MTW to offset the impact upon Matters of National Environmental Significance (MNES) by protecting and managing no less than 1,586 hectares (ha) of habitat for the Regent Honeyeater (*Anthochaera phrygia*) and Swift Parrot (*Lathamus discolor*). At least 1,586ha of the Goulburn River and Bowditch Biodiversity Areas (BAs) were to be secured as an Offset Area, with a legally binding mechanism for enduring protection by 17 February 2018. The EPBC 2009/5081 approval (also last modified in November 2016) requires WML to offset the MNES by protecting and managing a total of no less than 2,626 hectares (ha), of habitat for the Regent Honeyeater and Swift Parrot, with a legally binding mechanism for enduring protection also by 17 February 2018. Yancoal have requested an extension of the due dates for the provision of a legally binding mechanism to secure the offset areas associated with EPBC 2002/629 and EPC 2009/5081 to 15 February 2019. This revised date will align with that specified in the NSW Planning approval SSD 6464 for legal protection of these offset areas

The Biodiversity Management Plan and Biodiversity Offset Strategy for MTW includes direct offset and indirect compensation measures, including:

- Retirement of species and ecosystem credits within 3 years of the date of commencement of the action.
- Retirement of rehabilitation offsets credits, within 10 years after completion of mining operations.

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- Direct land based offsets within designated Regional Biodiversity Areas (Goulburn River, Seven Oaks, Bowditch, Putty, Condon View and North Rothbury BAs) and Local Biodiversity Areas (Southern Biodiversity Area including the Putty Road Offset Area and Northern Biodiversity Area).
- Performance criteria for regeneration of Warkworth Sands Woodland to ensure successful regeneration in the Northern Biodiversity Area within 15 years after commencement of the action. Schedule 3 of NSW approval PA 06_0261 requires the lodgement of a Conservation and Biodiversity Offset Implementation Bond of **A\$1AUD1** million (indexed to inflation) to provide financial security that the Warkworth Sands EEC would be rehabilitated within the Northern Biodiversity Area. This bond would revert to the state in the event rehabilitation fails to meet performance targets within a 15 year period.
- Development of an Integrated Management Plan for the Warkworth Sands Woodland EEC; and
- A one off **A\$1AUD1** million contribution to the Office of Environment and Heritage (OEH's) 'Saving Our Species – Regent Honeyeater' conservation program.

The Biodiversity Management Plan for MTW (RTCA, 2016) reports that the MTW mine holds a total of 6,380 ha of offsets under both state and federal project approvals. Each with different requirements under the relevant permits which requires greater diligence in their management to ensure compliance. The Regional Biodiversity Areas Annual Report (2017) reports that monitoring results indicate that the vegetation and habitat health are being maintained in comparison to the baseline data. The Local Biodiversity Areas Annual Report (2017) identified that trespassing and illegal tree clearing and timber getting have been recorded within the Southern Biodiversity Area. Yancoal has undertaken appropriate actions to prevent a continuation of this activity: Offsets are believed to have been addressed or are in an advanced state of resolution. As such, no material risk is believed to be presented by offsets required by the current MTW approvals.

Rehabilitation and Mine Closure Liability

Rehabilitation is informed by the respective Mine Operations Plans (the HVO North and South MOPs and the MTW MOP, prepared in 2016) and the Mine Closure Plans for the Assets, prepared in 2014. Review of the 2016 MOPs indicates these are comprehensive documents that identify mined land suitable for rehabilitation during the MOP period and provide high quality information to support the rehabilitation and revegetation process.

Rehabilitation is reported to be progressing across the site at a rate generally consistent to that specified within the MOPs. The 2016 HVO Annual Environment Management Report (AEMR) reports a total of 84.9 ha rehabilitation was completed during 2016 against a MOP target of 82.6 ha. Total disturbance undertaken was 120.2 ha, 28.9ha lower than the MOP projection of 149.1 ha. This represents 80% (304 ha) of the area proposed for rehabilitation during the 2013 MOP period. Capping of the Interim Tailings Storage Facility continued during 2016 and is due for completion in 2017. At MTW 102% (180 ha) of land proposed was rehabilitated during the 2013 MOP period. Capping and rehabilitation of Tailings Dam 1 at MTW was undertaken in 2015. A site inspection indicates this landform has been designed to gently shed surface water and is now surfaced with a thick cover of pasture grasses. The 2016 MOPs propose a total of 616 ha of rehabilitation at HVO between 2015 and 2018, compared to 730 ha of new disturbance. At MTW 681 ha of rehabilitation is proposed during the MOP period, which compares to a total of 440 ha of new disturbance.

The adequacy of the woodland rehabilitation undertaken is the subject of ongoing monitoring and comparison with nearby reference sites. Niche (2016) report the findings from rehabilitation monitoring undertaken at sites in which the intended post-mining vegetation community is Central Hunter Grey Box – Ironbark Woodland and Central Hunter Ironbark-Spotted Gum-Grey Box Forest. The results of this study indicate that the monitoring sites have as yet not reached parity with the reference site benchmarks. Three sites of the 20 monitoring sites scored 50% or higher conformance with the 10 benchmark monitoring parameters. The majority of monitoring sites (85%) recorded a degree of divergence from the reference site benchmarks. The soil testing that has been undertaken during rehabilitation monitoring and presented in Appendix 5 of the 2016 AER indicates that many of the rehabilitation sites have soil limitations when viewed in the context of agricultural soil requirements. Most of the rehabilitation to be undertaken at MTW in the future is aimed at re-establishing native vegetation communities so the soil limitations need to be assessed with regards to native vegetation establishment rather than agricultural outcomes.

A grazing trial commenced at HVO in 2014 to document the suitability of rehabilitated pastures for grazing stock. Results reported in the HVO 2015 AEMR indicate cattle grazed on rehabilitated land gained weight faster than those cattle grazed on reference sites. These findings are supportive of the view that



rehabilitation of pastures on the site has been undertaken to a suitable standard. The current ACARP funded grazing trial (C23053 Study of Sustainability and Profitability of Grazing on Mine Rehabilitated Land in the Upper Hunter) concluded during June 2017.

No issue of material significance was identified relating to current rehabilitation practices from review of the documents outlined.

MOOLARBEN

HSE and Social Setting

Moolarben is an existing open cut and underground coal mine located approximately 40 km northeast of Mudgee in the Western Coalfields of NSW in the vicinity of the Ulan and Wilpinjong mines and within the Moolarben Creek Valley, in the headwaters of the Goulburn River catchment. The Goulburn River National Park is to the northeast of the Moolarben and the Munghorn Gap Nature Reserve is to the south. Ulan village to the west comprises residential dwellings, a small rural primary school, one church, commercial premises and a hotel. All of the residences and the majority of vacant freehold land in the village are mine owned. A rural residential development is located approximately 4km to the southwest of the Moolarben. A small number of farms and scattered homesteads occupy the remainder of the surrounding freehold land.

The Company is proactively engaged in the local communities through a range of mechanisms, including biannual newspaper advertorials, quarterly letters to neighbours, local government briefings, community consultation committees and financial sponsorship and support. In total, Moolarben provided ~~\$146~~AUD146,799 in community donations during 2017 to 45 community groups and events through its Community Support Program and other programs. Complaints received from local community members are recorded and investigated by the Company. During 2017, a total of 119 complaints were received by 17 complainants. All complaints are investigated and included in the complaints register on the Moolarben Coal website (www.moolarbencoal.com.au). Noise remained the primary issue of concern (96% of complaints). A comparison of complaints to previous years indicates an ongoing decrease in the total number of complaints, as well as reduction in noise related complaints. Use of real-time feedback within the mining operation has facilitated proactive and reactive responses. Ongoing community and stakeholder liaison and consultation has continued.

Heritage Values

Moolarben has developed an Aboriginal Heritage Database which includes all previously recorded Aboriginal objects and holds all information on Aboriginal archaeological resources relevant for the entire Moolarben - 454 sites have been reported in the Heritage Management Plan (HMP). The Historic Heritage Sites Database includes 25 sites of known and potential historical (non-Aboriginal) heritage significance (local). Construction/development activities are undertaken in accordance with the HMP (2017). As a result of previous assessments and archaeological salvage works, approximately 270 Aboriginal heritage sites and 13 historic heritage sites have already been managed (e.g. salvaged) and/or require no further management.

As outlined within the HMP, 85 sites will be protected in perpetuity as part of designated heritage conservation areas (Murrumbidgee Creek Management Area, Powers Conservation Area and Red Hills Conservation Area) in accordance with the Stage 2 Project Approval (08_0135). In addition, Moolarben have identified two additional management areas – the Underground 2 Rock Shelter Management Area and Bora Creek Management Area. The long-term management and security of these areas has not been confirmed although it is noted that all five of these Management Areas are clearly identified and protected within the current Life of Mine Plan and are located outside of approved mining activities. As such, they are not considered to present a material risk.

Native Title Claims

NC2017/001 (Warrabinga-Wiradjuri #7) was registered on 01 September 2017. Native Title has not been extinguished for some areas (including crown land and water ways) and Native Title may still exist. The majority of the Assets holdings are however not subject to native title and future material risk associated with currently approved projects is not anticipated as a result of Native Title.



An Ancillary Deed of Agreement is also maintained between Moolarben and the North-Eastern Wiradjuri People of the Bathurst/Lithgow/Mudgee Area. The Deed (Government Party Deed) represents an agreement for the purposes of section 31(1)(b) of the Native Title Act and was executed on 7 July 2008. The Deed includes obligations for Moolarben and the North-Eastern Wiradjuri People, such as the funding of apprenticeships and scholarships and the formation of an Aboriginal Cultural Liaison Sub-Committee and an Implementation Committee. [ERM have not reviewed this agreement and cannot comment on any ongoing commitments or risks].

No issues of material significance were identified relating to current heritage management practices from review of the documents outlined. Heritage related risk and regulatory obligations in respect to cultural heritage values are understood to have been satisfactorily addressed. Future material risk associated with currently approved projects is not anticipated.

Emission Discharges

Similar to other open cut coal mines in the region, air emissions at Moolarben are predominantly a combination of windblown dust and direct emissions from vehicles. Air quality is managed in accordance with an Air Quality Management Plan, approved by DP&E and includes a combination of real time and supplementary dust monitoring at locations representative of sensitive receptors. Moolarben has previously undertaken studies into best practice control implementation for wheel generated dust and for disturbing and handling overburden in adverse weather conditions in accordance with regulatory requirements of the EPA (now all complete). Dust control measures include a real time monitoring and reporting system, paired with a policy of relocating / pausing operations in response to elevated dust emissions. Dust emissions from roadways are minimised through regular watering by a water cart fleet, while emissions from other exposed surfaces are reduced by progressive clearing and rehabilitation. The most recent Independent Environmental Audit (Trevor Brown and Associates, 2016) concluded that the implementation of the Air Quality Management Plan addresses management of operations and monitoring of air quality for the Moolarben activities in accordance with best management practices outlined in the Air Quality Management Plan and that air quality management at Moolarben are in compliance with approval and licence requirements.

Moolarben is licensed to discharge water in accordance with its Environmental Protection Licence EPL 12932 subject to various water quality and rainfall criteria. However, no water discharges occurred from Moolarben during the 2017 reporting period. Further, the most recent Independent Environmental Audit (Trevor Brown and Associates, 2016) concluded that the implementation of the Water Management Plan and sub-plans prepared for the Moolarben project and approved by DP&E on 31 July 2015, demonstrate Moolarben is managing surface water generally in accordance with Project Approval, EPL and bore licence requirements. The audit report concluded that upgrades to the surface water management system, the Water Sharing Agreement with Ulan Coal and no licensed discharges from the site during January 2013 to December 2015, have demonstrated a high level of performance of water management on the site.

Moolarben manages noise and vibration in accordance with the Noise Management Plan (NMP) and Blast Management Plan, including real time monitoring, attended monitoring and complaints handling system for noise. The most recent Independent Environmental Audit (Trevor Brown and Associates, 2016) concluded that Moolarben is currently meeting its obligations under all the Project Approval noise and blast conditions, Statements of Commitment and EPL 12932 conditions. The complaints response procedure is consistent with best practice and with the use of the Mining and Production Environmental Assistants providing real time investigation and advice to the mine operations personnel on noise emissions from the mine activities, is considered to exceed the procedures/protocols implemented at other extractive industry projects in NSW.

No issues of material significance were identified relating to emission discharges from review of the documents outlined.

Land Tenure and Permitting

Moolarben operates under a number of mining leases: ML1605 (expires 20/12/2028), ML1606 (expires 20/12/2028), ML1628 (expires 23/9/2034), ML 1691 (expires 23/9/2034 and ML 1715 (expires 31/8/2036).

Mining operations at the Moolarben are currently approved until 31 December 2038 and are carried out under NSW Project Approval (05_0117) (Moolarben Project Stage 1) (as modified) and NSW Project Approval (08_0135) (Moolarben Coal Project Stage 2) (as modified). Additional approvals under the



Commonwealth Environment Protection and Biodiversity Conservation Act 1999 apply to mining operations, including Stage 1 mining operations Approval Decision (EPBC 2007/3297) granted 24 October 2007 (as varied) and EPBC 2013/6926) granted 13 November 2014. Stage 2 mining operations are also undertaken in accordance with Approval Decision EPBC 2008/4444) granted 18 May 2015. There are pending requests to modify both the Stage 1 and Stage 2 Project Approvals (05_0117 and 08_0135 respectively), as well as an additional EPBC Controlled Action application associated with the Stage 1 and Stage 2 extension project however it is understood that these are outside the current Life of Mine Plan (LOM) and have not been considered further.

Environment Protection Licence 12932 applies to the Site. Moolarben also operates under a number of other approvals, including for the storage of explosives, storage of dangerous goods and water licences, as well as under a number of operational and management plans approved by relevant regulators.

No issues of material significance were identified relating to permitting from review of the documents outlined.

OPERATIONAL HSE PERFORMANCE

Environmental Performance

Moolarben has exhibited a high degree of environmental compliance over recent years. An Independent Environmental Audit (IEA) dated April 2016 demonstrated a high degree of compliance with respect to statutory requirements and internal management plans (Trevor Brown and Associates, 2016). The next Independent Audit will be required by December 2018. Minor non compliances with the Project Approval conditions more recently in 2017 related to blasting and stockpiling and resulted in Penalty Notices being issued. These have been adequately addressed through procedural review and implementation of corrective measures by the Company and are not material. Various non compliances with conditions of EPL 12932 were reported from 2008 – 2016. These were largely administrative non compliances and / or matters dealt with via pollution studies and reduction program attached to the EPL. Previous pollution reduction programs attached to the licence relating to particulate matter management and water management have been completed. There are no current pollution studies and reduction programs attached to the licence. Historic non compliances and regulatory action related to water management and off site discharges at the site were addressed at the time (2009/2010) and there have been no ongoing reoccurrences.

Current site compliance is not considered to present a material risk based on the documentation reviewed.

H&S Performance

Moolarben Open Cut

The key comparable statistic for Moolarban OC, TRIFA is running at 3.9 which is below the NSW coal mining open cut industry (2015/16) average of 6.6.

The Broad Brush Risk Assessment report provided was April 2016 (although an annual review is suggested) with 1 extreme risk and 26 high risks. Although a wide range of hazards were considered the controls noted referred to general control systems with no detail. Some of the hazards may have been assessed with a lower consequence than history would indicate (explosives consequence assessed as a single fatality) but overall considered reasonable.

The SHMS Compliance and Effectiveness Audit conducted in October 2017 was based on the NSW Department of Primary Industries Mine Safety Operations Branch Coal Operation Health and Safety Management System checklist. There was one major non-compliance/effectiveness identified with a deficiency with their management of mining induced seismic activity. It is assumed that with the closure of the action from the most recent safety audit there would be no material risks.

Moolarben Underground

The SHMS Compliance and Effectiveness Audit conducted in October 2017 by Aussafe Consulting was based on the NSW Department of Primary Industries Mine Safety Operations Branch Coal Operation Health and Safety Management System checklist. The audit commented that the HSMS had not long been



developed therefore some of the system requirements were not readily available. Some major non-conformances identified were primarily system based but included the following:

- audit schedules to be developed, ensuring audits are conducted to schedule;
- audit action close out;
- inconsistent application of change management system;
- develop an underground mine risk register including health risks; and
- updating of procedures after significant incidents.

There is no Broad Base Risk Assessment (BBRA) for ~~Moolarben~~Moolarben UG. Being in a transition state for the HSM systems is a concern with the audit indicating some significant shortcomings. The key comparable statistic of TRIFA is running at 22.8 is below the NSW coal mining underground industry (2015/16) average of 30.4. However, the fact that the lagging indicator of TRIFA is lower than average does not indicate a robust system. The HSMS audit indicated that a detailed safety and health risk assessment was not readily available for the site and therefore confidence in their identification of hazards with appropriate controls is limited. Based on the limited information available for review and in light of the outcomes of the 2017 SHMS Compliance and Effectiveness Audit, these shortcomings present a risk, however the mine has identified the weaknesses and it is understood they are addressing them, therefore the risk is unlikely to be material.

Water Management

Moolarben has an EPBC approval for Stage 2 (2008/4444) for the controlling provision: a water resource, in relation to coal seam gas development and large coal mining development. Condition of the approval is to supply data to government and adjacent mining stakeholders (to be provided in Water Management Plan) as monitored in accordance with state approval (08-0135). The site is subject to the conditions of EPL 12932 and includes discharge points and associated sampling requirements/discharge criteria, basin design details and effluent discharge conditions. No discharge occurred in 2016-2017. Realignment of Murrumbidgee and Eastern Creek is approved to allow for the mining activities to occur.

A Water Management Plan (WAMP) has been prepared by NSW DP&E approved, suitably qualified experts to meet the federal and state conditions of consent relating to water management. The WAMP was approved in January 2016. Surface water management on the site includes clean water diversions, creek realignment, clean water dams and sediment basins. Groundwater and surface water access licences are held for take of surface and groundwater. Take occurring in 2017 and 2016 were well below the allowable limits. A review of the 2015-2017 annual compliance and independent audit 2015 reports identified stream gauge issues and proposed revision to trigger levels for surface and groundwater analytes. The 2015 independent audit report identified that the EPA issued a formal warning in relation to daily monitoring of treated effluent discharge volumes in 2013/2014 reporting period. The issue was resolved by a variation to the EPL removing the requirement to monitor daily discharge volumes for the locations in question and there has been no ongoing recurrence of these issues.

No issue of material significance was identified relating to current water management practices from review of the documents outlined.

Soils and Contamination

The Moolarben Mine Operations Plan (MOP) states that a land contamination assessment will be undertaken as the decommissioning strategy and closure plan are being developed. Areas that will need to be addressed in the land contamination assessment include:

- Areas impacted by carbonaceous material (coal spillage and coal storage areas);
- Workshops and fuel storage areas (where hydrocarbon spills may have occurred);
- Water treatment ponds and tailings dam locations.

The 2017 Annual Review did not identify any significant contamination events beyond what would be considered normal operations at a similar mining operation. Current industry standard management methods such as bunding of hydrocarbon storage areas, immediate rectification of spills, on-site effluent treatment and disposal are being implemented to prevent the creation of contamination issues beyond



currently recognised areas of focus, as outlined above. The 2017 Annual Review identified that progressive rehabilitation is continuing at the site.

In line with similar operations in the region, a contamination risk is potentially posed by the current and historic tailings storage facilities. Due to the coal processing methods, heavy metals are stored in these facilities. These can lead to contamination if not contained appropriately. Data held on the National Pollutant Inventory database indicates the Moolarben site deposited a total of 528 tonnes of potentially hazardous heavy metals (including lead, mercury, chromium and arsenic) into on-site tailings storage facilities during the 2016-17 reporting period. Moolarben typically co-dispose coarse and fine rejects with overburden in the pit

ERM notes that no breaches have been filed against the Company or instances of contamination of the groundwater have been publically reported. There is an inherent risk in having contaminated tailings present on-site. As such it is understood rehabilitation of these materials by encapsulation is planned, however the variables associated with successful rehabilitation are many and existing budgets available can become insufficient if rehabilitation failures occur. Given the above, it is not considered a material risk of contamination tailings and rehabilitation failure, which is further supported with ongoing monitoring is undertaken to ensure they do not become material.

Ecology

Moolarben manages biodiversity in accordance with the requirements of three separate EPBC approvals and has secured (or in the process of securing) 19 separate Biodiversity Offset Areas covering over 5000 ha. Each of the approvals and offset areas have different requirements, which poses some risk (although not above the materiality threshold) with managing compliance and the status of each of these offset areas and any conservation agreements could not be confirmed by ERM. The relevant EPBC Approvals are:

- Moolarben Coal Project - Stage 1 (EPBC 2007/3297).
- Moolarben Coal Project - Stage 2 (EPBC 2008/4444)
- Moolarben Coal Project Stage 1 Optimisation Modification (EPBC 2013/6926)

Note: Moolarben Coal Project Stage 1 and Stage 2 extension (EPBC 2017/7974) was determined a controlled action on 24 August 2017 and is to be assessed under the Bilateral Agreement, however this project is outside of current LOM plan and not considered further.

The current Biodiversity Offset Management Plan (BOMP), Vegetation Clearance Protocol and Landscape Management Plan has been prepared to address the conditions of the EPBC 2013/6926 approval and is consistent with the management plans and protocols approved under EPBC 2007/3297. On 17 December 2014, DPE approved the plans and agreed that the use of a conservation covenant and restriction of use instrument would satisfy the relevant conditions of consent. Securing the Offset Areas by a legal instrument and providing protection in perpetuity is required within 24 months of the date of the EPBC approval. As highlighted in the 2017 AEMR, 5 of 7 required offsets under EPBC 2008/4444 were not secured in perpetuity within 24 months of the approval. Moolarben has sought extensions to the date by which the offset properties need to be secured.

Conditions of Project Approvals (08_0135) and (05_0117) also require Yancoal to determine and lodge Conservation Bonds with the NSW Department of Planning and Environment which covers the cost of implementing these Biodiversity Offset Strategies for Moolarben. The Conservation Bond cost was subject to Quantity Surveyor verification and endorsed by DP&E (as the consent authority). It is understood that the bonds totalling **\$3AUD3,819,982.50** were lodged with DP&E on 25-26 August 2016 however no documentation to that effect has been supplied for review.

Based on the information made available, a potential non-compliance risk associated with securing biodiversity offsets as per development consent conditions has been identified although this is unlikely to reach the materiality threshold of **\$10MAUD10M**.



Rehabilitation and Mine Closure Liability

Rehabilitation Management Plan

Moolarben has a Rehabilitation Management Plan (RMP) dated August 2016 and executed 3 November 2016. Section 2.0 of the RMP outlines the statutory requirements for the project rehabilitation. It is noted that the RMP includes the provisions of the commonwealth approvals associated with Stage 1 of the project and it is understood that the Rehabilitation and Offset management Plan relevant to Stage 1 is incorporated with the current Landscape Management Plan (LMP) and approved by the State government administering authority on 25 November 2013. The 2016 RMP has incorporated the 2013 LMP rehabilitation aspects.

The ML1628 and ML1691 Rehabilitation Cost Estimate (RCE) dated March 2018 noted area of disturbance of 317.84ha with progressive rehabilitation being 112ha. Current security held as at 17 November 2017 was for these ML's under the RCE is ~~\$5AUD5,344,000~~ with a calculated total security deposit as ~~\$7AUD7,694,218.86~~.

The RCE for ML1605, ML1606 and ML1715 dated March 2018 has an area of disturbance of 1156 ha and progressive rehabilitation of 253ha with no rehabilitation completed. The securities held under these ML's as at 17 November 2017 were ~~\$30AUD30,596,000~~ with a calculated total security deposition as ~~\$44AUD41,493,577.10~~.

The two RCE incorporates costings for the use of a third party for the demolition and removal of infrastructure. It is noted that CMA Contracting Pty Ltd have provided a demolition cost estimate, dated March 2018, of ~~\$12AUD12,083,470~~.

It is noted that the progressive rehabilitated figures provided in the Annual Review conflict with those provided in the combined RCE's above. The progressive rehabilitation figures provided in the Moolarben Annual Review of 226ha is not consistent with the progressive rehabilitation figures provided in RCE having a combined area of 365 ha (112ha + 253ha).

Moolarben Securities Register

The Moolarben Securities Register dated 11 May 2018 indicates a total of ~~\$44AUD41,494,000~~ for ML1605, ML1606 and ML1715 and ~~\$7AUD7,694,000~~ for ML1628 and ML1691. Therefore the securities held for the combined ML's is ~~\$49AUD49,188,000~~. This figure is consistent with the RCE combined calculated total security deposition of ~~\$49AUD49,187,795.74~~ (~~\$7AUD7,694,218.86~~ + ~~\$44AUD41,493,577.10~~).

Environmental Rehabilitation Budget Allocation

The rehabilitation budget for 2018 was provided at ~~\$659AUD659,000~~ with an additional bulk shaping and final landform costs of ~~\$2AUD2,000,000~~ included in the mining budget.

Mining Operations Plan

The Mining Operations Plan (MOP) was sourced from the Moolarben Coal website: http://www.moolarbencoal.com.au/icms_docs/273448_mining-operations-plan.pdf for the assessment.

From a review of the information provided in Section 3.3 of the MOP, Specific Risks Relating to Rehabilitation, there are no material risks associated with the rehabilitation from a soil resource management perspective.

This MOP was executed 6 April 2018 and covers the Period January 2017 to January 2019. Table 21 Section 7.3 outlines the summary of rehabilitation proposed during the MOP Term. The active rehabilitation phase as at 2017 has been identified as 268ha which appears to be inconsistent with the figures provided in Moolarben Annual Review and RCE's.

The MOP also provides for a further 182ha of progressive rehabilitation to be active by the end of the term of the MOP, January 2019. No figures for the current 2018 period have been provided and therefore an accurate indicator of progressive rehabilitation performance against allocated OPEX budgets cannot be determined.



ASHTON

EHS and Social Setting

Ashton is an approved open cut and underground operation located near the village of Camberwell, approximately 14km northwest of Singleton. The North East open cut (NEOC) is located west of Camberwell and Glennies Creek and ceased operations in 2011. The underground mine is located south of the north east open cut and New England Highway and is bounded to the west by the Ravensworth Underground Mine (RUM), to the south by the Hunter River and to the east by Glennies Creek. The South East Open Cut Project is approved (pending land purchase) however as yet undeveloped open cut mine located to the south of Camberwell and east of the underground mine and Glennies Creek.

Ashton receives minimal community complaints, having received two complaints in 2017, one in 2016 and nil complaints in 2015, all in relation to noise (subsequent investigations concluded that the noise was unlikely to have been generated from Ashton’s operations).

Heritage Values

Within the Ashton Project Area there are 54 recorded Aboriginals heritage sites, three of which have been identified as having high scientific and cultural significance. A large number of stone artefacts were recovered from the Oxbow site demonstrating historic long term Aboriginal occupancy of the area. The salvage of these sites is carried out under the approved Aboriginal Heritage Impact Permits (AHIPs). The current AHIP’s held for the Ashton are:

- AHIP #1130976 granted by the Land and Environment Court ([2011] NSWLEC 1249) in August 2011, encompassing the western underground longwall panels LW5, LW6A, LW6B, LW7A, LW7B and LW8 and the Bowmans Creek diversion. LW 205 in the ULLD seam is also within this area; and
- AHIP #1131017 issued on 23 December 2011, for the eastern underground longwall panels: LW 1 – 4. This AHIP also covers the area that will be subsided by LW 201 – 204 in the ULLD Seam.

While five heritage related issues have been raised within the courts these were all 5 to 6 years ago with not subsequent issues raised.

Ashton have comprehensive policies, standards and protocols in place to guide Aboriginal Cultural Heritage management and have also established an Aboriginal Community Consultation Forum chaired by an independent facilitator and is made up of representatives from Ashton, consulting archaeologists and members of Ashton’s 34 Registered Aboriginal Parties (RAPs). Aboriginal heritage related risk, regulatory obligations and all court decisions are understood to have been satisfactorily addressed and future material risk associated with currently approved projects is not anticipated.

Native Title Claims

As of 28 May 2018, two active Native Title Claim Applications are relevant to the Ashton Coal Project.

- NC2013/006 (Scott Franks and Anor on behalf of the Plains Clan of the Wonnarua People) was registered on 16 January 2015.
- NC2017/007 (Wonnarua Traditional Owners #2). This application was lodged on 2 December 2017 and is currently identified for registration decision under section 190A of the Native Title Act 1993. No determinations of native title have been made for this application and it is unclear what, if any material risk this may pose to future development proposals.

There is no material risk associated with these Native Title Claim Applications.

Native Title has not been extinguished for some areas (including crown land and water ways) and Native Title may still exist within the footprint of the South East Open Cut. The South East Open Cut (SEOC) has yet to commence and is understood is not planned to commence within the next 5 years. In 1876, land at Camberwell was devoted to temporary commonage. In 2010, the land was reserved for rural services and revoked as a common. A licence was granted to Ashton over the land for access, grazing and site investigation. It is understood that Yancoal have sought legal advice to clarify the existence, validity and



extent of Native Title and Aboriginal Land Rights Claims within and surrounding the SEOC. It is reported that Crown Lands will retain carriage of the resolution of these claims (along with other claims over numerous lots in the Hunter Valley) and the key risks identified as reported in the LOM Plan is the timing and cost impacts to process and resolve these matters. ERM has not reviewed or been provided copies of any legal advice regarding Native Title and Aboriginal Land Rights Claims although it is unlikely to exceed the material threshold of ~~\$10M~~AUD10M. The timing and cost impacts may present a risk to validity of the Upside Case as presented on the LOM Plan.

The remainder of the Ashton Project Area is either Ashton owned or freehold land and is not subject to native title.

Emission Discharges

Air Emissions:

The most recent Ashton Independent Environmental Audit (Horn, 2016) concluded that the site exceeded TSP annual average criteria at the Camberwell Village and deposited dust criteria at three onsite gauges in 2013. These were rated as medium risks at the time with no high risks identified. Current air emissions from the Asset is not considered likely to pose a regulatory risk, given no open cut mining is currently being conducted and the efficacy of the dust management procedures and processes currently in place.

Noise:

Ashton manages noise and vibration in accordance with site specific Noise Management Plan (NMP) and Blast Management Plan, including real time monitoring, attended monitoring and complaints handling system for noise. The most recent Ashton Independent Environmental Audit (Horn, 2016) states that Noise complaints reduced significantly from the previous audit period and that there had been no sustained significant exceedances of noise criteria for the site in the audit period. The 2017 AEMR reported that noise monitoring results during the reporting period follow the trends of the past few years, where Ashton Coal's operations are largely inaudible in the surrounding community and minimal noise complaints have occurred.

