Hera Resources Pty Ltd

Federation Project

Environmental Impact Statement

Chapter 2

Strategic Context

2. Strategic Context

2.1 Overview

This section describes the local and regional characteristics of the environment surrounding the Project, including justification for the Project and consideration of alternatives and cumulative impacts.

2.2 Project Justification

Mining at the Hera Mine is currently approved until December 2025. The development of the Project will allow for the continuation of mining in the local and regional area, with continued use of existing and proposed infrastructure at the Hera Mine.

The Project would generate approximately 100 jobs during construction. Operational workforce numbers would be higher than the existing Hera Mine workforce numbers (approximately 150), with approximately 200 – 250 jobs during operations. The transition of mining from Hera Mine to the Federation Site will allow for a near steady state ongoing operational workforce.

The Project will see continued benefits provided to the local, regional and wider economy with the transition of mining from Hera Mine to the Federation Site. Direct economic benefits through maintaining household incomes will be realised. Flow on effects to local business will be realised through household expenditure and generation of additional indirect jobs. The Project is also predicted to sustain and increase the current contributions provided through mining royalties to the NSW economy, with $63 M of royalties predicted over the Project life.

The June 2021 Australian Stock Exchange (ASX) Federation Mineral Resource Estimate (MRE), reports that the Federation deposit has an estimated combined Indicated and Inferred MRE totalling 5.1Mt at 5.5% Pb (lead), 9.3% Zn (zinc), 0.9g/t Au (gold), 7g/t Ag (silver) and 0.3% Cu (copper). The significance of the resource (as further discussed in **Section 10.3**) within the Federation deposit provides strong economic justification for the Project, based on global demand and supply forecasts. Total global consumption rates across all materials within the Federation deposit are forecast to increase year-on-year, bolstered by increased infrastructure spending and economic recovery efforts following COVID-19. These increases in demand relate to improvements to consumer sentiment and higher household savings relating to purchases of silver and gold jewellery, and the continued employment of silver, zinc, copper, and lead in equipment, building construction, infrastructure, transport, and industrial uses.

