STATE SIGNIFICANT DEVELOPMENT ASSESSMENT
Balranald Mineral Sands Project (SSD 5285)

Assessment Report
Section 89E of the
Environmental Planning and Assessment Act 1979
April 2016

Cover Photograph: Balranald Mineral Sands Project

Published April 2016
NSW Department of Planning and Environment
www.planning.nsw.gov.au

EXECUTIVE SUMMARY

Iluka Resources Limited (Iluka) is proposing to develop the Balranald Mineral Sands Project, a new mineral sands mine approximately 12 kilometres (km) northwest of Balranald in south-western NSW.

The project involves extracting heavy mineral sands (including zircon, rutile and ilmenite) from 2 separate linear mineral sands deposits, known as the West Balranald and Nepean deposits.

Mineral sands would be extracted using dry open cut mining methods (truck and shovel)[1]. Groundwater within the mining pits would be extracted in advance of mining operations and reinjected into the same aquifer in dedicated injection borefields.

Extracted ore would be processed on site to generate approximately 14.4 million tonnes of heavy mineral concentrate (HMC) and ilmenite over the 15 year project life, at production rates of up to 500,000 tonnes of HMC and 600,000 tonnes of ilmenite per year. HMC and ilmenite product would be transported from the site by road to Victoria for further processing and/or loading onto trains at a specialised rail loading facility.

The project involves the construction of a range of necessary infrastructure to support the new mine, including processing facilities, groundwater injection borefields, water supply pipelines, access roads and a workforce accommodation facility.

The project has a capital investment value of $681 million, and would generate up to 225 jobs during construction and up to 550 jobs during operations.

In total, the project would disturb some 5,160 hectares of land, of which approximately 1,179 hectares comprises Mallee vegetation areas (known as Southern Mallee Conservation Areas, or SMCAs) that have been previously set aside as conservation areas to offset impacts associated with agricultural land uses in the region.

The project is classified as State Significant Development (SSD) under Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act), and consequently requires approval from the Minister for Planning. However, under the Minister's delegations the application may be determined by the Executive Director Resource Assessments and Business Systems, as Balranald Council does not object to the project, only a small number of submissions were received, and no political donations have been reported.

The Department of Planning and Environment (the Department) exhibited the Environmental Impact Statement (EIS) for the project from 3 June 2015 to 6 July 2016. In response to the exhibition the Department received advice from 7 government agencies and 3 submissions from the general public. None of the agencies object to the project, however 2 of the public submissions objected to the project.

Key issues raised in submissions and/or identified in the Department's assessment included:

- biodiversity, particularly impacts on the SMCAs and the endangered Malleefowl, and the adequacy of Iluka's biodiversity offset strategy;
- Aboriginal cultural heritage, particularly the potential for discovery of additional sites of high significance in the project area;
- water resources, particularly on groundwater;
- traffic, particularly road upgrades and maintenance; and
- amenity impacts (noise and dust).

The Department is satisfied that these impacts can be adequately mitigated, managed, and/or at least offset through implementation of a number conditions recommended by the Department. These include requirements on Iluka to prepare, establish and/or implement:

- a comprehensive biodiversity offset strategy, including:
    - retiring biodiversity credits in accordance with the *NSW Biodiversity Offsets Policy for Major Projects*; and

[1] A small amount of ore material (up to 100,000 tonnes) would be extracted using an underground slurry pumping method, as part of an extension to an existing bulk sampling activity trial.

  - additional land-based offsets to compensate for the impacts on the SMCAs;
- a detailed Biodiversity Management Plan, including measures to mitigate and monitor impacts on threatened species including the Malleefowl;
- an Aboriginal Cultural Heritage Working Group to oversee cultural heritage management on site;
- a comprehensive Aboriginal Cultural Heritage Management Plan including provisions for:
  - additional geomorphic assessment;
  - subsurface archaeological testing;
  - archaeological salvage;
  - adaptive management through implementation of Trigger Action Response Plans (TARPs); and
  - cultural heritage management programs;
- detailed water management plans;
- considerable road and intersection upgrades and road safety improvements, and payment of road maintenance contributions to Council;
- noise and dust mitigation and monitoring, along with provision of voluntary acquisition rights for one landowner predicted to experience significant noise impacts; and
- payment of contributions to Council towards local community services and employment.

The Department has assessed a range of other potential impacts associated with the project, and is satisfied that these would not be significant and can be managed through the implementation of the recommended conditions to achieve an acceptable level of environmental performance.

Importantly, the development would result in a range of substantial economic and social benefits for south-western NSW, including:
- up to 550 operational jobs;
- capital investment in the area of $681 million;
- generating almost $1 billion in annual direct and indirect business turnover in the region; and
- generating $96 million in royalties for the NSW government.

The Department has carefully weighed the impacts of the project against the significance of the resource and the socio-economic benefits. On balance, the Department believes that the project's benefits outweigh its residual costs, and that it is in the public interest and should be approved, subject to stringent conditions.

1 PROPOSED PROJECT

1.1 Background

Iluka Resources Limited (Iluka) is proposing to develop a new mineral sands mine approximately 12 kilometres (km) northwest of Balranald in south-western NSW, within the Balranald local government area (see Figure 1). The project is known as the Balranald Mineral Sands Project (see Figure 2).

