



SECTION 8

Justification of the Project

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8 JUSTIFICATION OF THE PROJECT

This section provides a justification and conclusion of the Project as a whole, having regard to its economic, environmental and social impacts and the principles of ESD. Consistent with the requirement of the SEARs, this section also provides an evaluation of the Project.

As part of this justification consideration has been given to:

- the design of the Project, including the avoidance and minimisation measures implemented (Section 8.1);
- strategic planning context relevant to the Project (Section 8.2);
- statutory requirements and planning policies relevant to the Project (Section 8.3);
- key engagement outcomes and associated Project design decisions and consideration of alternatives (Section 8.4);
- key impacts and benefits (Section 8.5); and
- an assessment of the Project against the objects of the EP&A Act and EPBC Act and the principles of ESD (Section 8.6).

8.1 DESIGN OF THE PROJECT

8.1.1 Objectives of the Project

The EP&A Regulation requires for SSI that an EIS must include a statement of the objectives of the infrastructure (clause 192(1)(b) of the EP&A Regulation).

The objectives of the Project (Section 1.1.3) can be summarised as follows:

- To facilitate continuity of mining at the Dendrobium Mine, directly through the addition of Area 5 for the Project, and also indirectly as the Project supports the financial sustainability of IMC (Dendrobium Mine and Appin Mine) as well as the broader Southern Coalfield economic ecosystem.

- To address the IPC's concerns for the previous application.
- To avoid and minimise impacts on the Metropolitan Special Area.

Continuation of Dendrobium Mine

IMC is the largest coal producer in the Southern Coalfield and makes a significant contribution to the Southern Coalfield economic ecosystem.

IMC operates two underground mines producing metallurgical coal. The Appin Mine is an older operation (1962), operates at depth (> 500 m depth of cover) and is a high gas and highly complex operation in the Bulli Seam. The Appin Mine employs some 1,150 employees and contractors.

Dendrobium Mine currently mines the Wongawilli Seam, commenced operations in 2002 and is a simpler and lower operating cost mine, relative to Appin Mine. The Dendrobium Mine employs some 650 employees and contractors.

The Project proposes to extend the mine life of the Dendrobium Mine through the addition of a new underground mining area (namely Area 5) with extraction in Area 5 currently forecast to commence in 2027. The Project targets the Bulli Seam, as is currently mined at the Appin Mine. Appin Mine product is well known to BlueScope, having been used for many decades in iron and steelmaking at BlueScope's Port Kembla Steelworks.

The product coal from the Project would be a high quality metallurgical coal suitable for use in steel production domestically and internationally. There would be a small portion of PCI product extracted in the later stages of Area 5 extraction.

The Project also includes the use of the existing surface facilities until 2041. This is required to support the potential extraction of the remaining approved resource in Area 3C (Wongawilli Seam), the extraction of which is highly dependent on the development of technology and techniques to support the safe and efficient mining of the resource. Currently, there is significant uncertainty surrounding the mining of the remaining Area 3C resource.

If the Project does not proceed, the Dendrobium Mine is most likely to close after depletion of Longwall 23 in Area 3 (currently forecast in approximately 2027), leading to significant job losses at the Dendrobium Mine and likely flow on effects to the broader IMC, PKCT and the Southern Coalfield economic ecosystem.

Approval of the Project would maximise optionality for IMC and, if the Project is approved and developed, allow coal from Area 5 to be supplied (individually or in a blend with Appin Mine metallurgical coal) to both domestic and export customers.

Historically, the Dendrobium Mine has delivered lower operating costs (than the Appin Mine) making a significant contribution to the overall financial sustainability of IMC.

Therefore, the continued operation of the Dendrobium Mine via the Project would continue to support the financial sustainability of IMC and the broader Southern Coalfield economic ecosystem.

The Project would provide economies of scale for both IMC and the PKCT, supporting the overall financial sustainability of coal mining in the Southern Coalfield.

The Project may (subject to future decisions by, and agreements between, BlueScope and IMC) create optionality for BlueScope to use Bulli Seam product from the Dendrobium Mine as a blend with product from the Appin Mine, or as a discrete coal providing freight cost and carbon advantages to BlueScope.

Ultimately, the blends of coal for coke production are controlled by the end user and subject to agreements with coal suppliers.

If the Dendrobium Mine were to close, the greater IMC complex would lose the benefits of the lower operating costs relative to Appin Mine and the synergies (e.g. labour, overheads and capital, equipment and supply flexibility, and technical support) that have supported IMC for many decades. The capital and operating costs of PKCT would also be absorbed across fewer export tonnes emanating from IMC (Appin Mine) and the remaining producers.

Access to the export market is also critical to ensure the operations can work at a scale that supports the financial sustainability of both IMC and PKCT and ultimately the Southern Coalfield economic ecosystem.

Key Concerns Regarding the Previous Application

IMC previously sought to extend mining operations at Dendrobium Mine through the previous application.

The DPE concluded in its “whole-of-government” Assessment Report that the previous application was in the public interest and recommended approval (DPIE, 2020a).

However, this previous application was refused by the IPC in February 2021.

The IPC’s key concern for the previous application was broadly in regard to the assessed potential impacts of the mine development on the Metropolitan Special Area, including:

- impacts on water resources (i.e. quantity and quality);
- biodiversity impacts (including upland swamps);
- impacts to Aboriginal cultural heritage sites; and
- mine closure.

IMC has acknowledged the feedback received from the IPC, as well as other key stakeholders, and carefully considered how the mine plan could be re-designed for the Project to address these key concerns.

Accordingly, the Project has been re-designed to achieve the following:

- reducing the magnitude of potential surface water losses; and
- taking precautionary measures to reduce the risk of potential impacts on surface features (e.g. 1st and 2nd order streams, upland swamps, Aboriginal heritage sites).

In addition, IMC has undertaken preliminary work on the design concepts for the sealing of the portals and mine entrances, as well as management of seepage post-closure, which builds on the existing mine closure design work undertaken for Dendrobium Mine (Section 8.5.1).

Avoidance and Minimisation of Potential Impacts on the Metropolitan Special Area

The Project mine plan would result in approximately a 60% reduction in longwall mining area (from the previous application).

As the Project targets areas of relatively higher depth of cover and lower cutting height in the Bulli Seam, there is no predicted connective fracturing (or free drainage) to the surface above the Project longwalls when calculated using the Tammetta Equation.

Refined groundwater modelling for the Project indicates there would be an approximate 78% reduction in peak annual surface water losses (compared to the previous application).

The Project has reduced other potential impacts, as it would result in:

- no longwall mining beneath 3rd, 4th and 5th order (or above) streams;
- approximately 50% reduction in the length of 1st and 2nd order streams longwall mined beneath;
- approximately 40% reduction in the number of swamps (listed as threatened) longwall mined beneath;
- no longwall mining beneath identified key stream features;
- reduction in number of Aboriginal heritage sites directly mined beneath from 22 to six sites (with the likelihood of any direct impacts to these six sites expected to be approximately 1 in 10 based on extensive monitoring of subsidence-related impacts to heritage sites);
- no longwall mining beneath previously identified high archaeological (scientific) significance Aboriginal heritage sites;

- longwall mining at least 400 m from named watercourses (i.e. the Avon River, Cordeaux River and Donalds Castle Creek);
- minimum longwall mining setback distance of 300 m from the FSL of the Avon Dam;
- minimum longwall mining setback distance of 1,000 m from dam walls; and
- avoidance of the “Area 4” swamp cluster.

The overall effect is that the Project would result in a significant reduction in the potential impacts on the Metropolitan Special Area.

8.1.2 Alternatives Considered

Clause 192(1)(c) of the EP&A Regulation requires that an EIS must include:

(c) an analysis of feasible alternatives to the carrying out of the development, activity or infrastructure, considering its objectives, including the consequences of not carrying out the development, activity or infrastructure,

In addition, the *State Significant Infrastructure Guidelines* (DPIE, 2021a) and SEARs for the Project require consideration of feasible alternatives.

Consideration of alternatives to the Project is provided in Attachment 11 and summarised below.

The key, feasible alternatives to the Project considered were as follows:

- Not proceeding with the Project (and associated consequences).
- Alternative longwall mining locations within IMC’s existing coal tenements.
- Alternative underground mining methods within the Project underground mining area (Area 5).
- Alternative longwall layouts within the Project underground mining area to further avoid direct mining beneath surface features.
- Alternative mine parameters within the Project underground mining area to consider the implications to sub-surface fracturing and potential surface water losses.

Consequences of Not Proceeding with the Project

If the Project did not proceed, while there would be reduced environmental impacts, there would be likely significant adverse socio-economic implications given:

- In the absence of the Project, operations at Dendrobium Mine would most likely cease following the completion of Longwall 23 in Area 3, with associated:
 - Discontinuation of employment opportunities for the existing Dendrobium Mine and the Project, royalty payments, taxes and expenditure with regional businesses.
 - Increased risks to the financial sustainability of the Appin Mine, as continued operation of the Dendrobium Mine via the Project offsets the higher costs of IMC's Appin Mine operations and, as such, supports the financial sustainability of IMC and the broader Southern Coalfield economic ecosystem.
 - Increased risks of impacts on downstream industries in the Southern Coalfield economic ecosystem that currently transport or directly use Project coal, including PKCT and Port Kembla Steelworks.
- There would also be increased risks to the availability of local supplies of metallurgical coal to the Port Kembla Steelworks, given that:
 - Non-IMC coal supplies are not currently approved past 2033, compared to anticipated demand up to approximately 2045 based on BlueScope's recent decision to seek Infrastructure Approval for the Blast Furnace No. 6 Reline Project.
 - As such, while BlueScope may be able to source alternate supplies of metallurgical coal locally, the quantity and longevity of this option is uncertain.

It should be noted that, ultimately, decisions around coal supplies and blends as important ingredients for steelmaking lie with the end user and any coal supply arrangement is contingent upon future decisions by and agreements between the end user and supplier as to coal supply. As such, while BlueScope has stated that over 80% of its coal supplies are currently sourced from mines in the Illawarra Region (BlueScope, 2020), with IMC currently supplying approximately 60% of its total hard coking coal requirements, the make-up of specific future coal supplies to the Port Kembla Steelworks is outside of IMC's control. Similarly, decisions by non-IMC operations regarding their product sales is outside of IMC's control.

Alternative Longwall Locations to the Project

Alternative longwall locations, including scenarios involving underground mining larger portions of IMC's existing tenements compared to the Project, which could result in increased resource recovery, may also result in associated increased economic, environmental and social impacts.