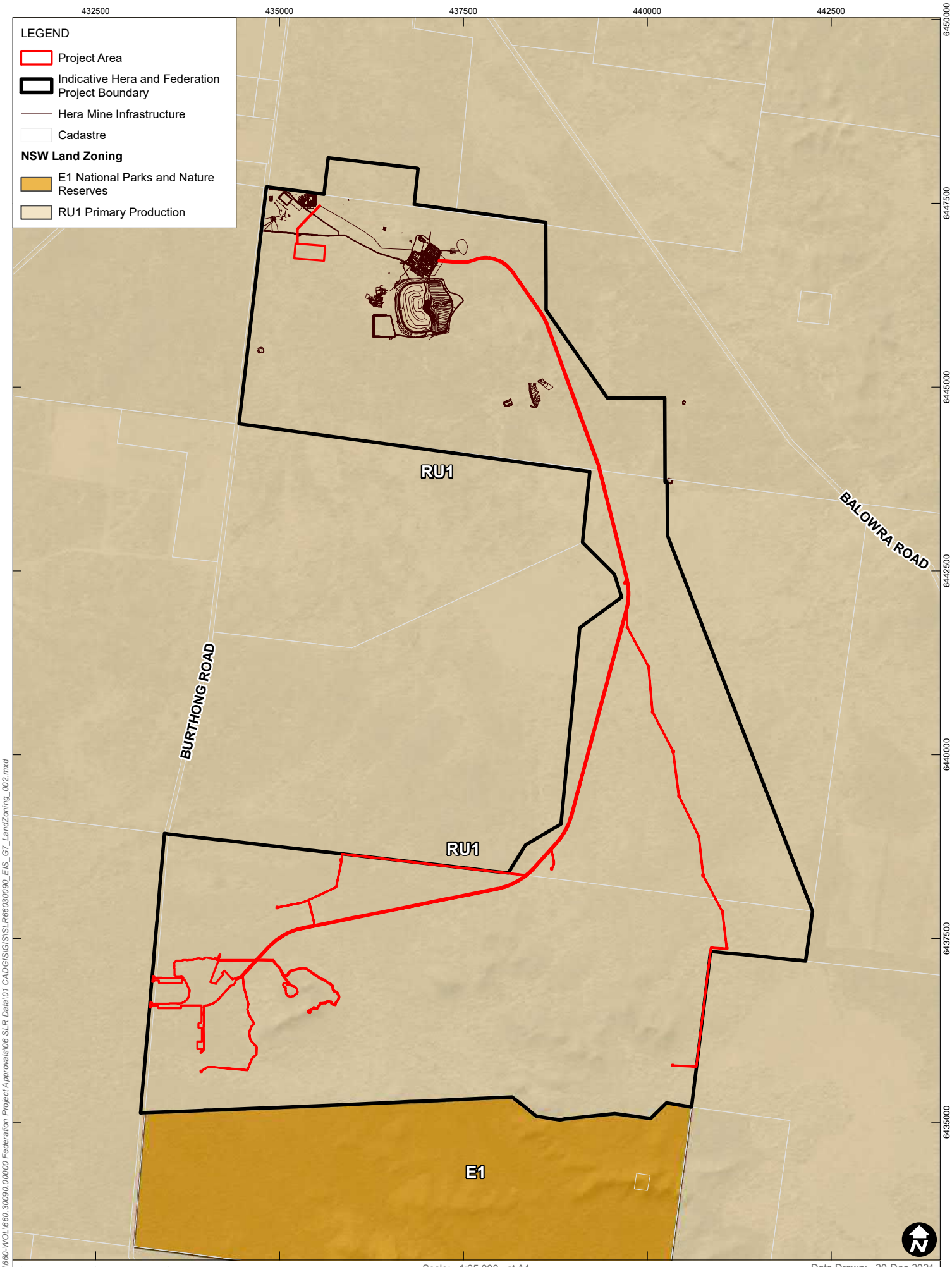
2.3 Regional Context

2.3.1 Project Location

The Federation Site is located in central-western NSW, approximately 15 km south of the Nymagee township (refer **Figure 2-1**). Nymagee is a small, rural township with approximately 20 residences, located approximately 80 km south east of Cobar.

2.3.2 Land Use

The Project is located on land zoned RU 1 – Primary Production under the *Cobar Local Environment Plan 2011,* which is identified in **Figure 2-1**. The RU1 zoning identifies development for the purpose of mining as permissible with development consent. Further discussion of development permissibility is included in **Section 6.2.2**.



Scale: 1:65,000 at A4
Coordinate System: GDA 1994 MGA Zone 55

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Project Number: 660.30090.00000

Data Source: Basedata NSW SS, 2019
Aerial imagery supplied by © Department of Customer Service 2020
Zoning - Cobar LEP 2012, Bogan LEP 2011 (DPIE, October 2019)

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LAND ZONING

FIGURE 2-1

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Within Nymagee there are a police and fire station, two churches, recreational areas, hotel, public school and residential development. Nymagee airport is located approximately 1 km to the north-west, and the racecourse is located on Rosevale Road on the northern outskirts of the town. The non-operational Nymagee Mine is located on the south-western outskirts of the town, enclosed by perimeter fencing. The area is dominated by agricultural land uses and native semi-arid woodland.

2.3.3 Local Transport Network

The Federation Site and Hera Mine are accessed via Burthong Road (Shire Road 19). Burthong Road is a local road that provides a connection between Nymagee in the north and Tallebung Road at Eremerang in the south. Burthong Road is sealed for approximately 6km south of Nymagee and unsealed over the remaining 48km. The sealed portion of Burthong Road is approximately 7m wide and allows for a single travel lane in each direction. The unsealed portion of Burthong Road generally has a wide gravel surface and follows a straight and level alignment. The road has a posted speed limit of 100km/h.

Priory Tank Road (MR461) is a regional road that provides an east-west link between Kidman Way and Nymagee. Priory Tank Road is sealed and follows a straight and level alignment with clear sight lines in both directions along Burthong Road. Kidman Way connects the Project with Cobar as well as PGM. Kidman way is a State road which forms part of a regional link through western NSW between the Mitchell Highway at Bourke and Newell Highway near Jerilderie, via Cobar, Hillston, and Griffith. Between PGM and Priory Tank Road, Kidman Way typically has a single travel lane in each direction with sealed shoulders. Kidman Way has a posted speed limit of 100km/h between Priory Tank Road and Cobar.

Whitbarrow Way (MR228) is a sealed regional road that, together with Nymagee Hermidale Road, provides a connection between Nymagee in the southwest and Hermidale in the northeast. Nymagee Hermidale Road was recently upgraded by widening, strengthening and sealing for 7km to improve safety and provide all-weather access to the Hermidale Rail Siding on the Narromine to Cobar rail line (TfNSW, 2020a). Whitbarrow Way has a posted speed limit of 100 km/h which reduces to 50 km/h in the vicinity of the Hermidale village centre.