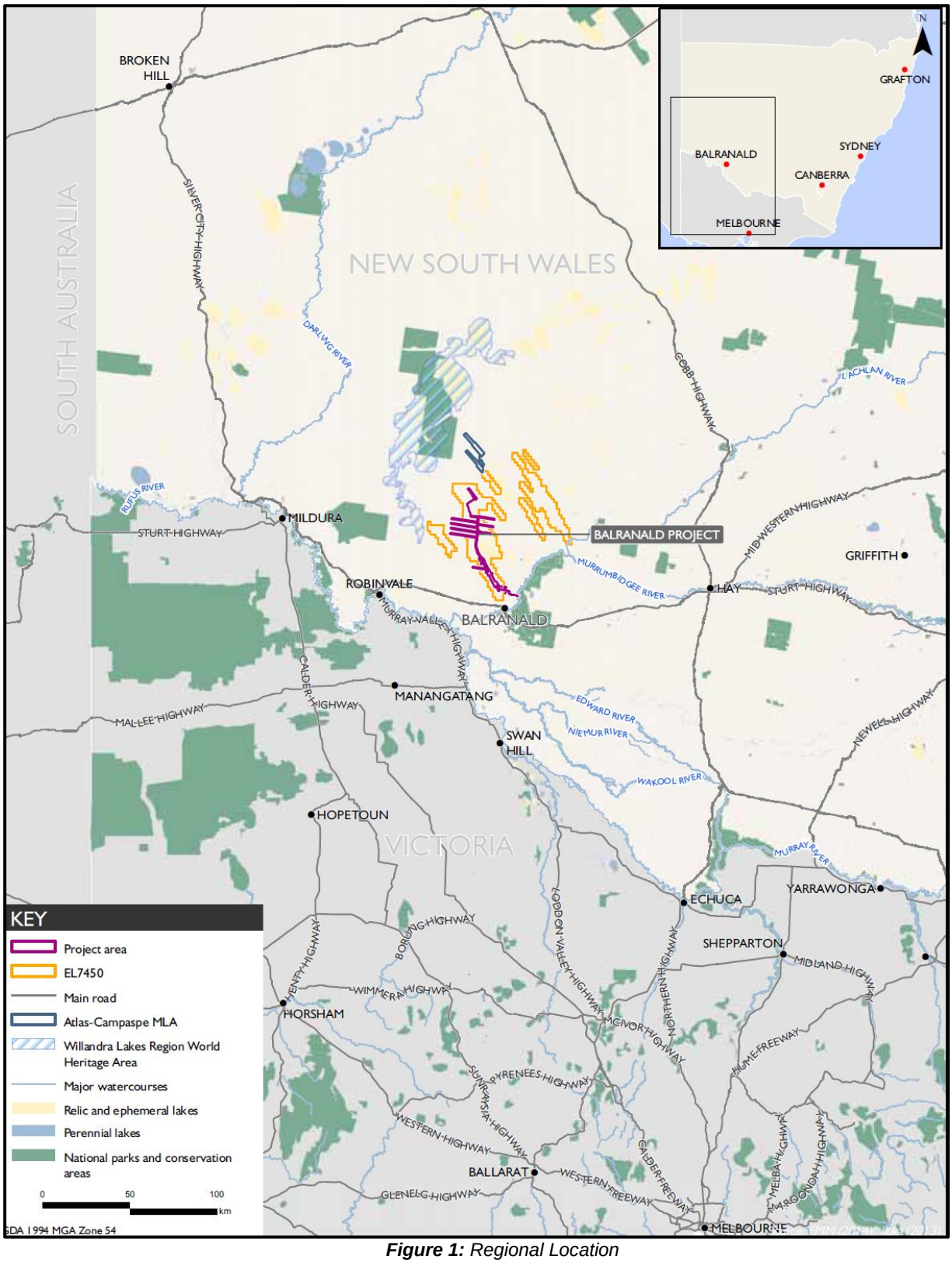

Figure 1: *Regional Location*

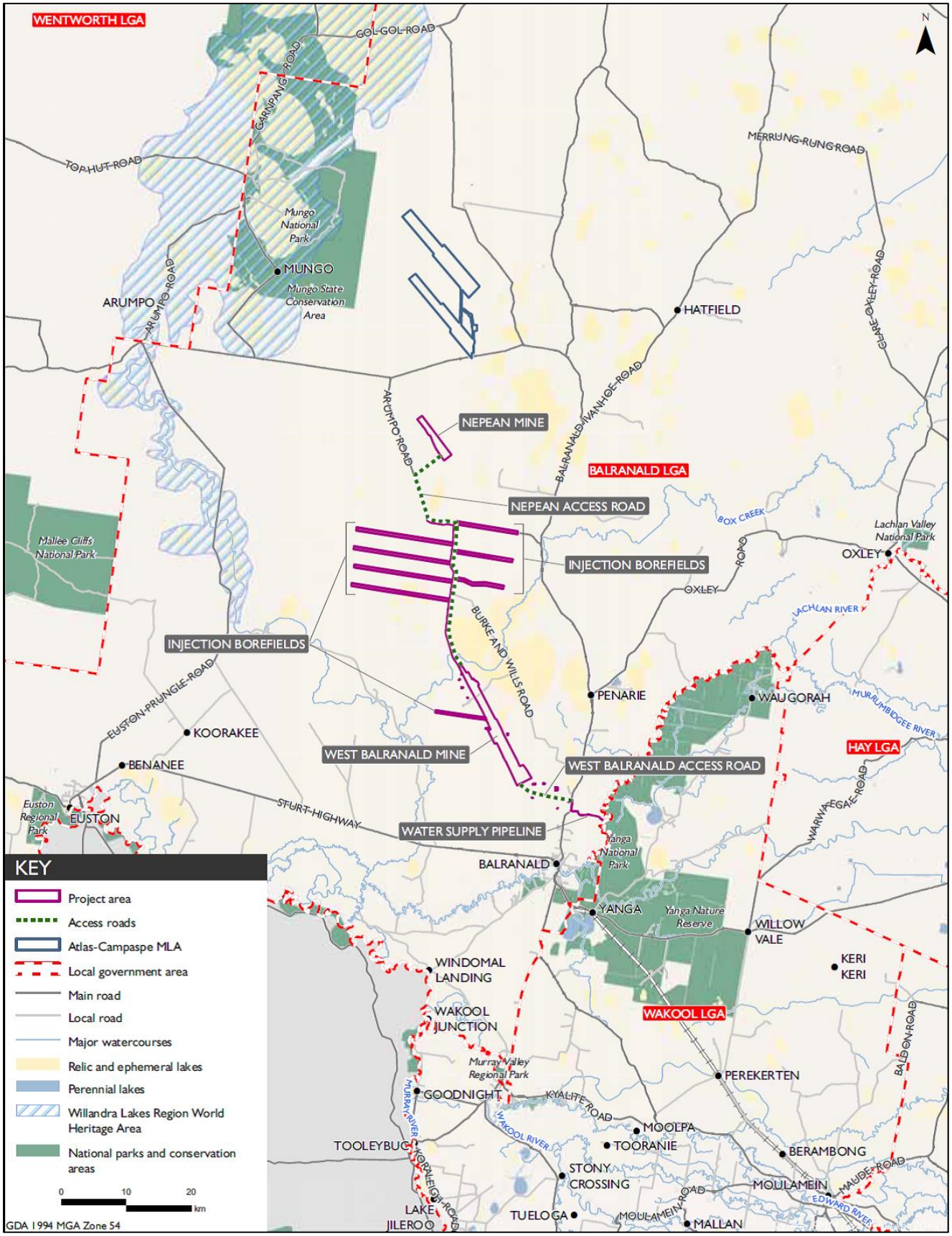

Figure 2: *Project Location*

1.2 Project Setting

The regional setting is characterised by vast areas of generally flat terrain and agricultural land interspersed with native vegetation comprising semi-arid woodlands and shrublands.

A number of reserves and conservation areas are located in the vicinity of the project area, including the Willandra Lakes Region World Heritage Area (WHA), Mungo National Park, Mungo State Conservation Area and Yanga National Park (see Figure 2). The nearest of these reserves (ie. Yanga National Park) is approximately 13 kilometres from the project area at the closest point.

The project area is within the Western Division of NSW, which encompasses around 42% of NSW. The majority of the Western Division is Crown land, administered under the *Western Lands Act 1901* and *Crown Lands Act 1989*. The Department of Primary Industries – Lands (DPI-Lands) is responsible for administering the Western Lands Leases and Crown lands under these Acts.