Water:

The 2016 Independent Environmental Audit (Horn, 2016) identified that there were some issues relating to water management, specifically the lack of containment for potentially saline water leaving site from the eastern emplacement. There was a small catchment on the northern side of the emplacement that was not captured on site and there was evidence of a saline seep from the emplacement at that point. However, the catchment was well vegetated and there was no risk of suspended solids leaving site.

No issues of material significance were identified relating to emission discharges from review of the documents outlined.

Land Tenure and Permitting

Current mining operations are conducted in accordance with the requirements of the conditions of Mining Lease (ML) 1529 (expires 11/11/2021), ML 1533 (expires 25/2/2024), ML 1623 (expires 30/10/2029 and ML 1696 (expires 16/5/2035), granted under the Mining Act 1992. The Ashton MLs exist with freehold land owned by Ashton and other mining companies, power station, RMS and Singleton Council. Various Crown Land permits apply the site.

Mining operations at Ashton are currently approved under DA 309-11-2001-I (as modified). The consent allows Ashton to extract up to 5.45Mtpa of ROM coal from the existing operation (not including the SEOC) with the operational mine life to operate until 11 February 2024, or a period of 12 years following the recommencement of open cut mining operations at the SEOC, whichever is longer.

On 4 October 2012, approval was granted for the Ashton SEOC project (MP 08_0182), however it was subsequently appealed. In 2014, the NSW Land and Environment Court upheld the approval, subject to further conditions. The revised development consent was issued to Ashton in April 2015. The SEOC has yet to commence (and is understood will not commence within 5 years). Under the NSW Environmental



Planning and Assessment Act 1979, a development consent lapses five years after the date that approval is granted unless the project has physically commenced on or before that day. Based on the date L&E Court approval dated 17 April 2015, the development consent will lapse on 17 April 2020 if the project has not achieved physical commencement. This is considered a low risk as Ashton has time in which to undertake works to trigger physical commencement to ensure the validity of the approval. The Ashton SEOC Project was deemed to not be a controlled action and thus approval under the Commonwealth Environmental Protection and Conservation Act (EPBC Act) was not required.

Environment Protection Licence 11879 applies to the Site. There is a licence variation application pending for EPL 11879. Ashton also operates under a number of other approvals, including for the storage of explosives, storage of dangerous goods and water licences, as well as under a number of operational and management plans approved by relevant regulators.

Current site permitting is not considered to present a material risk based on the documentation reviewed.

OPERATIONAL EHS PERFORMANCE

Environmental Performance

An independent review of Ashton completed in December 2016 (Hom, 2016), reported 27 non-compliances (14 of which were administrative and the remaining low and medium risks). No high risks were identified in the audit. The key identified non-compliances were associated with noise/blasting, dust and water related issues. The Ashton Annual Review report 2017 (covering the period 1 January 2017 – 31 December 2017) states that all actions from the independent audit report have been completed except for one relating to ~~stormwater~~storm water runoff on the north-east open cut, where an options analysis was completed during 2017, followed by peer review in early 2018 and ongoing consultation with the EPA.

A Penalty Notice was issued to Ashton by DPE in February 2017 relating to non-compliance with a condition of Project Approval DA 309-11-2003i relating to failure to maintain and publish a community complaints register on its website and update on a monthly basis and failure to provide a 24 hrs Community Compliant line. Ashton was fined ~~\$15~~AUD15,000 however the issue is now resolved and the operations are now in compliance with the condition.

Reported non-compliances against EPL 11879 during 2015 and 2016 are largely administrative non-compliances which have not resulted in any penalty notices nor prosecutions. Current site compliance is not considered to present a material risk to the project based on the documentation reviewed

H&S Performance

The last Broad Brush Risk Assessment was completed in December 2017 and appears comprehensive. The process employed demonstrates adequate controls are in place. Since the previous risk assessment a number of hazards have been assessed as higher risks. The group recorded as conducting the assessment shows depth of experience and covered management to the workers in the field.

The SHMS Compliance and Effectiveness audit completed by Aussafe Consulting in August 2017, using criteria based on the NSW Department of Primary Industries Mine Safety Operations Branch Coal Operation Health and Safety Management System checklist identified no major non-conformances and a number of lesser non-compliances including two from the 2015 audit.

The key comparable statistic of TRIFA running at 33 is marginally above the NSW coal mining underground industry (2015/16) average 30.4. Overall no material issues were identified.

Water Management

The site is subject to EPL 11879. The EPL outlines ambient surface water monitoring locations, parameters for analysis and frequency of sampling. No licenced discharge location are included. The EPL also outlines the requirement for the development of ~~Stormwater~~Storm water Management Plan for the development. Bowmans Creek was diverted to allow for the operation of the project. Numerous Water Access Licences



(WALs) exist for the site allowing extraction from the Hunter River and Glennies Creek. Review of the 2016 and 2017 Annual environmental reports identified that no exceedance of allowable take was observed.

A Water Management Plan (WAMP) was prepared for the site and was approved by NSW Department of Planning and Environment (DPE) in March 2018. Water management at the site includes groundwater dewatering bores, surface water and process water holding ponds, disturbed catchment catch drains, upslope diversion, contour drains and settlement basins. The WAMP states that discharge of surface water occurs from the site as it is stored and managed for site use, also stating that no spills were recorded from the site storages from August 2010 through to January 2017. The 2015, 2016 and 2017 annual environment report identified that no compensatory water needed to be required to private landholders during the reporting periods.

The water supply reliability states that reliability for water that is extracted under the WALs is under 50%. The water balance would predict the likelihood of a water supply deficiency during drought conditions and the site would seek alternative supply sources (such as purchasing additional WALs on the open market). The cost of obtaining such licences will unlikely be of material significance.

The 2015 and 2017 annual environmental reviews identified no incidents or non-compliances in relation to surface and groundwater management. The 2016 independent audit identified two administrative non-compliances related to consultation during the preparation of the management plan and the impracticality of the process to be implemented if a surface water assessment criteria is exceeded. The 2016 audit identified a non-compliance in relation to on-site management of water (and associated sampling) from a rehabilitated area adjacent to the rail line.

No issue of material significance was identified relating to current water management practices from review of the documents outlined.

Soils and Contamination

The 2017 Ashton MOP identifies that there are no areas of contaminated land within the site boundaries. The MOP also states that Acid mine drainage is not considered to be a risk at the site. However groundwater seepage and drainage from emplaced materials will be periodically tested for signs of acid rock drainage. Hydrocarbons and chemicals are stored in accordance with industry standards to prevent unintentional release and contamination. No issue relating to contamination was raised in the 2016 Independent audit. The 2017 annual review identified a non-compliance in that a drum containing a hydrocarbon material was not fully banded, though was rectified in the presence of the auditor.

In line with similar operations in the region, a contamination risk is potentially posed by the current and historic tailings storage facilities. Due to the coal processing methods, heavy metals are stored in these facilities. These can lead to contamination if not contained appropriately. Data held on the National Pollutant Inventory database indicates the Ashton mine deposited a total of 43 tonnes of potentially hazardous heavy metals (including lead, mercury, chromium and arsenic) into on-site tailings storage facilities during the 2016-17 reporting period.

ERM notes that no breaches have been filed against Ashton or instances of contamination of the groundwater have been publically reported.

There is an inherent risk in having contaminated tailings present on-site. It is understood rehabilitation of these materials by encapsulation is planned, however the variables associated with successful rehabilitation are many and existing budgets available can become insufficient if rehabilitation failures occur. ERM has not considered material risk of contamination tailings and rehabilitation failure, however it is understood that ongoing monitoring of these risks are undertaken by the asset to ensure they do not become material.

Ecology

The Upper Hunter region is home to a range of threatened species and Endangered Ecological Communities (EECs), which are subject to regulation under NSW and Commonwealth biodiversity legislation. At Ashton, the site progression from open cut to underground has reduced the potential for impact to ecological values.



To offset the ecological and archaeological impacts of the project and provide for the conservation of an important archaeological area, Ashton entered into a Conservation Agreement over part of Lot 3 DP 1114623 on 16 September 2010. This conservation area contains vulnerable threatened fauna (Grey Crowned Babbler, Hooded Robin and Speckled Warbler) and areas of significant cultural Aboriginal heritage value. This conservation agreement also recognises that the original development consent (dated 2002) permits mining of coal by longwall methods in four seams beneath the conservation area. Ongoing management and monitoring are being undertaken in accordance with the Voluntary Conservation Area Plan of Management (2012) to the conditions of AHIP #1131017, Flora and Fauna Management Plan (2017) and the Cultural Heritage Management Plan (2017). Future material risk associated with this agreement is not anticipated.

In accordance with development consent, Ashton has conducted bi-annual monitoring within this Voluntary Conservation Area since 2005 and Bowmans Creek since 2007. Monitoring will continue until the completion of underground mining within the extraction area and up to five years after secondary extraction is complete. As reported in the Independent Audit (2016) and the Annual Environment Management Report (AEMR) (2017), monitoring shows that terrestrial fauna species diversity remains consistent and reports no reduction in biodiversity values for the site, with the Bowmans Creek Diversion increasing aquatic biodiversity as rehabilitation associated with the diversion progresses.

In summary, biodiversity related risk and regulatory obligations in respect to biodiversity impacts at Ashton are understood to have been satisfactorily addressed. Future material risk associated with currently approved projects is not anticipated.

Rehabilitation and Mine Closure Liability

The rate of rehabilitation across the mine is generally proceeding in line with expectations (as detailed in the MOPs) and is broadly keeping pace with new disturbance. Overall 80% of the land has been rehabilitated, however none has been relinquished. Rehabilitation and closure risks are managed through the MOP and in accordance with the requirements of Ashton’s DA 309-11-2001-i. Three issues relating to mine closure liability have been noted by ERM and these are already known to Yancoal. These relate to: rehabilitation of subsidence, rehabilitation of final void dimensions and risks associated with a new Rehabilitation Cost Estimate method introduced by the NSW Government on 1 January 2018.

- Ashton’s DA 309-11-2001-i requires subsidence troughs on alluvial land adjacent to Bowmans Creek to be rehabilitated to provide a free draining surface. Up to 8m subsidence troughs are predicted, which will result in the ponding of water above mined land. ERM’s review of the Ashton Rehabilitation Cost Calculation (Doc 01.03.04.02.39) provides ~~\$66AUD66,165~~ for (minor) earthworks to rehabilitate 51.8 ha of subsidence areas. In lieu of the requirement to provide free draining land, the rehabilitation budget for this domain is likely to be insufficient.
- The Environmental Assessment for the SEOC and modification to the Ashton Mine development consent detailed the final NEOC void dimensions. The DA requires mining to be carried out in accordance with these dimensions. ERM understands that the final void dimensions may not be achievable if the SEOC does not proceed, in particular the base of the void will be 20-30m below the required elevation. Changes to the final void dimensions may require approval and until such approval is obtained there is a potential risk that the assets will not meet rehabilitation and relinquishment requirements.
- Yancoal is understood to be addressing both rehabilitation matters and has formally extended the term of the current MOP to July 2018 to allow time to address these matters for approval in the subsequent MOP. The progress of this work has not been viewed by ERM at the time of writing, however it is expected that both matters will be able to be resolved for approval.

Stratford and Duralie

EHS and Social Setting

The Stratford operations currently consist of the Bowens Road North Open Cut (BRN) and Roseville West Open Cut (Roseville) pits with a CHPP and associated raw and product coal handling and rail loading and



unloading facilities. Various other pits have been mined in the past. The Duralie Open Cut Coal Mine, is located about 20 km south of the Stratford mine. The Bucketts Way is the main road through the Gloucester Valley which connects to the Pacific Highway, approximately 12 km north of Raymond Terrace, to Gloucester over approximately 80 km through a number of small villages including Stroud, Craven and Stratford. The Stratford operation is located on the eastern side of the Bucketts Way, near the villages of Stratford and Craven.

The mines are situated within the Gloucester Valley and are surrounded by a range of agricultural land uses and native bushland and small hamlets. The closest residential receiver is located 500m north of the Duralie project area boundary. In addition, there are in the order of 150 privately owned residences within a 6 km radius of the mine.

Heritage Values

There are no Native Title determinations, claims or Indigenous Land Use Agreements at either Stratford or Duralie.

Stratford Mine Complex (SMC)

Heritage assessments at Stratford have recorded a total of 15 Aboriginal heritage sites, two Potential Archaeological Deposits (PADs) and a potential cultural area. In accordance with the requirements of the Stratford Extension Project Development Consent SSD-4966 (refer below), the approved Heritage Management Plan (2018) guides the management of Aboriginal cultural heritage sites impacted by the initial activities. The Initial Stage of the Stratford Extension Project would result in partial loss of value to five known sites. As per the letter from DP&E (dated 30 November 2017), Aboriginal cultural heritage sites impacted by later activities will be considered in a later revision of the HMP.

As detailed in the Stratford Extension Project (SEP) Environmental Impact Statement (EIS), five items identified in the site survey were assessed as having local heritage significance, including the Stratford Timber Railway (cutting and routes 1 and 2), the Glen Timber Railway, the Stratford Cemetery and the Craven Village. These items are all located outside of the SMC disturbance area and present no material or statutory risk.

Duralie Open Cut Coal Mine (Duralie OC)

The Heritage Management Plan describes eleven (11) Aboriginal heritage artefacts and two (2) Aboriginal sites in the Duralie development area and provides management for the Aboriginal heritage sites. Under the approved extension of Duralie, three (3) of these known Aboriginal heritage sites have been directly impacted (as approved). In accordance with the Heritage Management Plan topsoil disturbance during earthworks, construction and operation of the mine has been monitored utilising officers of the Karuah Local Aboriginal Land Council (KLALC). Following the completion of rehabilitation, salvaged artefacts that have been relocated into the care of the KLALC may be replaced back onto the rehabilitated landform in consultation with the Aboriginal community and OEH. The only European heritage building within the vicinity of the Duralie mine is the former Weismantels Inn. Photographic and archival recording of the Former Weismantels Inn in accordance with the DP&E’s Heritage Branch guidelines was undertaken in June 2011 and impacts to the have been reported within the annual reports.

In summary, heritage related risk and regulatory obligations in respect to cultural heritage vales at the Gloucester Basin Assets are understood to have been satisfactorily addressed. Future material risk associated with currently approved projects is not anticipated.

Emission Discharges

Stratford

Stratford operates under the development consent for the Stratford Extension Project. The development consent for Stratford requires preparation of a series of management plans. Some of these management plans have been combined to address the requirements for both Stratford and Bowers Road North consents.



Air Emissions

Similar to other open cut coal mines in the region, air emissions at the Stratford are predominantly a combination of windblown dust and direct emissions from vehicles. Air quality is managed in accordance with an Air Quality Management Plan and includes a combination of real time and supplementary dust monitoring at locations representative of sensitive receptors. Dust emissions from roadways are minimised through regular watering by a water cart fleet, while emissions from other exposed surfaces are reduced by progressive clearing and rehabilitation. At the CHPP, potential dust emission sources are controlled by automated water sprays at a number of locations. The product coal stockpile sprays are located on the overhead conveyor system. A wind speed/direction device provides information to a computer located in the coal preparation plant control room that can electrically activate spray valves. The valves open and close in a programmed cycle that alternatively activates sprinkler heads above the stockpile. The dust suppression system operates when the wind speed exceeds 5m/s for >30 seconds.

The most recent Independent Environmental Audit (Hanson Bailey, 2018) concluded that the dust emissions were generally well managed with the exception of excessive visible dust seen on the ROM pad near a working loader. SCPL advised at the time that water carts are usually active in this area however, were not at the time of the site visit. There were no exceedances of air quality criteria under the consents in the audit period.

Water Discharge

Stratford is licensed to discharge water in accordance with its EPLs subject to various water quality and rainfall criteria. However, no water discharges occurred from Stratford during the 2017 reporting period. The most recent Independent Environmental Audit (Hanson Bailey, 2018) concluded that the implementation of the Water Management Plan and sub-plans demonstrate that Stratford is managing surface water generally in accordance with its development consent, EPLs and water licence requirements.

Noise Emissions

Stratford manages noise and vibration in accordance with the Noise Management Plan and Blast Management Plan and the EPLs, including real time monitoring, attended monitoring and complaints handling system for noise. The most recent Independent Environmental Audit (Hanson Bailey, 2018) concluded that noise is generally well managed, however coal mining did not occur at Stratford in the audit period. There were no exceedances of noise criteria within the audit period. The main sources of noise during the audit period were from the CHPP and a stockpile dozer (which no longer operates in the area associated with the noise complaints). Operations have since recommenced and noise will require careful management to ensure impacts to sensitive receivers in the area remain within predictions. This is understood to be underway by the Company.

Duralie OC

Air Emissions

Air emissions at the Duralie are predominantly a combination of windblown dust and direct emissions from off-road diesel vehicles. Air quality is managed in accordance with an Air Quality Management Plan and includes a combination of real time and supplementary dust monitoring at locations representative of sensitive receptors. Dust suppression is undertaken using a range of best practice dust control measures. Dust emissions from roadways are minimised through regular watering by a water cart fleet, while emissions from other exposed surfaces are reduced by progressive clearing and rehabilitation. A number of Pollution Reduction Programs (PRP) required under EPL 11701 have previously been completed, including ‘Coal Mine Wind Erosion of Exposed Land Assessment’ August 2016. Results are available on the Duralie OC website.

On 11 April 2017, a dust incident was reported to the EPA. The dust had resulted from an area of very fine overburden which was being rehandled in the Weismantel pit. Dust emissions were reported internally and control measures implemented in accordance with the Air Quality Management Plan. As the dust emissions were not able to be controlled the activity was ceased. Additional controls were implemented and a written report provided to the EPA. In 2017, fourteen air quality related complaints were received (13 related to



odours and one to visible dust). All complaints were responded to promptly and details of the complaint responses and outcomes recorded with no infringement notices.

Water Discharge

Duralie OC is licensed to discharge water in accordance with its EPLs subject to various water quality and rainfall criteria. However, no water discharges occurred from the mine during the 2017 reporting period. A review of the most recent Annual Reviews indicates that the implementation of the Water Management Plan and sub-plans demonstrate that surface water is being managed generally in accordance with development consents, EPLs and bore licence requirements.

Noise Emissions

Duralie OC manages noise and vibration in accordance with the Noise Management Plan and Blast Management Plan and the EPL, including real time monitoring, attended monitoring and complaints handling system for noise. A review of the most recent Annual Reviews indicates that noise is generally well managed. In the last two years, there were two blast related incidents reported to the EPA regarding a blast after the approved time which was not monitored and a blast vibration complaint. Written reports were provided to the EPA and DP&E and no further action was required.

Land Tenure and Permitting

Stratford Mine Complex

Mining operations have been conducted in accordance with the requirements of the conditions of Mining Lease (ML) 1360 (expires 21/12/2036), ML1409 (expired 6/1/2018, renewal pending), ML1447 ((expires 31/3/2020), ML1521 (expires 23/9/2023), ML1528 (expires 19/1/2024), ML1538 (expires 24/6/2024), ML1577 (expires 28/2/2027) and ML1733 (expires 8/4/2037), granted under the Mining Act 1992. Security bonds have been registered for the mining operations. The Stratford MLs exist within freehold land owned by Yancoal.

Operations at Stratford (excluding Bowens Road North) were originally approved under DA 73/94 in January 1995. DA 73/94 was relinquished in July 2000 and operations commenced under DA 23-98/99 (approved in February 1999). Mining operations ceased at Roseville West pit in December 2013 and Bowens Road North in June 2014 however have since recommenced under SSD-4966 for the Stratford Extension Project in May 2018. The CHPP continues to receive coal from Duralie (as reported in Hanson Bailey, Independent Environmental Audit Report, February 2018).

Development consent for the Stratford Extension Project (SEP) (SSD-4966) was granted by the NSW Planning Assessment Commission (PAC) on 29 May 2015 to extract up to 21.5 million tonnes (Mt) of run of mine (RM), with mining operations permitted until 31 December 2025. The SEP provides for the continuation and extension of operations at Stratford including the mining of three new open cut areas. The approval consolidated Stratford and .Bowens Road North operations under a single development consent. A Mining Operations Plan (MOP) has been prepared for the period March 2018 – March 2021. Based on the MOP, SSD-4966 will be physically commenced within five years of the consent being granted (and based on the MOP, there is no material risk associated with the consent lapsing). In addition, a Commonwealth approval (EPBC 2011/6176) was granted on 29 January 2016 for the extension to open cut coal mining and processing activities at the Stratford of an additional 300 hectares and includes controlling provision: water resources. This approval expires on 30 November 2030.

EPL 5161 applies to Stratford (excluding Bowen Road North) (and being the area to which ML 1360 applies). EPL 11745 applies to Bowens Road North (an application to surrender EPL 11745, dated 11 January 2018, is pending). Stratford also operates under a number of other approvals, including for the storage of explosives, storage of dangerous goods and water licences, as well as under a number of operational and management plans approved by relevant regulators.



Duralie

Mining operations have been conducted in accordance with the requirements of the conditions of Mining Lease (ML) 1646 (expires 4/1/2032) and ML 1427 (expires 6/4/2019) granted under the Mining Act 1992. Security bonds have been registered for the mining operations. The Duralie OC MLs exist within freehold land owned by Duralie Coal Pty Ltd.

Current mining operations are undertaken in accordance with the Duralie Extension Project Approval (PA 08_0203) (as modified), approved in November 2010 for mining activities until 31 December 2021. In addition, a Commonwealth approval (EPBC 2010/5396) was granted on 22 December 2010 for the Duralie UG extension and includes conditions relating to water resources. EPBC approval expires on 31 December 2020 and would need to be extended to continue operations past this date. However, with Project Approval under PA 08_0203 to expire 31 December 2021 (ie only one year later) and with current Mine Closure Planning in preparation of the Mine Closure Plan to be submitted prior to 31 December 2019 (as reported in Hansen Bailey, 2018), the need to extend EPBC approval is unlikely and even if an extension was required, given the limited timeframe an extension would be required (ie for one additional year), the granting of such an extension is likely to be a low risk if there is ongoing compliance with the requirements of EPBC 2010/5396.

EPL 11701 applies to the Duralie Mine. Duralie OC also operates under a number of other approvals, including for the storage of explosives, storage of dangerous goods and water licences, as well as under a number of operational and management plans approved by relevant regulators.

Stratford Extension Project

No issues of material significance were identified relating to permitting from review of the documents outlined.

OPERATIONAL EHS PERFORMANCE

Environmental Performance

Stratford Mine Complex

Stratford has exhibited a high degree of environmental compliance over recent years (2014-2017). An Independent Environmental Audit dated February 2018 covering the period 2014 – 2017 concluded that a good standard of environmental management is generally being applied to the minor recovery operations and rehabilitation activities (Hansen Bailey, 2018). Implementation of site rehabilitation is progressing generally in accordance with supporting documents of the Development Consent and MOP. Some minor inconsistencies were noted between the MOP figure and the Development Consent which requires updating in the MOP. Further planning and assessment is required in consultation with relevant regulators to demonstrate that the long-term closure scenario of the final voids overtopping to natural drainage can be successfully implemented.

Two minor non-compliances with the Development Consent conditions for the Stratford (excluding Bowen Road North) related to dust emissions and air quality monitoring. These have been adequately addressed through procedural review and implementation. Three non-compliances with conditions of EPL 5161 were reported - two were administrative non-compliances and one minor in relation to dust emissions. These do not present a material risk.

At Bowens Road North, only administrative non-compliances with the Development Consent conditions were identified, which have been adequately addressed through procedural review and implementation. No non-compliances with conditions of EPL 11745 were reported. Both these have since been surrendered and no longer apply.

Community concerns are being well managed and recorded within a complaints register. As operations have largely ceased, the number of complaints received in the audit period was low. Seven complaints were received in 2015 for noise issues, primarily in relation to a stockpile dozer. No complaints were received in 2016 for the operation and only two complaints were received in 2017.



Current site compliance is not considered to present a material risk based on the documentation reviewed.

Duralie

An Independent Environmental Audit dated February 2018 covering the period November 2014 – December 2017 concluded that a good standard of environmental management is generally being applied to the operations and rehabilitation activities (Hanson Bailey, 2018). The audit identified seven non-compliances against conditions of development consent and other licenses and approvals. The seven non-compliances comprised five issues. Five non-compliances were ranked as low risk and two ranked as administrative non-compliances. Annual Reviews undertaken since 2014 indicate that the Duralie has exhibited a high degree of environmental compliance during its continued operations. Five minor non-compliances with the Project Approval conditions related to dust and odour emissions, air quality monitoring, water discharge and unrolled burning. These have been adequately addressed through procedural review and implementation. No non-compliances with conditions of EPL 11701 were reported.

Community concerns are being well managed and recorded within a complaints register. Hanson Bailey (2018) reported forty one complaints were received in 2015 primarily related to noise, nineteen complaints were received in 2016 primarily for air and odour issues and six complaints were received in 2017, primarily related to odour.

Current site compliance is not considered to present a material risk based on the documentation reviewed.

H&S Performance

The key comparable statistic of TRIFA is running at 20.68 which is significantly higher than the NSW coal mining open cut industry average (2015/2016) of 6.6.

A SHMS Compliance and Effectiveness Audit was completed by Aussafe in June 2017 with criteria based on the NSW Department of Primary Industries Mine Safety Operations Branch Coal Operation Health and Safety Management System checklist. No major non-compliances/effectiveness were identified. Minor issues identified were in the areas of obligation to HSMS, audit/inspection, contractor management, change management, hazardous chemicals, occupational health and accident/incident management.

No risk assessments were available for the assets but the SHMS covers the normal range of hazards. Although the lag indicator is high the site audit could indicate focus is required. With limited data available the assessment of materiality did not indicate an issue.

Water Management

Stratford Mining Complex

The site is subject to the conditions of EPL 5161, which includes the following related to water management:

- ~~Stormwater~~ Storm water discharge points and monitoring locations;
- Discharge water sampling parameters and sampling frequency;
- Groundwater monitoring locations;
- Mine wastewater irrigation conditions;
- Special condition relating to drought release of mine wastewater.

A Water Management Plan (WAMP) was prepared by NSW DP&E approved, suitably qualified experts to meet the federal and state conditions of consent relating to water management. The WMP was approved in September 2017. Surface water management on the site includes upslope temporary and permanent clean water diversions, water storage within open pits, irrigation onto rehabilitated areas and sediment basins.

Water access licences are held for the site though were not sighted, however it is understood to be in compliance.



The water supply model for the site indicated that the site runs at a surplus, with a supply reliability of greater than 99%, even in limited precipitation modelling. Modelling was also undertaken to determine the potential for an overflow from water storages on-site. The modelling indicated that the spill risk from the contained storages being less than one percent across all modelled climate scenarios. The surface water management plan identified that as of 2010 there has been no significant acid mine drainage issues.

Review of the 2017 and 2016 Annual Compliance reviews identified:

- No water discharges in 2016 and 2017 (though one overflow in 2017 that was monitored as required);
- Water take from water access licences was less than the entitlement;
- One water related complaint in the 2012/13 reporting period;
- No significant or measurable change in water table level or quality that could be attributed to the mines activities; and
- No water related non-compliances.

The most recent environmental audit (Hansen Bailey, February 2018) identified two administrative non-compliances. The first due to no evidence being provided that the site water balance was being updated on a six-monthly basis, with the site water balance was being undertaken on an annual basis. The second was due to a sampling event not being undertaken due to no flow events at the sampling locations.

No issue of material significance was identified relating to current water management practices from review of the documents outlined.

Duralie

Duralie OC has an EPBC approval (2010/5396) that includes conditions relating to water resources. The site is subject to the conditions of EPL 11701 and includes the following related to water management:

- ~~Stormwater~~Storm water discharge points and monitoring locations;
- ambient and discharge water sampling parameters and sampling frequency;
- Surface water quality concentration limits
- Effluent irrigation conditions;

The EPL does not provide sediment basin design criteria. The WAMP outlines that basins will be constructed in accordance with the Landcom (2004) Managing Urban ~~Stormwater~~Storm water: Soils and Construction. No defined criteria are pre-established. This is not considered a material issue. Coal Shaft Creek has been diverted to allow for the operation of the mine. This diversion and other water management structures on-site have been undertaken in accordance with the Water Supply Works Approval (20WA202053). A Water Management Plan (WAMP) was prepared by NSW DP&E approved, suitably qualified experts to meet the federal and state conditions of consent relating to water management. The WAMP was approved in July 2016, though a revised version following DP&E on annual review awaits approval. Surface water management on the site includes upslope clean water diversions, a main water dam with two auxiliary dams, irrigation of excess water, in-pit water storage, sewage treatment plant and system for disposal of effluent and sediment basins. To manage captured water on-site the pumps are used to transfer water between the Main Water Dam and Auxiliary Dam water storages and the open pits to minimise the disruption to mining and to maintain storm runoff storage capacity needed to achieve a negligible risk of uncontrolled release of mining-related water off-site.

A groundwater extraction licence (20BL168404) applies to the site. No surface water access licences are held by the site for surface water extraction.

The water balance simulation modelling identified that there was a negligible risk (<0.1%) of uncontrolled release of mining related water from site dams, with no overflow from the main water dam in the 1,000 climatic sequences simulated. The modelling notes that there is a potential risk to mining operation due to water being transferred to the open pits to prevent exceedance of the management systems capacity. Hence the material risk to the environment is low, though risk to expense from disrupted mining operations



may occur, with the modelling stating the risk was determined to be economically and operationally acceptable. The water balance simulation model also indicates that there is a low probability (<0.1%) of non-potable water shortfall occurring over the remaining mine life, with no shortages being simulated in any of the 1,000 climatic sequences.

Auditor review of the 2014 independent audit and the 2015, 2016 and 2017 Annual Compliance reviews identified:

- No non-compliances related to ground or surface water management in the 2014 audit, 2015 and 2017 annual compliance reports;
- A low risk non-compliance in the form of rainfall runoff discharge from the irrigation area during the 2016 reporting period. A written report was submitted to the EPA and DP&E, with the EPA confirming that no further action was required.
- Two complaints related to water in 10/11 reporting period and one in the 11/12 reporting period.

No issue of material significance was identified relating to current water management practices from review of the documents outlined.

Soils and Contamination

Stratford Mining Complex

The 2018 Stratford MOP identifies that the site has a bioremediation area for the treatment of hydrocarbon contaminated soil and waste rock. The MOP outlines that sewage is treated on-site and released via transpiration trench. The MOP states that a land contamination assessment will be undertaken as the development of the decommissioning strategy and closure plan are being developed. Areas that will need to be addressed in the land contamination assessment include:

- Areas impacted by carbonaceous material (coal spillage and coal storage areas);
- Workshops and fuel storage areas (where hydrocarbon spills may have occurred);
- Water treatment ponds and tailings dam locations.