2.4 Local Context

2.4.1 Biophysical Factors

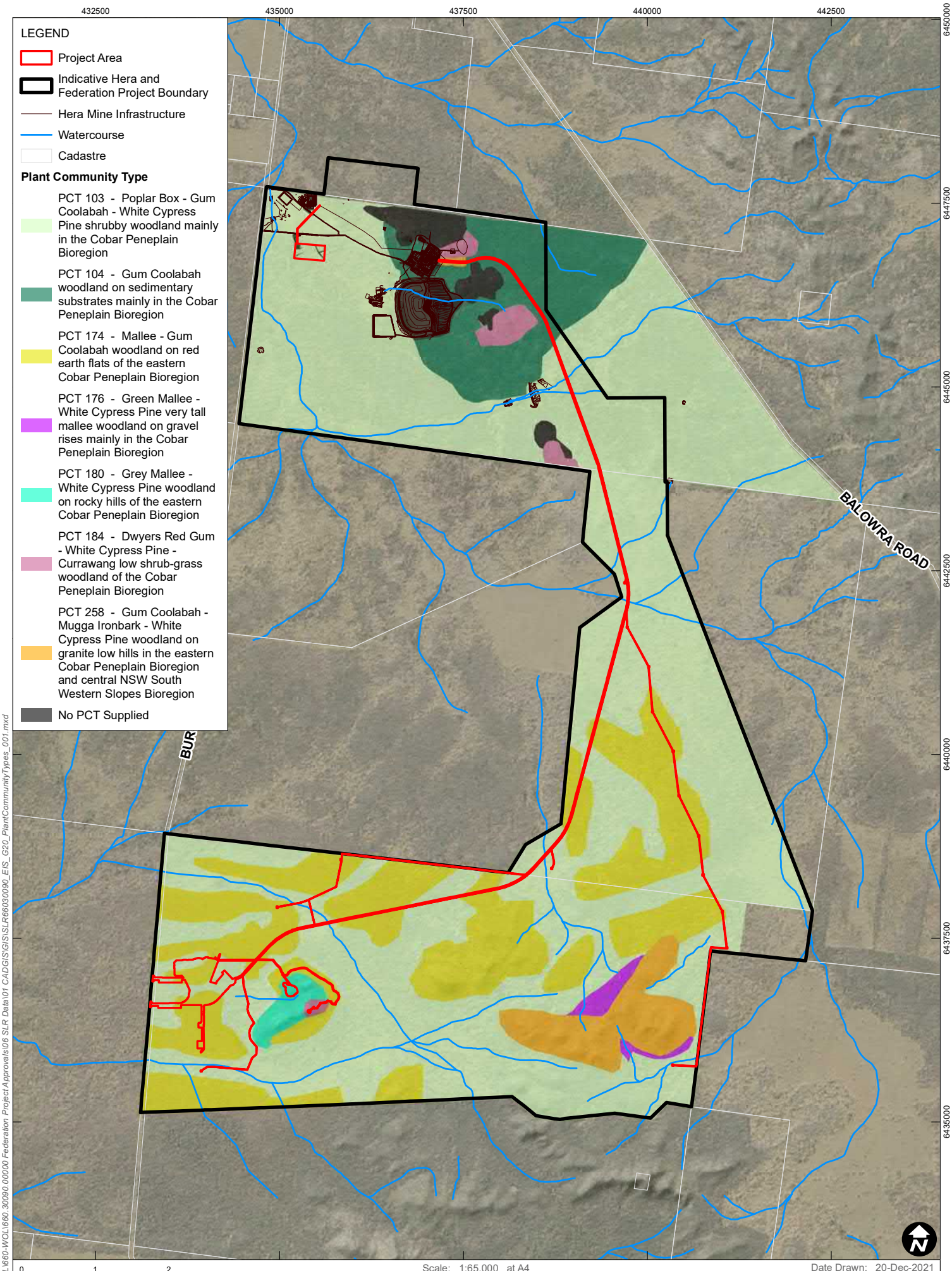
The Project is located within the Cobar Peneplain Bioregion, which is one of only two bioregions located wholly within the State of NSW. The bioregion covers an area of 7,334,664 hectares (ha) and is characterised by the presence of rolling undulating landscapes, which is distinct from the surrounding flatter floodplains associate with the Murray-Darling river systems.

2.4.1.1 Vegetation

The vegetation of the Cobar Peneplain is regionally distinctive. The bioregion is characterised by an undulating to hilly landscape with shallow, red earthsoils where the vegetation is mainly open woodlands of bimble or poplar box (*Eucalyptus populnea*), red box (*Eucalyptus intertexta*) and white cypress (*Callitris glaucophylla*) (NPWS 2003).

The Project area is comprised of predominantly woodland vegetation, which is common to the bioregion. Six Plant Community Types (PCTs) have been identified within the Project area (refer **Figure 2-2**):

- PCT174 - Mallee - Gum Coolabah woodland on red earth flats of the eastern Cobar Peneplain Bioregion;
- PCT104 - Gum Coolabah woodland on sedimentary substrates mainly in the Cobar Peneplain Bioregion;
- PCT103 - Poplar Box - Gum Coolabah - White Cypress Pine shrubby woodland mainly in the Cobar Peneplain Bioregion;
- PCT180 Grey Mallee - White Cypress Pine woodland on rocky hills of the eastern Cobar Peneplain Bioregion;
- PCT184 - Dwyer's Red Gum – White Cypress Pine – Currawang low shrub-grass woodland of the Cobar Peneplain Bioregion; and
- PCT258 Gum Coolabah - Mugga Ironbark - White Cypress Pine woodland on granite low hills in the eastern Cobar Peneplain Bioregion and central NSW South Western Slopes Bioregion.



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PLANT COMMUNITY TYPES (PCTs)

FIGURE 2-2

2.4.1.2 Topography and Soils

The Cobar region is located on a subdued bedrock-controlled landscape in the centre of semi-arid NSW. The regional topography is characterised by rolling downs and flat plains punctuated by stony ridges and ranges and is formed on the north westerly extension of the Lachlan Fold Belt (NPWS 2003).