The project would be developed on land that is largely leased under Western Lands Leases or privately-owned. The project area covers a total area of approximately 9,964 hectares (ha) and is located on agricultural land primarily used for low intensity grazing (primarily sheep). This agricultural land is interspersed with areas of native vegetation (primarily Chenopod and Mallee scrub), including several areas of Mallee vegetation that have been set aside as conservation areas to protect against regional habitat loss associated with clearing and grazing. These areas are known as the Southern Mallee Conservation Areas (SMCAs) (see Figure 3). As with much of the native vegetation in the project area, most of the Mallee vegetation in the SMCAs has been degraded as a result of grazing.

The project site is situated within the Murray Basin, which covers some 297,000 square km. The Murrumbidgee and Murray Rivers are the major permanent surface water features in the vicinity of the project area. The Murrumbidgee River is located approximately 13 km south-east of the project area.

Within the project area is the ephemeral Box Creek, which requires substantial and sustained rainfall to flow. The majority of the Box Creek catchment area drains into dry relic lakes (including Tin Tin, Muckee and Pitarpunga lakes – see Figure 3) or to local depressions, and does not contribute to the flows of the permanent surface water features except in times of major flooding.

The nearest privately-owned residence (R5) is located approximately 2.3 km from the project area, although two residences (R32 and R13) are located less than 1.5 km from the mine access road (see Figure 4)[2]. The closest town is Balranald, which is located approximately 12 km to the south-east and has a population of approximately 1,200 people. Outside of the Balranald township, the area surrounding the project is relatively sparsely populated, with surrounding properties typically comprising large rural land holdings.

Primary access to the project area is from the Balranald-Ivanhoe Road (see Figure 4). Other key local roads include Burke & Wills Road and Arumpo Road. Major highways in the region that would form part of the project transport routes include the Sturt Highway and Balranald-Tooleybuc Road.

There are a number of mineral titles in the region. The closest mine is the approved (but not yet commenced) Atlas Campaspe Mineral Sands Project, located approximately 20 km north of the project area (see Figure 2).

[2] A number of other assessment locations shown on Figure 4 in the vicinity of the project area are uninhabited sheds (eg. R36, R276, R277 and R281)