The sediments within the return water dam will also require characterisation and remediation. The above are considered consistent with typical mine sites.

Duralie

The Annual Review 2017 identified that the site has a bioremediation area for the biological degradation and treatment of hydrocarbon contaminated soils. The report also identified that the overburden dump is being progressively rehabilitated to the final landform, minimising disturbed land and the generation of contaminated water requiring treatment. The site has a fuel tank farm containing two double skinned 100,000L storage tanks. Runoff from these locations are managed by being conveyed across the concrete containment to an oil water separator. Industry standard hydrocarbon storage and management methods are applied in in the workshop. Effluent is treated via aerated waste water treatment system and the treated effluent is irrigated on-site.

The independent environmental audit of 2014 identified that the current practice of irrigating on the site appeared to be sustainable and that predicted irrigation water salinities would not cause soil structural degradation or plant growth issues in irrigation areas.

The MOP identified a key risk for mining closure and rehabilitation as the rehabilitation of PAF waste emplacements causing mine drainage contamination of surface and groundwater and long term contamination from mine water stored in prescribed dams and acid mine drainage contamination of groundwater. Risk reduction strategies were proposed to address these risks. The Duralie Coal Mine MOP states that a land contamination assessment will be undertaken as the development of the decommissioning strategy and closure plan are being developed. Areas that will need to be addressed in the land contamination assessment are the same as at Stratford.



Ecology

Stratford Mining Complex

A review of the ecological conditions provided throughout DA 39-02-01 (Bowens Road North) was undertaken by Cumberland Ecology (as commissioned by Hansen Bailey Environmental Consultants) as part of the 2017 Independent Environmental Audit of the Stratford. No development consent conditions for ecology were required to be assessed for Stratford (Stratford DA 23-98/99) and Stratford Coal Extension (SSD-4966) and this project has therefore not been considered further within this assessment.

The ecological audit indicated that the majority of the relevant biodiversity conditions have been or are being addressed and that various management plans and reporting were largely adequate in addressing requirements of conditions of consent.

No issues of material significance were identified relating to compliance with ecological conditions from review of the documents outlined.

Duralie OC

The Biodiversity Management Plan was approved by the DP&E (formerly DP&I) on the 29 March 2012 and by the Commonwealth under the EPBC approval on 28 August 2012. The BMP has been subject to various revisions, the most recent as reported in Hansen Bailey (February 2018) having occurred in 2017. The Independent Environmental Audit covering the period November 2014 – December 2017 (Hansen Bailey, February 2018) stated that the biodiversity offset areas were performing well, with one low risk non-compliance related to approval of the revised BMP by DP&E. No issues of material significance were identified relating to compliance with ecological conditions from review of the documents outlined.

Mine Rehabilitation and Mine Closure Liability

Stratford Mining Complex

The Independent Environmental Audit completed by Hansen Bailey (February 2018) covering the period November 2014 – December 2017 concluded that areas of rehabilitation were in accordance with the planning staging of areas approved in the relevant Mining operation Plan and that rehabilitation types, areas and success were consistent with the what was proposed in the EIS applying to the site. .

No issues of material significance were identified relating to compliance with specific mining rehabilitation practices from review of the documents outlined.

Duralie

The Independent Environmental Audit (Hansen Bailey, February 2018) for the period November 2014 – December 2017 found the operations to be compliant with development consent conditions relating to rehabilitation and that progressive rehabilitation of the site was being undertaken including active final shaping in preparation for rehabilitation.

Yancoal has advised that for 2018, there is an environment budget of ~~\$2AUD~~2.4 million for Stratford / Duralie, with an additional ~~\$500AUD~~500,000 for rehabilitation (excluding bulk shaping and final landform costs of ~~\$2AUD~~2 million, which are included in the mining budget to cover these works. Based on the reported progress and success to date of rehabilitation (as reported by Hansen Bailey in the Independent Environmental Audits for each asset (February 2018), no issues of material significance were identified relating to compliance with specific mining rehabilitation practices from review of the documents outlined.

AUSTAR

EHS and Social Setting

Austar is an amalgamation of four former mines (Ellalong, Pelton, Cessnock No. 1 and Bellbird South collieries). It is located approximately 10 km south of Cessnock in the Lower Hunter Valley. There is a long



history of underground mining at the site. The dominant land uses in the vicinity of the mine include Werakata State conservation area, old mine workings, active mines and rural properties. There are also a number of small residential areas in the vicinity of the mine including Ellalong, Paxton, Millfield and Kitchener. Natural features in the vicinity of the site include Quorrobolong Creek, Sandy Creek and Cony Creek. Topography of the site is undulating hills and alluvial flats.

Heritage Values

Austar includes lands within the boundaries of one active registered native title claim - NC2013/006 (Scott Franks and Anor on behalf of the Plains Clan of the Wonnarua People). A second claim, NCS2013/002 (Awabakal and Guringai People) was withdrawn in July 2017. It is noted that representatives of both claimant groups are registered Aboriginal parties for the most recent project works and have been invited to provide cultural information where relevant. As outlined within the MOP, all current and proposed mining activities occur within or below a combination of Austar and privately owned land, the Werakata State Conservation Area and Crown land. No evidence has been reviewed to suggest that native title has been extinguished within the Werakata State Conservation Area and Crown land. Assuming that Austar continues to consult with and provide notification of all future proposals, to the Plains Clan of the Wonnarua People, material risk associated with native title is not anticipated.

Aboriginal and non-Aboriginal heritage surveys have been undertaken at Austar to support the development approvals process. In consultation with Aboriginal stakeholders and representatives of the Department of Environment and Climate Change (DECC, now OEH), it was agreed mitigation measures may not successfully prevent the grinding groove site from cracking and that Austar would contribute ~~\$100~~AUD100,000 to an Aboriginal project or program to be decided by Aboriginal stakeholders as an offset for the potential impacts. Since 2013 it is reported in the Independent Audit that a total of ~~\$88~~AUD88,344 has been provided by Austar to support this initiative. Aboriginal Heritage monitoring to date and reported within the Independent Audit has not identified any impacts to artefact or grinding groove sites during the 2014-2017 audit period. Based on the data available for review, no material risk is anticipated to either Aboriginal or Non-Aboriginal (Historic) heritage values.

Emission Discharges

Air Emissions

Air quality has generally been a low level environmental and community risk for Austar due to limited sources of dust at site compared to open cut coal mines. Air quality is managed in accordance with an Air Quality and Greenhouse Gas Management Plan and includes high volume air sampling and continuous dust monitoring at locations representative of sensitive receptors. Air quality management controls (design and operational) have been successfully implemented with no exceedances of air quality criteria. No air quality complaints have been received, however a few combustion/odour complaints were made in 2016.

Water Discharge

Austar is licensed to discharge water in accordance with its EPL subject to various water quality and rainfall criteria. The most recent Independent Environmental Audit (SLR, 2018) notes that surface water is a key aspect for Austar, with erosion and sediment control and pumping of water across site requiring ongoing management. There have been incidents relating to water discharge and pipeline leakages and recommendations made to avoid further incidents. However, with the proper implementation of the Water Management Plan and sub-plans, Austar should be able to manage surface water in accordance with development consents, EPLs and water licence requirements.

Noise Emissions

Austar manages noise and vibration in accordance with the Noise and Vibration Management Plan and EPL, including attended and continuous unattended monitoring and complaints handling system for noise. The most recent Independent Environmental Audit (SLR, 2018) notes that noise is a significant risk for Austar due to the proximity of the site to the community, with some low level noise non-compliances relating to the low frequency modifying factor. Austar has been undertaking a voluntary noise pollution reduction program (PRP) for the CHPP site in consultation with the EPA over several years. As a result,



there have been improvements in noise management at the site with a reduction in complaints during the last audit period compared to the two previous audit periods.

Land Tenure and Permitting

Mining operations have been conducted in accordance with the requirements of the conditions of Consolidated Mining Lease (CML) 2 ML 1666 and ML 1661, ML 1157, ML 1283, ML 1345, ML 1388 and ML 1550, ML 1677 granted under the Mining Act 1992. Security bonds have been registered for the mining operations. The MLs exist within freehold land owned by Austar, private land owners and the Crown. Various other MPL, CCL and EL apply to the asset.

Two key approvals apply to the Austar: DA 29/95 applies to the Bellbird South and Project Approval for the Stage 3 Extension Project (PA 08_0111, as modified), granted in September 2009 for the extension to longwall mining until 31 December 2030. It is understood that since 2016, coal extraction from the Stage 3 mining area of PA 08_011 has been suspended with operations focused on the Bellbird South Longwalls B1 – B7 mining area of DA 29/95. Austar has not been referred under the EPBC Act.

Austar also operates under a number of other approvals, including for the storage of explosives, storage of dangerous goods and water licences, as well as under a number of operational and management plans approved by relevant regulators.

No issues of material significance were identified relating to permitting from review of the documents outlined.

OPERATIONAL EHS PERFORMANCE

Environmental Performance

Austar has exhibited a good standard of environmental management over recent years (2014-2017). An Independent Environmental Audit was conducted by SLR Consulting Australia Pty in November 2017. The audit conclusions indicated a generally high standard of compliance of the Austar Mine activities with the conditions of approval granted to the project under the Development Consent DA29/95, Project Approval 08_0111, EPL 416 and mining lease conditions.

Three minor and two moderate non-compliances with the Development Consent and Project Approval conditions related to meteorological data, noise emissions and water discharges. These have been adequately addressed through procedural review and implementation by Austar. Eight non-compliances with conditions of EPL 416 were reported - two were administrative non-compliances, three were minor in relation to monitoring of weather and water discharges and three were moderate in relation to water discharges.

Community concerns are being well managed and recorded within a complaints register. A total of 5 complaints were received in the 2016-2017 reporting period and 4 complaints in 2015-2016 reporting period. Complaints received were in relation to odour (from spontaneous combustion), vibration and surface water.

H&S Performance

Two fatalities occurred in April 15, 2014 at the Mine. This was investigated by the NSW Department of Industry, Resources and Energy, Mine Safety unit and there is an ongoing prosecution risk, however any regulatory penalty is unlikely to meet the materiality threshold. Reputational risk has already been realised. The investigation report made criticism of the risk assessment process as assumptions were made on geotechnical risks that were incorrect. A further significant coal burst event on 17 May 2018 has led to the NSW Resources Regulator prohibiting all underground longwall production activities at the Austar mine. It is understood the prohibition notice is to remain in place until a detailed geotechnical assessment is carried out and the Regulator is satisfied that that comprehensive risk controls can be implemented to protect workers against the threat of further and escalated outburst events.

The Broad-brush risk assessment (BBRA) reviewed indicated that Austar are in the process of conducting or reassessing lower level risk assessments that provide the detailed controls. It should be expected that



the lower level detailed risk assessment would identify the effectiveness of the controls and assess the adequacy of the combination of controls to demonstrate ALARP. The BBRA cannot demonstrate either of these important factors. The Austar BBRA indicates that there are numerous risk assessments conducted at a level focused on that individual hazard. The last RA conducted in July 2017 did involve a broad spectrum of the workforce and appears to cover the wide range of risks expected of a facility but is effectively a collated risk assessment that does not demonstrate adequacy or effectiveness of the controls.

The safety management system was audited in 2017 with the SHMS Compliance and Effectiveness Audit report issued in July 2017 (AusSAFE Consulting). The audit was based on the NSW Department of Primary Industries Mine Safety Operations Branch Coal Operation Health and Safety Management System checklist. Although there were no major non-conformances there were control ineffectiveness/minor non-conformances identified in the areas of Audit/inspection, change management, training/consultation, contractor safety performance/procurement, obligations of HSMS, fixed plant, hazardous chemicals, mobile plant and occupational health.

The key comparable statistic is TRIFA and the site is running at 30 which is marginally below the NSW coal mining underground industry average (2015/16) of 30.4.

Water Management

A pollution reduction program is imposed on the site EPL, requiring the CHPP Clean Water Drain be investigated and the cause of orange staining/residue be determined. It is understood that an investigation report was due to be submitted to the NSW EPA (regulatory body) in March 2018. Whilst this is an ongoing issue, it is unlikely to represent a material issue.

The site holds water licences for groundwater wells used for dewatering. The site also holds a water access licence for surface water extraction from the Upper Wollombi Brook Water Source. Groundwater inflow was within limits in Annual environmental management reports reviewed (2016 and 2017). No evidence was provided to confirm that surface water take was within allowable limits, however this is unlikely to be a material issue.

The site has a water management plan that was approved in May 2013, with the most recent update being prepared in April 2017. Water management at the site involves a reverse osmosis plant to treat water from surface and underground water storage areas prior to offsite discharge. Water is managed across the surface and groundwater storages to prevent discharges to only when EPL conditions allow.

The independent audit in 2017 identified incidents including:

- ~~an~~ discharge event on 21 and 22 April 2015 from LDP001. pH was outside of range (3.55) on 22 April 2015. EPA correspondence indicated that no regulatory action was going to be undertaken;
- Leak of mine water pipelines on 26 March 2015, 24 February 2017;
- Kitchener SIS Sediment Dam discharge on 6 January 2015 and 4 May 2015 (rainfall was greater than design capacity of the basin); and
- Orange staining in cleanwater drain on 7 June 2017.

An administrative non-compliance was also recorded in the 2017 independent report due to samples not being collected as creek conditions were dry. There have been discharges and pipeline leakages occurring at a frequency that suggest that the ~~stormwater~~storm water management system could undergo improvements. On-going issues may continue to be a risk, however the incorporation of amelioration measures to improve management of basin capacities could likely be achieved for under the material threshold. The amelioration of leakages from pipelines may identify that new infrastructure is required, dependant on the extent of new infrastructure required, however any such upgrade works are unlikely to exceed the material threshold

Whilst there is an outstanding issues associated with the pollution reduction program relating to the CHPP Clean Water Drain, the asset is investigating the issue and liaising with relevant regulators. This issue, whilst ongoing, is unlikely to represent a material risk.



Soils and Contamination

The 2017 Annual Environmental Management Report (2017) identified that a phase one contamination assessment was undertaken on the site during the 2015-2016 reporting period and was awaiting finalisation. This report would guide further management dependant on extent of contamination identified. The 2017 AEMR details that the method of management for spills and hydrocarbon storage infrastructure is to clean-up spills immediately and remediated on-site/send off-site by an authorised waste contractor. The site operates a hydrocarbon remediation area, composed of three bunded cells on a redundant laydown area.

The colliery is managed in accordance with Australian Standards and EPA guidelines to minimise the likelihood/extent of hydrocarbon spills. The site has a workshop and equipment storage at the Pit top surface facilities area and includes fuel and oil containment and treatment systems. The Environmental Management Strategy for the site identifies that the Coal Handling and Preparation Plant and reject emplacement areas will have long term issues at the washery site from acid mine drainage, though rehabilitation is proposed in the MOP.

Tailings are discharged into the old Pelton underground mine workings and the return water is recovered by dewatering bores into the sites contaminated water management system for reuse or discharge under the EPL following treatment (AEMR 2017). In line with similar operations in the region, a contamination risk is potentially posed by the current and historic tailings storage facilities. Due to the processing methods, heavy metals are stored in these facilities. These can lead to contamination if not contained appropriately. Data held on the National Pollutant Inventory database indicates the Austar deposited a total of 86 tonnes of potentially hazardous heavy metals (including lead, mercury, chromium and arsenic) into on-site tailings storage facilities during the 2016-17 reporting period. On-going phase 1 investigations will identify the extent of any contaminated areas on the site.

There is an inherent risk in having contaminated tailings present on-site. It is understood rehabilitation of these materials by encapsulation is planned, however the variables associated with successful rehabilitation are many and existing budgets available can become insufficient if rehabilitation failures occur. ERM has not considered material risk of contamination tailings and rehabilitation failure, however it is understood that ongoing monitoring of these risks are undertaken by the asset to ensure they do not become material.

Ecology

Austar has not been referred under the EPBC Act. Targeted assessment to date has concluded that mining would not have any significant impacts on any of the identified threatened species, populations or EECs, or on any EPBC Act listed MNES and therefore referral to the Minister for Environment and Water Resources was not required. Based on the information available, the risk of not referring this project appears to be low.

A Biodiversity Offset Area was established as part of the approved Stage 3 project to offset impacts from clearing of approximately 10ha of the surface infrastructure site. After the Stage 3 project was approved, Austar transferred ownership of the Offset Area to the National Parks Estate as part of the Werakata State Conservation Area. As such, the Offset Area will be managed in perpetuity by the NSW National Parks and Wildlife Service. Based on this transfer of ownership to reserved lands, the long term management of the Offset Area does not present any material obligations.

In accordance with project approvals, Austar have implemented an ecological monitoring program of riparian vegetation over Stage 2 Longwall Panels A3 to A5a and prepared the Stage 3 Biodiversity Management Plan for Longwall panels A7 to A10. Routine surveys are continuing and to date, there is no evidence of any impacts on ecological features as a result of longwall mining at Austar. Biodiversity related risk and regulatory obligations in respect to biodiversity impacts are understood to have been satisfactorily addressed. Future material risk associated with currently approved projects is not anticipated at Austar.

Rehabilitation and Mine Closure Liability

The majority of rehabilitation to be undertaken will principally involve reshaping of disturbed areas once demolition works and rubbish removal has been completed and establishment of a stable vegetative cover in these areas. As outlined in the 2017 AEMR, Austar's project approval PA08_0111 is valid until 31 December 2030 and final rehabilitation remains as proposed in the current MOP although it is noted that



site has currently rehabilitated less land than predicted in the MOP rehabilitation schedule. For 2017, 57.8 ha was planned to be rehabilitated but Annual Environmental Management Reports for the period 2015-2017 indicate that 2 ha of the site was rehabilitated in 2015 and approximately 4,000 cu.m of capping had been placed on the Aberdare Emplacement Area in 2016-2017. The MOP plans 88 ha of rehabilitation to be completed by year 2022. There is therefore a rehabilitation deficit of approximately 55 ha as of 2018. Significant works will be required to rehabilitate 55 ha by 2022. There is the potential for the site to not comply with the MOP rehabilitation requirements however this is not considered to be material to Austar.

It is understood that a significant sinkhole draining 360 ha of catchment appeared in the Aberdare Area 13 emplacement, despite this area having been previously rehabilitated. In addition to affecting underground works, this area will require remediation prior to relinquishment. ERM has not viewed any remediation plan or results of corrective / preventative actions, although such activities are stated to occur during the current MOP.

Given the current attention rehabilitation and closure is receiving from the NSW Government, including a reform of rehabilitation, any short comings in the site's rehabilitation are to be addressed within the current term of the MOP. As budgetary provisions for rehabilitation have not been provided, the materiality of this is not able to be ascertained however unlikely to meet the threshold.

DONALDSON, ABEL AND TASMAN

EHS and Social Setting

The dominant land uses above the mining area are agricultural, rural residential and a State forest. Two hard rock quarries, the Black Hill Quarry and the Stockrington Quarry, are also located within the mining footprint. The F3 Sydney-Newcastle freeway is located around 1 km east of the underground mining area. The Hunter Expressway is located about 1 km southwest of the mining area. The closest urban areas are Beresfield and Thornton, about 2 to 3 km north of the mine. The land upon which the surface infrastructure is located is understood to be private land owned by Donaldson Coal.

The Donaldson, Abel and Tasman mines (excluding the Tasman Underground Extension Project (Tasman UG Extension) which has not yet commenced) are all currently under Care and Maintenance. All three assets for Donaldson are referred to in the report.

Heritage Values

At Abel UG there are no sites of European Heritage although it is noted in the Part 3A assessment (2006) that land in the south-eastern section of the proposed Abel Underground area, near Pambalong Nature Reserve, associated with the former Richmond Vale Railway was listed by Cessnock City Council as having local Environmental Heritage'. Sixty-three (63) Aboriginal heritage sites and Potential Archaeological Deposits (PADs) are present within the Abel Project area, including 18 within the surface area north of John Renshaw Drive and 45 within the underground area south of John Renshaw Drive. At least two places that may be of traditional or historical cultural significance to Aboriginal people, however do not necessarily host physical remains, occur within the southern investigation area. These comprise an Aboriginal pathway along Black Hill Spur that probably extended from Hexham Swamp to Mount Sugarloaf and a ceremonial site known as 'the Doghole' in the vicinity of Stockrington and Long Gully. Ongoing management of heritage values at Abel are guided by the signed Aboriginal Heritage Management Agreements between Donaldson Coal and Awabakal LALC (signed 19/01/09) and Mindaribba LALC (not dated). For the term of these agreements, Donaldson is required to pay a management fee of ~~\$40AUD~~40,000 per year to ALALC and ~~\$200AUD~~200,000 per year to MLALC.

At Donaldson, thirty-one (31) sites of Aboriginal Cultural Heritage have been identified on property owned by Donaldson Coal. No European heritage sites have been identified at the mine. In accordance with Conditions 84, 85 and 86 of the Development Consent, Donaldson Coal has prepared an Aboriginal Sites Management Plan for each year of operation at the mine (and has not required revision since 2005). In accordance with Condition 83 of the Development Consent, a 50 metre buffer along Four Mile Creek has been established as an Aboriginal Conservation Area (ACA).



As Tasman UG has ceased and no known items or cultural heritage values have been reported within the surface infrastructure or rehabilitation areas, no ongoing heritage monitoring or management measures are required. Within the Tasman UG Extension, Aboriginal cultural heritage will be managed by an Aboriginal Cultural Heritage Management Plan as required by the Development Consent to be prepared prior to commencement of construction activities. The project area also includes a culturally sensitive men's area, keepa ~~keepa~~ pathways and burial caves. The Tasman UG Extension EIS and supporting Aboriginal Cultural Heritage Assessment (Kuskie 2012) commits that Donaldson Coal will facilitate and fund further documentation of Aboriginal cultural values by RAPS with cultural knowledge and traditional connection. The Development Consent requires that the Aboriginal Cultural Heritage Management Plan include appropriate payment and reporting mechanisms for the provision of up to ~~\$20AUD20,000~~ for an Aboriginal heritage educational documentation program for the Mount Sugarloaf area and for the provision of up to ~~\$40AUD10,000~~ to further investigate selected grinding groove sites in the underground mining domain.

In summary, heritage related risk and regulatory obligations at these mines are understood to have been satisfactorily addressed. Based on a review of available data, material risk associated with currently approved projects is not anticipated.

Native Title Claims

There are no active Registered Native Title claims within the Donaldson OC or Abel UG. There are no active Registered Native Title claims within the Tasman UG since NCS2013/002 (Awabakal and Guringai People) was withdrawn in July 2017. The Wonnarua People also made a Native Title Claim with respect to the existing Tasman UG Mining Lease (ML) 1555 (formerly MLA 186). This is recorded within the National Native Title Register (Tribunal File No. NC02/07, Federal Court File No. NSD6008/02). As reported within the Tasman UG Extension EIS, Response to Submissions Report (2012), an agreement was reached with the Wonnarua People with respect to this claim. ERM do not have any details regarding this agreement although we do note that this Native Title Claim was withdrawn in 2005.

Emission Discharges

The Donaldson, Abel UG and Tasman UG mines (excluding the Tasman UG Extension Project which has not yet commenced) are all currently under Care and Maintenance. Environmental monitoring activities continue during the care and maintenance period in accordance with the MOPs and requirements of MLs and project approval conditions, including ongoing surface water, groundwater, noise, flora and fauna and rehabilitation monitoring. Annual reviews for each mine site have not identified any material risks associated with current emission discharges.

Land Tenure and Permitting

Donaldson OC: Mining Lease 1461 applies to the Donaldson OC and expires on 20 December 2020. Approved operations at the mine operated under Development Consent 98/01173 (as modified) which approved mining operations to end December 2013. Mine operations were completed in April 2013, however in accordance with the requirements of the approval, ongoing compliance is required with respect to biological monitoring, bushland conservation and rehabilitation. The current Mining Operations Plan (MOP) for the period 16 May 2014 to 16 May 2021 was submitted to relevant regulators to cover the final rehabilitation of the Donaldson OC. This MOP was approved on the 16 May 2014. Environment Protection Licence 11080 applies to the mine. An application was made in April 2018 seeking to surrender the licence as activities approved by the licence have ceased. Other licences apply to the site including bore licence and water supply works approval.

Abel UG: Abel mine activities occur under Mining Lease 1618 which expires on 15 May 2029 and Mining Lease 1653 which expires on 21 January 2032. Exploration licence 4597 applies to the Site and expires on 21 July 2019. Operations at the mine are approved under Development Consent 05_0136 (as modified) which approves mining operations to 2030 and permits Run of Mine (ROM) coal production of 6.1 million tonnes per annum (Mtpa). EPL 12856 applies to the site. Other licences that apply to the site including Water Licence 20BL171935 for groundwater interception, due to expire on 4 August 2018. The mine was placed in Care and Maintenance from 28 April 2016 and is managed in accordance with the MOP covering the period ending 1 May 2019. No mining activities are proposed during the term of the MOP. Environmental



monitoring activities continue and are reported in the 2017 Annual Environmental Management Report (AEMR).

Tasman: Mining Lease 1555 applies to the Tasman UG, expiring on 6 October 2025. Construction and mining operations at the mine occurred between 2006 and 2013 under Development Consent 274-9-2002. Operations ceased in July 2013 and site rehabilitation was completed in September 2014. Since that time the mine has been under care and maintenance whilst the revegetated landform continues to develop. It is understood that Development Consent 274-9-2002 has been surrendered. Environment Protection Licence 12483 applied to the Tasman UG and was surrendered on 8 July 2015. Groundwater Bore Licence 20BL171792 also applied to the Tasman UG and has since expired as groundwater extraction ceased at the completion of mining operations.

The Tasman UG Extension Project received planning approval (SSD 4962) on the 18 March 2013 for an extension to the west of the previous underground operations. Donaldson has physically commenced development at the site to enliven the development consent, however construction or mining is not planned to commence in the near term. There is no current Mining Lease covering the whole of the extension project area (ML 1555 covers a portion of the area only). It is understood that a Mining Lease application for this area has been made.

OPERATIONAL EHS PERFORMANCE

Environmental Performance

Donaldson OC: The most recent Independent Environmental Audit (Trevor Brown and Associates, 2015) covering the period 2011 – April 2013 confirmed a high degree of compliance and did not identify any non-compliance with the Project Approval at the completion of mine operations in April 2013, stating that all mining and associated operations were undertaken in accordance with the development consent, EPL and other statutory instruments as issued by the various government agencies. The 2017 Annual Review reported minor non-compliance with the development consent and water licence relating to reporting and documentation requirements that are of no material risk. Various non-compliances with EPL 11080 are noted on the Public Register over the last few years, however these have either been identified as adequately addressed or formal warning issued. It is understood that these matters have been closed out and as such present no ongoing material risk.

Abel UG: The most recent Independent Environmental Audit (Trevor Brown and Associates, 2015) covering the period 2012 – 2015 confirmed a high degree of compliance with the Project Approval. The 2017 Annual Review reported minor non-compliance with the Project Approval and water licence relating to reporting and documentation requirements that are of no material risk.

Tasman UG: The most recent Independent Environmental Audit (Trevor Brown and Associates, 2015) covering the term of the Tasman mine between 2007 and 2013 confirmed a high degree of compliance and did not identify any non-compliance with the Project Approval. The report noted that the Tasman Mine developed under Development consent 274-9-2002 had essentially been completed with rehabilitation of the Tasman Mine site after closure of the underground mine and surface infrastructure areas having occurred generally in accordance with the rehabilitation targets set within the Mining Operations Plan. The 2017 Annual Review identified one administrative non-compliance with ML 1555. No other non-compliances were identified.

Current site compliance at the three operations are not considered to present a material risk to the projects.

H&S Performance

Donaldson OC: Although the site is non-operational, there are risks in care and maintenance. No risk assessments were provided for review so any special restrictions and concerns are difficult to identify and quantify. The site is monitored in the monthly report with a TRIF of 0. No safety management system was available for review. With little data available the assessment of materiality could not be completed. With the number of people involved and the limited activities on site the likelihood of a material issue arising is very low.



Abel UG: Although the site is non-operational there are risks in care and maintenance. No risk assessments were provided for review so any special restrictions and concerns are difficult to identify and quantify. The monthly board report is not tracking statistics for this site (4 people in care and maintenance mode). It is noted that there is a safety management system for Underground Operations Eastern region but it is unclear if all the controls are still in place in care and maintenance. With little data available the assessment of materiality could not be completed. With the number of people involved and the limited activities on site the likelihood of a material issue arising is very low.

Tasman UG: Although the site is non-operational, there are risks in care and maintenance. No risk assessments were provided for review so any special restrictions and concerns are difficult to identify and quantify. No safety management system was available for review. With no data available the assessment of materiality could not be completed. With the number of people involved and the limited activities on site the likelihood of a material issue arising is very low.

Water Management

Donaldson OC

The 2017 annual environmental report identified that the mining operations at the site were completed in April 2013. Progressive rehabilitation occurred throughout the life of the mine and the final rehabilitation activities were completed in March 2014. The site is currently subject to the conditions of EPL 11080, which is currently pending a decision from the EPA to allow for surrender. A Water Management Plan was prepared for the site in 2000 (not provided for review).

A groundwater licence applies to the site to allow for the groundwater extraction from the mining area. A water supply work approval applies to the site for the works associated with the open cut mining pits within the Hunter unregulated and Alluvial Water Sources 2009 Water Sharing Plan. The site is under care and maintenance and no issue of material significance was identified relating to current water management practices from review of the documents outlined.

Abel UG

A Water Management Plan has been prepared for the site and was approved by the DP&E in May 2008. Water management at the underground mine includes clean water diversion and water runoff from the 'box cut' area and surface infrastructure area as well as excess mine water directed to the sump within the West Pit adjacent to the Box Cut. This is then pumped to the Big Kahuna Dam within the Donaldson Mine site as needed. This water is then used for operational purposes or transferred to the neighbouring Bloomfield mine Lake Kennerson or discharged to Four Mile Creek. This is in accordance with approvals for the site.

The site is under care and maintenance for the period ending 01 May 2019. The Care and Maintenance MOP of 2016 identifies that no acid mine drainage issues have been encountered or are expected to occur. The water management strategy will continue throughout the care and maintenance period. The site is subject to a water licence (groundwater) that allows for the interception of groundwater. Annual reporting from 2016 and 2017 identified that take was below allowable limits and no compensatory water has been required to be supplied throughout the life of the mine. Review of the 2016 and 2017 annual reporting identified an administrative compliance relating to the submission of an annual return, otherwise there was no reportable ground or surface water incidents or non-compliances.