While these alternative locations could potentially meet the Project objective of continuity of mining, it is considered they would not meet the Project objective of addressing the concerns raised by the IPC.

Accordingly, these alternatives were not adopted for the Project.

Alternative Underground Mining Methods within the Project Underground Mining Area

Bord and pillar mining would not be economic for the Project as longwall mining is the only economic primary production method in Australia to use at depths from the surface that are greater than about 200 m (Department of Planning [DoP], 2008). Therefore, bord and pillar mining would not meet the Project objective of continuity of mining.

The consequences of not carrying out the Project are described above. Accordingly, alternative mining methods were not adopted for the Project.

Alternative Longwall Layouts within the Project Underground Mining Area

The Project has already significantly reduced potential impacts compared to the previous application, including an approximately 60% reduction in mining area, no mining beneath 3rd order and above streams, and no mining beneath previously identified high archaeological (scientific) significant Aboriginal heritage sites, and is therefore considered to address the concerns raised by the IPC.

Reductions in longwall layout to further reduce potential impacts to surface features are not considered reasonable and feasible as:

- Avoidance of streams defined as “significant” by WaterNSW and upland swamps would result in a mine plan that is not economically viable:
 - These alternatives would not meet the Project objective of continuity of mining.
 - The consequences of not carrying out the Project are described above.
 - Accordingly, these alternatives were not adopted for the Project.
- Any mine design seeking to achieve no risk of impacts to Aboriginal cultural heritage may not be economically viable:
 - Avoidance of directly mining beneath previously identified Aboriginal heritage sites (which are identified as having low or medium archaeological [scientific] significance) would result in a decrease in resource recovery and a mine plan that may be less economically viable, and would not achieve no risk of potential impact.
 - There are other factors that affect potential impacts to cultural values, for example potential impacts to streams, and for some stakeholders, any mining development may be considered to impact intangible cultural values.
 - This alternative would not meet the Project objective of continuity of mining and/or would not materially change the Project objective relating to addressing the IPC concerns or minimising potential impacts.

- Accordingly, this alternative was not adopted for the Project. Notwithstanding, the longwall layout for the Project results in a reduction in the number of Aboriginal heritage sites directly mined beneath from 22 to six sites in comparison to the previous application (with the likelihood of direct impacts to these six sites expected to be approximately 1 in 10, based on extensive monitoring of subsidence related impacts to heritage sites).

Alternative Mine Parameters within the Project

The Project has already significantly reduced potential surface water impacts compared to the previous application, and is therefore considered to address the concerns raised by the IPC:

- As the Project targets areas of relatively higher depth of cover and lower cutting height (in the Bulli Seam) there is no predicted seam-to-surface fracturing (or free drainage) when calculated using the Tammetta Equation.
- There is an estimated reduction of approximately 78% in peak annual surface water losses for the Project compared to the previous application.
- It is proposed that surface water offsets would be provided for the Project, consistent with the terms agreed with the NSW Government for the previous application.

Reductions in longwall width and/or cutting height to limit the predicted height of connective fracturing would adversely affect the economic sustainability of the Project and are not considered reasonable and feasible given that:

- Significant reductions in longwall widths/cutting heights to limit the predicted height of fracturing using the Tammetta Equation to below the Bald Hill Claystone would not be economically viable given the significantly increased operating costs and reduced resource recovery.
- Marginal reductions in longwall width/cutting heights are not expected to materially change potential surface water losses (i.e. surface water losses would occur and surface water offsets would be required).

- Accordingly, these alternatives do not satisfy the Project objectives of maintaining longwall continuity and/or would not materially change the Project objective to address concerns from the IPC regarding the previous application and minimising potential impacts. The consequences of not carrying out the Project are described above.
- It is noted that subsidence-related effects for reduced longwall width and cutting height would still be sufficient to result in impacts and consequences to surface features (adverse environmental impacts are still anticipated for reduced longwall widths down to approximately 150 m) and, as such, these alternatives would not satisfy the Project objective of further minimising impacts in the Metropolitan Special Area. Consideration of alternative mine layouts is provided above.

Accordingly, these alternatives were not adopted for the Project.

8.1.3 Project Mine Design

Mining Method

Dendrobium Mine currently uses conventional longwall underground mining methods. This would be continued for the Project (Section 3).

Longwall Layout

The Project underground mining area (Area 5) is constrained by the extent of CCL 768 to the west and north and the extent of the approved Area 3 (under Development Consent DA 60-03-2001) to the east.

In the Project underground mining area (i.e. Area 5), it is not feasible to extract metallurgical coal resource in the Wongawilli Seam (i.e. the seam mined at the existing Dendrobium Mine) due to the presence of sills.

Area 5 is also constrained by igneous intrusions in the Bulli Seam to the north and east, Avon Dam to the south and Avon River to the west (Figure 4-9).

IMC has designed the mine plan to target areas that would predominantly yield the highest quality metallurgical coal resource (i.e. rather than thermal or PCI product).

Longwall Design Features

Longwalls for the Project would have panel widths of approximately 295 m with a 5 m wide gate road either side, resulting in a void of approximately 305 m consistent with the existing Dendrobium Mine. The extraction height is determined by the seam thickness of the Bulli Seam, which ranges between approximately 2.1 m to 3.2 m in Area 5.

IMC has identified a number of key natural and built features in the vicinity of CCL 768 that may be susceptible to subsidence impacts. These features would *not* be mined beneath and the Project has incorporated minimum setbacks from these features.

Final Project longwall layouts would be subject to review and approval as a component of future Extraction Plans developed in consultation with the relevant authorities and to the satisfaction of the Secretary of the DPE.

IMC would also implement an adaptive management approach to achieve any relevant performance measures to maintain the safety and serviceability of surface infrastructure during the life of the Project. Adaptive management would involve the monitoring and periodic evaluation of environmental consequences against subsidence performance measures and, if necessary, mitigation measures and/or the mine design and mining extent may be adjusted to achieve the Infrastructure Approval performance measures to maintain the safety and serviceability of surface infrastructure during the life of the Project.

Indicative Mining Schedule

An indicative mining schedule for the Project is presented in Section 4 and is based on the planned maximum ROM coal production rate of 5.2 Mtpa.

The actual timing and mining sequence may vary in consideration of localised geological features, coal quality characteristics, detailed mine design, mine economics, market volume requirements, and/or adaptive management requirements.

Supporting Surface Infrastructure

The Project would be supported by the development of surface infrastructure and an extension to the life of the existing surface operations of Dendrobium Mine (namely the Dendrobium Pit Top, Kemira Valley Coal Loading Facility, Kemira Valley Rail Line, Dendrobium CPP, Dendrobium Shaft Sites [i.e. No 1 Shaft and No 2 and 3 Shafts] and the West Cliff Stage 3 Coal Wash Emplacement Area).

The Project would make continued use of these significant existing surface facilities and associated systems such as electricity supply with some additional upgrades over the life of the Project. The use of existing Dendrobium Mine surface facilities by the Project maximises the potential benefits of previous IMC infrastructure investment and minimises potential new surface disturbance areas in comparison to a greenfield mine proposal.

Additional surface infrastructure for the Project have been sited in close proximity to or within existing fire trails to minimise land disturbance associated with vehicular access, and each site was designed to avoid disturbance of TECs and upland swamps (Appendix D).

Additional surface infrastructure for the Project has also been designed to avoid all previously identified Aboriginal heritage sites (Appendix F).

8.2 STRATEGIC CONTEXT

8.2.1 Regional Context

In December 2021, the Project was declared SSI under section 5.12 of Part 5 of the EP&A Act by the Minister.

This declaration has reinforced the NSW Government's identification of the strategic importance of the continuation of Dendrobium Mine to supporting the financial sustainability of IMC's operations, and the overall financial sustainability of the Southern Coalfield economic ecosystem. Further detail of the regional strategic context of the Project is provided below.

Economic Significance of the Steelmaking Industry

Steel remains a fundamental material for a variety of construction and manufacturing industries, and domestic steelmaking is a strategically valuable asset for Australia's economic security and prosperity.

The importance of local (i.e. Australian) steelmaking is described in the Parliamentary Report *Australia's Steel Industry: Forging Ahead* (Commonwealth of Australia, 2017a), which outlines the safety benefits and economic significance of the steel industry to the Australian economy and regional economies where steelmaking facilities are located. In the Illawarra Region, the Port Kembla Steelworks (Commonwealth of Australia, 2017a):

- directly employs 3,000 people;
- indirectly supports about 10,000 jobs in the region (with the Illawarra Business Chamber noting in its submission to the Report that the multiplier effect of the steel industry is 3 to 5 indirect jobs for every direct job generated by the industry); and
- contributes approximately \$1.9 billion per annum to the economy, based on analysis conducted by Wollongong City Council (without considering any multiplier effect).

The Port Kembla Steelworks is the largest steel production facility in Australia, and one of only two primary iron and steelmaking facilities in Australia.

Use of Coal in Steel Production

Metallurgical coal is a raw material that is essential for the manufacture of "virgin iron" and steel (also known as "primary steelmaking" or "integrated steelmaking"). The other key raw material is iron ore.

While the Port Kembla Steelworks produces a portion of its steel using recycled scrap steel as a feed stock, there is not sufficient supply of scrap steel to meet demand, and therefore the steelmaking process continues to require the use of metallurgical coal and iron ore.

Metallurgical coal is used as a reducing agent in the steelmaking process. The carbon in the metallurgical coal is used to convert iron ore to molten iron in a blast furnace.

Research into the use of alternative reducing agents in the blast furnace method, such as hydrogen, is being undertaken. However, there is currently no economically viable alternative to the use of metallurgical coal as a reducing agent in the blast furnace method (i.e. the method employed at the Port Kembla Steelworks) at a commercial scale (BlueScope, 2019).

BlueScope has reiterated the need for continued supply of metallurgical coal for steelmaking as emerging “green steel” technologies are not yet ready for large scale implementation (BlueScope, 2021b).

Furthermore, BlueScope is seeking Infrastructure Approval for the Port Kembla Steelworks Blast Furnace No. 6 Reline Upgrade Project, and lodged an EIS stating the following regarding alternative steelmaking processes (BlueScope, 2022):

As these technologies require significant development, and are unlikely to be commercially viable at industrial-scale for use in the specific circumstances at Port Kembla Steelworks prior to the end of the current 5BF campaign, the most technically feasible and economically viable option for BlueScope at this time is to progress with the project.