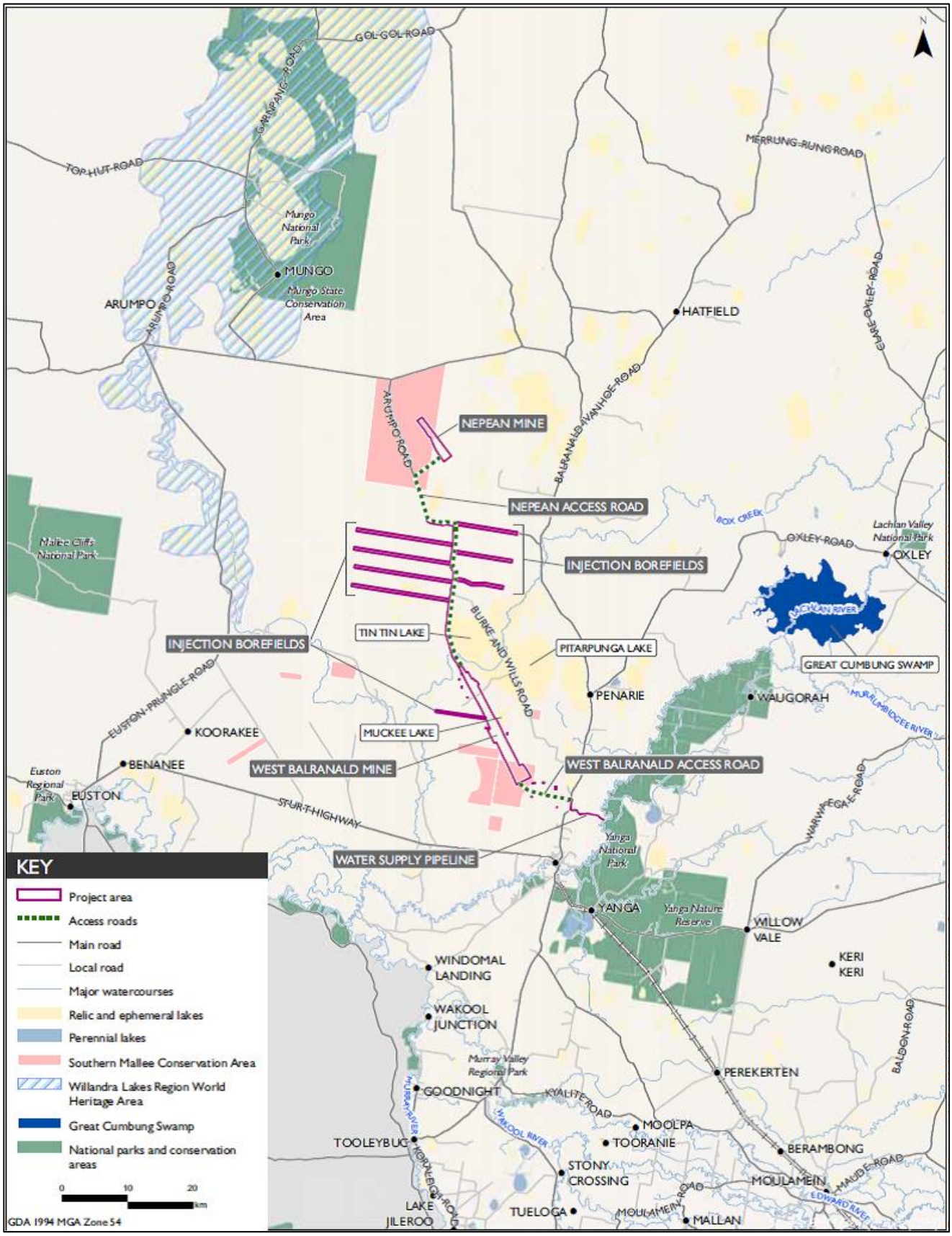

Figure 3: *Southern Mallee Conservation Areas*

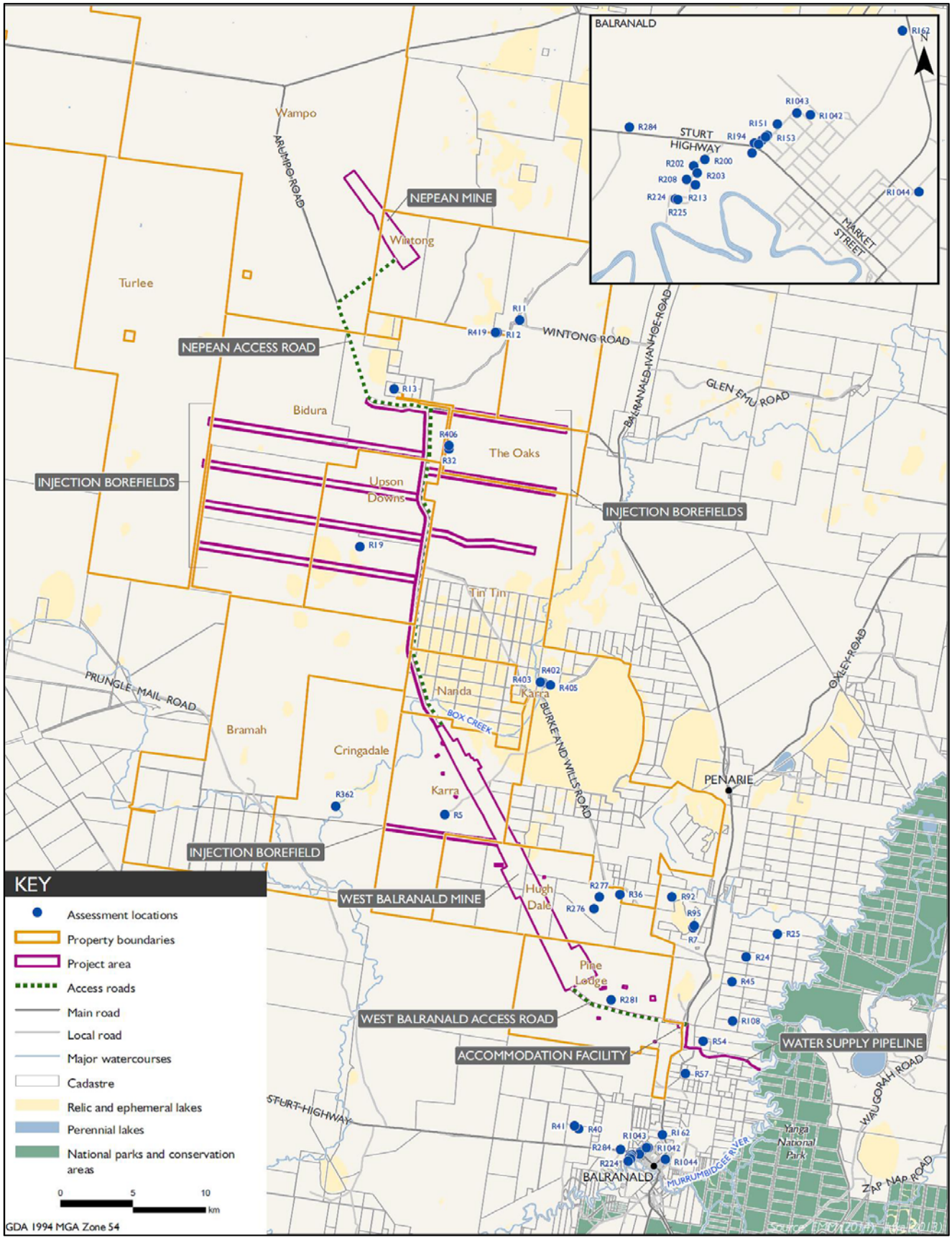

Figure 4: *Surrounding Receivers*

1.3 Project Description

The project involves the construction, extraction, processing and rehabilitation of two linear mineral sand deposits, known as the West Balranald and Nepean deposits.

Mining would be undertaken using dry open cut mining methods (truck and shovel). Saline groundwater within the mining pits would be extracted in advance of mining operations in order to keep the pits dry for mining, with the extracted groundwater reinjected into the same aquifer in dedicated injection borefields.

Extracted ore would be processed on-site to produce heavy mineral concentrate (HMC) and ilmenite. Both HMC and ilmenite product would then be transported by road to Victoria, with the HMC transported to Iluka's existing Mineral Separation Plant (MSP) at Hamilton for further processing, and ilmenite transported to a proposed[3] rail loading facility in Manangatang. From the Hamilton MSP and Manangatang rail loading facility, product would be transported to ports by rail.

The project is described in full in the Environmental Impact Statement (EIS) (see Appendix A).

Since exhibition of the EIS, Iluka has made a small amendment to the development application to include provision for continuation and enlargement of an existing bulk sampling activity within the proposed project disturbance area for the West Balranald mine. The activity involves the mining of mineral sands using underground techniques, essentially through pumping groundwater into bores at pressure, making the ore into a slurry which is then pumped to the surface for extraction. The existing bulk sampling activity allows Iluka to extract up to 20,000 tonnes of ore using this method, and Iluka is proposing to expand this to up to 100,000 tonnes using the existing bulk sampling activity infrastructure (with some expansions to accommodate the continued activity).

The major components of the project as amended are summarised in the following table and shown on Figures 5 to 8.

Table 1: *Major Project Components*

Aspect	***Description***
Project Summary	Development of a mineral sands mine, involving: • two separate open cut pits, identified as the West Balranald and Nepean mines; • continuation and enlargement of existing bulk sampling; • constructing and operating a mineral ore processing plant to process up to 14.4 million tonnes (Mt) of HMC and ilmenite over the life of the project; • developing associated infrastructure, including groundwater injection borefields, gravel extraction areas, a water supply pipeline, access roads and a workers accommodation facility; • transporting processed ore from the mine via road to Victoria for further processing and export; • receiving by-products from the Hamilton MSP via road back to the mine for in-pit emplacement; and • rehabilitation of disturbed areas.
Project Area	Approximately 9,964 ha.
Disturbance Area	Up to 5,346 ha.
Project Life	15 years.
Mining & Reserves	• West Balranald deposit – 12.0 Mt of heavy metals (10.8% zircon, 11.9% rutile and 64.1% ilmenite). • Nepean deposit – 2.4 Mt of heavy metals (14.4 % zircon, 14.5% rutile and 59.7% ilmenite).
Mining Methods	• Conventional (non-dredge) sequenced, dry mining methods using truck and shovel, excavators and dozers. • Dewatering of groundwater surrounding the ore body ahead of mining operations, with extracted groundwater reinjected into the same aquifer in the injection borefields. • Continuation and enlargement of existing bulk sampling activity using underground mining (slurry extraction) techniques, within the proposed open cut mining disturbance area.
Schedule	• Construction at the West Balranald mine would take approximately 2.5 years to complete. Mining would commence at the south end of the West Balranald deposit and progress in a northerly direction (Years 1 to 9 of the operational phase). • Construction of the Nepean mine would commence in Year 5 of the operational phase. Mining would commence at the south end of the Nepean deposit and progress in a northerly direction (Years 6 to 9 of the operational phase).