No issue of material significance was identified relating to current water management practices from review of the documents outlined.

Tasman UG

The site was subject to EPL12483, with this licence being surrendered in July 2015. A site inspection was undertaken by the EPA and the licence surrender is considered confirmation that on-going risk of sediment laden water from site is no longer a significant risk. The Care and Maintenance MOP details that no acid mine drainage issues were experienced during mining activities.



The 2017 Annual Review and 2015 independent audit states that no reportable incidents or non-compliances relating to surface or groundwater were identified in the reporting period.

The independent audit of 2015 revealed that the mining at Tasman ceased in July 2013 and no further groundwater extraction has occurred since that date. The groundwater licence applicable to the site was valid until March 2013 and was not renewed upon expiration.

No issue of material significance was identified relating to current water management practices from review of the documents outlined.

Soils and Contamination

Donaldson OC

As outlined above, a surrender notice has been supplied to the NSW EPA to relinquish the EPL. In order to surrender the licence, the site must have managed all previously contaminated areas to an acceptable limit. The 2015 Independent audit report for the site identified that contamination assessments were undertaken in 2013 to determine the extent of excavations required to remove contamination from the fuel farm and workshop areas. The remediation works occurred in 2013 and 2014 and potentially contaminating sources, such as oil drums, were removed from site by a suitably licenced contractor. Excavated material was landfarmed in the west pit. No evidence of confirmation that landfarmed material was classified as 'acceptable for final land use' was provided.

Abel UG

The MOP for Care and Maintenance identifies that the identification and remediation of contaminated lands has not yet commenced and will likely commence post current MOP. The Plan assigned a Medium risk rating for the perceived risk to rehabilitation posed by failing to address contamination on the site. The Annual Review for 2017 identified that no specific rehabilitation works were proposed for 2018, with works limited to rehabilitating subsidence impacts or erosion and sediment control measures. The approved Water Management Plan includes an Erosion and Sediment Control Plan that was prepared with consideration to Managing Urban ~~Stormwater~~Storm water: Soils and Construction.

Tasman UG

As outlined above the development consent and EPL were surrendered in 2015 following site rehabilitation. The MOP for Care and Maintenance identified that the contaminated land assessment had been completed and confirmed that there is no residual soil contamination that would pose a threat of environmental harm and was compatible with the final land use. The MOP also stated that all available soil had been re-spread for use in the final rehabilitation and as such specific controls are not required, beyond possible amelioration in areas where revegetation areas are not stabilising.

Ecology

Long-term monitoring programs are in place for Abel UG coalmine integrated with Donaldson OC and Tasman UG which are all currently in care and maintenance.

At Abel UG, an EPBC referral (2007/3695) confirmed no controlled action. The Biodiversity Management Plans provide for the management of the potential impacts and/or environmental consequences of the Abel UG second workings on aquatic and terrestrial flora and fauna, with a specific focus on threatened species, populations and their habitats, endangered ecological communities and water dependent ecosystems. Project Approval 05_0136 requires that a Biodiversity Offset Strategy is prepared prior to the commencement of construction of the coal conveyor or the vegetation clearing described in the EA, whichever is sooner. As the mine is currently in care and maintenance, this requirement has not yet been triggered. The biodiversity offset costs have not been confirmed.

At Donaldson OC one threatened flora species (*Tetratheca juncea*) has been recorded. A *Tetratheca juncea* Management Plan was developed to provide a comprehensive program for monitoring and management of this population on site. A Bushland Conservation Area Management has also been prepared in accordance



within consent condition 72(iii). The property around the open cut is owned by Donaldson Coal and has been retained as a buffer and a compensatory conservation area totalling 625ha. Donaldson Coal will retain management and ownership of this conservation area for a minimum of 36 years from the commencement of construction.

Tasman UG referral (EPBC 2001/253) and Tasman UG Extension Project referral (EPBC 2011/6211) were both determined to be ‘not a controlled action’. Mining of coal at Tasman UG ceased in mid-July 2013 and biodiversity values continue to be monitored through ongoing implementation of the flora and fauna monitoring program for the disturbance areas and compensatory habitat area. As reported in the 2017 AEMR, species diversity has returned to levels observed in 2007 and 2008 following a steady decline between 2009 and 2014. Ongoing monitoring will help to develop insight in whether mining activities had an impact on the compensatory habitat area and to track its ongoing recovery.

A Biodiversity Offset Strategy is required to be prepared prior to the commencement of construction of the new pit top (Tasman UG Extension Project). As this project has not yet commenced, these requirements have not been triggered. It is understood that this project is not envisaged to be developed in the short to medium term (ie not within the 3-4 years) and as such has not been considered further. No issue of material significance was identified relating to current biodiversity practices from review of the documents outlined. ERM notes that the Abel UG and Tasman UG Extension biodiversity offset costs and required conservation bonds have not yet been triggered and their costs have not been confirmed.

Rehabilitation and Mine Closure Liability

Donaldson OC:

All rehabilitation works have been completed at this asset. Assessment of rehabilitation performance at the Donaldson OC has been conducted by Global Soil Systems since August 2009. The results of this rehabilitation assessment were compared with the completion criteria for soil quality, vegetative cover, growth rates, species diversity and stem densities, as adopted by Donaldson Coal in the Rehabilitation Plan and MOP. The Global Soil Systems assessment found that several of the rehabilitated areas had met the completion criteria. The remaining rehabilitated areas assessed, were on track to meet the required completion criteria (Donaldson Coal Mine Rehabilitation Monitoring Report, Global Soil Systems 2014).

Under the current MOP limited maintenance works will be carried out to maintain the rehabilitated landform at the site. The site is still receiving small volumes of waste rock from the Abel operations which are placed in West Pit (1,000 cu.m/yr). In addition, West Pit and Square Pit are to be used for the temporary storage of excess water from the Abel UG operations, prior to transfer to the Big Kahuna dam. West Pit and Square Pit are planned to be transferred to the Abel Mining Leases during the term of the current MOP, effectively relinquishing these domains from the Donaldson OC. Until this transfer takes place, the security will remain against ML 1461. For the remaining areas, confirmation that rehabilitation has been successful is required before relinquishment and monitoring of this is planned during the current MOP. The 2017 Annual Review confirmed rehabilitation areas have met or are progressing to meet completion criteria. No material closure issues have been identified for this site. However, the sooner completion criteria can be met, the sooner the site can be relinquished and the appropriate security held by Government released.

Abel UG:

The current MOP provides for the site’s rehabilitation requirements specified under the site’s approvals. The current MOP states that rehabilitation works have not yet commenced in any active mining areas but progressive rehabilitation of subsidence areas have been completed to the satisfaction of landholders and council, as appropriate. Given the mine is an underground operation, the only significant rehabilitation will be for surface infrastructure. No specific issues affecting the ability to successfully rehabilitate the site have been identified by the most recent Independent Environmental Audit (2017). The costing for the proposed closure of Abel UG was estimated by Umwelt in 2014 and as highlighted in the Life of Mine (LOM) Plan, it did not include personnel costs although it did include a 20% contingency on the total closure cost.



Tasman UG:

Mining of coal at Tasman UG ceased in mid-July 2013. Rehabilitation activities commenced shortly after with sealing of the mine portals in December 2013. The removal of the surface infrastructure was completed in May 2014 and final landform shaping and revegetation was completed in September 2014. Since that time the mine has been under care and maintenance whilst the revegetated landform continues to develop towards a sustainable community acceptable for the relinquishment of ML1555. There have been no disturbance or rehabilitation activities conducted for the Tasman UG Extension Project. The current MOP states that only care and maintenance monitoring of rehabilitation will be carried out and remediate measures implemented if any non-compliance with trigger actions occurs. By the end of the current MOP, it is expected that ecosystem and land use sustainability will be achieved but lease relinquishment will not occur until the following MOP term and is dependent on the future operation of the Tasman UG extension project.

YARRABEE

EHS and Social Setting

A number of existing coal mining operations occur nearby including Jellinbah and Curragh mines located to the south. Blackwater is a mining town with large scale coal mining ongoing since the 1960s. The site operates a Stakeholder Engagement Strategy which provides procedures for external communications.

Heritage Values

A Cultural Heritage Management Plan (CHMP) was signed with the traditional owners Gaangalu Nation People in 2014. All land to be disturbed by mining is surveyed prior to works in accordance with this CHMP.

A Native Title application was made by the Gaangalu Nation People (Tribunal No QC2012/009 Fed Court No QUD400/2012) in August 2012. There are no known issues in relation to cultural heritage or native title that would be considered material risks to the project based on the information available at the time of the assessment.

Emission Discharges

Emissions and discharges are typical of similar open cut coal mining operations. The site operates a number of Environmental Management Plans to control all emissions and discharges and implement appropriate procedures in the event of any incident. These Plans include the following aspects: dust, noise, waste, topsoil, weeds and pests, erosion and sedimentation, surface water and tailings. Plans are in place for the mine and Boonal Train Loadout. Apart from two water discharge non-compliances at Yarrabee in 2015 and 2016 there has been no other non compliances as a result of emissions or discharges in the last three years.

No issues of material significance were identified relating to emission discharges from review of the documents outlined.

Land Tenure and Permitting

The site comprises of ten mining leases (MLs) 1770, 80049, 80050, 80096, 80104, 80172, 80195, 80196, 80197 and 90198. The MLs occupy 15 land parcels and two road reserves. All activities across these tenements is authorised under a single environmental authority (EA) EPML00844613.

Of the ten MLs, one is due to expire in October 2018 – ML80050 Yarrabee South. In the current Plan of Operations, this ML is still proposed for use in 2019. A renewal for this permit will need to be lodged at least 6 months prior to its expiry i.e.

May 2018 which is understood to have occurred). This is a standard administrative process and renewal of the ML is expected to occur. It is not expected that any renewal application would be refused by the [QldQLD](#) Government if sufficient time for renewal is provided.



Coal from the mine is hauled to the Boonal Train Loadout Facility located 37 km from the MLs. Activities at the Train Loadout are regulated under a separate EA EPPR00832813 operated by the Boonal Joint Venture. No EPBC Permit applies to the site.

There are no other issues of material significance identified relating to permitting from review of the documents outlined.

OPERATIONAL EHS PERFORMANCE

Environmental Performance

One non-compliance with EA EPML00844613 was reported between 2015 and 2016, based on the Annual EA returns for the site. This related to a mine water discharge event in Feb 2016 following a significant rainfall event which required excess water to be released from site under a Temporary Emissions Licence. A small exceedance of electrical conductivity was recorded in Twelve Mile Creek. Monitoring of the release was undertaken and reported. No environmental impacts were likely to have occurred and no ongoing investigation by the regulator is taking place. Overall, however, the site has demonstrated compliance with all other aspects of its EA (note: no third party audit reports have been provided to ERM for the mine and this finding is based on site's annual EA returns).

Based on the 2016 third party audit of the Boonal Train Loadout, non-compliances with EA EPPR00832813 were reported for: exceeding throughput tonnages, non-submission of 3 monthly dust monitoring reports and uncontrolled discharge of water following high rainfall events in February and July 2016. Corrective and preventative actions are documented as being implemented to ensure compliance with dust reporting and risk of water discharges and, in regards to the latter, the QLD regulator is understood to have accepted additional water management controls for the period February to May 2016..

Annual Return and environmental performance reporting including correspondence with the administering authority post May 2016 (post the pit dewatering TEL Application timeframe) has not been provided for assessment.

Based on the information reviewed, no material issues associated with environmental performance and compliance has been identified.

H&S Performance

The SHMS Compliance and Effectiveness Audit conducted in May 2017 was based on the Queensland Department of Mines and Energy (DNRM) produced Guidance Note QGN09, "Reviewing the Effectiveness of Safety and Health Management Systems (October 2008, version 2)". There were no major non-conformances with minor non-conformances focused on audit/inspections, obligations to HSDMS requirements, change management, training/consultation, contractor management, fixed plant and hazardous chemicals.

The Broad Brush Risk Assessment conducted in December 2016 indicated consultation with the required wide range of personnel. The risk assessment reviewed indicated a wide range of hazards were identified and assessed by identifying the controls and their adequacy.

The key comparable statistic of TRIFA is running at 7.6 is slightly below the Queensland coal mining open cut industry average (2016/17) of 12.6. No material issues were identified.

Water Management

The site manages water in accordance with the EA under the Water Management Plan (WMP). The WMP provides controls for the mine and Boonal Train Loadout. ERM notes that the WMP is required to be reviewed and updated annually to ensure it remains current to operations. The Version Control on page 2 of the WMP suggests the Plan was not reviewed for 7 years between 2010 and 2017. This is a minor non-compliance. However, the current version of the Plan was reviewed in August 2017, indicating it is likely to be appropriate to operations at the present time. Further review is required to confirm this interpretation.



Based on the information reviewed, no material issues associated with water management has been identified.

Soils and Contamination

Whilst there is no detailed mapping of soils in the area it is acknowledged in the Rehabilitation Report and Success Criteria 2013 that the mine is subject to cracking clays and dispersive soils with the presence of Gilgai and sodic soils. The presence of these soils is not considered to be a material risk based on the information provided however further investigation to the soil types is required to assess the management methodology and costs associated with the treatment of these soils to ensure their stability.

No information on known contamination on the Yarrabee open cut mine site has been provided for assessment. Under Section 8.3 Rehabilitation Methods of the Rehabilitation management Plan any contaminated soil material is to be placed in the pit for burial then partially back filled with spoil to create a residual void within the landscape. Section 10.3.2 of the RMP also notes that a contaminated land assessment is to be performed to determine contaminated areas of areas of highly saline material associated with major pieces of infrastructure across the Yarrabee Coal Mine site. The locations of these sites and volume of potentially affected material is unknown from the information provided and hence no determination on the actual level of risk can be determined.

Ecology

Rehabilitation and Mine Closure Liability

The site's Rehabilitation Management Plan (RMP) implements the requirements of EA EPML00844613 for the rehabilitation of the MLs. On review, it is noted that the RMP provided in the data room is a 2012 version and refers to operations on only six MLs (rather than 10). It therefore appears that rehabilitation on the remaining 4 MLs is not provided for in the RMP, including existing disturbance listed in the Plan of Operations for infrastructure on ML80197 and 80198. This is a non-compliance with the EA and potential material risk. However, ERM also notes that the EA requires an amended RMP to be submitted to the QLD regulator by 31 December 2017 and a more recent version of the RMP may not have been provided to ERM to view. The 2017 RMP must include all 10 MLs within its scope. If operating under the 2014 RMP, the site is presently not in compliance with the EA with disturbance already having occurred on ML80197 and ML80198 without appropriate rehabilitation measures being identified first.

No evidence has been provided to confirm the Financial Assurance bond of ~~\$69M~~**AUD69M** has been lodged with the ~~QLD~~**QLD** Government as security for rehabilitation. However as the mine is in operation it is assumed the FA has been lodged.

The current Plan of Operations states that DE Pit, which was receiving tailings slurry from the wash plant, will require several years of drying before the surface will be solid enough to allow machinery or waste rock to be placed on the surface for rehabilitation. This risk has not been identified in the RMP. However, the Pit DE Tailings Operations Plan (2014) does present conceptual management methods for the drying of tailings through natural evaporation and collection of water in low point sumps. Given DE Pit has now entered the decommissioning phase, the drying out of tailings is critical to the success of the domain's rehabilitation. Generally, the drying of coal tailings can present a significant risk to rehabilitation success and eventual relinquishment of this infrastructure. Without appropriate monitoring and management, this issue could present a material risk to the site if drying does not occur as expected. Notably, no rehabilitation was reported in the EA annual returns during the last three years. The Plan of Operations states rehabilitation targets of 385 ha and 428 ha in 2018 and 2019 respectively. These are large areas to be rehabilitated in the next 18 months and ~~\$9M~~**AUD9M** budget has been allocated to rehabilitation during the 2018 financial year. With rehabilitation reforms underway in QLD, the lack of rehabilitation to date could become a risk in the next 12-24 months, however further information on the reforms is required. Condition F4 of EPML008446613 requires the proponent to apply to amend the environmental authority to adopt the final landform domains and rehabilitation success criteria required by condition F5 and condition F7 by 31 May 2018 however no information has been provided to determine if this approval requirement has been met.

Section 7.3 Rehabilitation Methods included in the Rehabilitation Report and Success Criteria 2013 provides that the regrading of areas are to have a slope of no greater than 15% for rehabilitation of spoil.

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Currently it is understood that the slope is between 25-30% and hence is a potential material risk associated with the costs associated with reforming the landscape to achieve 15% to stabilise the ~~recontoured~~re-contoured landform.

As no rehabilitation has been reported in the EA annual returns during the last three years and with significant rehabilitation targets in 2018 and 2019 and rehabilitation reforms underway, achieving successful rehabilitation to meet targets is a key issue for the asset which requires focus and effort to ensure targets are met over the next 12 – 24 months, otherwise this may become a material risk.

MIDDLEMOUNT

EHS and Social Setting

The site is within the Isaac Regional Council area. Land uses surrounding the site include low density cattle ~~gazing~~grazing and separate coal mining operations i.e. German Creek, German Creek East and Foxleigh.

The December 2017 external audit report for the compliance against the Environmental Authority (EPML00716913) for Middlemount noted a complaint has been received in relation to vibration from blasting activities. The report also highlighted that vibration monitoring for blasting activities had not been undertaken however details of this aspect have not been provided for review. Complaints associated with noise and vibration are not uncommon for open cut mining operations and a one off complaint as the external report infers (although not explicitly stated) are unlikely to be a material risk.

Heritage Values

The site has an approved Cultural Heritage Management Plans in place with the Barada Barna People and Barada Barna, Kabalbara & Yetimarla People #4 native title claimants. Management of Aboriginal cultural heritage is conducted in accordance with the CHMPs. ERM is not aware of any non-compliances.

The MCPL Environmental Management Plan (MP003) dated 26 April 2017 does not indicate the presence of existing cultural heritage or Native Title issues associated with the operation. The EMP has provisions for surveys and inspections to be conducted on new clearing and works activities with the involvement with the BBKY#4 appointed Field Officers to assess for any unexpected finds.

The EMP does refer to the Cultural Heritage Management Plan however this has not been provided for review however based on the information provided in the EMP (MP003) cultural heritage for the existing operation does not pose a risk to the project.

A search of the public Native Title register has indicated that there is an active native Title application over the southern portion of ML70417 by the Barada Kabalbara .Yetimarala People (Tribunal No QC2013/004 Fed Court No QUD383/2013) which also incorporates the south eastern corner of ML70379. Additionally the southern portion of ML70379 has an active native title claim (QC2013/004 Feb Court No QUD383/2013) by the Barada Kabalbara Yetimarala People. This latest claim does not affect operations on the ML.

The risks associated with the existing operational footprint are considered minimal to the project and where additional clearing and land disturbance activities are planned for areas within the native title claim areas are addressed in the EMP includes involvement with the native title claimants in the pre-works survey and assessment process.

No non compliances or additional issues are associated with cultural heritage are known to ERM.

Emission Discharges

Emissions and discharges are typical of similar open cut coal mining operations. The site’s Environmental Management Plan provides controls for all emissions and discharges and appropriate procedures in the event of any incident. No non-compliances as a result of emissions or discharges have occurred in the last three years.



The EA requires particular limits to be applied to exploration activities (Conditions F31 – F45). The environmental management of exploration activities is not included within the Site’s Environmental Management Plan and it is understood from interviews on site that there is no formal Plan for managing these activities within the relevant ML. The lack of a formal Plan presents a risk of non-compliance with the EA for exploration activities, assuming other process and activity controls are not implemented as part of exploration activities on site, however such risk is unlikely to be material.

Land Tenure and Permitting

The current mine operates within three mining leases (MLs) 70379, 70417 and 700014. The expiry date of all three MLs is 30 September 2031. There are four land parcels within the MLs and two road reserves. Three of the land parcels are freehold owned by Middlemount Coal Pty Ltd. One parcel is leasehold land, owned by the Queensland Government but leased to a joint venture lead by BHP Coal Pty Ltd. This leasehold parcel is located in the centre of ML70379.

All mining activities across the three MLs are carried out under a single environmental authority (EA) EPML00716913. A Plan of Operations for activities to be undertaken in 2018 has been lodged with the Department of Environment and Science (DES), along with a corresponding Financial Assurance cost estimate proportional to the rehabilitation liability.

Under the Commonwealth Environment Protection and Biodiversity Conservation (EPBC) Act, operations are approved through two separate permits: EPBC 2010/5394 (Middlemount Stage 2) and EPBC 2016/7717 (North-eastern Extension).

Secondary permits are in place for water diversions and allocations required by the Water Act 2000 (QLD).

New tenure and environmental permit applications commenced in 2017 to enable the expansion of the pit to the newly acquired tenement to the North West. In relation to tenure for this tenement, an application for surface rights across ML70379 has been made to the Qld Department of Natural Resources, Mines and Energy (DNMRE) along with a new ML application for new infrastructure to facilitate the extension of the East Dump. Approval of these applications will require finalisation of any Native Title, landholder compensation / land acquisition issues to be resolved prior to grant. The expansion of the pit is within the current mine plan and that further permits are required to allow the continuation of mining in the later years of the mine life. Further, it is noted that part of the offset area for Stage 2 approved under EPBC 2010/5394 will be affected when the this planned expansion project is approved and commences. It however noted that this permit is not required for over 5 years and as such it is envisaged that the required permits will be approved prior to the commencement of mining in these areas. As such this is not considered a material risk to the continued mining and mine plan presented.

OPERATIONAL EHS PERFORMANCE

Environmental Performance

An audit by DES in March 2016 did not identify any matters of concern or evidence of non-compliance of the EA. However, one area of concern was identified at Sediment Dam 1, in particular a risk of potential overtopping. It is understood this concern was resolved and a repeat audit by DES in July 2017 did not identify any non-compliances or matters of concern.

The third party independent audit of the EA in December 2017 (LRS Environmental, Dec 17) identified three non-compliances with the EA (i.e. Conditions E3 Tailings sampling, D1 Blast Vibration Monitoring and G33 Supply of Register of Regulated Dams to DES with annual returns). Based on interviews with site personnel, ERM understands that all of these matters have been closed out. No material issues have been identified.

H&S Performance

The Middlemount safety management system describes the critical hazards for the site and the cardinal rules (related to single fatality hazards). This document is a shared document with the five contracting firms. They have individual implementation plans and various forms of internal monitoring which appears to be effectively implemented.



Running between 2 and 3, their performance is well below the Queensland industry average for open cut coal mining (2016/17) of 12.6. Their statistics are very good and they have lead indicator such as hazard identifications that demonstrate an increase in recognition of hazards and reporting. No material issues have been identified.

Water Management

The site operates a Water Management Plan (WMP) in accordance with the requirements of the EA. The WMP forms part of a broader water management system which collectively addresses site water balance, regulated structure operations, receiving environment monitoring, erosion and sediment control and severe weather practices. The WMP must be updated at least every three years and the current version was updated in 2016 which is compliant.

No material issues have been identified.

Soils and Contamination

The 2010 Environment Impact Statement indicated that the project area is subject to limited subsoil suitability for rehabilitation due to dispersivity, a tendency for gully erosion and alkalinity/sodicity. If dispersive subsoils are left exposed and not rehabilitated within an adequate timeframe they could be impacted by wind erosion. The risk of soil salinity was considered low.

The Rehabilitation Management Plan Version 1.0 dated 2012 confirms that to date no detailed site specific analysis of the tunnel erosion potential of spoil on the site has been conducted. Further, Chapter 11 of the RMP provides a risk assessment for the rehabilitation program however the mitigation plans to address unmitigated risks are based on proposed characterisation, trials and consideration of various methodologies. No information has been provided as to the status of the existing topsoil stockpile condition and the costs associated with the ongoing management and trialling of this material for rehabilitation purposes.

No information has been provided on potential and actual contamination associated with the project for this review, however in the Rehabilitation Management Plan Addendum 2014 it is noted that most of the coarse reject and tailings material generated from processing coal from the Middlemount and Pisces seams and some of the floor material from the Middlemount sea, are likely to be potentially acid forming (PAF) and will require management. As the volume of material that may be affected by PAF is unknown the costs associated with the management of these soils at the time of rehabilitation is unable to be estimated.

Condition F14 of the Environmental Authority EPML00716913 requires the completion of a Rehabilitation Management Plan. Therefore it is considered that the RMP is a regulated approved document by the administering authority and as such the commitments in mitigation plan outlined under Chapter 11 of the RMP are enforceable and as such the costs associated with implementing the mitigation plan commitments needs to be considered with respect to the overall final rehabilitation of the project area. With consideration to the commitments in the RMP and the limited information provided for assessment with respect to the status of progressive rehabilitation activities being undertaken the management of soils and potential contamination arising from the tailing management may present as a material risk for the project if not addressed as part of the upcoming study. As such currently is not considered a material risk within the LOM plan.

Ecology

Ecological impacts of mining activities are regulated under the EA and the two EPBC permits. Three offset areas are active, each with different requirements under the relevant permits. This poses some risk with managing compliance. Furthermore, part of one offset area (Stage 2 Offset Area approved under EPBC 2010/5394) is planned to be mined in the future by the Western Expansion.

It is understood that the site intends to develop a single Offsets Plan that is consistent and integrates all offset requirements into a single document. Whilst no non-compliances with offset requirements have occurred to date, having a single Offsets Plan will assist to ensure compliance is maintained. The need to mine an existing offset area will require negotiation with the relevant regulator. In principle, offset areas are



intended to be protected in perpetuity. However, it is understood that only 1.1% of the total Stage 2 Offset Area is planned to be mined.

Rehabilitation and Mine Closure Liability

No evidence has been viewed by ERM to confirm the Financial Assurance (FA) bond of **\$25AUD25.8M** has been lodged with the QLD Government. However, given the mine is operational it is assumed that the FA has been lodged.

The Rehabilitation Management Plan (RMP) identifies key risks to rehabilitation success as being a lack of suitable (non-erosive) spoil and capping material. Mitigation measures involving spoil characterisation and material balance calculations, as well as field trials, are planned to control these risks. The RMP was updated to include the results of these initial studies but it appears additional work is required. Should these risks not be managed then there may be a requirement to amend the rehabilitation criteria required by the EA. Such an amendment would be a material risk to completing the site’s rehabilitation requirements, if it was required which currently it is not.

The Middlemount Mine operation incorporates an area of 3,344ha in total. Section 5 of the Middlemount Plan of Operations, Revision 1.0 dated 8 January 2018 confirms that 32.5ha of area has been rehabilitated since 2014, with a number of issues occurring during the 2016-2017 rehabilitation program which resulted in rehabilitation being restricted to 25ha instead of the proposed 63ha. These issues included changes to the mining program within the vicinity of the proposed rehabilitation area, buffering from completed rehabilitation areas to new mining activity areas and the lack of competent pit rock to complete the rehabilitation methodology. A further 20 ha planned for the 2018 period. No information has been provided as to the success of the 32.5ha of rehabilitation completed in the past four years of operation.

Based on the commitments made in the RMP and in the absence of information to confirm the completion and outcomes from these commitments to date, it is considered that the final rehabilitation may exceed the amount currently calculated for FA, being **\$25MAUD25M** and therefore may present a risk for the project whoever is not considered to meet the material risk threshold. Rehabilitation is likely to be constrained by a lack of suitable spoil and capping materials on site. Initial studies have been completed to address these risks but additional investigations will be required to confirm final rehabilitation success. The need for an EA amendment of rehabilitation outcomes could become a permitting risk, particularly given the current reform of rehabilitation requirements by the Qld regulator.



16. HVO/MTW Underground Mining Potential

RPM highlights that the current HVO and MTW Ore Reserves and LOM Production Schedule presented in **Section 8** and **Section 9** are based on the current open cut mine designs and specifically excludes the underground resources. RPM notes that there is significant potential for underground mining to be undertaken on this material.

The Company and previous owners completed various studies for the underground portion of the HVO/MTW area of the Project (the “UG Project”). RPM has completed a review of the associated reports which outlines the proposed production profile, operations and costs. RPM utilised these reports and completed further in-house review and designs to better define the economic viability of an underground operation within the Project (the RPM Scoping Study).

The following summarises the results of a review into the underground mining potential at MTW and HVO and conceptual planning outcomes. RPM highlights the quantities and forecasts presented below are not Coal Reserves, nor does the review and underlying studies constitute a Prefeasibility Study, rather is considered a scoping level study to an accuracy of +- 50%.

RPM notes that the study presented is high level in nature and requires additional drilling and mining studies to be undertaken and may not result in an economically viable project being defined and are presented to highlight the potential for additional mining to be undertaken if drilling and studies show the economic viability of any defined resource.

16.1 Asset Description

Within the HVO and MTW leases, there has been a significant amount of coal identified as potential underground targets by various studies. Based on current inputs, the open cut operations are economic to deeper seams as the basal cut off (as outlined in **Section 10**) and as such the underground mineable quantities tonnage is now significantly reduced from previous studies. To date, all underground mine planning that has been completed to a conceptual level only with the focus of most of the previous work being the MTW area. High-level geotechnical and gas reservoir characterisation work has been undertaken for MTW. The most recent study work includes a technical review of previous conceptual work undertaken by a third party in June 2013 and internal modelling by the previous owners conducted in 2015. RPM notes the Company is currently undertaking further reviews however this is not finalised as at the effective date of this Report.

The June 2013 study was designed primarily as a review of the Lower Hunter assets and as a tool for the development of a conceptual underground mining strategy that would sit as either complementary, or as an alternative, to open cut mining at MTW and HVO. This work involved development of mine layouts, production scheduling and economic evaluation. It appears that little consideration was given during this study to the timing and interaction between open cut and underground operations.

The 2015 study work was completed by the previous owner and RPM has only sighted the XPAC design and schedule. This provides an insight into the most recent strategic thinking however, as would be expected for the level of study, no detailed timeframe was presented nor would it be expected.

The coal working section is that part of a coal seam, or aggregated coal seams including non-coal parting material that can be worked by underground methods. A set of criteria was applied to assessment of working sections for underground extraction. The criteria used to assess the suitability for working section development are outline in **Table 16-1**



Table 16-1 Criteria used by previous owners in the assessment of underground working sections

Parameter	Factor
Working section thickness	1.6m to 6.0m
Maximum parting thickness	0.3m
Working section raw ash	< 45%
Depth	75m to 600m
Seam dip	< 10 degrees

RPM has reviewed the characteristics of each of the potential underground targets within the context of latest thinking in relation to open cut operations.

MTW

Potential underground targets at MTW have been identified in the Mount Arthur, Vaux and Bayswater Seams. Due to open cut extraction or insufficient depth of cover to open cut final voids the Mount Arthur target has been confined to the Thorley lease area as shown in **Figure 16-1**. The Mount Arthur seam characteristics are provided on **Table 16-2**.