The Port Kembla Steelworks Blast Furnace No. 6 Reline Upgrade Project was declared as CSSI by the Minister for Planning and Public Spaces in 2021 for the following reasons (DPIE, 2021h):

- the project is essential to NSW for economic and employment reasons as it would enable continued domestic production of steel, ensuring supply chain security for nation building projects such as infrastructure, commercial and residential developments; and
- the project is a significant capital investment of \$700 million and would generate 1,000 contractor jobs and retain 4,500 existing jobs at the steelworks, delivering significant economic and employment benefits to NSW.

Importance of Local Metallurgical Coal Supply

The proximity of the Southern Coalfield metallurgical coal mines is a major factor in BlueScope's ability to make steel economically.

BlueScope blends coal from its supply base to produce a coke product for use in its operation and for export, with current operations at BlueScope designed to primarily utilise coal produced in the Illawarra Region, supplemented by imported coal and iron ore.

Local supply provides significant benefits to both BlueScope and NSW. For BlueScope, these benefits relate to, but are not limited to, coal quality, delivered cost, supply chain certainty, just-in-time supply with associated working capital benefits, and the maintenance of a competitive supply base, whilst minimising their carbon footprint associated with raw material freight.

For NSW, these benefits include royalties from local production and economic benefits (both generated by IMC but also related businesses such as BlueScope).

Coal from both IMC operations (i.e. the Dendrobium Mine and Appin Mine) is currently blended for sale into the export and domestic markets. This is forecast to continue if the Project proceeds, except in circumstances where a single source of supply from either mine is preferred by a customer and agreed to by IMC.

The dependency of the Port Kembla Steelworks on the continued supply of metallurgical coal from local sources in the Southern Coalfield was acknowledged by the NSW Legislative Council (5 May 2021), the DPE (2020a), and the independent economic study commissioned by the DPE for the previous application (BAEconomics, 2020). BlueScope has actively supported the continuation of mining in the Southern Coalfield in its prior submissions to the IPC stating (15 December 2020):

The purpose of BlueScope's submission is to firstly emphasise to the Independent Planning Commission, and the state of NSW, the critical importance of a continuation of mining in the Southern Coalfield of NSW for the ongoing production of iron and steel at the Port Kembla Steelworks.

Metallurgical coal supplies for BlueScope are reliant upon an ongoing commercially viable coal mining sector in the Southern Coalfield. BlueScope understands that export sales are critical to the mining operations remaining commercially viable. Further, local supplies of metallurgical coal are vital for the continuing economic health of the Illawarra Region and NSW at large, including the 4,500 direct jobs and contractors, supporting around 8,900 jobs that rely on Port Kembla Steelworks, the largest steel production facility in Australia.

This importance has only been enhanced as the production of domestic steel has become a critical part of:

- a) The development of sustainable and secure supply chains post the COVID pandemic; and*
- b) the significant step up in investment in renewable energy projects across NSW because of recently announced NSW Government policies.*

The second purpose of this submission is to emphasise the important role of the Dendrobium Mine, operated by South32, as one key mine that supplies metallurgical coal for steelmaking at Port Kembla.

In addition, the importance of multiple local metallurgical coal supplies to the Port Kembla Steelworks is outlined by the ACCC (2017) which noted the disadvantages the Port Kembla Steelworks may face if it were required to source metallurgical coal from the Bowen Basin in Queensland (rather than the Illawarra Region):

... there is significant additional cost associated with transporting substitute coking coal from alternative sources to the Australia steelmakers as well as potential capacity constraints limiting the ability of one steelmaker to import large volumes of coal by ship.

... In relation to transportation cost, BlueScope would incur significantly higher freight logistics costs to ship coal from the Bowen Basin via the Queensland coal exporting ports to its steel mill at Port Kembla compared to the costs associated with the supply of coal from South32 and Metropolitan mines in the Illawarra to its steelworks and Port Kembla. Market inquiries indicate that the cost of transporting coal from the Bowen Basin to Port Kembla is likely to be between \$US10 -15 per tonne.

BlueScope is a major contributor to the Illawarra Region, NSW and Australia, generating an economic input of \$ 1.9 billion per annum based on analysis by Wollongong City Council. As a consequence, BlueScope's proposed Port Kembla Steelworks Blast Furnace Reline Project has gained CSSI status.

The Port Kembla Steelworks Blast Furnace Reline Project is expected to extend the life of its blast furnace operations to approximately 2045. BlueScope is continuing with current blast furnace technology given the prevailing view that 'green steel' is still under development and many years away.

This creates ongoing metallurgical coal demand for the life of the blast furnace.

Southern Coalfield Economic Ecosystem

The independent economic assessment undertaken on behalf of DPE for the previous application by BAEconomics concluded the worst-case scenario would be the closure of the Dendrobium Mine and Appin Mine which would lead to broader impacts to the Southern Coalfield economic ecosystem, such as the cessation of coal exports through PKCT and the production of primary steel at the Port Kembla Steelworks (BAEconomics, 2020):

...the ongoing economic viability of the premium hard coking coal mining, iron smelting and coal transport and shipping businesses located in and around the Wollongong Port Kembla area and elsewhere in the Southern coalfield of NSW is critically dependent on the continuing success of Illawarra Metallurgical Coal and BlueScope steel. Major changes in either of these businesses would have flow on effects to the other as well as to other significant coal and iron and steel related businesses.

The independent economic assessment (BAEconomics, 2020) goes further in stating the future of IMC and the broader Southern Coalfield economic ecosystem is related:

...the historical linkages and dependencies between Illawarra Metallurgical Coal and the primary steelmaking operations at BlueScope mean that the failure of one will compromise the other.

Closure of IMC operations could cost the local Wollongong region around \$6.4 billion per year in lost regional product and the estimated loss to the Australian economy as a whole could be as high as \$10.7 billion per year (BAEconomics, 2020).

In addition, the closure of IMC's operations could result in the loss of employment for some estimated 5,500 direct personnel in the Illawarra Region, and inclusive of the indirect workforce losses, up to approximately 25,000 total jobs nationally (BAEconomics, 2020).

Without the Project, the Dendrobium Mine and other operations may become less financially sustainable (i.e. the Appin Mine), which in turn may result in the PKCT and other Southern Coalfield mines becoming less financially sustainable (the mines in the Southern Coalfield currently operating, including IMC's operations, Peabody's Metropolitan Mine and SIMEC's Tahmoor Colliery engage approximately 2,500 personnel) (BAEconomics 2020).

Port Kembla Coal Terminal

In addition, IMC is a key enabler to support a viable PKCT and hence local competitive supply of metallurgical coal to the Port Kembla Steelworks and the seaborne market. IMC currently provides 60% of the hard coking coal and 75% of the total coal exported through PKCT.

PKCT provides access to seaborne export and domestic markets and therefore underpins the operation of the mines in the Southern Coalfield region.

The maintenance of a strong local coal industry is important for competition and ongoing supply to both the domestic and export markets.

IMC forms a key part of the local coal and supporting industries which includes IMC, Tahmoor Mine (SIMEC), Metropolitan Mine (Peabody Energy) Russell Vale (Wollongong Coal), PKCT and BlueScope. This industry generates significant benefits for the region (e.g. economic, employment) as well as significant taxes and royalties for NSW as identified in BAEconomics (2020).

Current mine approvals in the Southern Coalfield foreshadow a reduction in total coal production with current approvals for Tahmoor Mine to 2033, Metropolitan Mine to 2032 and Russell Vale to (approximately 2026). This is likely to increase the cost burden on PKCT.

PKCT primarily supplies services to the five operating mines in the Southern Coalfield, however, from a volume perspective, IMC is forecast to contribute a minimum of 75% of the export volumes shipped through PKCT over the next 10 years and hence fund the bulk of the port operating costs and is important to the ongoing financial viability of PKCT.

This proportion may increase if the throughput of the other Southern Coalfield operations who use PKCT decreases (noting the port costs are allocated on a throughput basis with less tonnage increasing cost for the remaining users).

Based on current operating structures and cost regimes applicable to PKCT, reduced throughput is expected to increase costs per tonne for the use of PKCT.

Coal from the Project, if developed, is forecast to make up approximately 35% of the coal shipped through PKCT.

As the major shipper (forecast to be a minimum of 75%), continued supply of coal from IMC is critical for the viability of PKCT.

The importance of competition has been well developed in the various economic reports (as described above). A cost effective port is essential to support the Southern Coalfield operations.

8.2.2 Project Context

The Port Kembla Steelworks was originally developed due to its proximity to the coal mines of the Southern Coalfield.

The Project would continue to make use of the existing Kemira Valley Rail Line, which connects Dendrobium Mine and Kemira Valley Coal Loading Facility directly to Port Kembla. The Dendrobium CPP is located in the Port Kembla industrial precinct (regulated under the Port Kembla Steelworks EPL 6092) and IMC pays a fee to BlueScope for the use of the facility.

As such, the Dendrobium CPP is located within the steelworks and is integrated with BlueScope's operations.

Dendrobium Mine's existing direct rail access to the Port Kembla industrial precinct also facilitates the transport of Dendrobium product coal to other Australian customers (including the Liberty Primary Steel Whyalla Steelworks) and international customers, via the PKCT.

Under the Project, Dendrobium Mine product coal would continue to be transported from the PKCT to Australian and international customers.

The continued operation of Dendrobium Mine, should the Project be approved, would support the continued operation of the PKCT.

Existing Underground Mining Effects

The effect of underground mining within the Metropolitan Special Area to water resources has been subject to multiple reviews, including the Stored Water Inquiry by Justice Reynolds (Reynolds, 1976), Southern Coalfield Inquiry (NSW Government, 2008a) and reviews by the IEPMC.

The most recent review by the IEPMC (2019) concluded there has been no observed material impacts to drinking water supplies due to mining in these catchments, including mining by Dendrobium Mine:

Reservoir leakage rates – there is no measured evidence of significant long-term leakage from reservoirs due to mining in the Special Areas.

...

Watercourse bed leakage (at catchment scale) – from material presented to the Panel, there remains no strong evidence that cracking of watercourse beds leads to significant losses of water at catchment scales relevant for water supplies.

Further, with respect to potential impacts on water quality in the catchment, the IEPMC (2019) concluded:

Although the impact of underground long-wall mining in the catchment could lead to small changes in the levels of impurities in water entering SCA's dams, these changes can be coped with by SW's [Sydney Water's] treatment plants as evidence to date does not suggest a sufficiently large change in soluble organic concentrations to be of concern.

8.2.3 Strategic Statement on Coal Exploration and Mining in NSW

The NSW Government's 2020 *Strategic Statement on Coal Exploration and Mining in NSW* outlines how the NSW Government will continue to support responsible resource development for the benefit of the State (NSW Government, 2020a).