[3] Subject to separate approval

Aspect	***Description***
Production Rate	• 500,000 tonnes per annum (tpa) heavy metal concentrate (HMC). • 600,000 tpa ilmenite. • Bulk sampling activity production capped at 100,000 tonnes total.
Ore Processing	• Primary processing of ore on-site to produce HMC and ilmenite. • Transport of HMC by road to Iluka's existing Hamilton MSP in Victoria for further processing. • Transport of ilmenite by road to a proposed rail loading facility in Manangatang, Victoria (subject to separate consent).
Overburden Emplacement	• Overburden to be backfilled directly or stockpiled for progressive backfilling into the mining voids. • Stockpiles would be up to 15 m high.
Rejects Disposal	• Tailings from the processing plant would be dried at the tailings storage facility and then backfilled into the mining voids. • Rejects from the Hamilton MSP would be managed within Iluka's existing Victorian operations, or returned to the project via road and backfilled into the mine voids.
Potentially Acid Forming Material (PAF)	• PAF material within overburden would be extracted and then backfilled and covered as soon as practicable. • Once the initial boxcut is complete, no above ground stockpiling of PAF overburden would be required.
Infrastructure	Key infrastructure includes: • A processing plant (at the West Balranald mine), including: - the pre-concentrator plant, wet concentrator plant, wet high-intensity magnetic separator, and the ilmenite separation plant; and - tailings storage facility, maintenance areas and workshops, product stockpiles, truck load-out area, administration offices and amenities. • On-site accommodation facility for up to 550 people. • Power and communications infrastructure. • Water management infrastructure, including: - a water supply pipeline to transfer water from the Murrumbidgee River; - a number of lined dams; and - groundwater management infrastructure, including a dewatering system, injection and monitoring bores and associated pumps and pipelines.
Road Works	• West Balranald access road: new unsealed 18 km two-lane access road off Balranald-Ivanhoe Road to the processing area at the West Balranald mine. • Nepean access road: 39 km access road comprising new private access roads and sections of two existing public roads (Burke & Wills Road and Arumpo Road). • Construction and upgrade of various other sections of unsealed roads and intersections along the mineral concentrate transport route.
Traffic & Transport	• Ore from the Nepean mine would be transported to the processing facility at the West Balranald mine. • HMC would be transported from the processing facility to Iluka's Hopetoun, Victoria rail loading facility for onward transport to the Hamilton MSP. • Ilmenite would be transported by road to a proposed rail loading facility at Manangatang, Victoria. • All trucks would use Balranald-Ivanhoe Road, McCabe Street, the Sturt Highway, Balranald-Tooleybuc Road, through Tooleybuc and then west into Victoria. • Processing waste by-products would be trucked back to the project area as required and emplaced in the West Balranald pit.
Rehabilitation	• The project disturbance area would be progressively rehabilitated, including backfilling the Nepean mine and partially backfilling the West Balranald mine. • The final landform would include a 40 ha final void (the West Balranald pit) approximately 13 m deep. Slopes would be battered to integrate with the surrounding landscape and would remain above the groundwater table. • The final landform would comprise native vegetation species (mostly Chenopod scrub) suitable for either low intensity grazing or native vegetation conservation.
Biodiversity Offsets	• The project would disturb up to 5,160 ha of native vegetation. • Iluka would offset this by retiring some 217,000 biodiversity credits, which equates to an indicative offset area of approximately 28,000 ha. Additional land-based offsets of some 2,041 ha would be acquired to replace the SMCA disturbance.
Employment	• Peak employment of up to 225 construction employees (average 158) and up to 550 operational employees (average 385).
Capital Investment Value	• $681 million.
Hours of Operation	• 24 hours per day, 7 days a week (construction and operation).