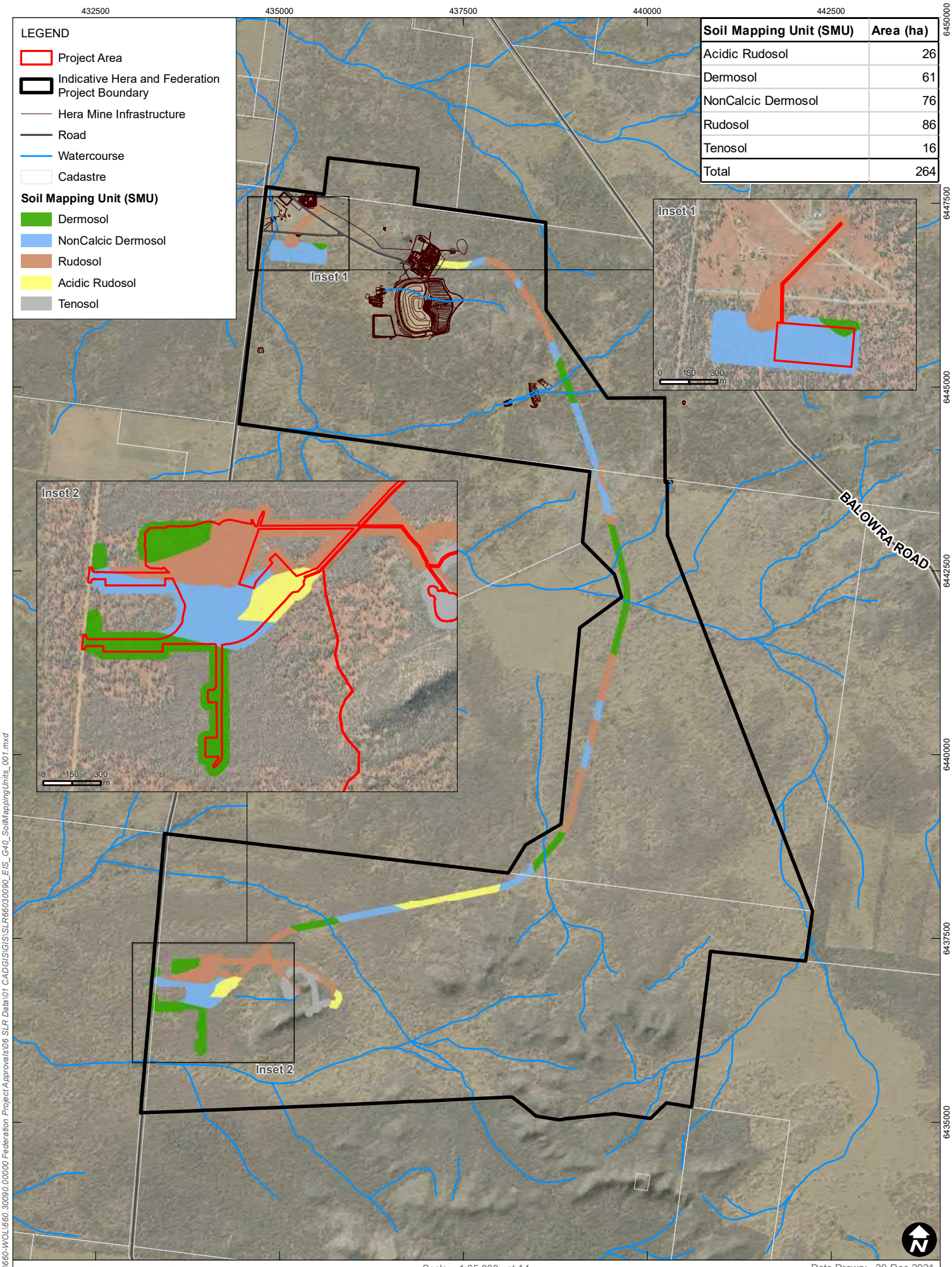
The topography of land within the Project boundary is generally flat, ranging between approximately 300 m AHD to 380 m AHD (refer **Figure 2-5**). The local topography of the Federation Site is dominated by an unnamed topographical feature to the south of the mine infrastructure area, with a maximum elevation of approximately 398 m AHD and side slopes that exceed 18°, particularly on the upper sections of the hill. The western section of land within the Project boundary is undulating, with maximum elevations between 380 m AHD and 418 m AHD. Remaining sections of land within the Project boundary is typically flatter, with elevations of between 310 m AHD and 370 m AHD, with a general east to west slope.

Five soil mapping units have been identified in the Project area (refer **Section 8.1**). These are provided in **Figure 2-3** and are summarised below:

- Dermosol Soil Mapping Unit was red with sandy clay loam topsoil trending to light clay with depth. Most sample pits had more than 1 m of soil, which appears to have been deposited during multiple cycles;
- Non-Calcic Dermosol Soil Mapping Unit had red clay loam topsoil over red light clay subsoil. It was found in footslopes of hills in the Project area and was constrained by low pH, elevated exchangeable aluminium, low nutrient levels and moderate rootzone depth;
- Rudosol Soil Mapping Unit had red sandy clay loam topsoil, but layers with more than 50% gravel were encountered at an average depth of 20 cm. Rudosol occurred over the slopes and crests of hills in the Project area;
- Acidic Rudosol Soil Mapping Unit was characterised by shallow depth to layers with more than 50% gravel and an acidic layer that extends from at least 5 to 30 cm. The Acidic Rudosol Soil Mapping Unit occurred on hills and parent material was logged as fine sandstone; and
- Tenosol Soil Mapping Unit occupied the hill area of the telecommunications tower and surface extraction area and access tracks. There was a thin layer of soil on this land.

2.4.1.3 Geology

The Federation deposit is located on the eastern margin of the Palaeozoic Cobar Basin, an intracratonic basin within the Lachlan Orogen (MacRae, 1987). The Cobar Basin is the richest polymetallic basin within the Lachlan Orogen, hosting a significant number of precious and base metal deposits related to different tectonostratigraphic units from Late Silurian to the Early Devonian. The Federation deposit is located near the contact between shelf facies sediments of the Mouramba Group and turbiditic sediments of the Amphitheatre Group within the Cobar Basin (Aurelia Metals, 2020).