The Project would be consistent with the *Strategic Statement on Coal Exploration and Mining in NSW* as:

- Dendrobium Mine is a metallurgical coal mine.
- The Project would facilitate the continuation of the approved Dendrobium Mine, represents a logical continuation of the development of Dendrobium Mine within IMC's existing mining leases (Sections 3 and 4), supporting NSW regional manufacturing industries and significantly supporting the Illawarra and NSW economies.
- The Project would be developed in a manner that is responsible and considers the benefits and consequences of the development for other land uses, including coexistence with the Metropolitan Special Area. The IEPMC (2019) has found no evidence of significant loss of water, or changes in water quality from mining, of concern to water supply (Section 2.2.2).

- The Project decision-making process will be informed by public involvement and participation through the EIS consultation program (Section 6), public exhibition of the EIS document, and assessment of the Project by the Minister in accordance with the EP&A Act.
- The Project incorporates relevant ESD considerations (Section 8.6.3).
- This EIS has been prepared using the best available science, and the Project would incorporate comprehensive management, monitoring and adaptive management (Section 7).
- Significant returns for society would be generated through:
 - continuation of current operational employment at Dendrobium Mine of approximately 650 personnel, and generation of approximately 50 operational jobs and approximately 100 construction jobs for the region, with many more expenditure-induced indirect jobs;
 - enabling IMC to continue supporting BlueScope's Australian operations at its Port Kembla Steelworks and the Australian steelmaking industry, including local and regional businesses;
 - enabling IMC to continue supporting the PKCT;
 - State and Commonwealth corporate tax contributions; and
 - payment of coal royalties to the NSW Government over the life of the Project.
- IMC is also committed to ongoing financial support for community projects through the DCEP.

8.2.4 NSW Net Zero Plan Stage 1: 2020-2030

The *Net Zero Plan Stage 1: 2020-2030* (NSW Government, 2020b) provides the foundational framework for NSW to reach net-zero emissions by 2050.

Consistent with Dendrobium Mine, the Project would continue to operate in consideration of the objectives of South32's company-wide Climate Change Strategy and annual *Sustainable Development Report*. Further discussion of the NSW Net Zero Plan and South32's company policy is contained in Appendix R.

The NSW Government's long-term objective to reach net-zero emissions by 2050 is consistent with the target of South32's Climate Change Strategy. Project-specific, best-practice greenhouse gas mitigation measures (namely maximising gas capture to enable flaring) are described in Section 7.21, Appendix I and Appendix R.

In September 2021, DPE released the *Net Zero Plan Stage 1: 2020–2030 Implementation Update* (DPIE, 2021f). It outlines an updated 2030 emissions reduction objective of 50% reduction below 2005 levels.

It should be noted that South32's decarbonisation target is company-wide, and does not apply equally or directly to each individual operation. Similar to the approach outlined by the NSW Government regarding its implementation plan, which states that different sectors of the NSW economy will reduce emissions at different rates, it is expected that various components of South32's operations will decarbonise at different rates (Appendix R).

In relation to assessment under the EP&A Act, the *Net Zero Plan Stage 1: 2020–2030 Implementation Update* states (emphasis added):

*The emissions reduction projections do not assume, and the NSW Government does not intend, that all sectors of the NSW economy will abate at the same rate. The NSW Government's projections also find that the State is on track to achieve this objective on current policy settings. In light of this, the **NSW Government policy is that the NSW Government's objective set out in this Plan, to reduce emissions by 50% below 2005 levels by 2030, is not to be considered in the assessment or determination of development and infrastructure applications under the Environmental Planning and Assessment Act 1979.***

8.2.5 Illawarra Shoalhaven Regional Plan 2041

The Project is partially located within the area covered by the *Illawarra Shoalhaven Regional Plan 2041* (NSW Government, 2021).

The Project is located within the Southern Coalfield, and would provide for continued supply of metallurgical coal for the Australian steel industry and for export through the PKCT.

The *Illawarra Shoalhaven Regional Plan 2041* acknowledges that coal mining within the Metropolitan Special Area has the potential to affect water supply, security and infrastructure, and ecological integrity (NSW Government, 2021).

In this regard, the *Illawarra Shoalhaven Regional Plan 2041* (NSW Government, 2021) concludes:

These risks must be carefully managed through assessment, management and regulation that is informed by best available science.

IMC has designed the Project to reduce the potential impacts on water resources (as well as biodiversity values and other environmental values of the Metropolitan Special Area) as far as is practicable, in addition to provision of targeted offsets (Section 7). In addition, the Project has been assessed using the best available science, including adopting the advice of the IEPMC with respect to assessment of potential impacts of mine subsidence on groundwater and surface water resources.

8.2.6 WaterNSW Principles for Managing Mining and Coal Seam Gas Impacts in Declared Catchment Areas

The *WaterNSW Principles for Managing Mining and Coal Seam Gas Impacts in Declared Catchment Areas* (WaterNSW, n.d.) were developed to protect the declared water catchments and Special/Controlled areas, and catchment infrastructure works in relation to the management of mining impacts.

The *WaterNSW Principles for Managing Mining and Coal Seam Gas Impacts in Declared Catchment Areas* provides six principles to protect the drinking water catchments and Special/Controlled areas, and catchment infrastructure works in relation to the management of mining impacts. Each principle, key WaterNSW statements explaining each principle, and how the Project is considered to satisfy these principles, are addressed in Section 2.3.

8.2.7 Drinking Water Catchments

Mining has occurred in the Special Catchment Areas (which includes the Metropolitan Special Area) for over a century. As noted by the IEPMC (2019), there has been no observed material impacts to drinking water supplies due to mining in these catchments:

Reservoir leakage rates – there is no measured evidence of significant long-term leakage from reservoirs due to mining in the Special Areas.

...

Watercourse bed leakage (at catchment scale) – from material presented to the Panel, there remains no strong evidence that cracking of watercourse beds leads to significant losses of water at catchment scales relevant for water supplies.

The socio-economic benefits to NSW and the region from underground mining in the catchment areas are significant, including in consideration of the interdependence between the Southern Coalfield economic ecosystem and continuation of mining for the Project (Section 8.5). It is also noted that, given the access restrictions to the Metropolitan Special Area, underground mining is the only major development that can coexist in the catchment areas given its limited surface impacts.

The Project incorporates a number of setbacks from key features to reduce potential impacts on the Metropolitan Special Area (Section 8.1.1).

The coexistence between underground mining and the provision of drinking water supplies in the Metropolitan Special Area is expected to continue should the Project be approved.

8.2.8 Suitability of the Site

The Port Kembla Steelworks was originally developed due to its proximity to the coal mines of the Southern Coalfield.

IMC has designed the mine plan to target areas that would predominantly yield the highest quality metallurgical coal resource (i.e. rather than thermal or PCI product).

The Project would also include the ongoing use of existing Dendrobium Mine surface facilities located at the site, which maximises the potential benefits of previous IMC infrastructure investment and minimises potential new surface disturbance areas in comparison to a greenfield mine proposal.

Mining operations and nearby land uses, such as state conservation areas and suburban areas, have historically co-existed and this would continue for the Project (e.g. no evidence of significant loss of water, or changes in water quality from mining, of concern to water supply). The Project would also be developed in a manner that is responsible and considers the benefits and consequences of the development for other land uses, including coexistence with the Metropolitan Special Area.

Therefore, the site is considered suitable for the Project, as the Project would not adversely impact on, or be inconsistent with, adjoining existing or future land uses.

8.3 STATUTORY REQUIREMENTS

The following sub-section is a brief synthesis of the statutory requirements as described in Section 5 and Attachments 6 and 7 of the EIS.

The EP&A Act and EP&A Regulation set the framework for planning and environmental assessment in NSW. Approval for the Project will be sought under the SSI provisions (i.e. Division 5.2) under Part 5 of the EP&A Act.

Under section 5.12 of the EP&A Act, any development, or class of development, may be declared as SSI by a SEPP.

Clause 2.14 of the Planning Systems SEPP provides that a development is declared SSI for the purposes of the EP&A Act if it is specified in Schedule 4 of the Planning Systems SEPP.

In December 2021, the NSW Minister for Planning declared the Project to be SSI. This declaration came into effect in December 2021 and is included in Schedule 4 of the Planning Systems SEPP.

As the Project has been declared to be SSI and may be carried out without obtaining Development Consent under Part 4 of the EP&A Act, the Project requires assessment and approval under Part 5, Division 5.2 of the EP&A Act.

The NSW Minister for Planning is the approval authority for SSI developments (including the Project) under Part 5 of the EP&A Act.

Further, IMC referred the relevant elements of the Project to the Federal Minister for the Environment in November 2021 (EPBC 2021/9115) (the Proposed Action). A delegate of the Federal Minister determined on 13 January 2022 that the proposed Action is a “controlled action” and, therefore, the Action requires approval under the EPBC Act.

Mining activities for the Project would be carried out within existing mining leases, and therefore no mining leases are required to be issued under the *Mining Act 1992* to enable the Project to be carried out.

Additional analysis of the consistency of the Project with relevant legislation, plus SEPPs and LEPs that would have applied, but for the Project’s SSI declaration, is provided in Section 5 and Attachment 7.

8.4 KEY ENGAGEMENT OUTCOMES AND ASSOCIATED PROJECT DESIGN

Consultation conducted during the preparation of this EIS has provided the opportunity to identify issues of concern or interest to stakeholders and to consider these issues within this EIS.

Consultation for the EIS has been undertaken in consideration of *Undertaking Engagement Guidelines for State Significant Projects* (DPIE, 2021e) given that:

- Extensive consultation has been conducted for the previous application since 2017, as well as throughout the operation of Dendrobium Mine since 2002.
- The extensive consultation undertaken has allowed for key concerns in regard to Dendrobium Mine and the Project to be well understood.
- A range of engagement activities for the Project have been undertaken, including:
 - interviews and meetings with relevant stakeholders;
 - focus group with the DCCC;
 - distribution of community newsletters; and
 - maintenance of website and community call line for provision of feedback regarding Dendrobium Mine and the Project.
- Commitment to continue consultation with a range of stakeholders following the lodgement of the EIS and during the life of the Project.

Furthermore, IMC has carefully considered the feedback provided by the local community, Government agencies and other stakeholders on the previous application for Dendrobium Mine (Section 2.1).

IMC has sought to address stakeholder concerns through commitment to a number of significant Project design measures, genuine community engagement and successful environmental management.