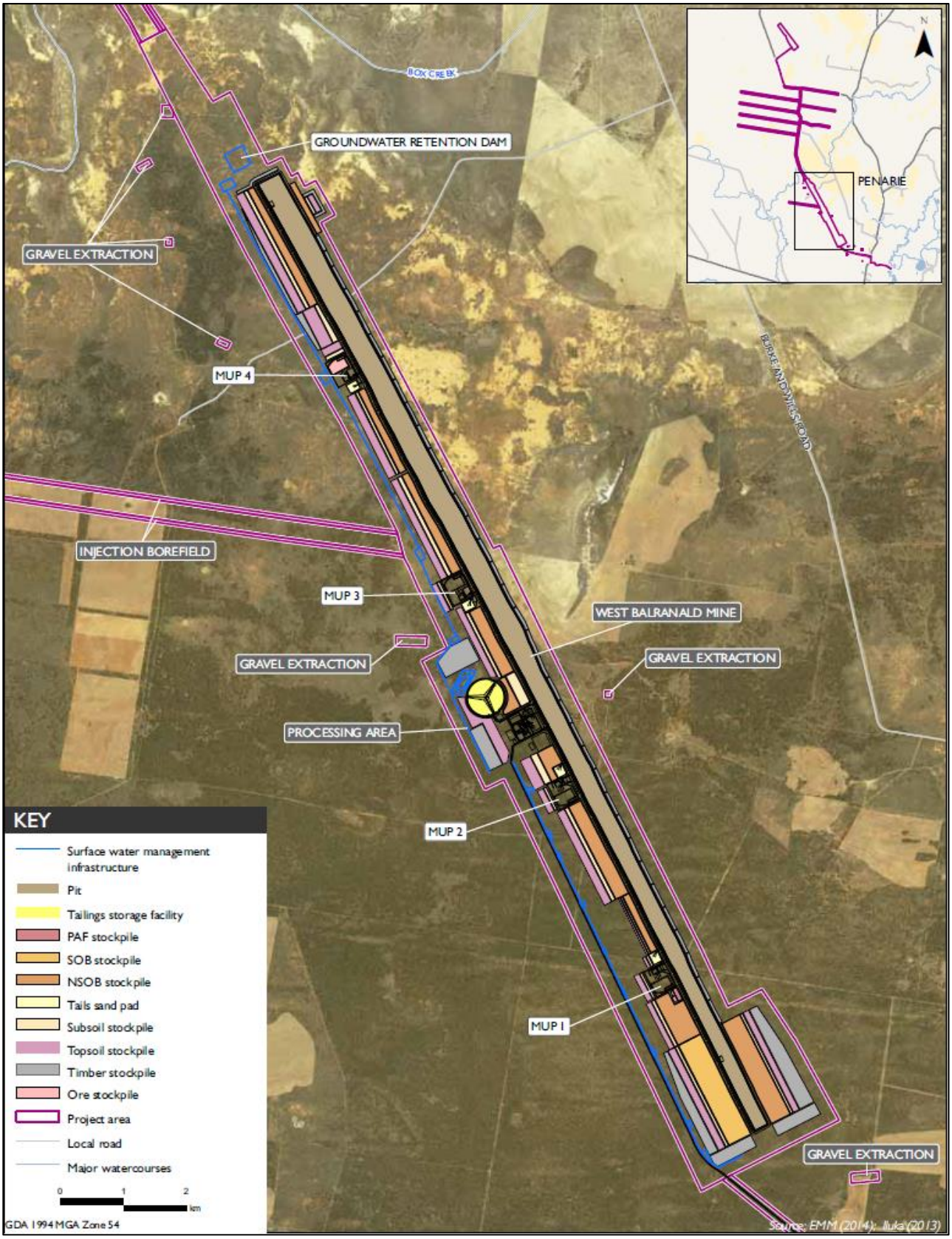

Figure 5: *West Balranald Mine Conceptual Layout*

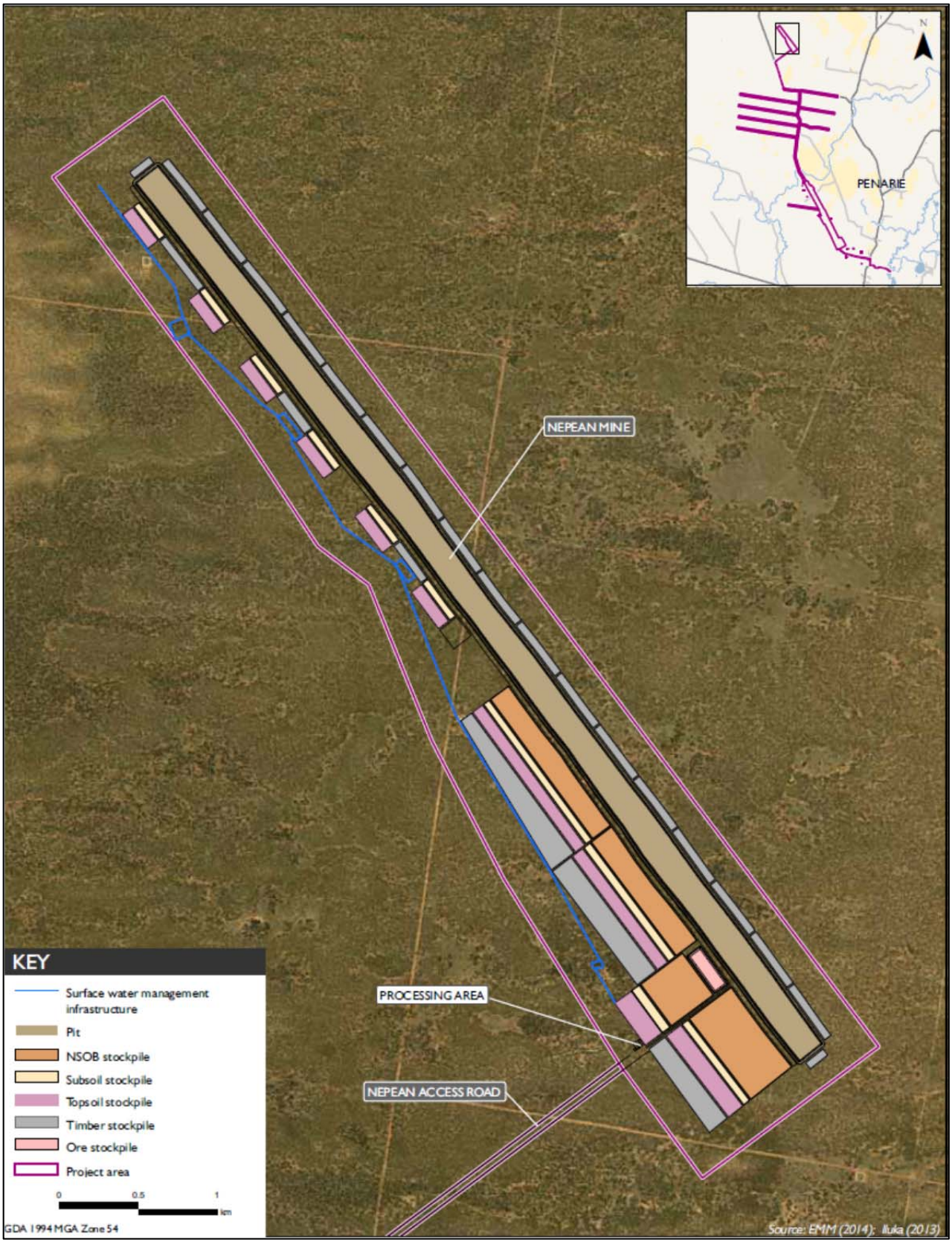

Figure 6: *Nepean Mine Conceptual General Arrangement*

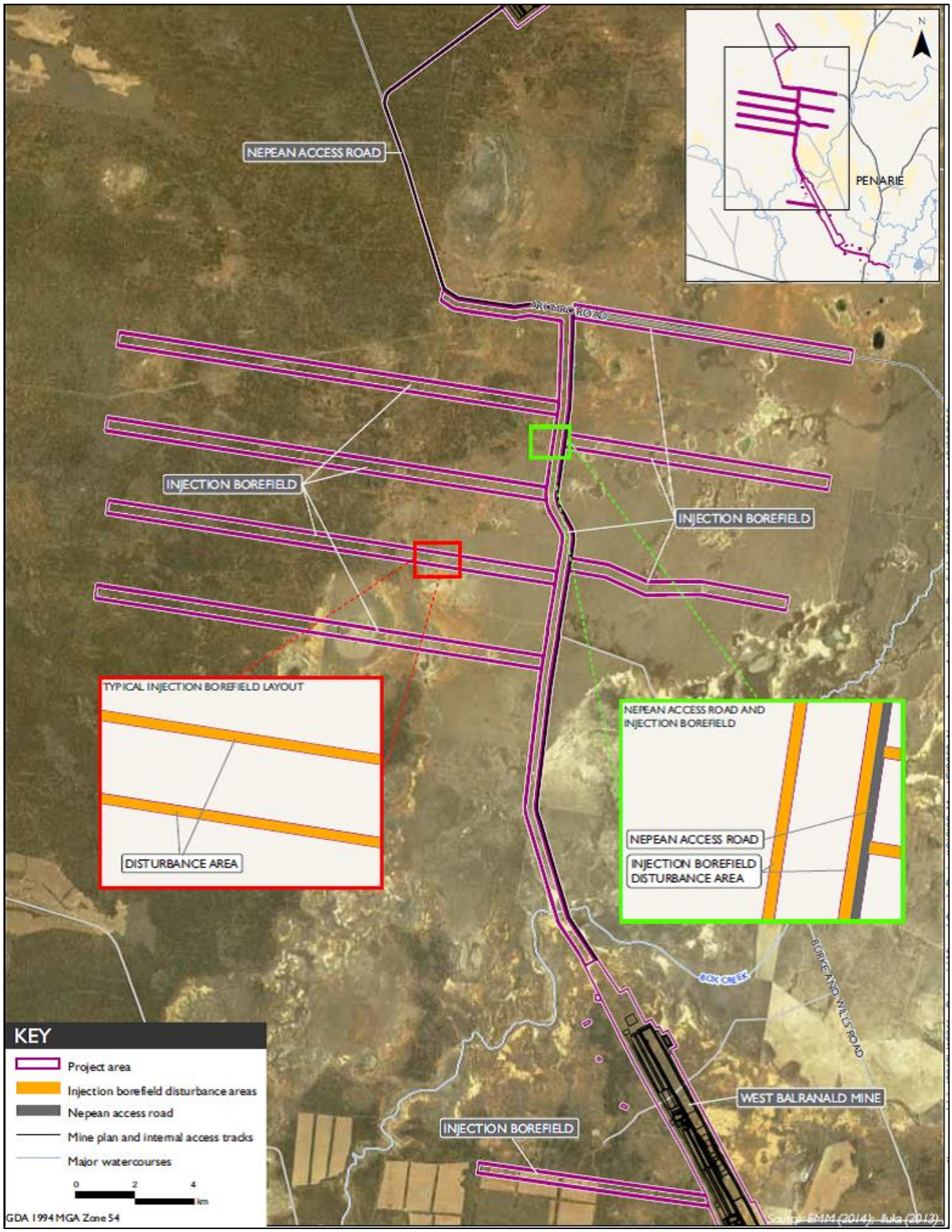

Figure 7: *Injection Borefields and Nepean Access Road*

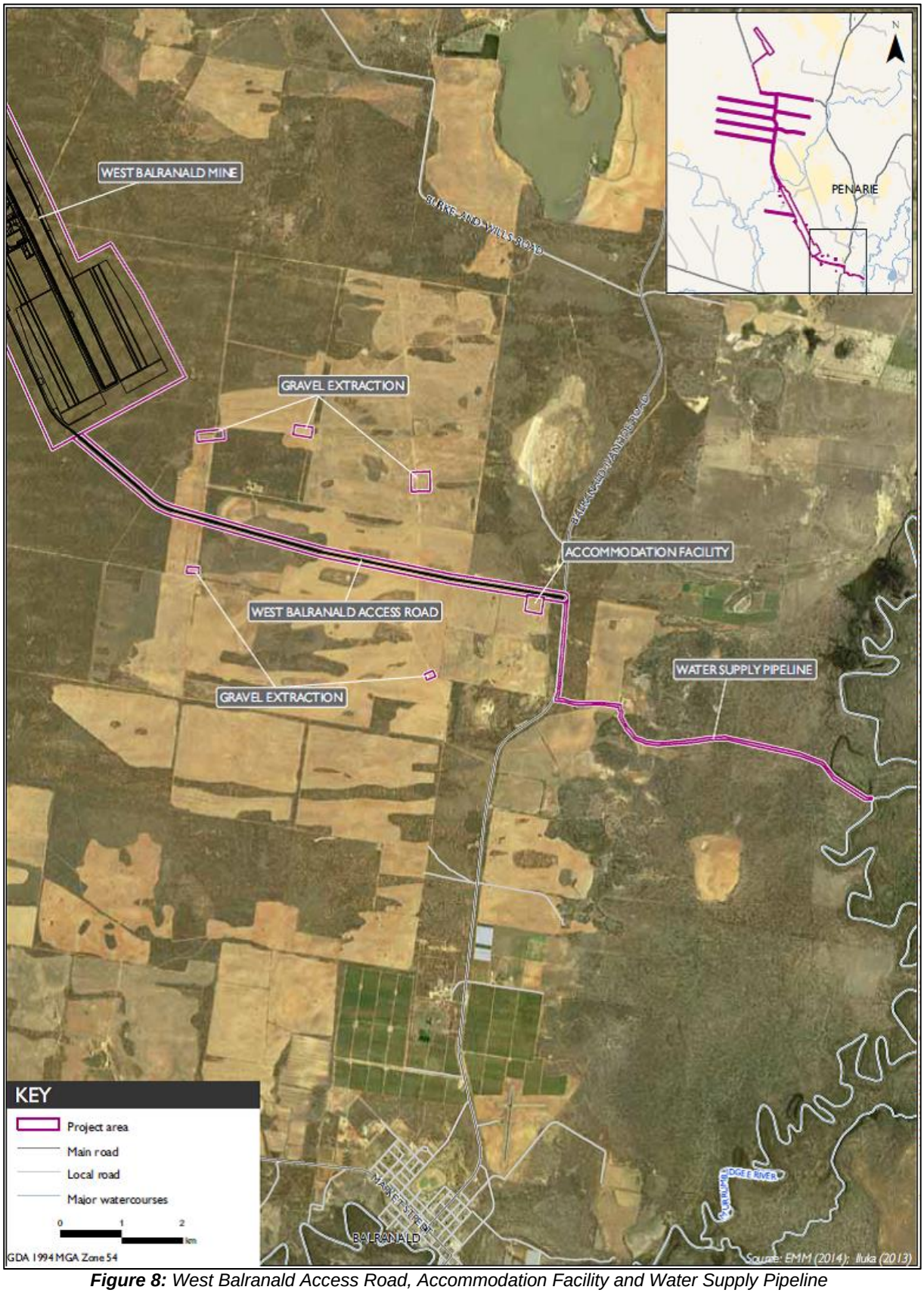

Figure 8: *West Balranald Access Road, Accommodation Facility and Water Supply Pipeline*

2 STRATEGIC CONTEXT

In September 2011, the NSW Government released the *NSW 2021: A Plan to Make NSW Number One* (the Plan) to guide policy and budget decisions over the ten year period to 2021.

One of the strategic goals of the plan is to drive economic growth in regional NSW. The plan includes a number of goals and actions, the implementation of which is supported by a number of regional plans including the 2012 Murray-Lower Darling Regional Action Plan (the Regional Action Plan).

The Regional Action Plan recognises that there are further opportunities to grow the economy and increase regional business investment through the expansion of existing industries such as agricultural and manufacturing as well as the development of the new mineral sands mining industry in the west of the Murray-Lower Darling Region. The plan recognises that mineral sands mining within the Murray Basin is a key industry that will help grow and diversify the NSW economy by increasing local employment opportunities in regional areas.

The Department is satisfied that the project is consistent with the goals of the aforementioned plans, and that it would assist in supporting economic growth in regional NSW. In this regard, the project is expected to provide significant social and economic benefits for both the local area as well as the State as a whole. These benefits include:

- 225 construction jobs;
- long term employment for up to 550 people during operations;
- increased direct and indirect spending in the region with a capital expenditure of around $681 million;
- generating around $96 million (in present value terms) of royalties for the State government; and
- significant flow on benefits and economic multiplier effects in the region.

The project would also provide access to a significant mineral sands resource (around 14.4 Mt) and produce up to 500,000 tonnes a year of heavy mineral sands concentrate, which represents around 43.5% of current production in NSW. The project would also produce up to 600,000 tonnes a year of ilmenite, which is not currently produced in significant quantities in NSW.

That said, the Department also recognises that these benefits must be weighed against the impacts of the project on the surrounding community and the environment. The Department has carefully considered these issues in Section 5 of this report.

3 STATUTORY CONTEXT

3.1 State Significant Development

The proposed development is declared to be State Significant Development under Section 89C of the EP&A Act as it is 'development for the purposes of mineral sands mining' in accordance with clause 8 and Schedule 1 of *State Environmental Planning Policy (State and Regional Development) 2011.*

Consequently, the Minister for Planning is the consent authority for the development. However, under the Minister's delegation dated 16 February 2015, the Executive Director, Resource Assessments and Business Systems can determine the development application, as less than 10 public submissions in objection have been received, Council did not object, and the company has not reported any political donations.