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Coordinate System: GDA 1994 MGA Zone 55

Date Drawn: 20-Dec-2021
Project Number: 660.30090.00000

Data Source: Basedata NSW SS, 2019
Aerial imagery supplied by © Department of Customer Service 2020 & Aerometrex Pty Ltd, 2019
Soil data supplied by Sustainable Soils Management Pty Ltd

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SOIL STUDY AREA SOIL MAPPING UNITS

FIGURE 2-3

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2.4.1.4 Surface Water

The Project is located within the Barwong-Darling River system catchment which makes up approximately 13% of the Murray-Darling catchment. The Barwong-Darling River system generates only 2.8% of flows into the Murray-Darling Basin, with 99% of flow captured upstream. Of the total surface water within the catchment only 3% is diverted for irrigation. The Darling River is located approximately 220 km to the northwest of the Project. Surface water drainage within the Project catchment is characterised by sheet wash with mapped drainage features limited to indistinct, discontinuous, ephemeral watercourses (mdba, 2021). The Project area is located near the head of the catchment separating the Darling catchment from the Macquarie catchment (refer **Figure 2-4**).

There are no identified, permanent watercourses or drainage lines running through the Project area. At Hera Mine there are limited ephemeral watercourses traversing the site. There are a number of unnamed, ephemeral, indistinct, State mapped watercourses which intersect the Services Corridor (refer **Figure 2-5**). These watercourses generally flow to the northwest, west or southwest.

2.4.1.5 Groundwater

The aquifer in the Project Area is located within the indurated Palaeozoic sediments that constitute a fractured rock aquifer where groundwater is stored and transmitted via fractures, joints and other discontinuities within the rock mass.

The groundwater depth in the Project area is 45 to 90 m below surface. Recharge to groundwater occurs through infiltrating rainfall and lateral throughflow from adjoining aquifers. Given the depth to water in the bedrock and annual rainfall volumes, the recharge rates are likely to be low. GHD (2021) states that based on the available data, groundwater flow direction at the Federation Site is approximately east to west.

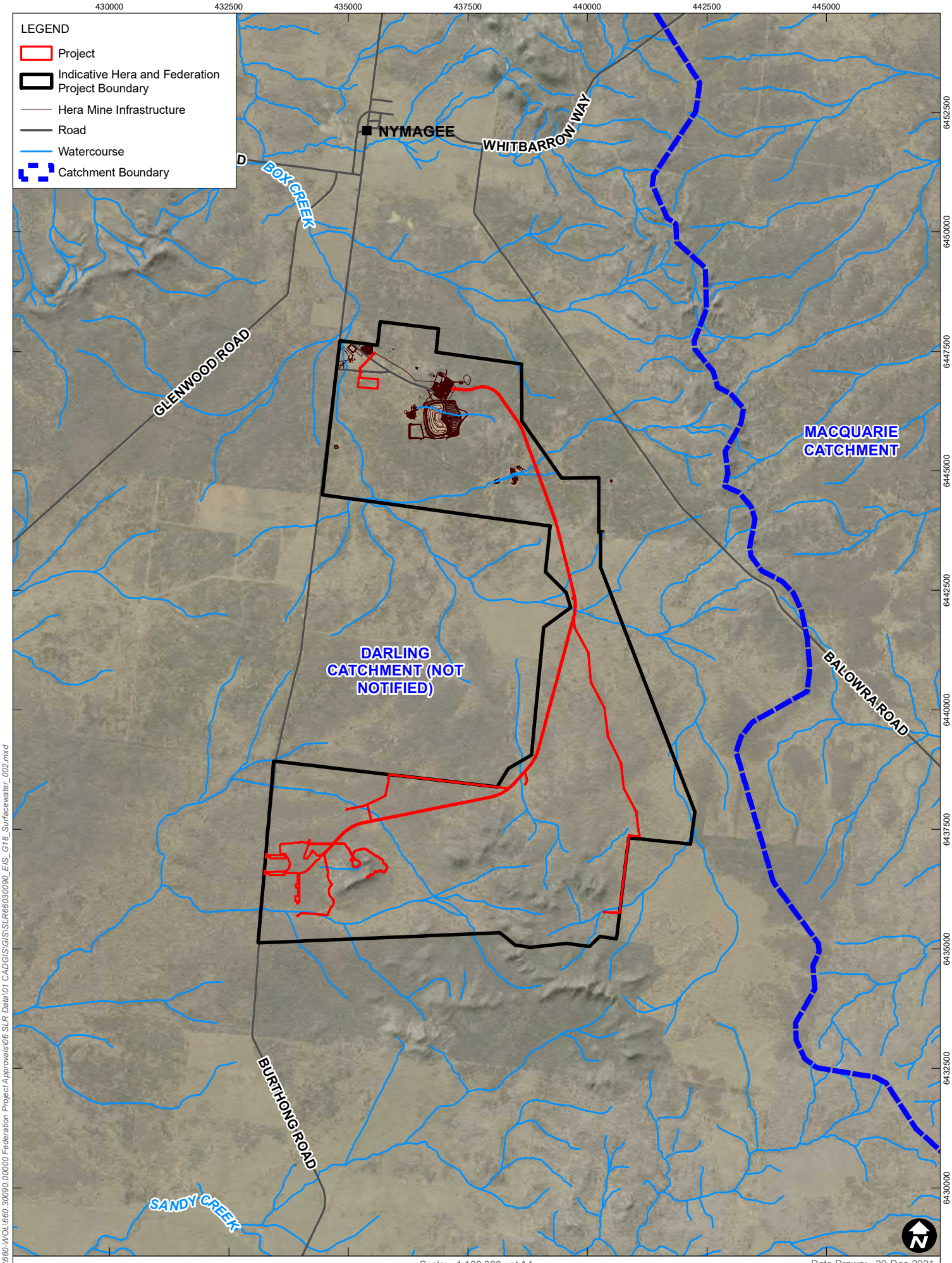
The fractured rock groundwater source is classified as 'less productive' in accordance with the criteria specified in the NSW Aquifer Interference Policy (i.e. the yield is typically less than 5 L/s and/or the total dissolved solids concentration is typically greater than 1,500 mg/L).