Regulatory and public engagement by IMC for the Project and the previous application (Section 6) has identified the following key assessment issues for the Project:

- Mine subsidence effects and associated potential impacts on:
 - water supply yield and quality;
 - water supply infrastructure;
 - the interaction of groundwater and surface water resources;
 - upland swamp drying and wetting cycles and associated plant species distribution; and
 - riparian and aquatic habitats due to alterations to surface water flows.
- Potential impacts of direct land disturbance on biodiversity and heritage values.
- Potential impacts of the continuation of existing Dendrobium Mine surface facilities (e.g. amenity, traffic and safety issues).
- Potential continuation and extension of Dendrobium Mine's positive impacts on employment, regional expenditure and royalties.
- The importance of local metallurgical coal supplies to the operation and socio-economic benefits of the PKCT and Port Kembla Steelworks.

Key potential adverse impacts can be generally grouped into:

- impacts related to underground mining subsidence and associated impacts on the overlying physical environment; and
- impacts of the surface activities of Dendrobium Mine that are not related to mine subsidence (noting that the Project maximises the use of the existing surface infrastructure of Dendrobium Mine).

Key potential benefits of the Project identified in engagement were largely socio-economic in nature. It is noted that potential adverse social impacts were not generally raised as a concern for the Project; however, some respondents highlighted the fear of negative social impacts should the Project not be approved (Sections 6 and 7 and Appendix K).

A number of alternatives to the Project have been considered by IMC in the development of this EIS in light of engagement feedback, particularly the feedback received on the previous application. An analysis of key alternatives to the Project considered by IMC is provided in Attachment 11.

8.5 EVALUATION OF KEY IMPACTS AND BENEFITS

8.5.1 Key Potential Impacts

Regulatory and public engagement by IMC for the Project and the previous application (Section 6) has identified a number of key assessment issues for the Project. Key potential Project direct impacts and indirect adverse impacts are described below (Tables 8-1 to 8-4).

Potential Adverse Direct Impacts

Tables 8-1 to 8-3 summarise key direct impacts, the proposed mitigation measures to address these impacts, and the associated Project outcomes associated with:

- mine subsidence effects on water resources;
- biodiversity and Aboriginal heritage values; and
- amenity effects from the continued operation of Dendrobium Mine surface facilities.

Potential Adverse Indirect Impacts

Most potential indirect impacts of the Project identified are positive in nature (e.g. indirect employment effects, supplier benefits, the significance of local metallurgical coal supply to the ongoing operation of Port Kembla Steelworks).

However, an indirect adverse impact of the Project is the potential for Scope 1 and Scope 2 greenhouse gas emissions of the Project, and Scope 3 greenhouse gas emissions (i.e. customer greenhouse gas emissions from the burning of Project product metallurgical coal) to contribute to global climate change effects.

Table 8-4 summarises the potential impacts of greenhouse gas emissions from the production and burning of Project product coal, the proposed mitigation measures to address these impacts, and the associated Project outcome.

8.5.2 Key Potential Benefits

Regulatory and public engagement by IMC for the Project and the previous application (Section 6) has identified a number of key potential benefits for the Project.

The Project would support the extraction of approximately 31 Mt of ROM coal, with production of up to approximately 5.2 Mtpa of ROM coal.

The Project is required to facilitate the continuation of Dendrobium Mine, with uncertainty regarding the ability to extract the remaining resource in the approved Area 3C and the timing, which is contingent on IMC's ability to effectively drain gas from the seam to achieve levels that facilitate safe extraction of the resource.

In the absence of the Project there will be longwall discontinuity and, therefore, no production from Dendrobium Mine, which may potentially make Dendrobium Mine (as well as Area 3C) and IMC less viable.

The Project would include the implementation of environmental mitigation measures (including performance monitoring and adaptive management) to minimise potential impacts on the environment and community (Section 7).

A summary of the Project environmental mitigation, monitoring and reporting measures are provided in Attachment 10.

Socio-Economic Benefits

The Project would increase the availability and longevity of employment at Dendrobium Mine.

At full development, the Project operational workforce would be in the order of 700 FTE on-site personnel inclusive of both direct IMC employment and on-site contractors. The Project, therefore, would include an increase of approximately 50 operational personnel from the current workforce of Dendrobium Mine.

An additional construction workforce of up to approximately 100 people would also be required during a two-year construction period for the Project.

Table 8-1
Key Potential Impacts and Associated Project Outcomes – Water Supply

Summary of Potential Impact Mechanism	Summary of Mitigation Measures	Project Outcome Summary
Reduced water yield from drinking water catchments.		
<p>Due to fracturing above the goaf (which is predicted to remain below the surface fracture network for the Project) and associated groundwater depressurisation, a proportion of surface water flows from streams overlying the Project underground mining area would report to deeper groundwater systems (i.e. be lost from the surface), and ultimately into the Project water management system.</p> <p>This has been estimated to be less than 1% of the Avon and Cordeaux catchment yields (Section 7).</p>	<p>For the previous application, the NSW Government proposed an agreement with Government that would require IMC to make payments to offset any water quantity impacts during and post-mining (the terms of which were accepted by IMC).</p> <p>The terms of the proposed agreement with Government were outlined in the draft conditions of consent for the previous application and included:</p> <ul style="list-style-type: none"> during mining – annual payments based on actual surface water taken (as modelled annually) due to the Project for each water year (annual payments priced at the actual IPART retail price for that water year and varied over time to reflect inflation and drought/non-drought year prices); and post-mining – up-front payment made upon approval of the first Extraction Plan for the Project to account for predicted post-mining surface water losses (value of payment based on the present value of modelled post-mining losses and IPART prices). <p>IMC would seek to enter a similar agreement with the NSW Government to offset water quantity and quality impacts during and post-mining for the Project to result in a net benefit to Sydney's drinking water supply.</p> <p>In addition, IMC already holds WALs for the groundwater take of the Project from the deeper groundwater systems, including the volume that may report to groundwater systems from surface water systems.</p>	<p>An agreement with Government would allow the Minister for Water, Property and Housing to spend these funds (as required) on priority water projects to result in a net benefit to Sydney's drinking water supply.</p>
Potential impacts on water quality in drinking water catchments.		
<p>The <i>Special Areas Strategic Plan of Management 2015</i> (WaterNSW and OEH, 2015) describes land management programs to control sedimentation in the Special Catchment Areas as a priority. Additional Project surface disturbance activities within the drinking water catchments may lead to sediment generation.</p> <p>Mine subsidence could result in localised, episodic pulses in iron, manganese and EC in surface water systems, as has been observed as a result of previous longwall mining.</p>	<p>Project sediment controls for surface disturbance activities would be designed consistent with <i>Managing Urban Stormwater Soils and Construction – Volume 2E – Mines and Quarries</i> (DECC, 2008).</p> <p>While there has been no measurable effect on water quality in Special Catchment Areas dams as a result of localised, episodic pulses in iron, manganese and EC from longwall mining in the past, IMC proposes to fund water quality improvement actions such as transfer of 20 ha of IMC-owned land within the Metropolitan Special Area to WaterNSW and fire management measures (e.g. slashing) and maintenance of unsealed roads as part of the Project.</p> <p>These actions for the Project would be additional to those already proposed and funded annually by WaterNSW and would target reduced sedimentation in the Special Catchment Areas. This would result in material improvements to water quality within the Special Catchment Areas, as the measures are consistent with WaterNSW's planned management works.</p>	<p>Notwithstanding the Project's declaration as SSI, it is considered the Project would have a net beneficial effect on water quality in the Special Catchment Areas, consistent with Chapter 8 of the Biodiversity and Conservation SEPP and the DPE's and IPC's conclusions regarding the previous application (Section 7).</p>
Potential subsidence impacts on water supply infrastructure.		
<p>Mine subsidence can adversely impact surface infrastructure, including water supply infrastructure maintained by WaterNSW.</p>	<p>The longwall layout proposed for the Project (Section 4) has been designed with a number of longwall mine constraints to minimise potential impacts, including minimum 1,000 m setback from the existing Avon Dam wall and a minimum 300 m longwall setback from the FSL of Avon Dam.</p> <p>Approval from Dams Safety NSW would be required for any Project mining within the Dams Safety NSW Notification Area associated with the existing Avon Dam.</p>	<p>No material subsidence impacts on existing WaterNSW water supply infrastructure are predicted to occur due to the Project (Section 7).</p>

Table 8-2
Key Potential Impacts and Associated Project Outcomes – Biodiversity and Aboriginal Heritage Values

Summary of Potential Impact Mechanism	Summary of Mitigation Measures	Project Outcome Summary
Potential impacts on upland swamp drying and wetting cycles.		
Project mine subsidence may result in changes to upland swamp hydrology for upland swamps within 60 m of the longwalls (i.e. longer dry periods due to an increased rate of water level recession following rainfall). Upland swamps include TECs and provide habitat for threatened fauna species.	<p>The Swamp Offset Policy (OEH, 2016a) provides the framework for offsetting residual impacts to swamps from longwall mining.</p> <p>Many upland swamps overlying Area 5 currently experience natural drying and wetting cycles (Appendix D). Based on monitoring data from previously mined beneath upland swamps at Dendrobium Mine (and other mining operations in the Southern Coalfield), changes in swamp hydrology as a result of subsidence are not expected to result in significant changes to the extent of upland swamp vegetation and species composition (Appendix D).</p> <p>Notwithstanding, predicted impacts to upland swamps due to the Project subsidence would be offset via the Project biodiversity offset strategy (Section 7). IMC would offset potential subsidence impacts to TECs associated with upland swamps, as well as offsets for threatened fauna species for which the upland swamps provide habitat (Section 7).</p>	Potential Project subsidence impacts on upland swamps and associated potential habitat effects would be offset consistent with NSW and Commonwealth Government policies.
Potential impacts on riparian and aquatic values due to alteration of surface water flows.		
Project mine subsidence may result in changes to stream hydrology overlying the longwalls (e.g. recession of pools following rainfall) with potential impacts on aquatic ecology habitat values and associated threatened fauna species.	<p>The proposed longwalls are located at a minimum longwall mining distance of 400 m from named streams (the Avon River and Donalds Castle Creek are located at distances of 900 m and 700 m, respectively, while the Cordeaux River and Wongawilli Creek are located more than 1.9 km from the proposed longwalls) (Appendix A).</p> <p>The Project also does not directly mine beneath 3rd order and above streams and avoids direct mining beneath mapped "key stream features" overlying the Project underground mining Area 5 through implementation of setbacks.</p> <p>Significant Project impacts on aquatic ecology are predicted to be unlikely (Appendix E). Notwithstanding, impacts on threatened biodiversity in all streams that are predicted to be adversely impacted would be offset in accordance with the BC Act (Sections 4 and 7).</p> <p>IMC would implement remediation measures to mitigate physical damage to the streams, where it is practicable to do so, where monitoring indicates that subsidence-related impacts have occurred to key stream features (i.e. named watercourses and key stream features).</p>	Potential Project subsidence impacts on aquatic ecology values and associated potential habitat effects would be offset consistent with NSW and Commonwealth Government policies.
Potential impacts of direct land disturbance on biodiversity and heritage values.		
Project surface development works within the Sydney Drinking Water Catchment may impact on the largely undisturbed biodiversity values associated with these protected areas.	<p>Additional Project surface infrastructure has been preferentially sited in close proximity to or within existing fire trails to minimise land disturbance, and designed to particularly avoid potential disturbance of mapped TECs and upland swamps (Appendix D and Section 7).</p> <p>Notwithstanding, predicted impacts on biodiversity from surface disturbance activities would be offset in accordance with the BC Act.</p>	Potential Project surface disturbance impacts on biodiversity would be offset consistent with NSW and Commonwealth Government policies.
Potential subsidence impacts on Aboriginal heritage values.		
Mine subsidence can adversely impact on the largely undisturbed Aboriginal heritage values associated with the Metropolitan Special Area.	<p>Proposed surface infrastructure for the Project has been designed to avoid all known Aboriginal heritage sites and natural landscape features.</p> <p>The Aboriginal heritage sites directly mined beneath by the Project are all classed as low scientific significance. The Aboriginal heritage sites assessed as having moderate or high scientific significance would not be directly mined beneath by the Project.</p> <p>If the Project is approved, IMC would continue to undertake further engagement with Aboriginal stakeholders that may hold knowledge regarding cultural values in the vicinity of the Project.</p>	An AHMP would be developed for the Project in consultation with the registered Aboriginal parties and the relevant government agencies (e.g. Heritage NSW) to manage potential impacts on Aboriginal heritage values.