The Vaux Seam lies 20m to 30m below the Mount Arthur Seam and as such could be mined in areas where the Mount Arthur Seam has been extracted by underground methods however would be too close to the surface in areas where the Mount Arthur had been extracted by open cut. Review of existing and planned cover remaining over the Vaux Seam following open cut activity has resulted in the identification of two target areas, one covering the MTO lease and the other below the northern part of the Warkworth Pit. These areas are shown on **Figure 16-2** and the seam characteristics are provided on **Table 16-3**.

The Bayswater Seam lies an additional 80m below the Vaux Seam and is not constrained through prior open cut mining or lack of fresh cover. As shown on **Figure 16-3** the Bayswater target covers the extent of the MTO lease and the Warkworth pit. It should be noted that the MTO lease is stratified and includes all Resources above the Bayswater Seam. This means that a lease extension would need to be secured if underground mining is to be undertaken in the Bayswater Seam at MTO. YAL has submitted an application for an exploration lease for this purpose. The characteristics of the seam are provided on **Table 16-4**. There is very little exploration of either the Lemington Seam or the Barrett Seam which are located below the Bayswater Seam and as such neither are considered to be underground mining targets at this time. RPM understands that YAL will be completing exploration drilling to these seams within the next 2 years.

Table 16-2 MTW – Mount Arthur Seam characteristics

Parameter	Factor
Proximity to open cut pits	Thorley pit
Proximity to surface infrastructure	South tailings dam and Putty/Charlton Road
Seam thickness	2.4m to 4.2m
In Situ estimate	86Mt
Depth of cover (from topo)	175m to 245m
Cover to base of open cut	100m
Seam dip	Shallow, except for south east portion of MTW South
Raw ash	22.0% to 37.0%
Likely products	Semi soft coking and thermal



Table 16-3 MTW – Vaux Seam characteristics

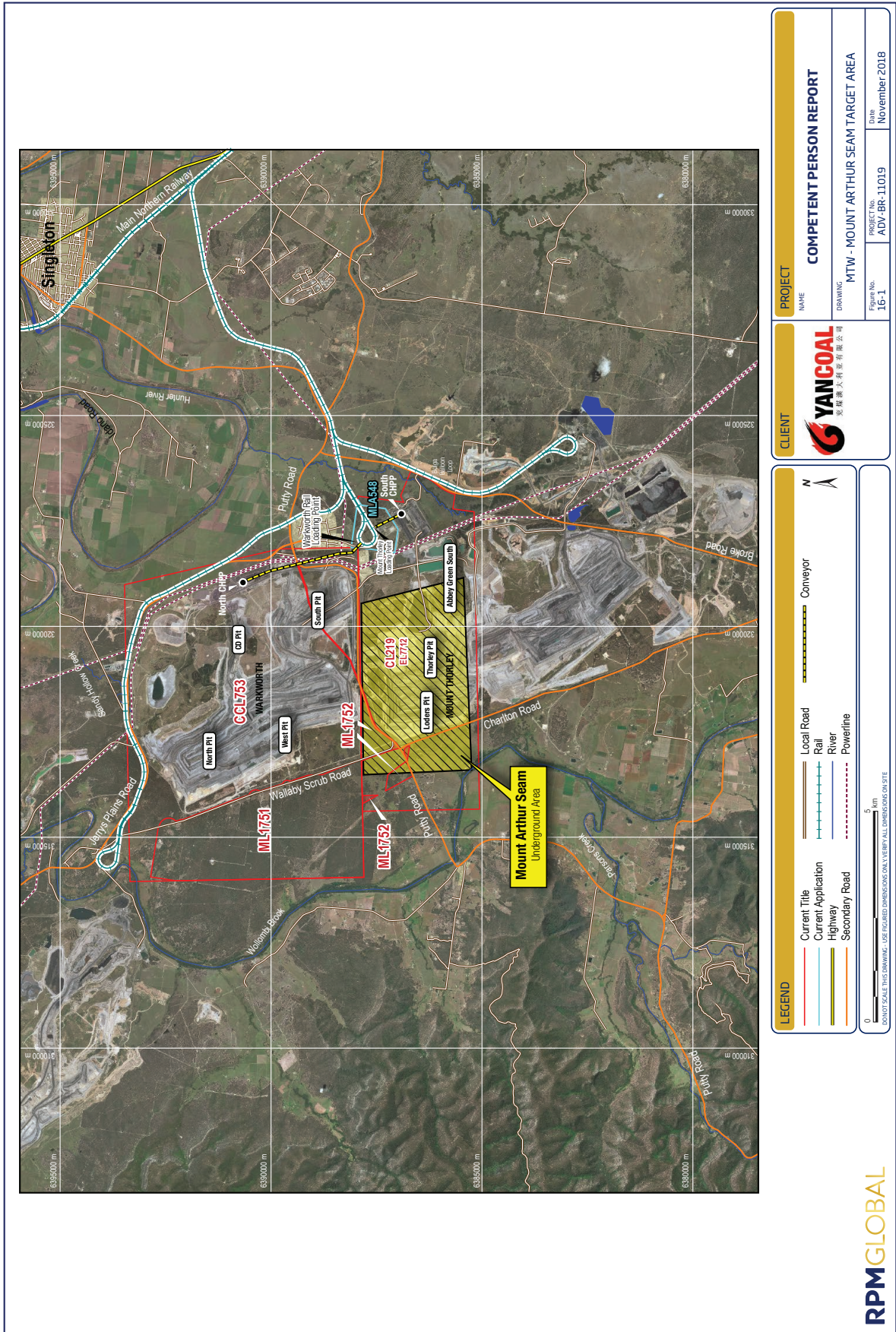
Parameter	Factor
Proximity to open cut pits	West pit and Thorley pit
Proximity to surface infrastructure	North/south tailings dam and Putty/Charlton Road
Seam thickness	1.2m to 4.1m
In situ estimate	67Mt
Depth of cover (from topo)	100m to 400m
Interburden to seam above	20m to 30m below Mt Arthur seam
Seam dip	Shallow, except for south east portion of MTW South
Raw ash	15% to 20%
Likely products	Low ash semi soft

Table 16-4 MTW – Bayswater Seam characteristics

Parameter	Factor
Proximity to open cut pits	West pit and Thorley pit
Proximity to surface infrastructure	North/south tailings dam and Putty/Charlton Road
Seam thickness	2.7m to 8.4m
In situ estimate	338Mt
Depth of cover (from topo)	200m to 450m
Interburden to seam above	60m below Vaux seam
Seam dip	Shallow, except for south east portion of MTW South
Raw ash	25% to 30%
Likely products	Low ash thermal

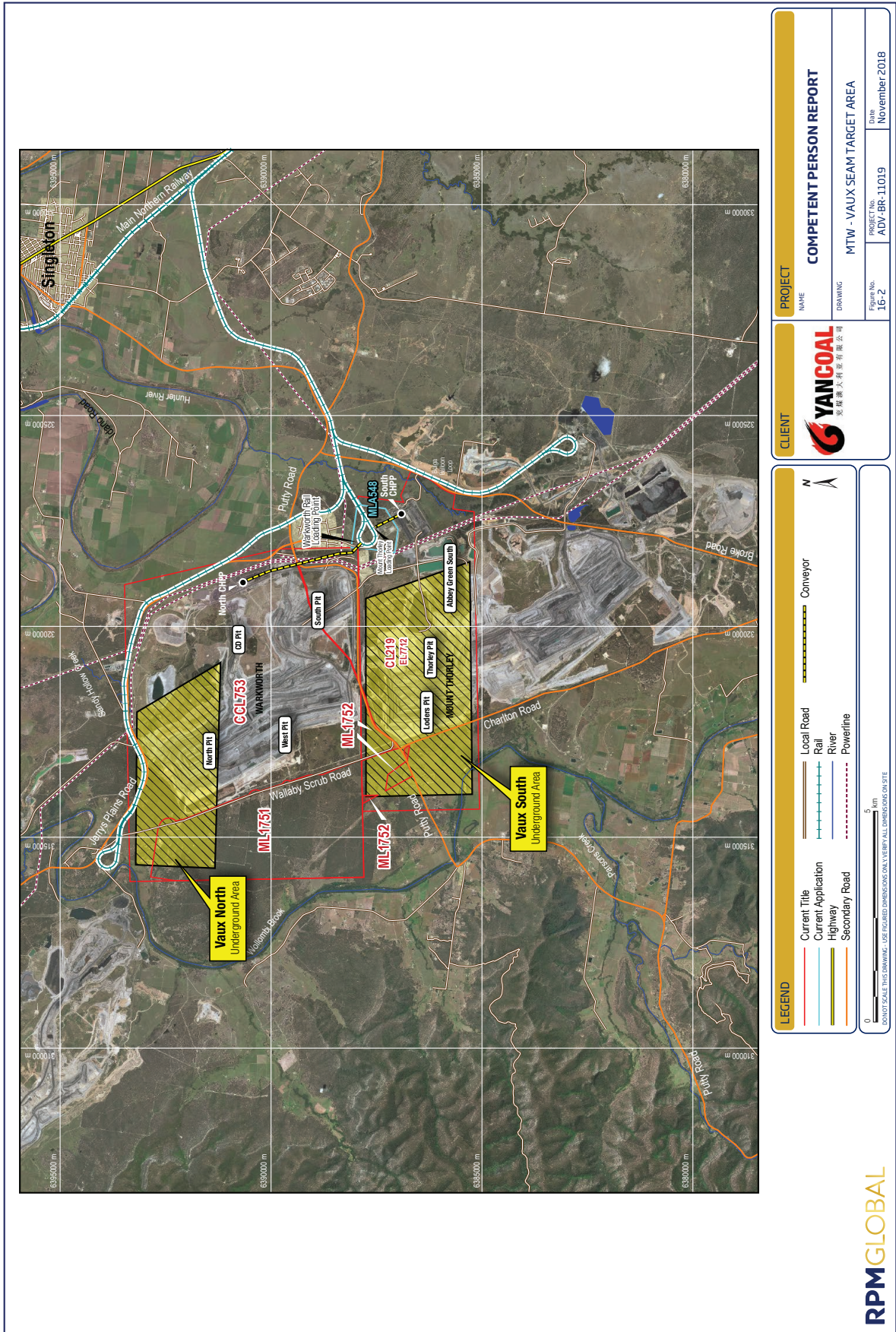
APPENDIX III

COMPETENT PERSON'S REPORT



APPENDIX III

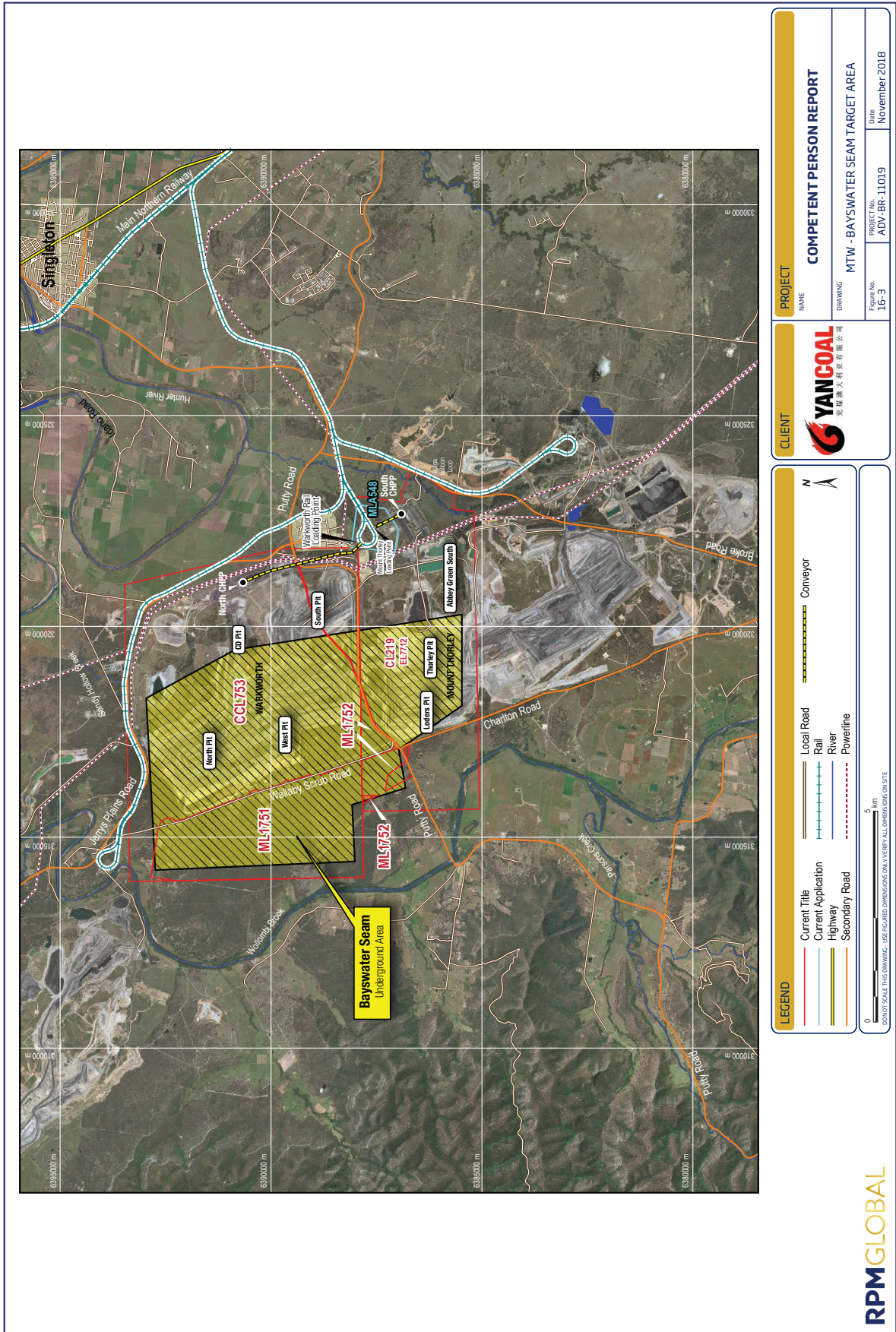
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HVO

At HVO potential underground mining targets have been identified in the Arties Seam, Liddell Seam and Barrett Seam. As shown in **Figure 16-4 to Figure 16-6** these seam are much thinner than the MTW targets. The Arties and Liddell seams are constrained through a lack of sufficient cover and as such have been confined to the areas shown on Figure 16-4 and Figure 16-5. The deeper Barrett Seam is not affected by open cut operations and as shown on **Table 16-6** and covers a wider area.

Table 16-5 HVO – Arties Seam characteristics

Parameter	Factor
Proximity to open cut pits	Cheshunt pit
Proximity to surface infrastructure	-
Seam thickness	1.5m to 2.3m
In situ estimate	35Mt
Depth of cover (from topo)	200m to 375m
Burden to base of open cut	170m – 180m
Seam dip	Shallow
Raw ash	28% to 46%
Likely products	Low ash thermal to semi-soft

Table 16-6 HVO – Liddell Seam characteristics

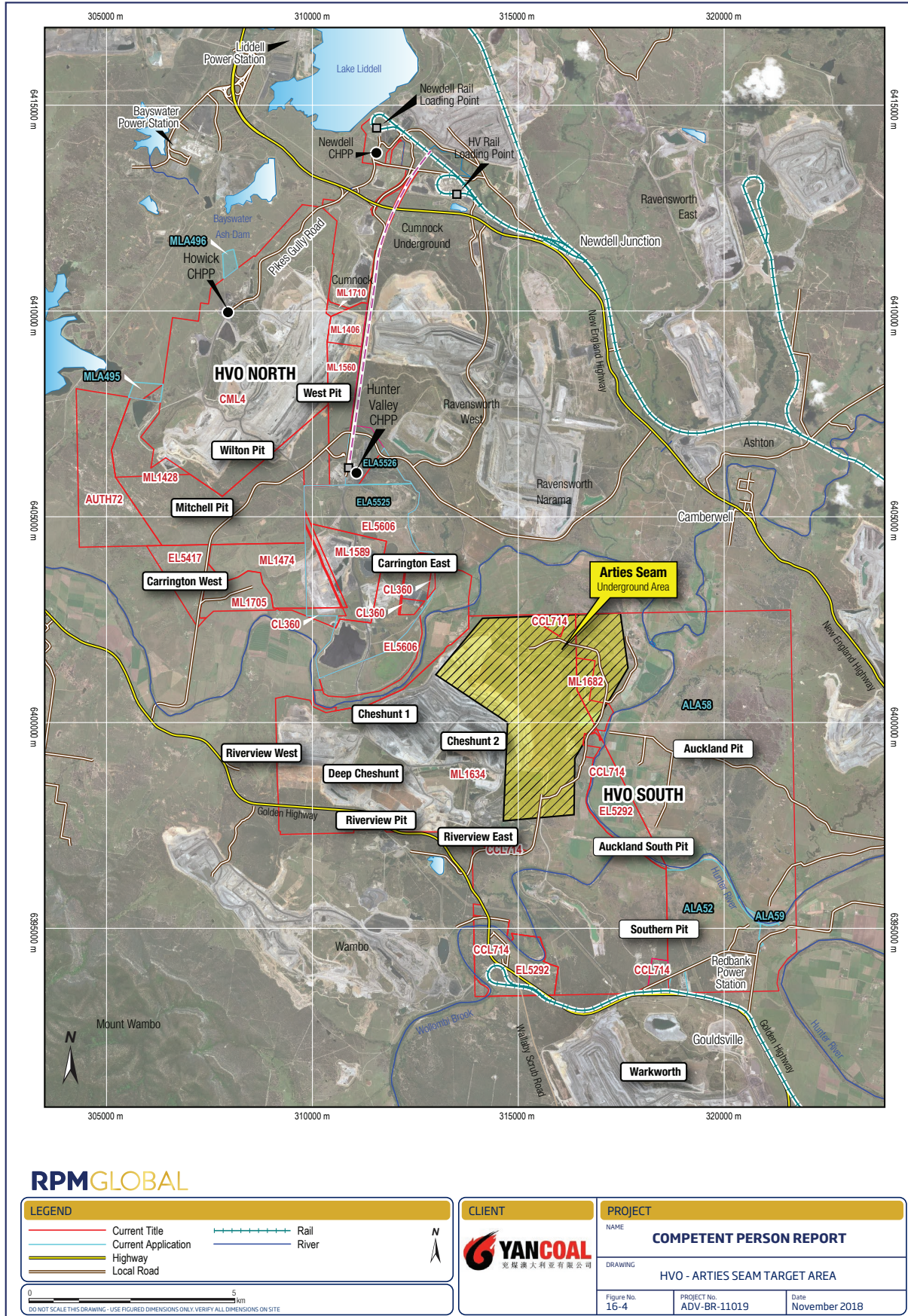
Parameter	Factor
Proximity to open cut pits	Cheshunt pit
Proximity to surface infrastructure	-
Seam thickness	1.2m to 2.6m
In situ estimate	Insufficient data to estimate
Depth of cover (from topo)	275m to 475m
Interburden to seam above	60m – 70m
Seam dip	Shallow
Raw ash	22% to 35%
Likely products	Low ash thermal to semi soft

Table 16-7 HVO – Barrett Seam characteristics

Parameter	Factor
Proximity to open cut pits	Cheshunt pit
Proximity to surface infrastructure	-
Seam thickness	1.9m to 2.9m
In situ estimate	82Mt
Depth of cover (from topo)	300m to 500m
Interburden to seam above	17m – 32m
Seam dip	Shallow
Raw ash	22% to 33%
Likely products	Semi soft

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LEGEND

- Current Title
- Current Application
- Highway
- Local Road
- + + + + + Rail
- River

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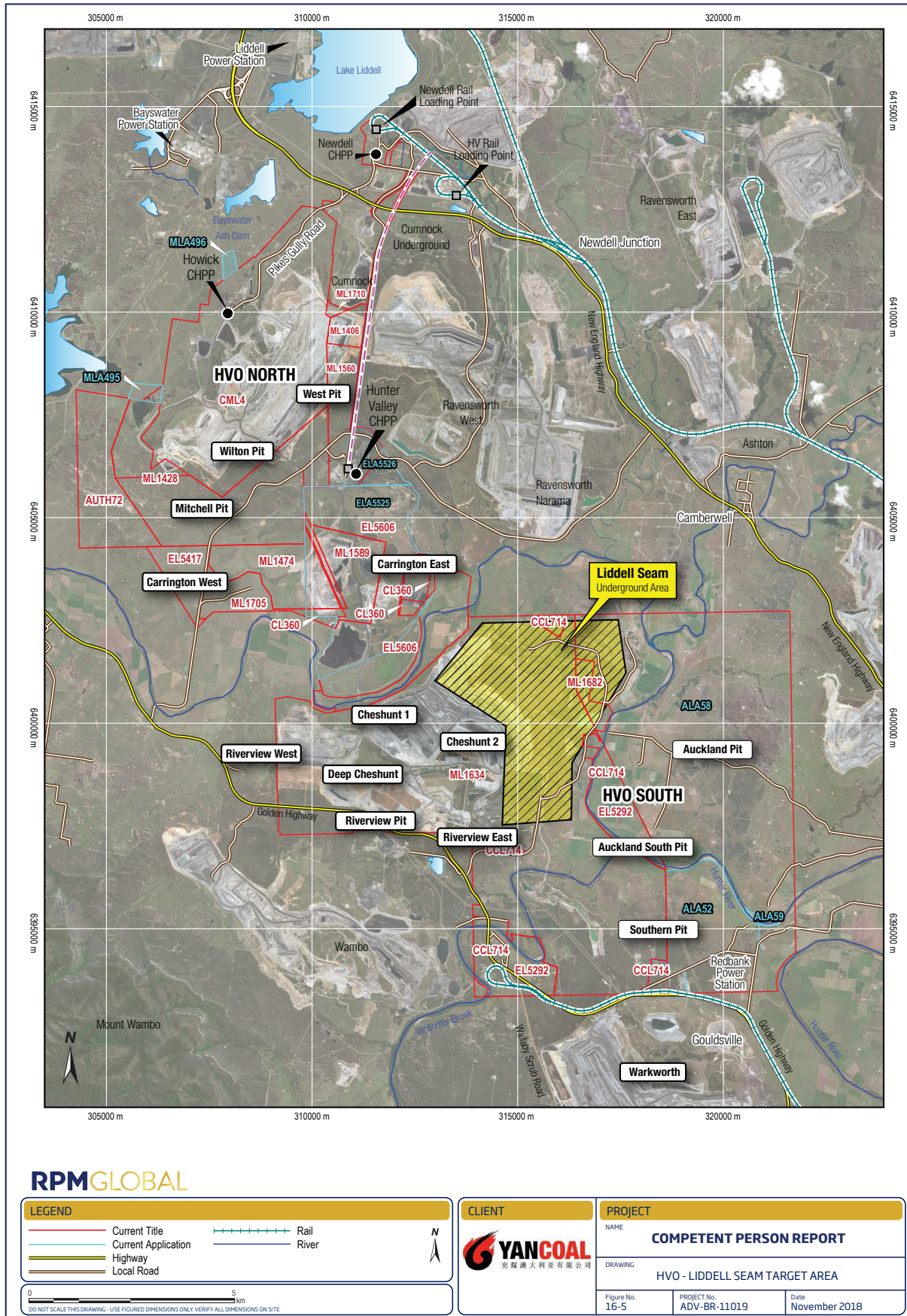


PROJECT

NAME COMPETENT PERSON REPORT		
DRAWING HVO - ARTIES SEAM TARGET AREA		
Figure No. 16-4	PROJECT No. ADV-BR-11019	Date November 2018

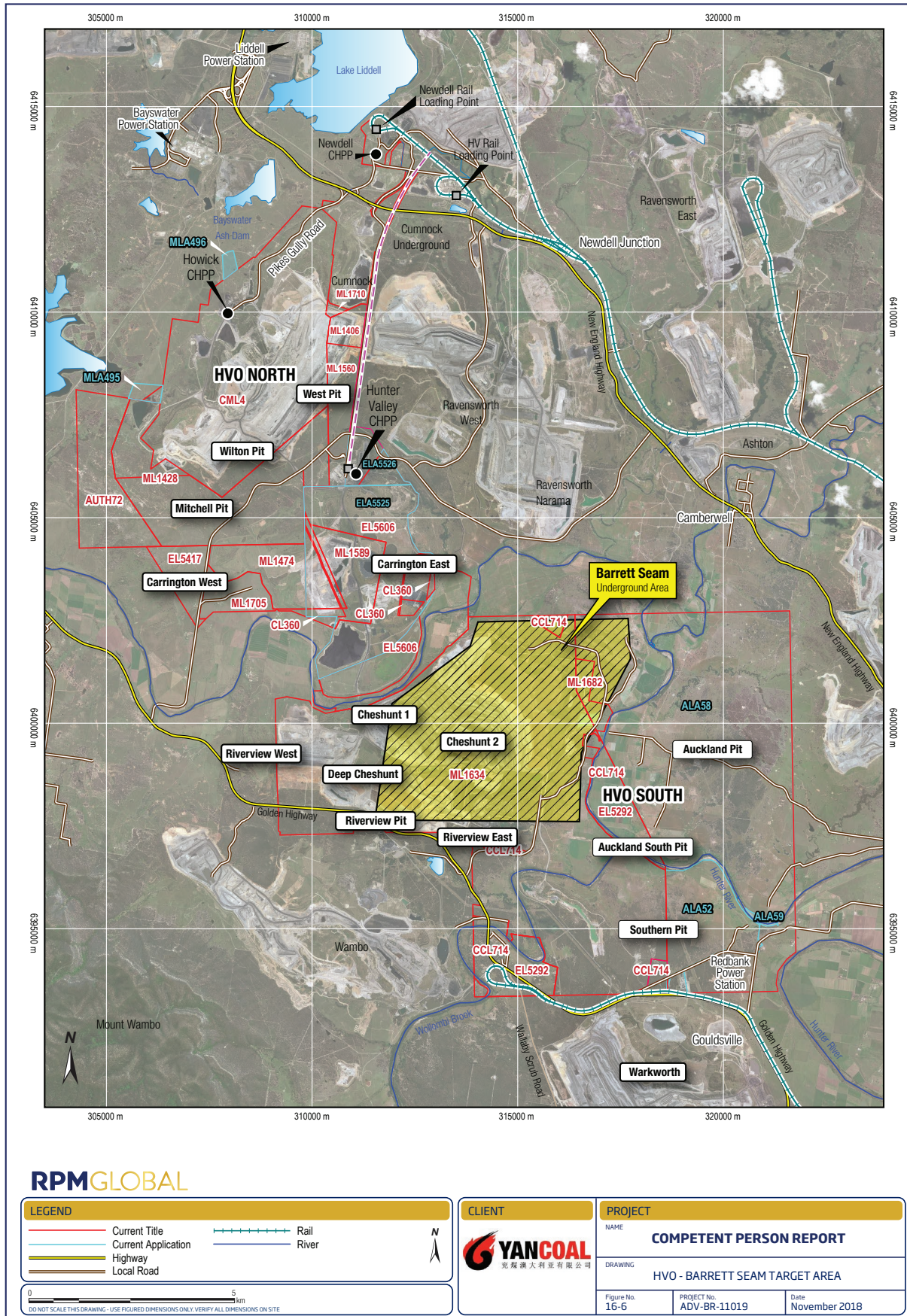
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16.2 Production Estimate

RPM has reviewed the Resource areas and quantities available for underground mining operations in order to consider the possible production range for individual operations and the number of operations that could operate concurrently at the site as required for the Scoping level of study. Operational considerations that contribute to a conceptual underground development strategy include:

- The conversion of in situ tonnages to potential ROM production.
- Interaction between underground and open cut operations.
- Interaction between separate underground production units operating in close proximity (either within the same seam or overlying seams).
- Productivity range relative to the seam characteristics (depth, thickness, continuity, geotechnical considerations, etc)
- Economics of the Resource, i.e. how much capital does the scale of the Resource naturally support.

All scenarios have applied either longwall or the Longwall Top Coal Caving method. As discussed within the individual seam commentary below, RPM considers that the seam characteristics are generally favourable for longwall mining as is being utilised at Ashton and Austar by the Company.

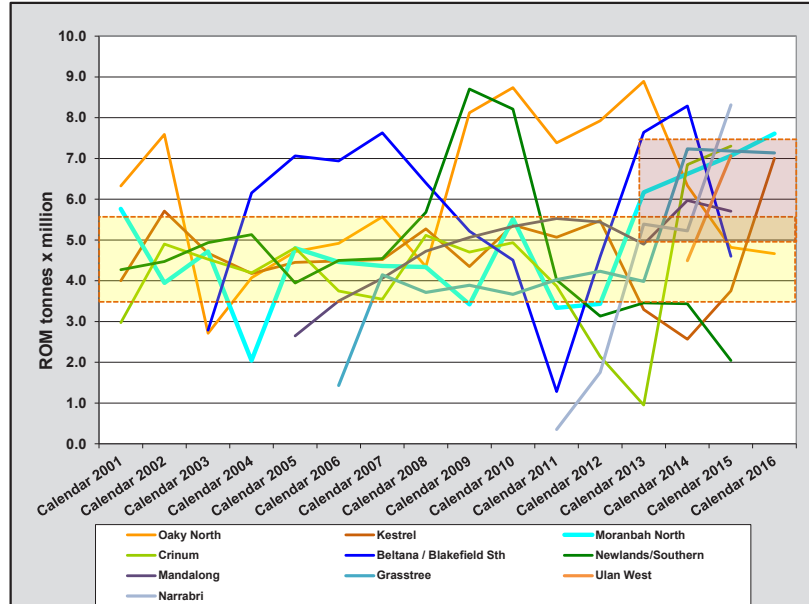
Figure 16-7 shows the performance of the top Australian longwall operations over the last fifteen years based upon publically available production information collated by RPM. This illustrates the long-term trend of the top performers remaining within a fairly tight range of 3.5Mt to 5.5Mt in a year with a single outstanding performer recording between 7Mt and 9Mt. Historically, it would be expected that the outstanding performer would typically hold its position for four or five years before returning to the pack and another high performer takes its place. This trend is generally attributed to the commencement of new operations that are mining in the shallowest and most favourable conditions with new equipment and latest technology. As the mine progresses, conditions become more challenging and equipment downtime increases.

In terms of mine planning it has therefore been assumed by industry that an operation should be designed to produce up to 10Mtpa with the operation potentially achieving up to this figure for a limited period. Long-term (life of mine) rates however, should be pegged at much lower levels. Until recently, the long-term rate assumed for this purpose was up to 5.5Mtpa.