2.4.1.6 Climate

The Project is located in a semi-arid region of far western NSW. The climate is characterised by hot summer months, mild winters and low rainfall.

The closest Bureau of Meteorology (BOM) stations are located at Cobar approximately 80 km to the north west and Nyngan approximately 100km to the north east of the Project which provide climatic data for a period of over 140 years.

Historical climate data was obtained from the BOM station located at Cobar. The mean maximum temperature is recorded as 26 ^{0}C with a mean minimum temperature of 18.2 ^{0}C. The hottest month of the year is January with a maximum average of 35 ^{0}C and the coolest month recorded as July with a maximum average of 14 ^{0}C . The mean average rainfall received is 350mm. The average highest rainfall is received in December with an average of 35mm and the driest months are reported as July and September with 23 mm.



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Data Source: Basedata NSW SS, 2019
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Catchment Boundaries Office of Environment and Heritage (OEH) - Office of Water

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SURFACE WATER LINES

FIGURE 2-4

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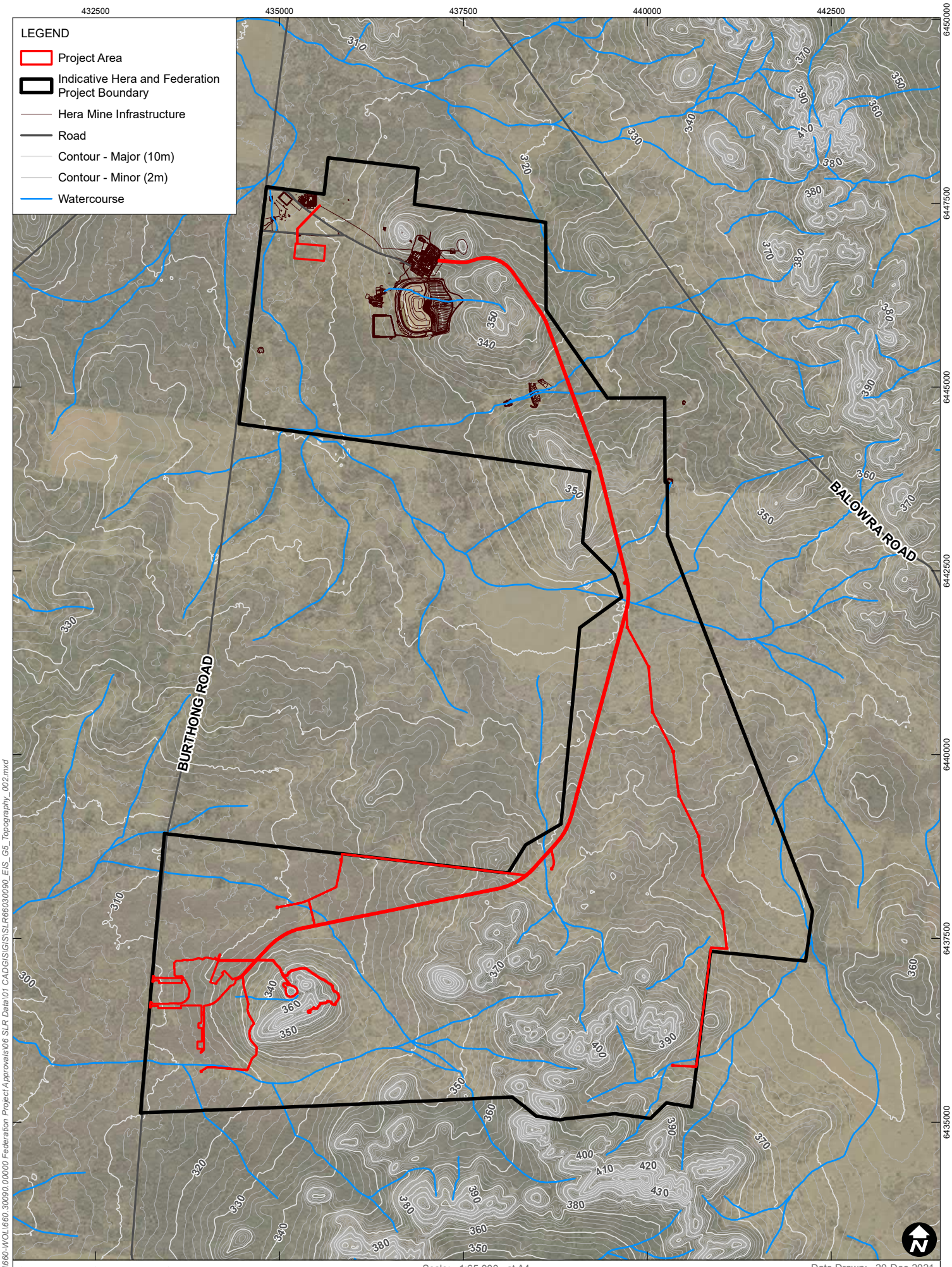