Table 8-3
Key Potential Impacts and Associated Project Outcomes – Amenity

Summary of Potential Impact Mechanism	Summary of Mitigation Measures	Project Outcome Summary
<i>Potential amenity impacts of the continuation of Dendrobium Mine surface facilities.</i>		
<p>The Project proposes only minor changes to the currently approved and operating surface facilities of Dendrobium Mine (Section 4).</p> <p>Existing amenity impacts associated with the operation of these facilities would be extended from 2030 to 2041 for the Project.</p> <p>These primarily comprise ongoing Dendrobium Mine:</p> <ul style="list-style-type: none"> • rail noise; • operational noise; • dust emissions; and • road transport noise. 	<p>IMC would continue and extend the current mitigation and monitoring framework for the management of amenity impacts from Dendrobium Mine surface facilities as described in the current and proposed environmental management plans, including the:</p> <ul style="list-style-type: none"> • TMP; • Dendrobium Mine Driver's Code of Conduct; • NMP; and • AQGGMP. <p>IMC would also continue the application of restricted rail haulage operating hours for the Kemira Valley Rail Line (between 6.00 am and 11.00 pm) and, where reasonable and feasible, would implement further progressive rail noise mitigation measures over the life of the Project.</p>	<p>Existing amenity impacts associated with the operation of Dendrobium Mine surface facilities would continue under the Project.</p> <p>IMC would comply with the requirements and criteria stipulated in the Infrastructure Approval, should the Project be approved.</p>

Table 8-4
Key Potential Impacts and Associated Project Outcomes – Indirect Impacts

Summary of Potential Impact Mechanism	Summary of Mitigation Measures	Project Outcome Summary
<i>Potential impacts of greenhouse gas emissions, plus greenhouse gas emissions from the end use of Project coal.</i>		
<p>The Project's contribution to global climate change effects would be proportional to its contribution to global greenhouse gas emissions.</p> <p>Greenhouse gases directly generated at the Project (i.e. Scope 1 emissions) and indirect emissions associated with the on-site use of fuel and electricity (i.e. Scope 2 emissions) have together been estimated at an annual average (during Area 5 longwall mining) of approximately 0.5 Mt CO₂-e per year to 1.8 Mt CO₂-e per year during operations (the range indicates a dependency on the proportion of MVA that is vented/flared, respectively) (Section 7).</p> <p>In addition to Scope 1 and 2 emissions for the Project, the Scope 3 emissions for the Project from upstream and downstream sources will also contribute to global greenhouse gas emissions. The majority of Scope 3 emissions from the Project relate to the downstream use of Project metallurgical coal in the manufacture of steel, in both Australia (at the Port Kembla Steelworks or Whyalla Steelworks) and overseas.</p>	<p>South32 has set a group-level medium-term target to halve its operational Scope 1 and Scope 2 emissions by 2035. South32 is investing in efficiency projects, applying low carbon design principles and evaluating carbon reduction technologies to achieve this goal.</p> <p>IMC's greenhouse gas mitigation strategy is focused on reducing fugitive emissions by increasing the efficiency of gas drainage and assessing technologies for reducing ventilation air methane.</p> <p>The Project's direct (Scope 1) greenhouse gas emissions would, therefore, be minimised as far as possible in particular through maximising gas flaring (predicted to reduce total Scope 1 emissions by approximately 31% over the life of the Project).</p> <p>Further opportunities to maximise gas capture via pre-drainage and management of goaf gas would be investigated, and implemented if technically feasible and commercially viable.</p> <p>Project-specific greenhouse gas minimisation measures would be described in an AQGGMP for the Project.</p>	<p>Scope 1 greenhouse gas emissions from the Project would be minimised as far as reasonable and feasible.</p> <p>The Project's contribution to global climate change effects would be proportional to its contribution to global greenhouse gas emissions.</p>

The Economic Assessment indicates the Project would result in a total net benefit to the NSW economy of \$649 million in NPV terms, inclusive of estimated costs for environmental externalities and internalisation of environmental management costs by IMC (Appendix L).

This net benefit includes some \$293 million in total direct benefits to NSW in NPV terms, comprising (Appendix L):

- \$35 million of net producer surplus attributable to NSW;
- \$82 million in company tax attributable to NSW; and
- \$177 million paid to the NSW and local governments, in the way of coal royalties, payroll tax, land taxes and council rates.

In addition to the direct economic impacts, it is estimated the Project would generate \$364 million in indirect economic impacts in NPV terms, comprising (Appendix L):

- a Project increase in worker benefit for the NSW economy of \$231 million; and
- a Project net supplier benefit for the NSW economy of \$133 million.

Further, Project coal production would continue to contribute to the continuation of manufacturing operations at the Port Kembla Steelworks and Liberty Primary Steel Whyalla Steelworks, the operation of the PKCT, NSW export income and industry in other countries that purchase Project product coal.

8.6 ASSESSMENT OF THE PROJECT AGAINST THE OBJECTS OF THE EP&A ACT AND ECOLOGICALLY SUSTAINABLE DEVELOPMENT CONSIDERATIONS

8.6.1 Consideration of the Project against the Objects of the EP&A Act

The SEARs (Section 1.3) require consideration of the consistency of the Project against the objects of the EP&A Act. Section 1.3 of the EP&A Act describes the objects of the EP&A Act as follows:

- (a) *to promote the social and economic welfare of the community and a better environment by the proper management, development and conservation of the State's natural and other resources,*

- (b) *to facilitate ecologically sustainable development by integrating relevant economic, environmental and social considerations in decision-making about environmental planning and assessment,*
- (c) *to promote the orderly and economic use and development of land,*
- (d) *to promote the delivery and maintenance of affordable housing,*
- (e) *to protect the environment, including the conservation of threatened and other species of native animals and plants, ecological communities and their habitats,*
- (f) *to promote the sustainable management of built and cultural heritage (including Aboriginal cultural heritage),*
- (g) *to promote good design and amenity of the built environment,*
- (h) *to promote the proper construction and maintenance of buildings, including the protection of the health and safety of their occupants,*
- (i) *to promote the sharing of the responsibility for environmental planning and assessment between the different levels of government in the State,*
- (j) *to provide increased opportunity for community participation in environmental planning and assessment.*

The Project is considered to be generally consistent with the objects of the EP&A Act, as:

- The Project would continue to facilitate local and regional employment and economic development opportunities (Appendix K).
- The Project would continue to develop the State's mineral resources (i.e. coal resources) and coexist with the local community, as well as with the wider land uses within the region.
- The Project would incorporate relevant ESD considerations (Section 8.6.3).
- Mining operations and nearby land uses, such as state conservation areas and suburban areas, have historically co-existed and this would continue for the Project; therefore, the Project would not adversely impact, or be inconsistent with, adjoining land uses.
- The Project would incorporate a range of measures for the protection of the environment, including the protection of native plants and animals, threatened species, and their habitats (Section 7).

- The Project includes Aboriginal and historic heritage assessments, which identify avoidance measures and suitable management and mitigation measures for potential direct and indirect impacts of the Project (Section 7 and Appendices F and G).
- The Project would largely utilise the existing surface infrastructure of Dendrobium Mine. However, surface disturbance for additional built infrastructure such as ventilation shafts and supporting infrastructure would be minimised as far as practicable and infrastructure would utilise materials coloured similar to surrounding vegetation (e.g. to minimise potential visual impacts).
- A PHA has been conducted to assess the potential hazards associated with the Project (Section 7 and Appendix N), and existing Occupational Health and Safety measures would continue to be employed for the Project.
- The Project would be determined by the Minister; however, a wide range of stakeholders have been consulted throughout the assessment process.
- The Project would be developed in a manner that incorporates community engagement through the EIS consultation program (Section 6 and Appendix K) and engagement undertaken for the previous application, as well as the public exhibition of the EIS document and the major project assessment process.