The graph does however show that the industry has broken out of this trend over the last three or four years and the majority of the top performers are now appearing to consistently produce in the range of 5.0Mtpa to 7.5Mtpa. RPM considers that this is due to widespread adoption of automation technology that is able to maintain more consistent operating conditions on the face and reduced delays as a result of operator error.



Figure 16-7 Historic production for top 10 producers



The scenarios proposed by previous studies all require the application of twin longwall systems (two units operating in the same general vicinity) or dual (two units operating in otherwise disconnected workings however at the same site) longwall mines.

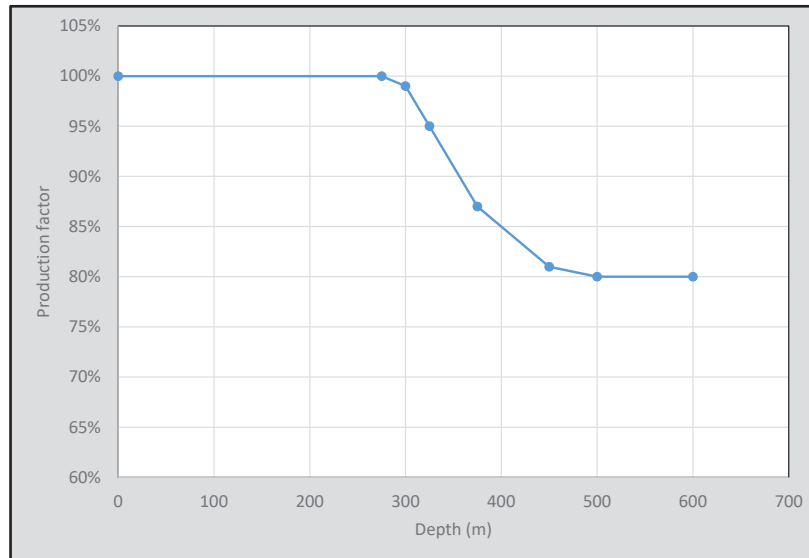
In Australia there is currently limited operational experience of operating these systems with the majority of underground mines working a single longwall. The original Gordonstone Mine, renamed Kestrel Mine, was initially setup to operate two longwalls and more recently the Oaky North Mine was expanded to operate with two longwalls.

In RPM’s experience running multiple longwall units at full production presents significant operational challenges and it is often difficult to maintain adequate development inventory in advance of the longwall. Ventilation and gas management systems as well as general underground logistics support are also often made far more difficult, however having said that with careful planning these challenges can be overcome to form a successful operation.

Longwall production has been found historically to be highly dependent on depth of cover with horizontal and vertical stress generally increasing with depth and creating a more challenging operating environment. Through industry experience, RPM has developed a guideline for estimating productivity relative to depth. This is illustrated in **Figure 16-8** whereby there is little or no production derating up to a depth of 300 m, after which production is expected to decline to a minimum factor of 80% from around 450 m. This means that a longwall that is deemed capable of producing at 7Mtpa at 250m depth would be expected to produce around 5.6Mtpa in the same seam however at 500m deep.



Figure 16-8 Production factor relative to depth



Production can also be dependent on seam thickness although the relationship has historically been far less defined than the depth relationship. In theory thicker seams yield more coal per meter cut than their thinner counterparts and so overall productivity is expected to be higher. Higher longwall faces are however harder to manage and are more vulnerable to deterioration in high stress environments. Historically in Australia, thicker seam operations have often exhibited large swings in production whilst more moderate thickness operations (3m to 4 m) have been able to achieve more a consistent operating environment and more reliable production rates.

RPM is of the opinion that recent successes with the introduction of automation will enable operators to maintain greater control over the longwall face and as such thicker-seam operations will be better placed to achieve their potential. Importantly there is a similar seam thickness range in the Mount Arthur and Vaux seams at MTW and Arties, Liddell and Barrett at HVO and as such similar productivities may be expected. The Bayswater Seam at MTW is much thicker (up to 8.4 m) and would be expected to produce at higher rates.

Issues related to placement of tailings and spoil in the open cut voids directly above underground mines further complicates underground extraction in most areas at MTW and HVO. Overlying liquid tailings can present a significant hazard to underground mining as a result of the risk of inrush. Unconsolidated spoil can significantly impact stress regimes (and consequently productivity and roof support requirements) and access to the underground workings via surface boreholes. The significance of these issues should not be underestimated and technical solutions will have to be found before underground mining can commence. These will be addressed in future studies.

RPM has assumed that a minimum fresh interburden thickness of 80m is required below any surface spoil. In areas where this cannot be maintained, the higher coal seam is assumed to remain unmined, however operations may continue in deeper seams.

Seam-wise production and productivity

MTW Mount Arthur Seam

The Mount Arthur Seam provides a potential underground mining target within the MTO lease area only. Open cut operation will be concluded in the area within the next 6 months and will not directly impact



underground mining. The old pits are however planned to be backfilled with a combination of waste and tailings which may impact the geotechnical loading of the in situ strata. The burden between the base of the open pit, mined to the Woodlands Hill Seam and potential underground operation is estimated to be around 100m and as such should be sufficient however this would need to be confirmed through geotechnical review.

The backfilling of the open pit areas conflicts with the underground option to obtain a low-cost access point from an existing highwall. Detailed design would be required to define the optimal access point and any compromise required with open cut waste storage.

The average thickness of the seam is 3.2m which makes it well suited to high production mechanised mining. An 80 cm claystone band sits directly above the Mount Arthur Seam with the Warkworth Seam lying directly above the claystone. The claystone is deemed too thick to extract as part of the mining sequence thereby providing access to the Warkworth Seam. The competence of the claystone with overlying coal has not been assessed as part of this review however RPM considers there may be a risk with this material in the immediate roof. It is estimated that there is approximately 86Mt of Mount Arthur Seam Resource within the MTO lease.

The potential ROM quantity of 44.5Mt was scheduled for this seam in the 2015 model. In consideration of the shallow depth and moderate seam thickness RPM expects the production range for this target would average 5.5Mtpa with annual output ranging from 4.5Mt to 6.5Mt.

MTWVaux Seam

As shown on Figure 16-2 the Vaux Seam target is divided across two distinct areas, Vaux North and Vaux South. Vaux South lies 20m to 30m below the Mount Arthur underground target and would have to be scheduled to commence following completion of the Mount Arthur operations.

The depth of cover averages 190m and the seam thickness averages 2.5m thus making is an appropriate target for underground mechanised mining. The Vaux North depth of cover under the Warkworth Pit extends to 320m which may result in a drop off in productivity however not to a significant level.

It is estimated that there is 42Mt of Resource in Vaux South which equates to 27Mt ROM when allowing for 80% resource recovery and 80% mining recovery. Productivity would be expected to be similar to the Mount Arthur Seam, averaging 5.5Mtpa, with a range from 4.5Mt to 6.5Mt.

For Vaux North it is estimated that there is approximately 25Mt of Resource and with the same recovery factors applied, this equates to 16Mt ROM. It is expected that there will be a slight reduction in productivity to 5.2Mtpa resulting from the increased depth.

MTWBayswater Seam

The average thickness of the Bayswater Seam in MTW is 7.05m with thickness increasing to over 8m in some areas. Previous studies have recommended the application of the longwall top coal caving (LTCC) method. Elevated stress levels are required with this method to assist in fracturing the coal as part of the caving process. RPM does not consider that LTCC will be a viable choice in this case due to the relatively low depth of cover and the expected reduction in horizontal stress with the extraction of the overlying Vaux Seam.

RPM has therefore based production assumptions on a thick-seam longwall operation with a maximum extraction height of 6.0 m. The total Resource estimate is 338Mt and allowing for a Resource recovery of 80% and a reduced mining recovery of 68% to allow for up to 6m extraction, this results in a mineable quantity of 184Mt ROM.

As shown in Figure 16-9 average productivity is expected to range from 6.5Mtpa to 7.5Mtpa based on depth. For any one year the potential output could be expected to range from 5.5Mt to 8.5Mt.



Access would be expected from the eastern side of the Resource as an extension of the Vaux Seam workings.

HVO Arties Seam

The depth below open cut final voids appears to be sufficient to protect the underground from connection to the surface.

The Arties Seam thickness ranges in thickness from 1.5m to 2.3 m. Resources with seam thickness less than 2.0m are generally considered to be thin and will require more specialised equipment in order to effectively mine. The lack of height provides ergonomic challenges for operators and generally result in reduced productivity.

The Resource is estimated to be 35Mt which translates to 22Mt when applying a Resource recovery of 80% and mining recovery of 80%.

RPM has assumed that given the limited seam thickness, average productivity would not be expected to significantly exceed 4Mtpa. RPM considers that whilst this may remain a potential underground target there is currently a high level of uncertainty and a low probability of a favourable economic outcome. This target has therefore not been considered any further.

HVO Liddell Seam

The Liddell Seam lies 60m to 70m below the Arties Seam and as such can be considered over a similar area to the Arties Seam.

The Liddell Seam thickness ranges in thickness from 1.2m to 2.6m which places it in a similar marginal category as the Arties Seam.

There is limited exploration upon which to base a Resource estimate or mine plan. Based on seam thickness it is assumed that the in situ and ROM tonnages for the Liddell Seam will be similar to the Arties Seam.

RPM has assumed that given the limited seam thickness, average productivity would not be expected to significantly exceed 4Mtpa. RPM considers that whilst this may remain a potential underground target there is currently a high level of uncertainty and a low probability of a favourable economic outcome. This target has therefore not been considered any further.

HVO Barrett Seam

The Barrett Seam lies between 17m and 32m below the Liddell Seam however is predominantly greater than 20 m. Should the Liddell Seam be mined, detailed geotechnical analysis would be required to confirm sufficient coverage lies between the two seams to allow mining to proceed in the Barrett. The Barrett Seam thickness ranges between 1.9m and 2.9m which provides a more attractive target for underground mechanised mining than either the Arties or the Liddell.

As the Barrett target area falls beneath the Cheshunt Pit then open cut mining would need to be largely complete in this pit before underground operation could proceed. It is estimated that there is up to 82Mt of in situ Resource within the Barrett Seam area which converts to 52Mt based on 80% Resource recovery and 80% mining recovery.

With an average seam thickness of 2.5m the Barrett Seam lies at the low end of the moderate thickness mining however does not necessarily fall into the thin seam mining category. An average production rate of 4.8Mtpa has been estimated for working in this seam.

Summary

Table 16-8 shows the in situ and ROM estimates for each of the underground targets as discussed in the previous sections. It should be noted that not all ROM tonnage has been included in the table for the Arties



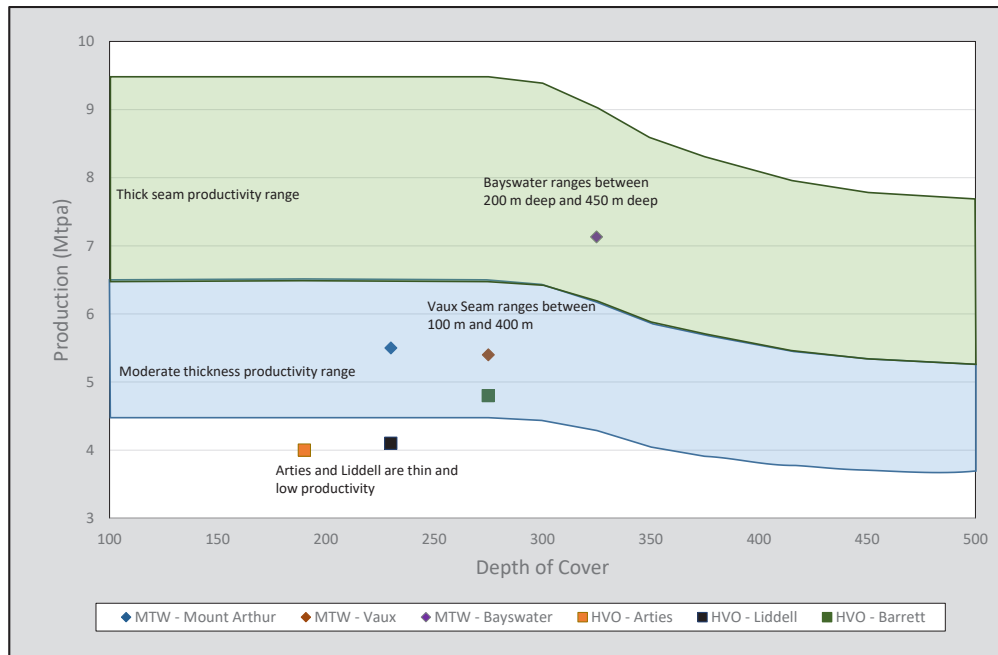
or Liddell seams due to the high levels of uncertainty and high probability of a negative or very marginal economic outcome.

Table 16-8 Underground tonnage summary

Site / Seam	In situ (Mt)	ROM (Mt)
MTW		
Mount Arthur	86	45
Vaux	67	40
Bayswater	338	185
Total MTW	491	270
HVO		
Arties	35	
Liddell		
Barrett	82	50
Total HVO	117	50
TOTAL MTW / HVO Complex	608	320

Figure 16-9 shows the high-level productivity estimation for each seam based on depth and seam thickness characteristics.

Figure 16-9 Average productivity by seam



16.3 Production Schedule

A full underground schedule has not been completed at this level of study, however comment can be made on when operations may commence, the potential production and life of each operational sector, the number of contiguous longwall operations and potential annual output from the complex.



Figure 16-69 provides a high-level estimate of each seam based on the productivities and projected ROM tonnage. The Bayswater Seam is estimated to take up to 26 years to complete whilst the other seams combined are estimated to take 27 years to mine. With the Bayswater Seam using one height of longwall equipment and the other targets all requiring smaller equipment this lends itself to a two longwall arrangement with one longwall in the Bayswater Seam and the second longwall working simultaneously through the other mining targets.

The powered roof supports are the major high-cost capital item with long life and so scheduling to ensure optimal utilisation over the total life of the complex is a key schedule consideration. Roof support life is measured in cycles where one cycle is completed every time the longwall moves a single web forward. Longwalls typically advance between 0.8m and 1.0m every cycle depending on the equipment set up which is a consideration of the seam characteristics. Based on support life of 70,000 cycles RPM has estimated that a single set of supports would be sufficient to mine the thick seam Resources at MTW in the Bayswater Seam. One set of moderate height supports would be required for the Mount Arthur and Vaux Seam operations at MTW and one additional set would be required to mine the Barrett Seam at HVO.

Table 16-9 Life of mine and roof supports

Target	ROM (Mt)	Rate (Mtpa)	Life (years)	Thickness (m)	Cycles (#)	LW Life (%)
MTW – Mt Arthur	44	5.5	8	3.20	28,971	41%
MTW – Vaux	50	5.4	8	2.54	35,269	50%
MTW – Bayswater	184	7.1	26	6.00	63,889	91%
HVO - Barrett	52	4.8	11	2.40	45,573	65%
Total	323					

Figure 16-10 provides a conceptual schedule for the underground operations across MTW and HVO. The sequencing and timing has been organised to achieve continuous operation whilst minimising interaction between the underground operations and the open cuts. At this time no consideration has been given to the impact on total output of the complex or processing capacity.

Figure 16-10 Conceptual underground production schedule





16.4 Operating and Capital Costs

Capital Costs

RPM has provided indicative capital costs based upon typical industry costs observed in recent years. The general logic behind the estimate is as follows:

- MTW - Mount Arthur is a new operation and must bear the initial capital cost of all new equipment and infrastructure.
- MTW - Vaux South is an incremental extension of the MTW - Mount Arthur operations and other than the installation of new underground services and infrastructure, should be able to utilise much of the equipment already in operation.
- MTW - Vaux north is a satellite operation and as such will require the installation of all new fixed infrastructure however will be able to utilise the production and mobile equipment from existing operations.
- MTW - Bayswater represents an expansion to the underground operations, it is operating in a much thicker seam and so little of the existing equipment is transferrable. Other than the limited additional depth for access, this will be similar to establishing a completely new operation.
- HVO - Barrett is another satellite operation and has been costed in a similar manner to Vaux North. By this point however, it is estimated that the original powered roof supports will have completed their life and a new set will need to be purchased.

Table 16-10 provides a summary of the timing and breakdown of the estimate of initial capital costs. As estimates have been based upon database figures, individual line items should be considered with a level of accuracy of +/- 50%. Contingency has been applied at 15%.

Table 16-10 Initial capital estimate

	Owners Cost	Mt Arthur	Vaux South	Vaux North	Bayswater	Barrett	Total
Key Dates							
Mine access		Y-2	Y6	Y11	Y10	Y14	
Longwall		Y1	Y9	Y14	Y13	Y17	
Initial Capital							
Set up	100						100
Mine access		87	15	128	30	102	362
MIA		25				25	50
Ventilation		40		40	20	40	140
Development		75			75		150
Longwall eqt		163			190	163	516
Coal clearance		30	15	30	15	30	120
Diesel eqt		22	11		22	11	66
UG Infrastructure		55	28	55	28	55	220
Closure	100						100
Neat estimate	200	497	69	253	380	426	1,824
Contingency	30	75	10	38	57	64	274
Total	230	572	79	291	436	490	2,098

Sustaining capital is required to cover the replacement of operational equipment, other than the powered roof supports which are costed individually. Historical records show that sustaining capital for underground operations typically ranges between \$4AUD/t ROM and \$8AUD/t ROM depending on the age and complexity of the operation. RPM has applied high level sustaining capital rates in **Table 16-11** to provide a life of mine sustaining capital estimate. It is assumed that this is distributed over the life of mine in proportion to total ROM output.

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Table 16-11 Sustaining capital estimate

	Mt Arthur	Vaux South	Vaux North	Bayswater	Barrett	Total
ROM (Mt)	45	25	15	185	50	320
Rate (\$/AUD/t ROM)	3	5	5	5	5	
Total (\$M/AUDM)	135	125	75	925	250	1,510

Operating Costs

Operating cost ranges for the underground have been developed from RPM’s industry knowledge in line with the level of accuracy of the CAPEX. Underground costs are typically categorised into development, longwall, outbye and engineering to provide a “Pit Top Cost”. Additional costs for technical services and general and admin have also been applied to provide a total underground operating costs. Costs are included to a ROM pad at the Pit Top, however surface transport costs to CHPP’s, Coal processing, rail freight and Corporate overhead are not included. These are assumed to be in line with the current open cut OPEX which are detailed in Appendix G (LOM average of \$43AUD13.8/ROM t HVO and \$40AUD10.7/ROM t MTW). Examples of a breakdown of these costs for three scenarios are provided on Table 16-12. The three scenarios are as follows:

- Scenario 1 – 2.0m seam at 250m depth of cover with a production rate of 4.5Mtpa. This is similar to the HVO Barrett underground target.
- Scenario 2 – 2.5m seam at 150m depth of cover with a production rate of 5.5Mtpa. This would be similar to the MTW Mount Arthur operation.
- Scenario 3 – 6.0m seam at 350m depth of cover with a production rate of 8.0Mtpa. This would be similar to Bayswater.

Table 16-12 UG OPEX Cost scenarios

	Cost Scenario 1 (\$/AUD/t ROM)	Cost Scenario 2 (\$/AUD/t ROM)	Cost Scenario 3 (\$/AUD/t ROM)
Development	13.1	9.1	3.9
Longwall	8.9	6.8	8.9
Outbye	6.7	5.6	5.2
Engineering	4.2	3.4	3.3
Pit Top Cost	33.5	24.9	21.3
Technical Services	1.1	1.0	0.8
General & Admin	1.7	1.5	1.2
Total Underground	36.3*	27.3*	23.3*

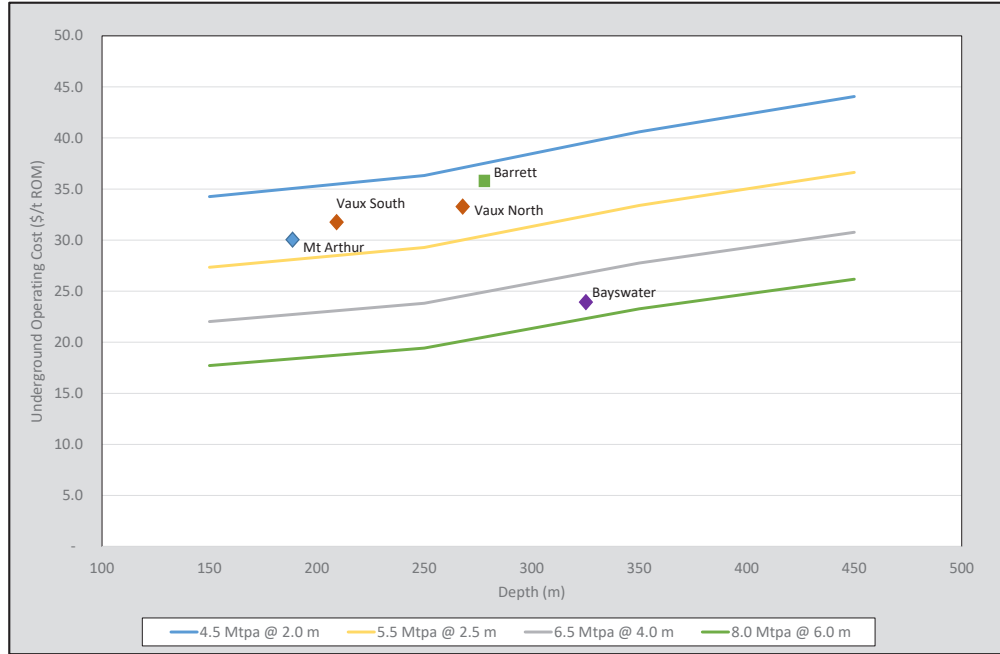
*Excludes CHPP and Offsite costs which total LOM average of \$43AUD13.8/ROM t HVO and \$40AUD10.7/ROM t MTW

Table 16-12 illustrates the wide variability in costs in respect to different operating conditions and mining approach. This creates a high level of uncertainty with regard to high-level estimates of underground operations and little reliance may be attached to any unit rates before more detailed analysis is undertaken.

Figure 16-11 shows the operating cost output range over depth, thickness and production. Indicative positions of each of the underground targets have been provided on the chart to illustrate the relative attractiveness of each deposit.



Figure 16-11 Site Operating cost ranges



16.5 Development Sequence Overview

Development of underground mines generally encompasses a number of steps which vary in both length and costs, these include:

- Exploration and Mining Studies.
- External Approvals and
- Construction and Operations.

The UG Project has advanced the initial exploration and study phase as outlined above. These works have highlighted the economic potential in the UG Project.

Exploration and studies

The progression of exploration through the various stages of study, to construction and ultimately operation are dictated by three primary factors:

1. External approvals – this includes federal and state approvals and encompasses environmental and mining approvals.
2. Internal approvals – these approvals predominantly relate to the release of funds and provision of corporate support for progression to the next phase of study or development.
3. Time to complete a phase of study or construction.



Internal approvals

Internal approval processes and the manner in which they are implemented are specific to individual organisations and their objectives. These approvals can in some cases have a greater impact on the project development timeline than external approvals.

Study phase

An exploration and study program required to prove up a greenfield coal deposit normally follows three distinct study phases. The actual length of each study phase is not fixed and will depend upon the size and complexity of the resource, specific community or environmental issues and the quality of the supporting data and analysis at the start of the study phase. In addition to this, the depth of investigation and analysis required by the client may vary significantly from one organisation to another and this will be reflected in the time that a company is prepared to invest in a particular phase.

RPM understands that The Company will begin Pre-feasibility studies in 2018.

Exploration

Staged exploration work is undertaken prior to and throughout the early stages of each of the above study phases. This exploration work is progressively focused on the higher-value areas within the deposit and is tailored to meet the objectives of the study phases. The deposit’s JORC classification status therefore progresses from exploration results through to Measured Resources throughout the study phases.

At the Concept Study phase, much of the data available for the deposit would be Inferred with some broad portions brought up to higher classification status. During the Pre-feasibility stage, the key areas of the deposit sufficient in size on which to base a reasonable-sized mine are typically elevated to an Indicated status. At the completion of a final Feasibility Study, it is typical to have the area which is planned to be mined during the first five to ten years of mine life, explored sufficiently to be classed as Measured Resources, with the remainder of the proposed mine’s resources remaining at an Indicated Resource level. As the mine is developed, ongoing exploration required for the completion of detailed mine planning will progressively elevate the life of mine resources from an Indicated to Measured status.

RPM understands that The Company will begin Pre-feasibility exploration in 2018.

The duration of each stage of exploration is largely dependent upon the size, depth and geological complexity of the resource. Access and weather conditions can also impact on the actual time to complete each stage. **Figure 16-12** shows the Company’s indicative timeline for the project.

Figure 16-12 – Staged Exploration and Study Time Line





Summary

RPM concludes that for a greenfield site with no approvals, it is likely to take around five years to complete exploration, mining and associated studies and relevant environmental studies and approvals. Following this there is likely to be a full year prior to the commencement of construction, during which internal approvals and funding is obtained, engineering design and tendering / procurement commence. Surface construction and underground access plus development can be expected to continue for around 3 years before the longwall can commence operation.

RPM highlights that the HVO/MTW operations are currently active mines, as such the ramp up timeline may be reduced significantly given the current site and regional infrastructure in place. As outlined below there is a number of options to develop the underground operations in conjunction with the open pit operations. These options will be analysed and optimised as part of the ongoing pre-feasibility study being completed by the Company.

16.6 Development Options

RPM understands that there is no set development option or sequence for the UG Projects, however RPM notes that there are various options which are being considered in current studies which are flexible in timing of commences and can optimise the interaction between the current operations and underground while realising value however not to the detriment to the current open cut LOM.

RPM notes there are two key limitations of the underground production, these include the interactions between the open cut and underground operations along with the ability to process additional material planned to be produced from the underground mines. RPM is aware the Company has significant experience with operating open cut and underground operations, including within the same project such as at Moolarben. As such this is not considered a limiting factor, however will require detailed planning an ongoing optimising to ensure no impact between the two operations such as the waste and tailings material in pit dumping strategy as outlined above. RPM considers the key consideration to the development of the underground operation is the ability to process additional run of mine coal. Of importance, as outlined in Section 11 the HVO and MTW operations have a total of four CHPP’s with a total capacity of 42mtpa while planned ROM production is 20.6Mtpa at HVO and 17Mtpa at MTW. As such there is some capacity for increased throughput at the current plants however the likely production rate is well in addition to this level (5 to 8mtpa). RPM notes there are three main scenarios for production plant:

- Scenario1 - Delay Underground operations beyond the open pit mine life at MTW. RPM does not consider this an attractive viable option with production currently planned to cease at MTW in 2040. As such no value would be realised in this scenario in the short term, nor would this allow offset of the current take or pay commitments.
- Scenario 2 – Maximise throughput case. Construct an additional CHPP to process all underground production. While this would add additional CAPEX to the start-up costs this scenario but would realise value in the short term, in addition to allow a dedicated CHPP without interaction with the open cut operations or the seams which will be mined. RPM is aware there are potential locations for a CHPP.
- Scenario 3 – Capped throughput case. Limit production to the excess capacity at the current CHPP. This would limit start-up CAPEX and simplify the underground production plan (one Longwall vs two), however would reduce the realised value in the short term. While decreasing the production complexity this would increase the complexity in the CHPP due to variable seam throughputs. RPM notes that the CHPP’s currently process up to four seams as such this would not be considered a limiting factor.
- Scenario 4 – A combination of scenario 2 and 3. This scenario would allow significant flexibility in the underground operations while maximising the current CHPP capacity. As with Scenario three this would increase the interaction with the open cut operation however this is not considered a determining factor in optimisation decisions

RPM considers all four scenario to be achievable and realistic and highlight the commercial path to production of the operation, however given the current level of study no detail options analysis has been completed nor it is warranted at this stage. In determining the optimal development scenario a number of studies, both on a technical and commercial front, need to be considered, these are planned to occur over the next 12 to 18 months.



16.7 Risk Overview

Some of the key risks that will be addressed as part of the ongoing studies into the potential for underground operations at MTW and HVO include:

- **Mining Approvals** - No current mining approvals are in place for commencement of UG operations. These are expected to take a period of time, however systematic approach is in place in NSW.
- **Geotechnical Conditions** - Assessment of geotechnical conditions and the resultant productivity and cost impacts arising from mining multiple seams. This will include defining effective subsidence management as well as gas and spontaneous combustion management strategies particularly in areas of reduced interburden.
- **Interaction with Open Cut** - No studies have been undertaken to determine and plan for impact on current operations and CHPP. This would include current tailings and waste storage plans and impact on underground operations.
- **Geological Information** - Delineation of any limiting geological structures (faults, dykes, sills, etc.) in seams not currently mined by open cut methods.



17. Mine Risks and Opportunity Assessment

17.1 Opportunity

RPM considers there are several opportunities within the Assets. These include:

- **HVO/MTW Underground** –As further outlined in **Section 16** this would include multiple areas and could be undertaken in conjunction with the current open pit operations. If undertaken this would increase ROM production by up to 5 to 7Mtpa and have the added advantage of augmenting take or pay commitments of the groups operation.
- **HVO Boundary Coal Pillar**- The current Coal Reserves and LOM plans excludes significant coal within the boundary pillar of the tenement holding due to the inability of mining across the tenement boundary on the neighbouring tenement (**Figure 9-3**). A study from a third party indicates that an additional coal tonnage of between 100 and 120Mt could be exploited with extensions of the West, Carrington East, Riverview East and West and Cheshunt Deep pits. Integrated mine planning to a PFS level of detail is required to confirm this coal is technically feasible and economically viable. Following completion of this work then boundary coal may be considered for inclusion in Company mine plans and inclusion in Coal Reserves.
- **Blending** – The current LOM plan presented in this Report and the supporting cashflow analysis, assumes no blending occurs either within the operations or between the operations. The products generated by the operations are generally high value coal types and blending based on product qualities can realise additional value rather than selling single products from the operations. In addition as the Company further incorporates HVO/MTW into its operations this blending strategy could be used to further optimise mining operations in both short and medium term planning through careful and meticulous mine plans focusing on:
 - Maximise the exploitation of the in situ resources by potentially increasing pit limits using improved revenue streams and
 - Incorporate the ability to reach quickly to market condition by changing the short term mine plan to target seams with specific coal qualities.
- **Moolarben Expansion** –The expansion involves optimisations to approved Stage 1 and Stage 2 operations at the Moolarben mine which will increase open cut ROM coal production to 16Mtpa and a Moolarben Complex ROM production capacity of 24Mtpa. The Approvals Modification also involves a minor extension to the OC2 pit limit, minor extensions and reductions of the OC3 pit limits, rehabilitation, water management and relocated/additional surface infrastructure.