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Project Number: 660.30090.00000

Data Source: Basedata NSW SS, 2019
Aerial imagery supplied by © Department of Customer Service 2020
Contours supplied by Aurelia Metals (Derived: Unknown)

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TOPOGRAPHY

FIGURE 2-5

H:\Projects-SLR\660-SrvWOL\660.30090.00000 Federation Project Approvals\06 SLR Data\01 CAD\GIS\GIS\SLR66030090_EIS_G5_Topography_002.mxd

2.4.2 Social and Economic

Cobar Shire is situated in the centre of NSW encompassing an area of around 45,600 square km (km^2), about 700km north-west of Sydney and 650km north of Canberra. With a population of approximately 5,000 residents, the Shires' economy is built around mining (copper, lead, silver, zinc and gold), and pastoral/ agricultural industries.

According to the Australian Bureau of Statistics (ABS), Cobar's population has been reasonably steady for the past ten years. However, anecdotal evidence derived from consultation with local residents suggests that the population of Cobar is in decline and school student numbers are similarly reducing annually in recent years.

The suburb of Nymagee has a small population of approximately 100 people, with 20 of those residents living within the township of Nymagee. Mining and agriculture are the two sectors within which male Nymagee residents predominantly find employment. The female population predominantly find employment within the agriculture, forestry and fishing sector, with a small percentage working in the accommodation and food services sector. The average median weekly household income of the suburb of Nymagee is $1,224.0.

2.4.3 Land Ownership

Details of land ownership within the Project boundary are provided below in **Table 2-1.**

Table 2-1 Ownership Details

Lot	Deposited Plan	Owners	Lease
3129	765334	Richard and Katherine Harley	Perpetual Lease Western Lands Lease 5379
3586	769242	Phillip and Marie Harley	Perpetual Lease Western Lands Lease 6089
664	761702	Aurelia Metals	Perpetual Lease Western Lands Lease 2455

2.5 Planning Agreements

Hera Resources currently have two Voluntary Planning Agreements (VPA) in place, with Cobar Shire Council (CSC) and Bogan Shire Council (BSC). The VPA with CSC was established in 2013 and was varied as part of Hera Mine's approval modification (MOD) 3 in 2016. An updated VPA has been prepared and submitted to CSC associated with MOD 6.. The VPA provides for:

- 5c/t/km for concentrate and ore haulage; and
- Community fund contribution around $35k pa.

The VPA with BSC provides for $120k pa road maintenance contribution, subject to annual consumer price index (CPI) changes. Hera Resources will consult with CSC and BSC about potentially amending the VPAs as part of the Project.

2.6 Alternatives Considered

2.6.1 Do Nothing

If the Project was not to proceed, mining operations at Hera Mine would cease by 2025. The consequences of not proceeding with the Project include:

- Cessation of employment for the workforce at Hera Mine (approximately 150 workers);
- Negative economic and social flow on effects to the local communities, which would no longer benefit from mining activities in the local and regional areas;
- Revenue generated through the taxation system would be forgone;
- Royalties due to the NSW Government would not be generated; and
- The high-quality mineral resource identified in the Federation Deposit would remain unmined and not utilised for beneficial purposes.**Other Alternatives**

As part of the mine planning a number of alternatives have been considered which are summarised in **Table 2-2.**

Table 2-2 Project Alternatives Considered

Item	Comment
Haul Road	A private haul road between the Federation Site and Hera Mine was considered for the Project, however the use of Burthong Road is the preferred haul route. A private haul road was not preferred due to the impacts from vegetation clearing (potentially clearing an additional 30ha) and to ongoing land use. Items of Indigenous heritage are also located in the area between Hera Mine and Federation Site which would need to be avoided to mitigate any impact.
Backfill of stopes	Unconsolidated rock, cemented rock fill, cemented aggregate fill and cemented hydraulic fill were not preferred for backfilling of stopes due to insufficient volume or high cost. The preferred option is to use a mix of tailings pastefill and waste rock. Tailings pastefill reduces the volume of tailings reporting to, and requiring management at the TSF, whilst stabilising the underground workings.
Ore Destination	Options for the proposed split for ore processed at Hera Mine and PGM were considered to allow for flexibility in processing methods, and to maximise metals recovery and associated economic benefits. The proposed maximum tonnage of ore to be processed at PGM was selected to align with current approvals, whilst limiting additional traffic volumes.
Hera Processing Plant	The options considered for the processing plant at Hera Mine included: ▪ Construct a new processing plant whilst continuing to operate the existing plant during the period whilst a new processing plant was being constructed; and ▪ Modify the existing plant. The preferred option is to construct a new process plant that is better suited to maximising metal recoveries from the ore from the Federation deposit. The existing process plant will be utilised whilst the new process plant is being constructed.