8.6.2 Consideration of the Project against the Objects of the EPBC Act

Section 3 of the EPBC Act describes the objects of the EPBC Act as follows:

- (a) *to provide for the protection of the environment, especially those aspects of the environment that are matters of national environmental significance; and*
- (b) *to promote ecologically sustainable development through the conservation and ecologically sustainable use of natural resources; and*
- (c) *to promote the conservation of biodiversity; and*
- (ca) *to provide for the protection and conservation of heritage; and*

- (d) *to promote a co-operative approach to the protection and management of the environment involving governments, the community, land-holders and indigenous peoples; and*
- (e) *to assist in the co-operative implementation of Australia's international environmental responsibilities; and*
- (f) *to recognise the role of indigenous people in the conservation and ecologically sustainable use of Australia's biodiversity; and*
- (g) *to promote the use of indigenous peoples' knowledge of biodiversity with the involvement of, and in co-operation with, the owners of the knowledge.*

The Project is considered to be generally consistent with the objects of the EPBC Act, as:

- The Project incorporates measures to protect the environment (including aspects of the environment that are of national significance), via the Project design (Section 4) and the application of mitigation, offsets and other measures (Section 7).
- The Project would continue to develop the State's mineral resources (i.e. coal resources) while incorporating relevant ESD considerations (Section 8.6.3).
- The Project includes a BDAR and Aquatic Ecology Assessment and a strategy to offset unavoidable impacts on ecology and other compensatory measures (Section 7 and Appendices D and E).
- The Project is not expected to have a significant impact on water resources, on the basis that:
 - reductions in yields in the Special Catchment Areas due to the Project are predicted to be negligible (and IMC would provide offsets in the form of a planning agreement with the NSW Government to pay for predicted surface water losses during and post-mining) (Appendix C);
 - predicted impacts to water quality in the Special Catchment Areas dams and downstream take-off point are predicted to be negligible (and the Project proposes water quality offset measures in the form of a planning agreement with the NSW Government to account for any small, localised water quality impacts resulting from mine subsidence) (Appendix C);

- “minimal impact” to groundwater (as defined in the NSW AIP) is predicted (Appendix B);
- based on monitoring data from previously mined beneath upland swamps at Dendrobium Mine (and other mining operations in the Southern Coalfield), changes in upland swamp hydrology as a result of subsidence are not expected to result in significant changes to the extent of upland swamp vegetation and species composition (Appendix D); and
- significant impacts on aquatic ecology are predicted to be unlikely (Appendix E).
- The Project includes Aboriginal and historic heritage assessments, which identify relevant cultural values, avoidance measures and suitable management and mitigation measures for potential direct and indirect impacts of the Project (Section 7 and Appendices F and G).
- The Project would be developed in a manner that incorporates engagement from the community, landholders and Indigenous peoples through the EIS consultation program (Section 6) and for the previous application, the public exhibition of the EIS document and the assessment process.
- The Project includes consideration of IMC’s contribution to maintaining Australia’s international environmental responsibilities and the potential impacts on these matters (e.g. consideration of greenhouse gas emissions).

8.6.3 Ecologically Sustainable Development Considerations

Background

The concept of sustainable development came to prominence at the World Commission on Environment and Development (1987), in the report titled *Our Common Future*, which defined sustainable development as:

Development that meets the needs of the present without compromising the ability of future generations to meet their own needs.

In recognition of the importance of sustainable development, the Commonwealth Government developed a *National Strategy for Ecologically Sustainable Development* (NSED) (Commonwealth of Australia, 1992) that defines ESD as:

using, conserving and enhancing the community’s resources so that ecological processes, on which life depends, are maintained, and the total quality of life, now and in the future, can be increased.

The NSED was developed with the following core objectives:

- *to enhance individual and community well-being and welfare by following a path of economic development that safeguards the welfare of future generations;*
- *to provide for equity within and between generations; and*
- *to protect biological diversity and maintain essential processes and life support systems.*

Australia’s commitment to the principles of ESD is considered in the EPBC Act, which defines the principles of ESD as:

- (a) *decision-making processes should effectively integrate both long-term and short-term economic, environmental, social and equitable considerations;*
- (b) *if there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation;*
- (c) *the principle of inter-generational equity - that the present generation should ensure that the health, diversity and productivity of the environment is maintained or enhanced for the benefit of future generations;*
- (d) *the conservation of biological diversity and ecological integrity should be a fundamental consideration in decision-making;*
- (e) *improved valuation, pricing and incentive mechanisms should be promoted.*

For the purposes of this EIS, the relevant definition of ESD is that found in section 6(2) of the NSW *Protection of the Environment Administration Act 1991*, which is the definition adopted by the EP&A Act. This definition provides as follows:

Ecologically sustainable development requires the effective integration of social, economic and environmental considerations in decision-making processes. Ecologically sustainable development can be achieved through the implementation of the following principles and programs:

(a) *the precautionary principle – namely, that if there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation.*

In the application of the precautionary principle, public and private decisions should be guided by:

(i) *careful evaluation to avoid, wherever practicable, serious or irreversible damage to the environment, and*

(ii) *an assessment of the risk-weighted consequences of various options.*

(b) *inter-generational equity – namely, that the present generation should ensure that the health, diversity and productivity of the environment are maintained or enhanced for the benefit of future generations,*

(c) *conservation of biological diversity and ecological integrity – namely, that conservation of biological diversity and ecological integrity should be a fundamental consideration,*

(d) *improved valuation, pricing and incentive mechanisms – namely, that environmental factors should be included in the valuation of assets and services, such as:*

(i) *polluter pays – that is, those who generate pollution and waste should bear the cost of containment, avoidance or abatement,*

(ii) *the users of goods and services should pay prices based on the full life cycle of costs of providing goods and services, including the use of natural resources and assets and the ultimate disposal of any waste,*

(iii) *environmental goals, having been established, should be pursued in the most cost effective way, by establishing incentive structures, including market mechanisms, that enable those best placed to maximise benefits or minimise costs to develop their own solutions and responses to environmental problems.*

Consideration of Ecologically Sustainable Development for the Project

Project design, planning and assessment have been carried out applying the principles of ESD, through:

- incorporation of risk assessment and analysis at various stages in the Project design and environmental assessment and within decision-making processes;
- adoption of high standards for environmental and occupational health and safety performance;
- consultation with regulatory and community stakeholders; and
- optimisation of the potential economic benefits to the community arising from the development of the Project.

Assessment of potential medium-term and long-term impacts of the Project was carried out during the preparation of this EIS on aspects of surface water and groundwater, transport movements, air quality emissions (including greenhouse gas emissions), noise emissions, aquatic and terrestrial ecology, heritage and socio-economics.

The Project design takes into account biophysical considerations, including the principles of ESD as defined in section 6(2) of the *Protection of the Environment Administration Act 1991*.

In addition, it can be demonstrated that the Project can be operated in accordance with ESD principles through the application of mitigation measures, compensatory measures and offset measures that have been developed based on conservative impact assumptions for the Project.

As IMC has re-designed the Project in consideration of the feedback received on the previous application to reduce the overall extent and, therefore, associated impacts, it is considered the Project would meet the principles of ESD.

The following sub-sections describe the consideration and application of the principles of ESD to the Project.

Precautionary Principle

Environmental assessment involves predicting the likely environmental outcomes of a development. The precautionary principle reinforces the need to take risk and uncertainty into account, especially in relation to threats of irreversible environmental damage.

An ERA (Appendix M) and PHA (Appendix N) were conducted to identify Project-related risks and develop appropriate mitigation measures and strategies.

The PHA considers off-site risks to people, property and the environment (in the presence of controls) arising from atypical and abnormal hazardous events and conditions (i.e. equipment failure, operator error and external events).

The ERA addressed potential environmental impacts associated with the Project, including long-term effects. In addition, potential long-term risks are considered by the specialist studies conducted in support of this EIS (Section 1.4).

In the Groundwater, Surface Water and Economic Assessments (Appendices B, C and L), risk and uncertainty have also been taken into account through sensitivity and/or uncertainty analysis.

Findings of these specialist assessments are presented in Section 7 and relevant appendices. Measures designed to mitigate potential environmental impacts arising from the Project are also described in Section 7, and summarised in Attachment 10.

The specialist assessments, PHA and ERA have evaluated the potential for harm to the environment associated with the development of the Project. A range of mitigation measures have been adopted as components of the Project design to minimise the potential for serious and/or irreversible damage to the environment, including the development of environmental management and monitoring programs, compensatory measures and ecological offsets based on conservative assumptions. Where residual risks are identified, contingency controls have been considered (Attachment 10).

In addition, for key Project environmental assessment studies and aspects (i.e. Subsidence Assessment [Appendix A], Groundwater Assessment [Appendix B] and predicted greenhouse gas emissions and proposed mitigation measures [Appendix I]), peer review by recognised experts was undertaken (Attachment 5).

IMC would undertake geological investigations such as in-seam drilling as a component of the ongoing mining operation to identify geological features that may be of relevance to the refinement of Project subsidence predictions and/or mine design to maintain environmental performance consistent with the Project as approved. These investigations would help to manage the risk of unexpected outcomes in regard to potential surface water and/or groundwater impacts, associated potential impacts to water-dependent ecology and potential impacts on water-harvesting infrastructure, and therefore, increase the level of certainty that predictions of environmental impacts would not be exceeded.

The approach with respect to the management of subsidence effects on surface features (such as infrastructure and cliffs) within the extent of the proposed mining areas, which provides for the implementation of additional response and contingency measures in the event that the impacts being observed exceed approved thresholds, also provides increased certainty that the environmental outcomes predicted in this EIS would be achieved (Section 7).

Social Equity

Social equity is defined by inter-generational and intra-generational equity. Inter-generational equity is the concept that the present generation should ensure that the health, diversity and productivity of the environment are maintained or enhanced for the benefit of future generations, while intra-generational equity is applied within the same generation.

The principles of social equity are addressed through:

- assessment of the social and economic impacts of the Project (Appendices K and L, and Section 7), including the distribution of impacts between stakeholders and consideration of the potential social and economic costs of climate change;
- management measures to be implemented in relation to the potential impacts of the Project on water resources, heritage, land resources, noise, air quality, ecology, transport, hazards and risks, greenhouse gas emissions and socio-economics (Section 7);

- implementation of environmental management and monitoring programs (Section 7) to minimise potential environmental impacts (which include environmental management and monitoring programs covering the Project life); and
- implementation of measures during the life of the Project to offset potential localised impacts that have been identified for the development (Section 7).

The Project would benefit current and future generations through the continuation of Dendrobium Mine employment (up to an additional 100 people during Project construction and employment to some 700 operational staff during peak Project operations). Flow-on employment effects in the region would also be significant (Appendix K).

Economic benefits potentially forgone if the Project does not proceed amounts to a net benefit of \$649 million in NPV terms to the State of NSW and \$264 million in NPV terms to the greater Wollongong Region (Appendix L). This includes an estimated \$177 million in royalties, payroll tax and council values in NPV terms.

The Project incorporates a range of mitigation measures to minimise potential impacts on the environment; the costs of these measures would be met by IMC and have been included in the Economic Assessment (Appendix L). The potential benefits to current and future generations have, therefore, been calculated in the context of the mitigated Project.