17.2 Risk

Mining is a relatively high risk business when compared to other industrial and commercial operations. Each mine has unique characteristics and responses during mining and processing, which can never be wholly predicted. RPM’s review of the Mines indicates mine risk profiles typical of large scale mines at similar levels of resource, mine planning and development in Australia. Until further studies provide greater certainty, RPM notes that it has identified risks and opportunities with the Assets as outlined in **Table 17-2**.

RPM has attempted to classify risks associated with the Mine based on Guidance Note 7 issued by The Stock Exchange of Hong Kong Limited. Risks are ranked as **High**, **Medium** or **Low** and are determined by assessing the perceived consequence of a risk and its likelihood of occurring using the following definitions:

Consequence of risk:

- **Major**: the factor poses an immediate danger of a failure, which if uncorrected, will have a material effect (>15% to 20%) on the Mine cash flow and performance and could potentially lead to Mine failure;
- **Moderate**: the factor, if uncorrected, could have a significant effect (10% to 15% or 20%) on the Mine cash flow and performance unless mitigated by some corrective action and
- **Minor**: the factor, if uncorrected, will have little or no effect (<10%) on Mine cash flow and performance.

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- Likelihood of risk occurring within a 7 year timeframe:
- **Likely:** will probably occur;
- **Possible:** may occur and
- **Unlikely:** unlikely to occur.

The consequence of a risk and its likelihood of occurring are then combined into an overall risk assessment as shown in **Table 17-1** to determine the overall risk rank.

Table 17-1- Risk Assessment Ranking

Likelihood	Consequence		
	Minor	Moderate	Major
Likely	Medium	High	High
Possible	Low	Medium	High
Unlikely	Low	Low	Medium

RPM notes that in most instances it is likely that through enacting controls identified through detailed review of the Mine’s operation, existing documentation and additional technical studies, many of the normally encountered Mine risks may be mitigated.

Table 17-2- Risk Assessment

Risk Ranking	Risk Description and Suggested Further Review	Potential Mitigant	Area of Impact
M	Community Relations Communities have voiced grievances against some mine operations, in particular regarding noise and dust emissions, leading to equipment downtime and subsequent investment in noise attenuation equipment for equipment.	Continue proactively engaging with affected communities and implementing noise mitigation strategy to remain in compliance with applicable regulatory standards and minimize equipment downtime. Assess and regularly review the noise impacts of planned mine development in increasing proximity to Bulga and continuously estimate related equipment downtime	OPEX, MTW, Stratford and Moolarben Asset Economics
H	Coal Bursts - Austar Several Coal Bursts have occurred within the Austar mine which has resulted in loss of production and forced shutdowns and 2 fatalities in 2014. RPM is aware the company has introduced a number of measures to manage the issue.	Ongoing monitoring of rib and face stress levels during development, implementation of additional face shielding on the longwall, management systems developed and implemented.	Safety and Production
H	Austar Restart RPM is aware that the Austar permit for the operation of the longwall has recently been suspended following a coal bursts in 2018 and now has approval for limited longwall activities under controlled conditions. Limited operations at Austar recommenced on 14 August 2018 subject to certain conditions which the mine can comply with however full scale operations are as yet to recommence.	Continue discussions with the regulators.	Full-scale Recommencement timeframe and reserves.
L	Plant Maintenance - all		

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Risk Ranking	Risk Description and Suggested Further Review	Potential Mitigant	Area of Impact
	Several of the CHPP’s are ageing and this is reflected in the requirement for more detailed and systematic planning systems. This presents a risk for increased OPEX and unavailability. RPM is aware that maintenance costs are included in the costs presented in this report	The Company has implementing several system to ensure continued operation and utilisations. Ensure management overview of maintenance.	OPEX
L	Commodity Price Fluctuation The market for Coal has been variable over recent years, RPM highlights that while the recent lower commodity prices the operations are still profitable, as such the risk to the profit sensitivity	Long term contracts.	Assets Economics
L	Data Quality - all Limited original data or sampling and assay protocols or data is available for the drill hole information. However a significant review program has been undertaken.		Resource estimate
L	Coal Quality – Middlemount/Stratford and Duralie Drilling suggests potential issues with coking properties in northern area. No estimate completed for SEOC at Ashton. Coal Qualities based on reconciliation with Avon North Pit	Complete Further grade control drilling and modelling	Plant Yield and Costs
L	Structural Model – Middlemount Potential for additional structure such as faults to be encountered during mining	Review structural interpretations at the site. Review geotechnical impacts and operational implications.	Resource estimate/ OPEX
L	Wallaby Scrub Road Permit - MTW The Closure of wallaby scrub road agreement with the local council is nearing completion. RPM is aware discussions are well advanced and likely to be completed in the near future.	Confirm closure permit	MTW operations
L	Relative Density - MTW Some bias may have occurred within for deposits Of particular note is the regressions noted in Section .6	Complete a reconciliation of the BD completed against the mined areas to determine the variation on a local scale.	Local Variation of Resource estimate
L	Water Management - Yarrabee and Moolarben Ongoing permits and approval to ensure supply for CHPP and dust suppression. RPM is aware of managements management’s procedure in place which current manage this risk.	Ongoing approvals procedures and management and monitoring	Ongoing production
L	Potential Acid Forming Tails and Waste- Stratford Waste and tails storage of PAF material is ongoing in voids etc. Current management plans in place	Ongoing monitoring and planning both short and long term	Ongoing production
L	Heavy Metals Contaminations- All		

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Risk Ranking	Risk Description and Suggested Further Review	Potential Mitigant	Area of Impact
	Fate of heavy metals in tailings and potential groundwater and soil contamination have not been assessed. Historical or future contamination could lead to regulatory shut-down, community opposition and clean-up costs	Conduct leaching test and soil and groundwater environmental site assessment at relevant locations in and around tailings facilities	Compliance, Assets Economics (closure and/or clean-up costs)
M	South East Open Cut Approvals The mining permit is pending an agreement with a single land holder for access in the SEOC area.	Ongoing Negotiation with landholder	Production commencement date.
M	Groundwater Impacts - Ashton Potential compliance risks with extracting the lower seam longwall panels around the Bowmans Creek alluvials in the Ashton underground mine, specifically how much water is drained from the alluvials, how well the workforce is able to maintain economic productivity levels with higher groundwater make into the underground workings and any potential discharge issues associated with the higher water make.	Conduct ongoing groundwater modelling, validated by results from environmental testing.	Local Variation of Reserve estimate



Appendix A. Experience and Qualifications





David McMillan - Master of Engineering - Royal School of Mines - Imperial College, University of London - Executive Consultant RPM (Brisbane)

David’s career spans twenty-three years, with over seventeen years of operational experience. He has extensive practical underground and open-cut coal experience working in operational, managerial and technical roles. David’s operational experience extends over three continents and covers potash and coal mining. David has been with RPM for six years and currently holds the title of Executive Consultant. During this time he has lead teams in the delivery of major pre-feasibility and feasibility studies for underground coal operations in New South Wales and Queensland. He has also completed numerous technical reviews and mine optimisation studies.

David is a Competent Person for the estimation of Reserves in underground coal operations and is a Registered Professional Engineer of Queensland (RPEQ).

Greg Eisenmenger - Executive Consultant - Bachelor of Engineering (Civil) (Hons)

Greg has more than 35 years of international coal mining industry experience, with a strong technical and general management background. Greg’s specific general management capabilities are drawn from involvement in the management of large mining contracts in open cut coal, management of in-house technical and engineering programs, management of the annual budgeting process for individual mine sites and the business unit level and project development involving project definition, tendering, evaluation, award and construction supervision.

Greg is an Executive Consultant with RPM in the mining advisory space, managing coal mining project feasibility studies and undertaking independent technical reviews of mining assets being targeted by potential investors and completing valuations of coal projects.

Brendan Stats - Senior Resource Geologist, Bachelor of Science (Hons) Geology. MAusIMM, MAIG

Brendan is a Geologist with over ten years of experience in the mining industry. Brendan has a strong background in exploration, mine geology, coal quality and open cut geotechnical engineering. Brendan has significant experience working for Rio Tinto in Australia on large open cut coal operations in Queensland and New South Wales. More recently Brendan has worked as a consultant providing services in geology, mine geology, exploration and civil projects. This work involved projects in Australia, Indonesia, South Africa, China, Mozambique and Mongolia. Brendan has worked on mining projects from exploration, project evaluation to operating assets, as well as conducting resource estimate and reporting for listed companies.

With substantial experience in coal, Brendan meets the requirements for Qualified Person for NI 43-101 reporting and Competent Person for JORC reporting for most Coal Resources.

Jeremy Clark – Manager, Hong Kong, Bsc. with Honours in Applied Geology, Grad Cert Geostatistics, MAIG, MAusimm

Jeremy has over 15 years of experience working in the mining industry. During this time he has been responsible for the planning, implementation and supervision of various exploration programs, open pit and underground production duties, detailed structural and geological mapping and logging and has a wide range of experience in resource estimation techniques. Jeremy’s wide range of experience within various mining operations in Australia and recent experience working in South and North America gives him an excellent practical and theoretical basis for resource estimation of various metalliferous deposits including Iron Coal and extensive experience in reporting resource under the recommendations of the JORC and NI-43-101 reporting codes.

With relevant experience in a wide range of commodity and deposit types, Jeremy meets the requirements for Qualified Person for 43-101 reporting and Competent Person (“CP”) for JORC reporting for most metalliferous Coal Resources. Jeremy is a member of the Australian Institute of Geoscientists

Philippe Baudry – General Manager – China and Mongolia, Bsc. Coal Exploration and Mining Geology, Assoc. Dip Geo science, Grad Cert Geostatistics, MAIG



Philippe is a geologist with over 20 years of experience in the mining industry. With a strong background in mine geology where he worked in both open cut and underground precious metal mines in Western Australia, Philippe gained a post graduate qualification in Geostatistics leading to a specialization in resource estimation and project evaluation. Over the last 11 years Phil has worked as a consultant focused on the Asian and Russian regions and after 3 years living and working in Russia developing 2 porphyry copper projects he moved to Beijing where for the past 9 years he has built up and managed RPM's business in north Asia including offices in China, Hong Kong, Mongolia and Russia before taking over responsibility for RPM's global advisory division which includes over 100 employees in 20 offices.

During his time in Asia, Philippe has worked closely with leading financial institutions across Asia and Europe on transactions ranging from Commercial Loan, Due Diligences to IPO's and has gained detailed understanding of the requirements of both investors and banks in regards to commercial loans, public technical report requirements and listing processes on various financial exchanges. Philippe has an in depth knowledge of the Soviet and other Asian resource/reserve reporting systems and has gained significant experience in both reviewing projects based on these systems and in converting projects from this region to international standards of reporting such as JORC and NI 43-101.

Philippe is a Member of AIG and is a Competent Person and Qualified person (JORC and NI 43-101) for both base and precious metals Mineral Resources.

Doug Sillar – Senior Engineer – Bachelor of Engineering (Mining) (Hons), Grad Dip App Finn, MAusIMM

Doug's work history spans over 16 years in the mining industry. During this time he has developed significant experience in the mining engineering field including expertise in a wide range of areas such as life of mine planning, optimisation of mining operations, mining options studies and design and scheduling. Doug's engineering career has seen him manage a number of mine planning studies ranging from high level conceptual studies through to full feasibility studies.

Throughout his career Doug has developed an ability to analyse the technical and economic issues of mine planning. He has strong project financial evaluation skills and the ability to develop project financial models including capital and operating costs, discounted cash flows and project valuations. Doug has achieved a Graduate Diploma of Applied Finance from Kaplan which compliments his strong technical skillset.

Company's Relevant Experience

RPM (RPM) is the market leader in the innovation of advisory and technology solutions that optimize the economic value of mining Assets and operations. RPM has serviced the industry with a full suite of advisory services for over 50 years and is the largest publicly traded independent group of mining technical experts in the world.

RPM has completed over 14,000 studies across all major commodities and mining methods, having worked in over 118 countries globally.

RPM has operations in all of the world's key mining locations enabling them to provide experts who understand the local language, culture and terrain. RPM's global team of technical specialists are located in 18 offices around the world. Through their global network, RPM can provide you access to the right specialist technical skills for your Assets.

RPM's advisory division operates as independent technical consultants providing services across the entire mining life cycle including exploration and Assets feasibility, resource and reserve evaluation, mining engineering and mine valuation services to both the mining and financial services industries.

RPM's trusted advisors typically complete assignments across all commodities in the disciplines of:

- Geology;
- Mining Engineering;
- Coals Processing;
- Coal Handling and Preparation;
- Infrastructure and Transportation;



- Environmental Management;
- Contracts Management;
- Mine Management;
- Finance and Assets Funding;
- Commercial Negotiations.

RPM was founded in Australia and as a result, has a solid understanding of and is committed to compliance with the codes which regulate Australian corporations and consultants.

Over the past 45 years, RPM has grown into an international business which has continued to provide Client and those that rely on its work the confidence that can be associated by the use of the relevant global industry codes some of which include:

- The Australasian Institute of Mining and Metallurgy Code of Ethics;
- The Australasian Code for Reporting of Exploration Results, Coal Resources and Coal Reserves;
- The Australian Institute of Geoscientists Code of Ethics and Practices;
- Society for Mining, Metallurgy and Exploration Code of Ethics; and
- The National Instrument 43-101 Standards of Disclosure for Coal Assets.

RPM has conducted numerous independent mining technical due diligence studies and reporting for IPO's and capital raisings under the requirements of all key mining equity markets over the past six years, with involvement in capital raisings worth more than ~~US\$44~~USD44 billion. Some of this and other work is summarised in **Table A1**.

RPM leverages the power of its specialist knowledge to also provide cutting edge mining software that is sought after globally for mine scheduling, equipment simulation and financial analysis. RPM software is relied on by mining professionals to understand how to structure their long and short term operations efficiently using auditable best practice methodologies and solutions.

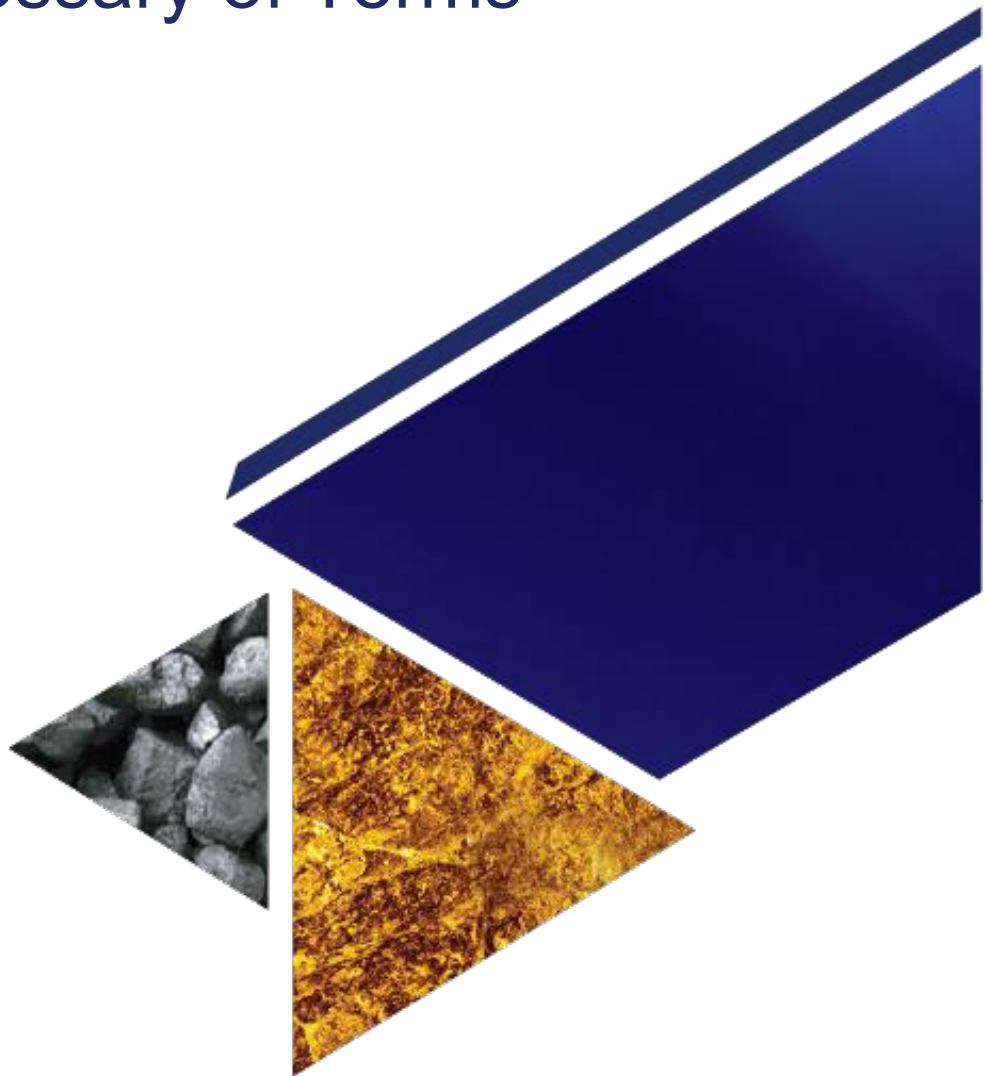


Table A1 - Mining Related IPO and Capital Raising Due Diligence Experience

<p>2017 China Molybdenum Company., Ltd; Competent Persons Report of Mineral Resources and Ore Reserves under JORC and Independent Technical Review for inclusion in a HKEx Prospectus to support the a indirect Major Transaction for the acquisition of the Tenke Copper and Cobalt Mine, DRC.</p>
<p>2016 China Molybdenum Company., Ltd; Competent Persons Report of Mineral Resources and Ore Reserves under JORC and Independent Technical Review for inclusion in a HKEx Prospectus to support the a Major Transaction for the acquisition of the Tenke Copper and Cobalt Mine, DRC.</p>
<p>2016 China Molybdenum Company., Ltd; Competent Persons Report of Mineral Resources and Ore Reserves under JORC and Independent Technical Review for inclusion in a HKEx Prospectus to support the a Major Transaction for the acquisition of the Phosphate and Niobium Mine Brazil</p>
<p>2016 CGN Mining Company Limited; Competent Persons Report of Mineral Resources and Ore Reserves under JORC and Independent Technical Review for inclusion in a HKEx Prospectus to support the a Major Transaction for the acquisition of a 19.9% equity stake in Fission Uranium Corps Pattersons Lake Uranium Project, Canada.</p>
<p>2015 BHP Limited Demerger into South 32; independent technical review and compilation of a Competent Persons Report as defined by the European Securities and Markets Authority’s Recommendations on consistent implementation of Commission Regulations (“EC”) No 809/2004 implementing the Prospective Directive (the “ESMA Recommendations”). The ITR was completed on the assets of lawara lawarra Coal Holdings located in the New South Wales state of Australia.</p>
<p>2014. MMG., Ltd; Competent Persons Report of Mineral Resources and Ore Reserves under JORC and Independent Technical Review for inclusion in a HKSE Prospectus to support the acquisition of the Las Bambas Copper Mine, Peru.</p>
<p>2014 Hidili International Development Company., Ltd; Competent Persons Report of Mineral Resources and Ore Reserves under JORC and Independent Technical Review for inclusion in a HKSE Prospectus to support the divestment of Multiple Coal Mines, Yunnan Province, China.</p>
<p>2013 China Molybdenum Company., Ltd; Competent Persons Report of Mineral Resources and Ore Reserves under JORC and Independent Technical Review for inclusion in a HKSE Prospectus to support the acquisition of the Northparkes Copper and Au Mine, Central West NSW, Australia.</p>
<p>2012 China Au Resources International., Ltd; Tibet Jiama Copper-Polymetallic Phase II NI 43-101 HKEx Pre-Feasibility Study. China</p>
<p>2012 China Precious Metal Resources Holdings Co., Ltd Competent Persons Report of Mineral Resources and Ore Reserves under JORC and Independent Technical Review for inclusion in a HKSE Prospectus to support the acquisition of an Au Operation Yunnan Province, China.</p>
<p>2012 Kinetic Mines and Energy., Ltd; Competent Persons Report of Mineral Resources and Ore Reserves under JORC and Independent Technical Review for inclusion in a HKSE Prospectus to support the IPO of an underground coal asset in Inner Mongolia Province, China.</p>
<p>2012 China Daye Non-Ferrous Metals Mining., Ltd; Competent Persons Report of Mineral Resources and Ore Reserves under JORC and Independent Technical Review for inclusion in a HKSE Prospectus to support the acquisition of 4 operating underground copper, lead, zinc assets in Hubei Province, China.</p>
<p>2012 Huili Resources Group ., Ltd; Competent Persons Report of Mineral Resources and Ore Reserves under JORC and Independent Technical Review for inclusion in a HKSE Prospectus to support the IPO of multiple underground nickel, lead, zinc, copper and au mining assets in Xinjiang and Hami Province, China.</p>
<p>2011 China Polymetallic Limited Mining., Ltd; Competent Persons Report of Mineral Resources and Ore Reserves under JORC and Independent Technical Review for inclusion in a HKSE Prospectus to support the IPO of a lead zinc silver polymetallic underground mining assets in Yunnan Province, China.</p>



Appendix B. Glossary of Terms





<u>Abbreviation</u>	<u>Unit or Term</u>
A	Ampere
ad	air dry
adb	air dry basis
AFC	Armoured Face Conveyor
AHD	Australian Height Datum
AIG	Australian Institute of Geoscientists
AOP	Annual Operations Plan
ar	as received
arb	as received basis
ARD	Apparent Relative Density
ARTC	Australia Rail Track Corporation
AUD	Australian Dollar
AUSIMM	Australasian Institute of Mining and Metallurgy
bcm	bank cubic metre
BESR	Break Even Strip Ratio
BoW	Base of Weathering
C	Celsius (temperature)
Ca	Calcium
CAPEX	Capital expenses
CHPP	Coal Handling Processing Plant
Client	Yancoal Australia Ltd
Company	Yancoal Australia Ltd
CPR	Competent Persons Report
CQCN	Central Queensland Coal Network
CSN	Crucible Swell Number
DD	Diamond Drillholes
ddpm	dial divisions per minute
DES	Department of Environment and Science (Qld)
DMC	Dense Medium Cyclone
DNRME	Department of Natural Resources, Mining and Energy (Qld)
DPE	Department of Planning and Environment (NSW)
DPI	Department of Primary Industry
DTM	Digital Terrain Model
EA	Environmental Authority (Qld)
EHS	Environmental, Health and Safety
EIS	Environmental Impact Statement
EMP	Environmental Management Plan
EMS	Environmental Management System
EP	Equator Principles
EPA	Environmental Protection Authority (NSW)
EPBC	Environment Protection and Biodiversity Conservation (EPBC Act 1999)
EPC	Exploration Permit for Coal
EPCM	Engineering, Procurement, Construction Management
EPL	Environment Protection Licence
ESAP	Environmental and Social Action Plan
FoS	Factor of safety
FS	Feasibility Study
g	Grams
g/cc	Grams per cubic centimetre (density measurement)
gar	gross as received
GDB	Geological Database
GPS	Global Positioning System
HGI	Hardgrove Grindability
HKEx	Hong Kong Stock Exchange
HVCC	Hunter Valley Coal Chain
HVO	Hunter Valley Operations
HVON	HVO North
HVOS	HVO South
H:V	Horizontal:Vertical ratio



hp	Horsepower
H2SO4	Sulphuric acid
Hz	hertz
JORC	Joint Coal Reserves Committee
JORC Code	Refers to the Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves 2012 edition, which is used to determine resources and reserves and is published by JORC on behalf of the Australasian Institute of Mining and Metallurgy, the Australian Institute of Geoscientists and the Minerals Council of Australia
kcal	thousands of calories
km	kilometre
sq.km	square kilometres
Kt	thousands of tonnes
ktpa	thousands of tonnes per year
kV	kilovolt
kW	kilowatt
kWh	kilowatt hour
l	liter Litre
l/s	liters Litres per second
LAS	Log ASCII Standard
lb	pound
lbs	pounds
LD	Large Diameter
LOM	Life of Mine
LPMA	Lands and Property Management Authority
LTCC	Longwall Top Coal Caving
m	metre
cu.m	cubic metre
masl	meters above sea level
M	Million
MBcm	Million Bank cubic metres
M&I	Measured and Indicated (with respect to Resources)
ML	Mining Lease
MOP	Mine Operations Plan
Mt	Million tonnes
Mtpa	Million tonnes per annum
MTW	Mount Thorley/Warkworth
MW	megawatt
MWh	megawatt-hour
nar	net as received
NPV	Net present value
NSW	New South Wales
OC	Open Cut
OK	Ordinary Kriging
OPEX	Operational expenses
P	Phosphorus
PCI	Pulverised Coal Injection
PG	Professional Geologist
PoO	Point of Observation
PPE	Personal Protective Equipment
ppm	parts per million
QA/QC	quality-assurance/quality-control
QLD	Queensland
RC	Reverse Circulation Drill Holes
RCE	Rehabilitation Cost Estimate
RD	Relative Density
Rec	Recovery
ROI	Return on investment (percentage, after tax)
ROM	Run of Mine
RPM	RPM Global
Rv max	Vitritite Reflectance



S	Sulphur
SD	Standard deviation
SGBB	Sydney-Gunnedah-Bowen Basin
SO ₂	Sulphur Dioxide
SR	Strip Ratio (expressed either as t:t or bcm:t)
SSCC	Semi Soft Coking Coal
t	Metric tonne
tph	Metric tonnes per hour
tpd	Metric tonnes per day
t/m ³	Tonnes per cubic metre (density measurement)
TSF	Tailings Storage Facility
UCS	Uniaxial Compressive Strength
UG	Underground
USD	United States Dollars
Wi	Work index (grinding characteristic of rock)
WWTP	waste water treatment plant
XRF	X-ray fluorescence
YAL	Yancoal Australia Ltd
2D	2 Dimensional
3D	3 Dimensional

Note: Where the terms Competent Person, Inferred Resources and Measured and Indicated Resources are used in this report, they have the same meaning as in the JORC Code.

A 'Coal Resource' is a concentration or occurrence of solid material of economic interest in or on the Earth's crust in such form, grade (or quality) and quantity that there are reasonable prospects for eventual economic extraction. The location, quantity, grade (or quality), continuity and other geological characteristics of a Coal Resource are known, estimated or interpreted from specific geological evidence and knowledge, including sampling. Coal Resources are sub-divided, in order of increasing geological confidence, into Inferred, Indicated and Measured categories.

An 'Ore Reserve' is the economically mineable part of a Measured and/or Indicated Coal Resource. It includes diluting materials and allowances for losses, which may occur when the material is mined or extracted and is defined by studies at Pre-Feasibility or Feasibility level as appropriate that include application of Modifying Factors. Such studies demonstrate that, at the time of reporting, extraction could reasonably be justified.

A 'Measured Coal Resource' is that part of a Coal Resource for which tonnage, densities, shape, physical characteristics, grade and mineral content can be estimated with a high level of confidence. It is based on detailed and reliable exploration, sampling and testing information gathered through appropriate techniques from locations such as outcrops, trenches, pits, workings and drill holes. The locations are spaced closely enough to confirm geological and grade continuity.

Mineralisation may be classified as a Measured Coal Resource when the nature, quality, amount and distribution of data are such as to leave no reasonable doubt, in the opinion of the Competent Person determining the Coal Resource, that the tonnage and grade of the mineralisation can be estimated to within close limits and that any variation from the estimate would be unlikely to significantly affect potential economic viability.

An 'Indicated Coal Resource' is that part of a Coal Resource for which tonnage, densities, shape, physical characteristics, grade and mineral content can be estimated with a reasonable level of confidence. It is based on exploration, sampling and testing information gathered through appropriate techniques from locations such as outcrops, trenches, pits, workings and drill holes. The locations are too widely or inappropriately spaced to confirm geological and/or grade continuity but are spaced closely enough for continuity to be assumed.

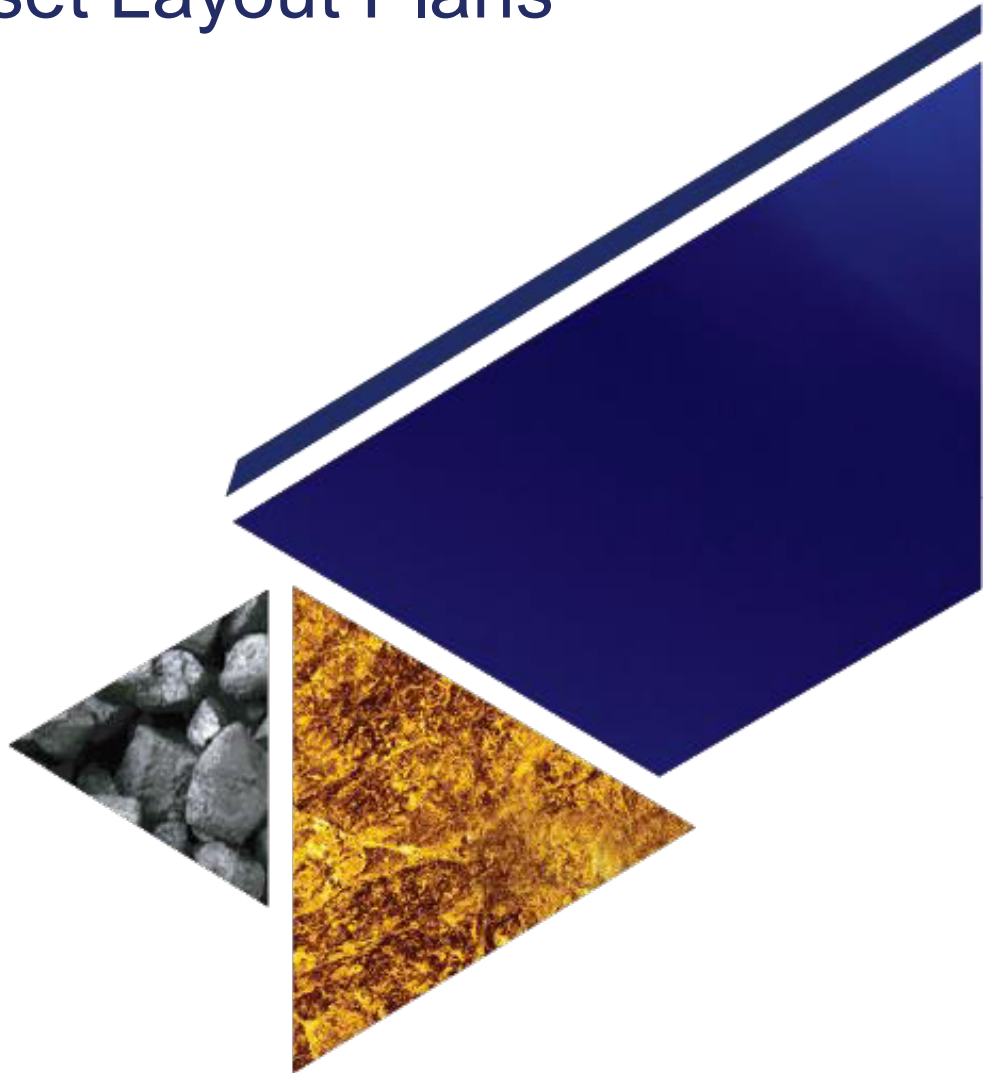
An Indicated Coal Resource has a lower level of confidence than that applying to a Measured Coal Resource, however has a higher level of confidence than that applying to an Inferred Coal Resource. Mineralisation may be classified as an Indicated Coal Resource when the nature, quality, amount and distribution of data are such as to allow confident interpretation of the geological framework and to assume continuity of mineralisation. Confidence in the estimate is sufficient to allow the application of technical and economic parameters and to enable an evaluation of economic viability.