Item	Comment
Tailings Disposal and Transport	Options for tailings disposal were considered. Utilising approximately 60% of tailings for stope backfill was preferred as it reduces the volume of tailings requiring storage in the Hera TSF and addressed the shortage of backfill material at Federation. Tailings is proposed to be transported from Hera processing plant to Federation by truck along Burthong Rd. This option was preferred to piping tailings to Federation due to the additional infrastructure costs and impact required for piping and handling of tailings. However, the potential for a dedicated tailings pipeline and return water pipeline within the Services Corridor has been assessed in this EIS, as well as the option for trucking of tailings
Water Supply	Water will be sourced from groundwater in the underground workings. New production bores are proposed (in addition to existing production bores) to supplement any shortfall in water supply from the underground workings. Alternative water supply options were considered, including utilisation of water from the non-operational Nymagee mine, trucking of water from local sources and reuse of treated effluent from the accommodation village. However, the water balance demonstrates that the primary water sources (underground workings and production bores) will provide sufficient water and these alternatives have been considered as potential contingency measures.
Power Supply	Options considered for power supply to the Federation Site included: ▪ Grid power connection ▪ Piped off lease gas supply ▪ Separate gas plants at Hera and Federation ▪ Gas plant at Hera, gas trucked to Hera with powerline to Federation ▪ Gas plant at Hera, gas trucked to Hera with powerline to Federation; supplemented by solar power from solar farm, The first two options were not preferred due to the complexity of off-lease infrastructure and the impacts on land use and from clearing vegetation. The third option was not preferred due to the additional infrastructure costs associated with two gas plants. The fifth option was preferred over the fourth option as the addition of a solar farm allows for a reduction in greenhouse gas emissions and alternative energy sources for increased reliability.

2.7 Cumulative Impacts

As detailed in '*Cumulative Impact Assessment Guidelines for State Significant Projects*' (DPIE, 2021) (Cumulative Impact Guideline), the relevant future projects for cumulative impact assessment include:

- Changes to existing projects;
- Approved projects;
- Projects under assessment; and
- Related development to the Project.

To ensure the assessment focusses on the key matters that could be materially affected by the cumulative impacts of the Project and other relevant future projects, only the following types of development need to be identified for inclusion as 'relevant future projects':

- Other State significant development (SSD) and State significant infrastructure (SSI) projects;
- Projects that are classified as designated development and require an EIS;
- Projects that require assessment under division 5.1 of the EP&A Act that are likely to significantly affect the environment and require an EIS;
- Projects that have been declared to be controlled actions under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)*; and

Any major greenfield and urban renewal developments that are scheduled for the area (e.g. new areas zoned for urban development).

A review of online local, state and federal resources was undertaken to determine the location of any developments which would need to be considered in accordance with the Cumulative Impact Guideline. These are identified in **Table 2-3.**

Table 2-3 Approved and Planned Developments in Proximity to Federation Project

Name	Status	Distance to Project	Description
Peak Gold Mine (PGM)	Operational	75km	PGM comprises several polymetallic underground mines plus an 800ktpa gold and base metals processing plant, located in the northern part of the Cobar Basin in NSW. PGM is wholly owned by a subsidiary of Aurelia.
CSA	Operational	90km	CSA Mine is located 11 km north-west of Cobar, central western NSW, with production of about 50,000 tonnes of copper in concentrates each year. The CSA Mine is one of Australia's highest grade copper mines and employs about 670 people, including contractors.
Nyngan Scandium Project	Approved	100km	Involves the development of a new open cut scandium mine to extract a total of 1.5 million tonnes of ore from two adjacent open cut pits. Mining would be undertaken on a campaign basis up to three times a year with each campaign lasting between three to five weeks. A maximum of 175,000 tonnes of ore would be processed each year to produce a total of 45 tonnes of scandium oxide. The site is approximately 20 km southwest of Nyngan in the Bogan LGA, in western NSW. The site covers an area of 910 ha, 145 ha of which would be directly disturbed by the project.
Cobar Biohub	EIS in preparation	85km	Renewed Carbon is proposing to construct the 'Cobar BioHub' (the BioHub) near Cobar in central western NSW. The BioHub would be a regional biomass processing facility for vegetation. A by-product would be the generation of around 3-5 MW of surplus energy. The site is approximately 110 ha in size.

Name	Status	Distance to Project	Description
New Cobar Complex	Response to Submissions - Complete	70km	The New Cobar Complex Project SSD is an amalgamation of existing approved underground mining of the Chesney and Jubilee deposits and development of new underground workings of the Great Cobar and Gladstone deposits to create the New Cobar Complex Project. All works associated with the project will be located underground or within an existing, operational mining complex (the New Cobar Complex). The project area is defined as the area south of the Barrier Highway and east of Kidman Way, with a 10 m buffer around proposed underground workings. This includes all areas of existing and proposed mining disturbance associated with the project. The New Cobar Complex is wholly owned by a subsidiary of Aurelia.
Western Slopes Pipeline - SSI	SEARS issued	50km	APA Western Slopes Pipeline Pty Limited is proposing to construct a 400-450mm diameter, buried, steel, high pressure gas pipeline approximately 450 km in length to connect the Narrabri Gas Project (NGP) to the NSW gas transmission network. The route is from Bundure in the west to the Newell Highway just south of Wee Waa. This project is a controlled action under the EPBC Act and will be assessed under the bilateral agreement between the NSW and Commonwealth Governments, or an accredited assessment process.

Given the remote locality of the Project and the distance to nearby developments, an issue specific cumulative impact assessment (CIA) approach has been undertaken and is included in **Section 8.19**.