Project benefits would also flow to sectors such as steel manufacturing that use metallurgical coal as key inputs to the manufacturing process.

Various mines in the Illawarra Region, including IMC's operations, supply coal to the Port Kembla Steelworks. The proximity of the Southern Coalfield metallurgical coal mines is a major factor in the Port Kembla Steelwork's ability to make steel economically.

Conservation of Biological Diversity and Ecological Integrity

Biological diversity or "biodiversity" is considered to be the number, relative abundance, and genetic diversity of organisms from all habitats (including terrestrial, marine and other aquatic ecosystems, and the ecological complexes of which they are a part), and includes diversity within species and between species as well as diversity of ecosystems (Lindenmayer and Burgman, 2005).

For the purposes of this EIS, ecological integrity has been considered in terms of ecological health and ecological values.

The Infrastructure Application Area includes extensive areas with recognised ecological values, which include the presence of threatened fauna species as well as TECs (Section 7). The environmental assessments in Sections 7.7 to 7.9 (and Appendices D and E) describe the potential impacts of the Project on the biological and ecological environment and associated Project mitigation and the indicative offset strategy.

Greenhouse Gas Emissions and Biological Diversity and Ecological Integrity

Dendrobium Mine is an existing contributor to NSW and Australian greenhouse gas emissions, and this would continue to be the case for the Project (Appendix R and Section 7).

Many natural ecosystems are considered to be vulnerable to climate change. Patterns of temperature and precipitation are key factors affecting the distribution and abundance of species (Preston and Jones, 2005). Projected changes in climate will have diverse ecological implications. Habitat for some species will expand, contract and/or shift with the changing climate, resulting in habitat losses or gains, which could prove challenging, particularly for species that are threatened.

Anthropogenic Climate Change is listed as a key threatening process under the BC Act, and loss of climatic habitat caused by anthropogenic emissions of greenhouse gases is listed as a key threatening process under the EPBC Act.

It is acknowledged that (subject to the efficacy of national and international greenhouse gas abatement measures) all sources of greenhouse gas emissions in NSW, irrespective of their scale, will contribute in some way towards the potential global, national, state and regional effects of climate change.

The Project greenhouse gas emissions would make some contribution to global greenhouse gas emissions. The Project's contribution to climate change, including the associated environmental impacts, would be in proportion with its contribution to global greenhouse gas emissions.

In addition to Scope 1 and 2 emissions for the Project, the Scope 3 emissions for the Project from upstream and downstream sources would also contribute to global greenhouse gas emissions. The majority of Scope 3 emissions from the Project relate to the downstream use of Project metallurgical coal in the manufacture of steel, in both Australia (at the Port Kembla Steelworks or Whyalla Steelworks) and overseas.

Scope 3 emissions from the use of Project coal in overseas customer countries would be managed in accordance with customer countries' commitments under the *Paris Agreement* (detailed in Appendix R) and would not contribute to Australian greenhouse gas emissions or factor into Australian greenhouse gas reduction targets.

Project product coal sold on the domestic market (e.g. to Port Kembla Steelworks) would likely be substituting or augmenting supply from existing coal sources. It is, therefore, anticipated that these emissions would not increase Australia's current greenhouse gas emissions.

If the Project does not proceed, global demand for coal/steel may be satisfied by other sources and, therefore, there would not be a corresponding reduction in global greenhouse emissions in the atmosphere. The Project's relatively low greenhouse gas emissions intensity means that it would remain competitive in the global coal market. If the Project does not proceed, and therefore does not produce high-quality metallurgical coal, the existing and future demand for coal is likely to be satisfied by lower-quality (and thus more emissions-intensive) coal, which would result in higher greenhouse gas emissions.

Potential environmental costs associated with Project greenhouse gas emissions have also been considered in the Economic Assessment (Appendix L).

Measures to Maintain or Improve the Biodiversity Values of the Surrounding Region

A range of measures would be implemented for the Project to maintain or improve biodiversity values of the region in the medium to long term. As summarised below and detailed in Sections 7.7 to 7.9, these measures include impact avoidance, minimisation, mitigation and offsets (for residual impacts).

IMC has well established and accepted management practices for operating an underground coal mine in the same environment as the Project. These include minimising access and disturbance (i.e. through implementation of a vegetation clearance protocol), measures to limit the risk of spreading weeds and other pests, measures to reduce the risk of bushfires from surface facilities (e.g. enclosed flaring of gas), speed limits to reduce vehicle strike, measures to limit noise and lighting impacts to fauna, etc.

The design and location of surface facilities required for the Project have been through a design process to avoid and/or reduce impacts to biodiversity values. This includes avoidance (as far as practicable) of TECs and threatened fauna habitat, as well as minimisation of disturbance footprint and re-design of the infrastructure layout to avoid threatened flora and fauna values. Upland swamp communities have been avoided for all Project-related surface facilities and their supporting infrastructure (e.g. power supply and access tracks).

IMC has continued its existing company-wide avoidance commitments relating to longwall designs and natural features. These include various commitments relating to biodiversity as described in Attachment 10.

Residual impacts of the Project to biodiversity would be provided for through biodiversity offsets. All residual impacts have been conservatively assessed and an offset strategy would be implemented as part of the Project to maintain or improve biodiversity value of the region in the medium to long term.

Further detail on the management of potential biodiversity impacts is provided in Sections 7.7 to 7.9.

Valuation

One of the common broad underlying goals or concepts of sustainability is economic efficiency, including improved valuation of the environment. Resources should be carefully managed to maximise the welfare of society, both now and for future generations.

In the past, some natural resources have been misconstrued as being free or underpriced, leading to their wasteful use and consequent degradation. Consideration of economic efficiency, with improved valuation of the environment, aims to overcome the underpricing of natural resources and has the effect of integrating economic and environmental considerations in decision-making, as required by ESD.

While environmental costs have been considered to be external to Project development costs historically, improved valuation and pricing methods attempt to internalise environmental costs and include them within Project costing.

The Economic Assessment (Appendix L) has incorporated environmental values via direct valuation where practicable (e.g. greenhouse gas emissions of the Project). Furthermore, wherever possible, direct environmental effects of the Project would be internalised through the adoption and funding of mitigation measures by IMC to mitigate potential environmental impacts (e.g. biodiversity offset costs, infrastructure management costs).

Furthermore, the valuation of environmental costs for the Project has adopted a methodology that is generally consistent with the valuation undertaken for the previous application.

Greenhouse gases directly generated by the Project (i.e. Scope 1 emissions) are estimated to be approximately 0.4 to 1.7 Mt CO₂-e per year (during Area 5 longwall mining), depending on the proportion of MVA that is vented/flared (Appendix R). Indirect emissions associated with the on-site use of fuel and electricity (i.e. Scope 2 emissions) are estimated on average to be 0.07 Mt CO₂-e per year (Appendix R). Greenhouse gas minimisation measures are described in Section 7.21.5 and Appendix R.

The Economic Assessment in Appendix L indicates a net benefit (i.e. net of the value of externalities including Scope 1 and 2 greenhouse gas emissions) of \$649 million in NPV terms to the State of NSW and \$264 million in NPV terms to the greater Wollongong region would be forgone if the Project is not implemented. This includes an estimated \$176 million in royalties, payroll tax and council values in NPV terms.

While the value of externalities from indirect (Scope 3) greenhouse gas emissions are not considered in the net benefit to NSW, neither are the economic benefits associated with the ongoing use of this coal for steelmaking and other uses, which have been recognised as significant to the Illawarra Region and Australia (Commonwealth of Australia, 2017a).

Scope 3 greenhouse gas emissions that may be emitted by other parties, namely from the use of the product coal produced by the Project, are considered in this EIS. On average, over the life of Project, the indirect (i.e. Scope 3) emissions from these activities are estimated to be approximately 9.2 Mt CO₂-e per year (Appendix R), with a proportion of these global Scope 3 emissions occurring directly in NSW (e.g. Port Kembla Steelworks) and Australia (e.g. Liberty Primary Steel Whyalla Steelworks).

These (typically manufacturing-related) greenhouse gas emissions are currently occurring at facilities such as the Port Kembla Steelworks and are, therefore, already accounted for in NSW's and Australia's current greenhouse gas emission estimates. These emissions, therefore, form part of the existing Australian greenhouse gas emission estimates that are being considered by State and Federal Governments when developing greenhouse gas abatement mechanisms to meet Australia's international greenhouse gas abatement obligations (e.g. under the *Paris Agreement*).

8.7 CONCLUSION

The Project is a continuation of the existing approved Dendrobium Mine that would comply with applicable statutory requirements and relevant strategic and statutory planning policy objectives (Sections 2 and 5 and Attachments 6 and 7).

This would provide for the continuation of employment of the existing Dendrobium Mine workforce of approximately 650 personnel, with approximately 50 additional operational jobs generated by the Project and approximately 100 additional jobs generated during surface facility construction and longwall development activities. It would also continue to support the financial sustainability of IMC and the broader Southern Coalfield economic ecosystem.

There is currently no economically viable, commercial-scale alternative to the use of metallurgical coal in making steel using the blast furnace method, which is employed at the Port Kembla Steelworks. The proximity of the Southern Coalfield metallurgical coal mines is a major factor in BlueScope's ability to make steel economically.

Engagement with members of the public and key Government agencies has informed IMC's design of the Project, including adoption of a range of avoidance measures to minimise impacts on named watercourses, mapped key stream features and existing WaterNSW water supply infrastructure.

IMC would apply offsets or other Project-specific measures to address key residual impacts on biodiversity, catchment yield and water quality (Tables 8-1 and 8-2 and Section 7).

The site is suitable for the proposed Project use, as underground coal mining by longwall methods is compatible with the catchment area status of much of the site and the Project would generate a significant net benefit to the State of NSW (Section 7 and Appendix L).

Economic benefits potentially forgone if the Project does not proceed amounts to a net benefit of \$649 million in NPV terms to the State of NSW and \$264 million in NPV terms to the greater Wollongong region (Appendix L). This includes an estimated \$176 million in royalties, payroll tax and council values in NPV terms.

IMC has re-designed the Project in consideration of the advice received by the IAPUM and IPC, to reduce the overall footprint in comparison to the previous application by 60%, thereby reducing potential impacts, including a 78% reduction in predicted peak annual surface water losses, while also allowing for significant benefits to the greater Wollongong region and the State of NSW.

IMC is committed to the sustainable development of natural resources and to successful environmental management. IMC believes the Project strikes the right balance of developing the resources the world needs, while minimising environmental impacts, and is in the public interest.