An ‘Inferred Coal Resource’ is that part of a Coal Resource for which tonnage, grade and mineral content can be estimated with a low level of confidence. It is inferred from geological evidence and assumed but not verified geological and/or grade continuity. It is based on information gathered through appropriate techniques from locations such as outcrops, trenches, pits, workings and drill holes which may be limited or of uncertain quality and reliability.

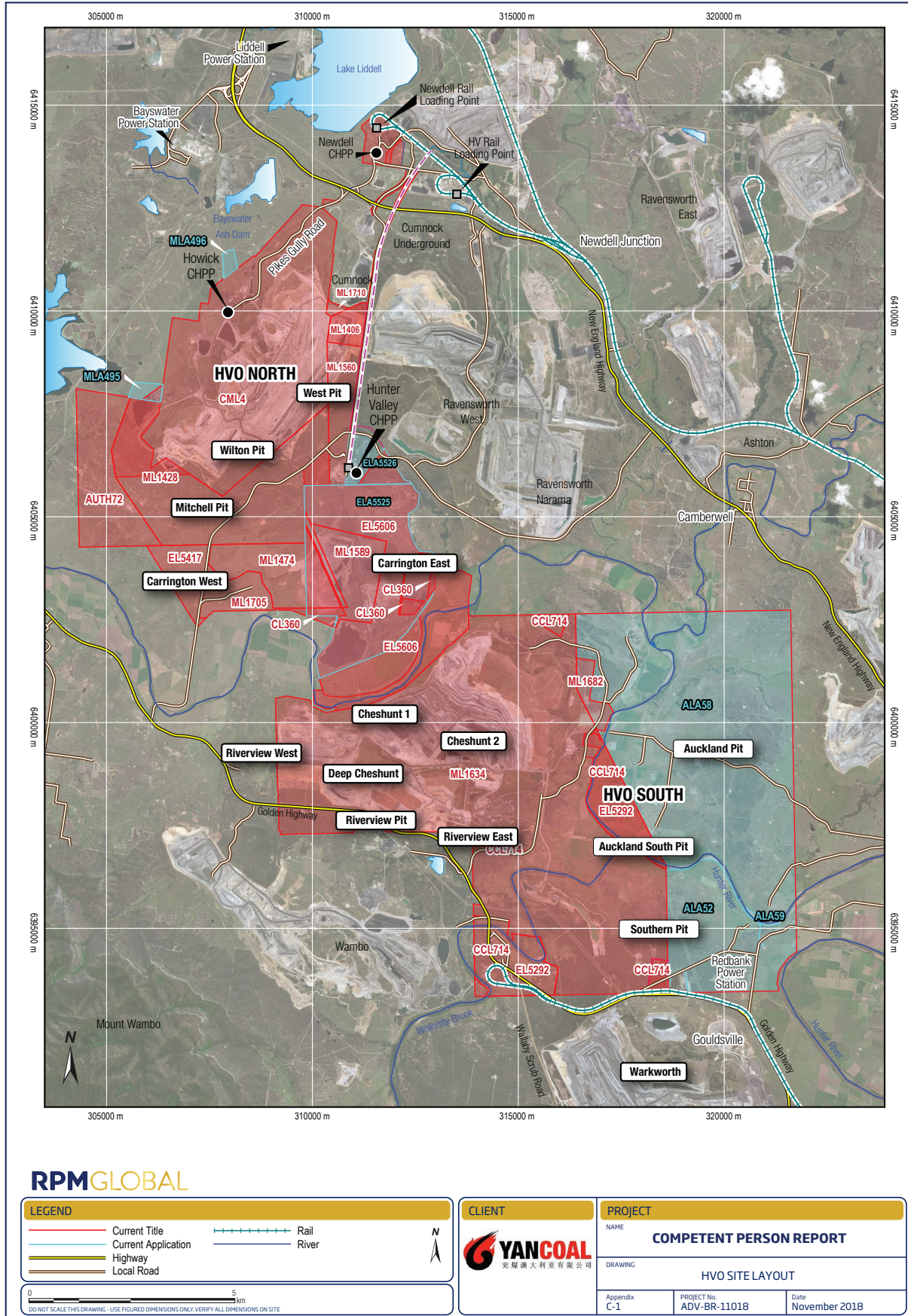
An Inferred Coal Resource has a lower level of confidence than that applying to an Indicated Coal Resource. The Inferred category is intended to cover situations where a mineral concentration or occurrence has been identified and limited measurements and sampling completed, however where the data are insufficient to allow the geological and/or grade continuity to be confidently interpreted. Commonly, it would be reasonable to expect that the majority of Inferred Coal Resources would upgrade to Indicated Coal Resources with continued exploration. However, due to the uncertainty of Inferred Coal Resources, it should not be assumed that such upgrading will always occur. Confidence in the estimate of Inferred Coal Resources is usually not sufficient to allow the results of the application of technical and economic parameters to be used for detailed planning. For this reason, there is no direct link from an Inferred Resource to any category of Ore Reserves.

Appendix C. Asset Layout Plans



APPENDIX III

COMPETENT PERSON'S REPORT



RPMGLOBAL

LEGEND

- Current Title
- Current Application
- Highway
- Local Road
- +—+—+—+— Rail
- River



0 5 10
Kilometers
DO NOT SCALE THIS DRAWING - USE FIGURED DIMENSIONS ONLY. VERIFY ALL DIMENSIONS ON SITE.

CLIENT

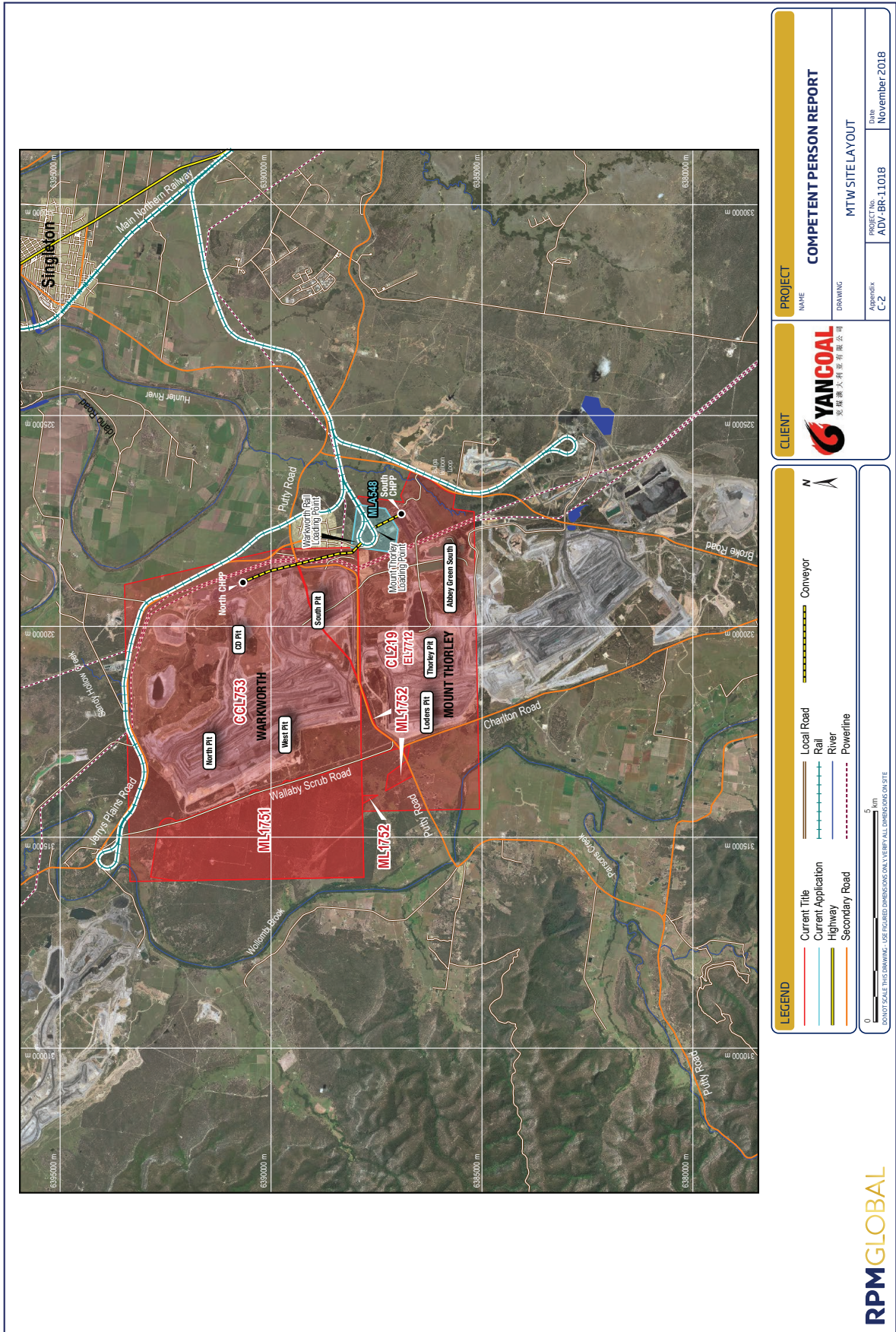


PROJECT

NAME COMPETENT PERSON REPORT		
DRAWING HVO SITE LAYOUT		
Appendix C-1	PROJECT No. ADV-BR-11018	Date November 2018

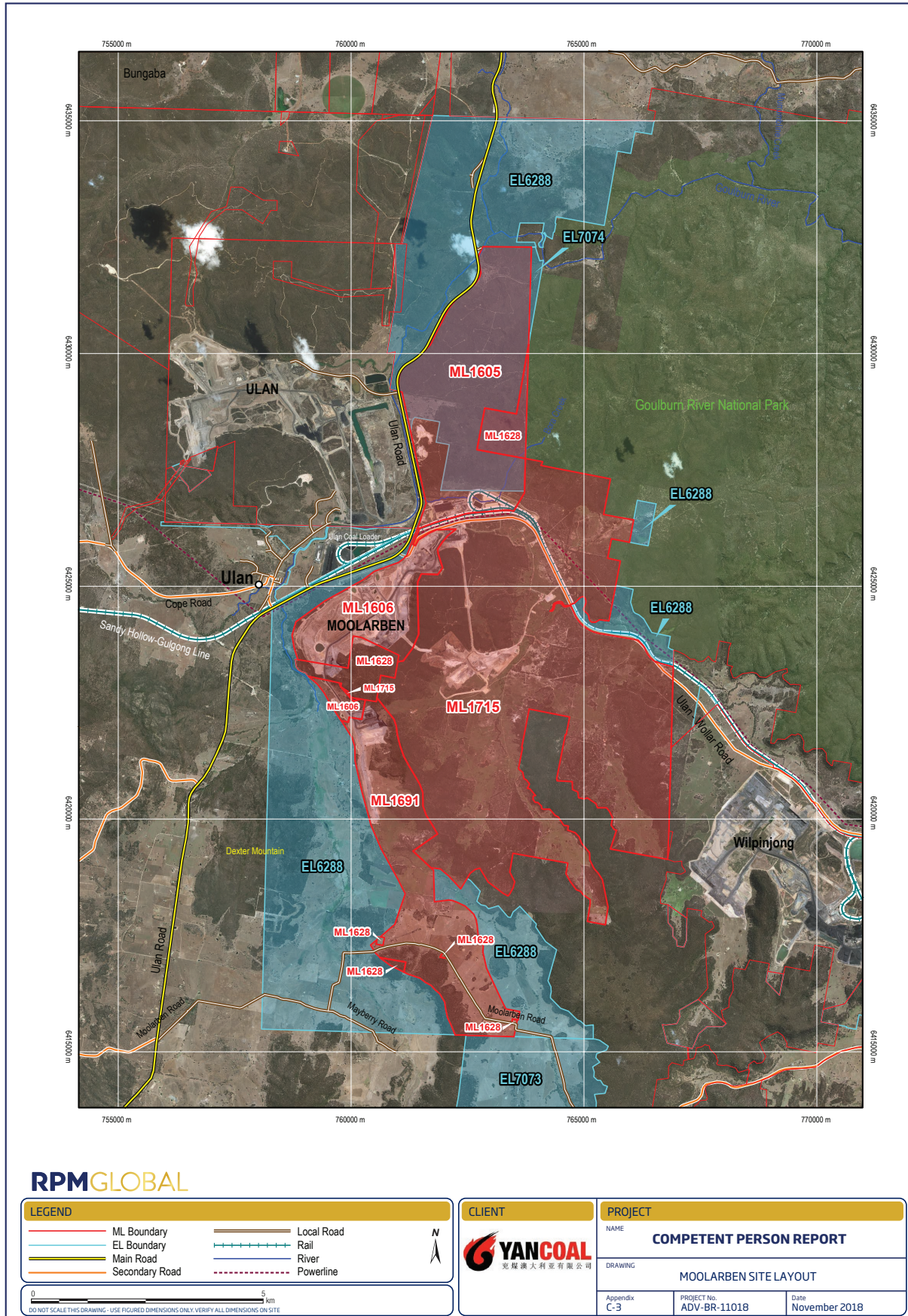
APPENDIX III

COMPETENT PERSON'S REPORT



APPENDIX III

COMPETENT PERSON'S REPORT



RPMGLOBAL

LEGEND

- ML Boundary
- EL Boundary
- Main Road
- Secondary Road
- Local Road
- Rail
- River
- Powerline



0 5 km
DO NOT SCALE THIS DRAWING - USE FIGURED DIMENSIONS ONLY. VERIFY ALL DIMENSIONS ON SITE.

CLIENT



PROJECT

NAME: **COMPETENT PERSON REPORT**

DRAWING: **MOOLARBEN SITE LAYOUT**

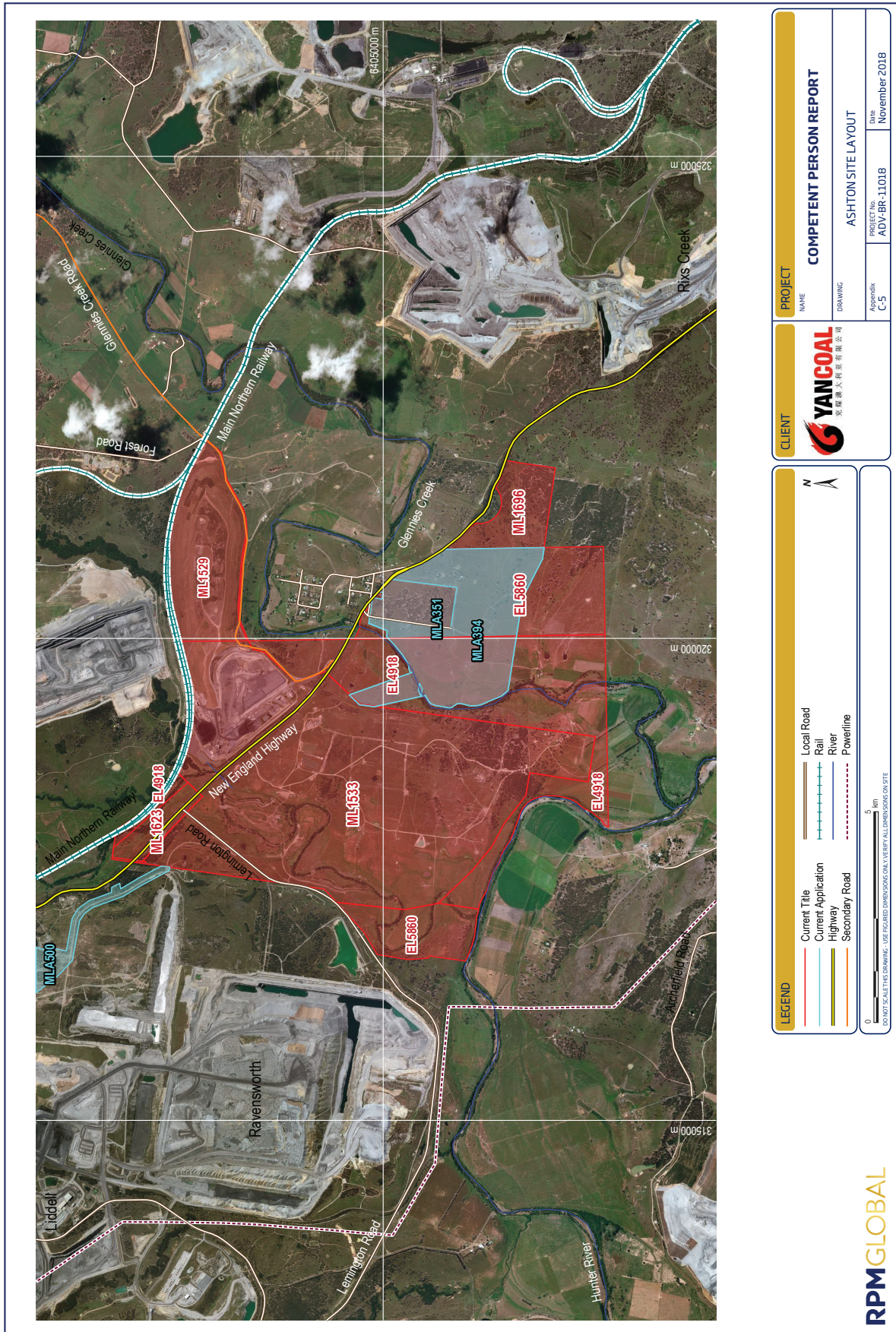
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PROJECT No. ADV-BR-11018

Date November 2018

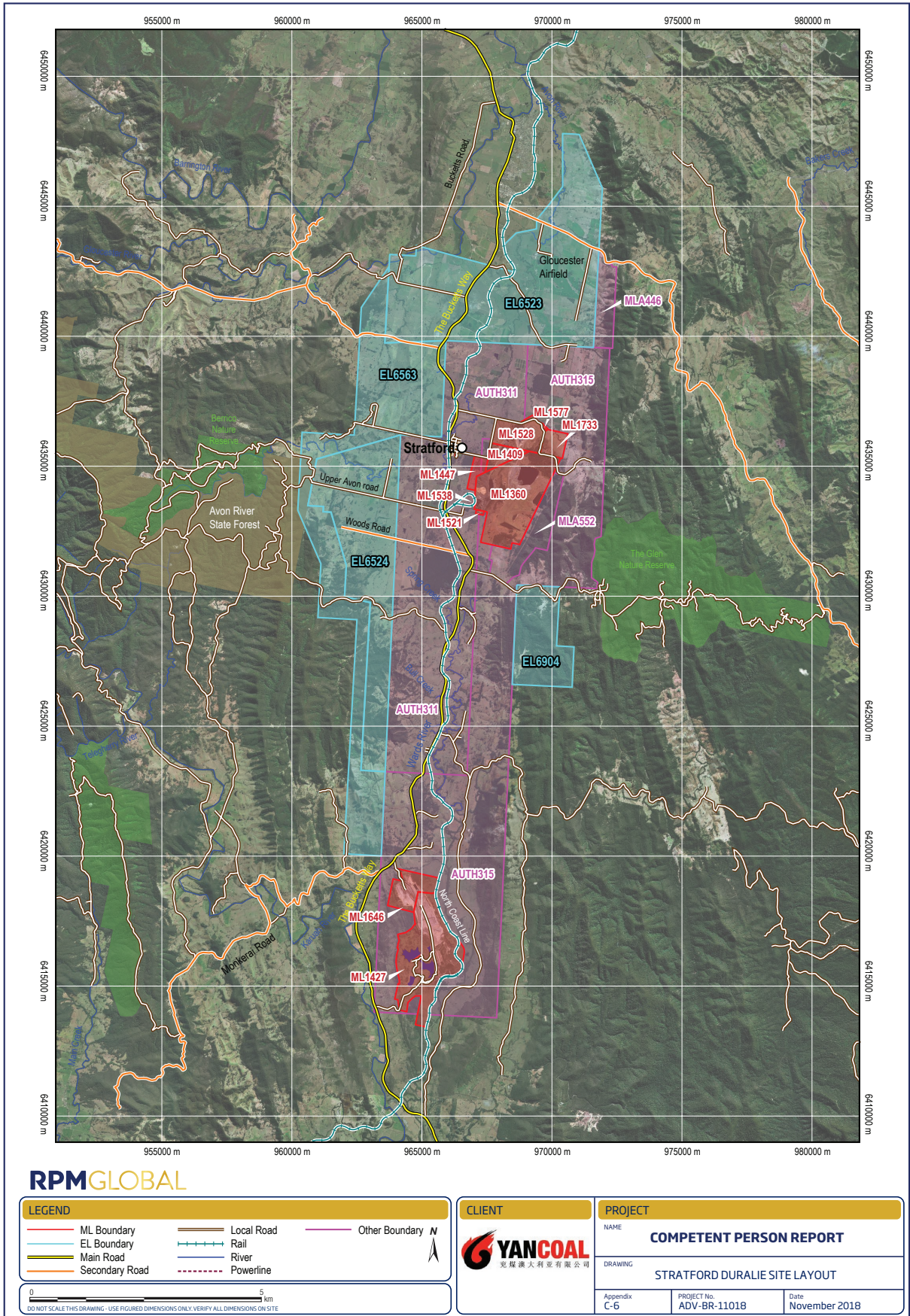
APPENDIX III

COMPETENT PERSON'S REPORT



APPENDIX III

COMPETENT PERSON'S REPORT



RPMGLOBAL

LEGEND

- ML Boundary
- EL Boundary
- Main Road
- Secondary Road
- Local Road
- Rail
- River
- - - Powerline
- Other Boundary

0 5 km
DO NOT SCALE THIS DRAWING - USE FIGURED DIMENSIONS ONLY. VERIFY ALL DIMENSIONS ON SITE.

CLIENT



PROJECT

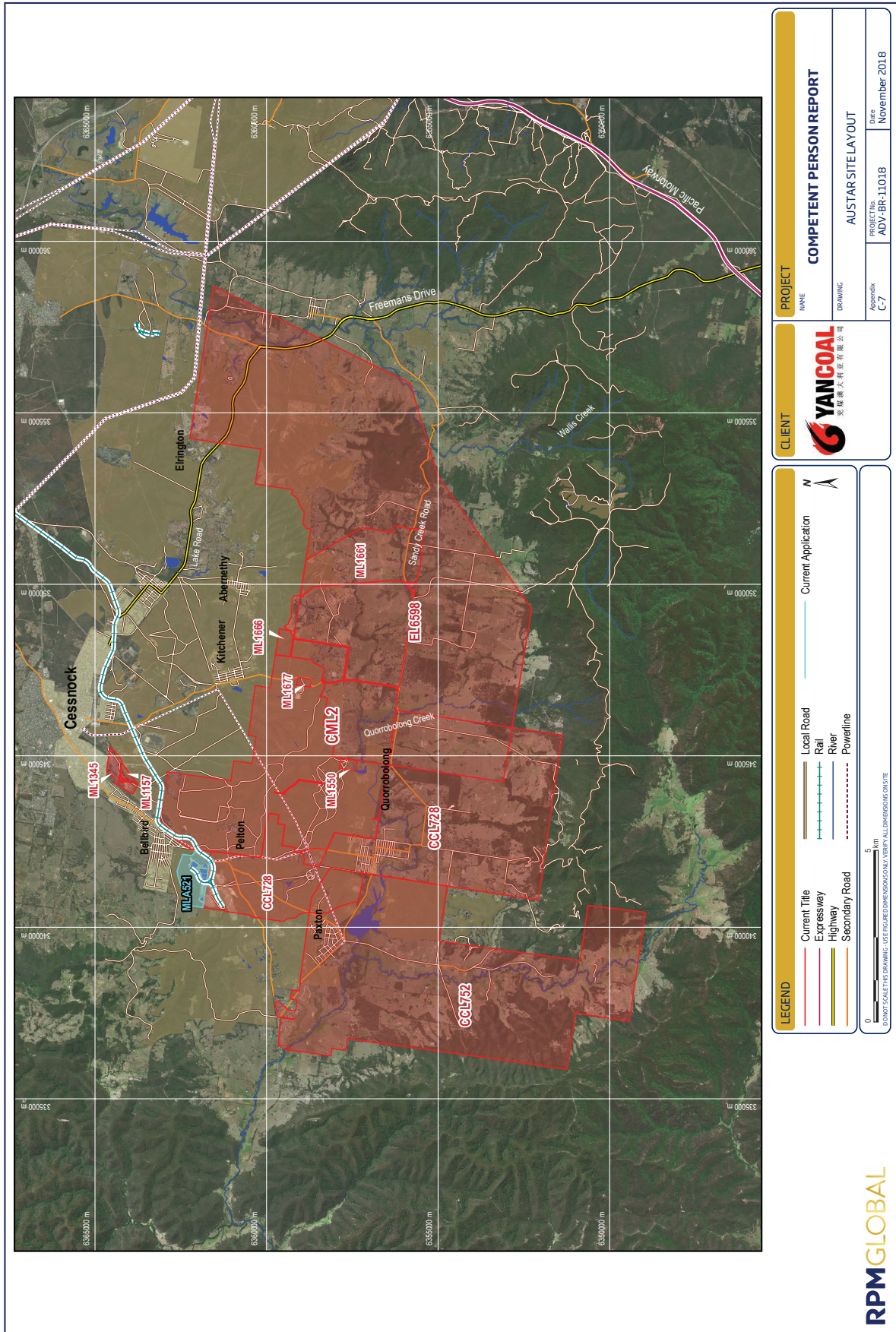
NAME: **COMPETENT PERSON REPORT**

DRAWING: **STRATFORD DURALIE SITE LAYOUT**

Appendix C-6	PROJECT No. ADV-BR-11018	Date November 2018
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APPENDIX III

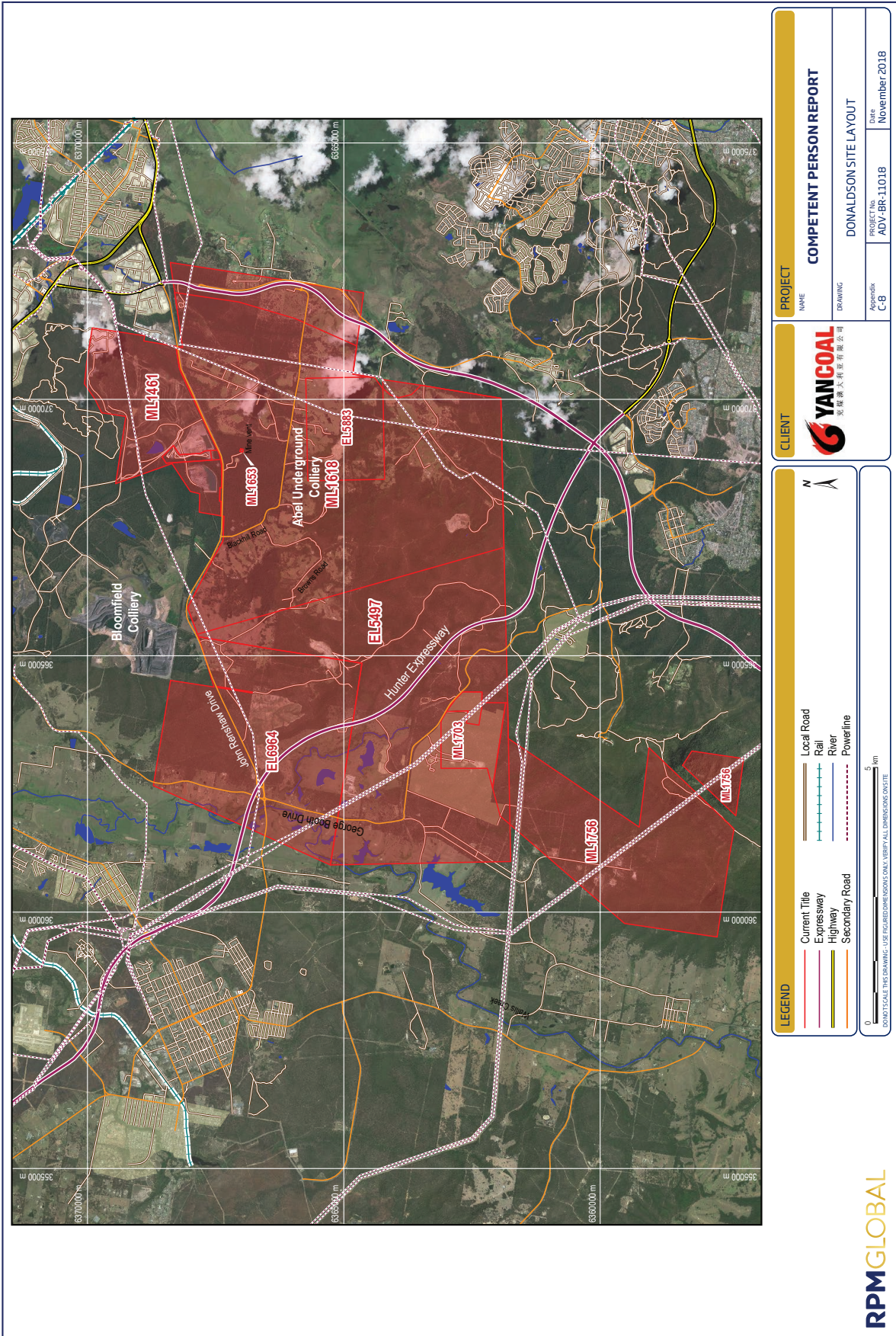
COMPETENT PERSON'S REPORT



RPM GLOBAL

APPENDIX III

COMPETENT PERSON'S REPORT



APPENDIX III

COMPETENT PERSON'S REPORT