3.2 Permissibility

The proposed development is located in the Balranald LGA. Under the *Balranald Local Environmental Plan 2010* (Balranald LEP), the project area is located on land zoned RU1 Primary Production. Open-cut mining is permissible in the RU1 Primary Production zone.

Underground mining (for the bulk sampling activity) is prohibited under the Balranald LEP (as an innominate use), however it is permissible under Clause 7 of *State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007*, which allows underground mining (or extracting a bulk sample of more than 20,000 tonnes) to be undertaken on any land, subject to consent.

3.3 Environmental Planning Instruments

Several environmental planning instruments are relevant to the project, including:

- *Balranald Local Environmental Plan 2010*;
- *State Environmental Planning Policy (SEPP) (State and Regional Development) 2011*;
- *SEPP (Mining, Petroleum Production and Extractive Industries) 2007 (Mining SEPP)*;
- *SEPP (Infrastructure) 2007*;
- *SEPP No 33 – Hazardous and Offensive Development*;
- *SEPP No 44 – Koala Habitat Protection*; and
- *SEPP No 55 – Remediation of Land.*

The Department has assessed the project against the relevant provisions of these instruments (see Appendix D), as well as Iluka's consideration of these instruments in the EIS.

Based on its assessment of these instruments and its broader environmental assessment in Section 5, the Department considers that the project can be undertaken in a manner that is consistent with the aims, objectives and provisions of these instruments. However, this is subject to the implementation of a range of mitigation, monitoring and management measures, as outlined in Section 5.

3.4 Integrated and Other NSW Approvals

Under Section 89J of the EP&A Act, a number of other approvals are integrated into the State Significant Development approval process, and consequently are not required to be separately obtained for the project. These include certain approvals, permits and authorisations under the *Heritage Act 1977,* the *National Parks and Wildlife Act 1974,* the *Native Vegetation Act 2003,* the *Rural Fires Act 1997* and the *Water Management Act 2000*.

Under Section 89K of the EP&A Act, some further approvals would still be required for the project, but these approvals must be substantially consistent with the development consent, including:

- a mining lease under the *Mining Act 1992*; and
- an environment protection licence (EPL) under the *Protection of the Environment Operations Act 1997*.

Iluka currently has an Exploration Licence (EL 7450) over the proposed mining area, and would be required to acquire relevant Western Land Leases and/or enter into an agreement with leaseholders to gain access to the land, prior to commencing mining.

The Department has consulted with the relevant government agencies responsible for these other approvals (see Section 4) and considered the relevant issues relating to these approvals in its assessment of the project (see Section 5). None of the relevant agencies object to the project.

3.5 Commonwealth Approvals

Iluka also needs to obtain an approval from the Commonwealth Minister for the Environment under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), because the project is a 'controlled action' under that Act due to the potential for significant impact to:

- listed threatened species and communities, in particular threatened fauna (specifically Malleefowl);
- listed migratory species, in particular migratory wetland birds;
- World Heritage values of a declared World Heritage property (the Willandra Lakes Region World Heritage Area); and
- heritage values of a National Heritage place (the Willandra Lakes Region).

This project is not being assessed under the NSW Bilateral Agreement (as it does not meet the requirements of the agreement), and hence the Commonwealth Department of the Environment (DoE) is undertaking its own assessment of the project under the EPBC Act.

3.6 Objects of the EP&A Act

The Minister is required to consider the objects of the EP&A Act when making decisions under the Act. The objects of most relevance to the Minister's decision on whether or not to approve the development are:

(a) to encourage:
- *(i) the proper management, development and conservation of natural and artificial resources, including agricultural land, natural areas, forests, minerals, water, cities, towns and villages for the purpose of promoting the social and economic welfare of the community and a better environment,*
- *(ii) the promotion and co-ordination of the orderly and economic use and development of land…*
- *(vi) the protection of the environment, including the protection and conservation of native animals and plants, including threatened species, populations and ecological communities, and their habitats, and*
- *(vii) ecologically sustainable development.*

The Department is satisfied that the proposal encourages the proper use of resources (Object 5(a)(i)) and the promotion and co-ordination of the orderly and economic use of land (Object 5(a)(ii)). The proposal would see the efficient extraction of a state significant resource without compromising the aims and objectives of nearby land uses including agriculture, conservation, recreation and tourism.

The encouragement of environmental protection (Object 5(a)(vi)) is considered in Section 5 of this report. Following this consideration, the Department is satisfied that the potential impacts of the proposal can be suitably mitigated and managed to ensure an acceptable level of environmental performance. The Department has considered the encouragement of ecologically sustainable development (ESD) (Object 5(a)(vii)) in its assessment of the development application. This assessment has sought to integrate all significant environmental, social and economic considerations and to avoid any serious or irreversible damage to the environment, based on an assessment of risk-weighted consequences.

4 CONSULTATION

4.1 Exhibition

Under Section 89F of the EP&A Act, the Department is required to publicly exhibit the EIS for the development for at least 30 days. After accepting the EIS, the Department:

- publicly exhibited the EIS for 5 weeks from 3 June 2015 until 6 July 2015 at the:
  - Department's Information Centre in Sydney;
  - Balranald Shire Council's offices;
  - Nature Conservation Council's office;
- made the EIS available for download on its website;
- notified relevant State government authorities and Balranald Shire Council;
- notified relevant road and other public infrastructure authorities in accordance with the Mining SEPP and Infrastructure SEPP; and
- advertised the exhibition in the Swan Hill Guardian and Riverine Grazier newspapers.

In undertaking these processes, the Department has satisfied the notification requirements of Section 89F of the EP&A Act and the Infrastructure SEPP.

During the assessment process, the Department also made other relevant documents publicly available on its website, including:

- the development application;
- the environmental assessment requirements;
- community and agency submissions received during the exhibition of the EIS; and
- Iluka's Response to Submissions (RTS) (see Appendix C).

The Department received advice from the following 7 government agencies during the exhibition of the EIS and/or in response to Iluka's RTS:

- Division of Resources and Energy within the Department of Industry (DRE);
- Environment Protection Authority (EPA);
- Office of Environment and Heritage (OEH);

- Department of Primary Industries (DPI), including DPI Water, Crown Lands and NSW Agriculture;
- NSW Heritage Office;
- Roads and Maritime Services (RMS); and
- Balranald Shire Council (Council).

The Department received 3 submissions from the general public, of which one supported and two objected to the development.

The advice from agencies and issues raised in public submissions are summarised below, focusing on the residual issues where stakeholders have provided additional submissions following the EIS. Full copies of the submissions are provided in Appendix B.

4.2 Agency Advice

None of the government agencies object to the project. However, some of the agencies raised issues about the assessment and potential impacts of the project, and made recommendations as to how these issues could be addressed, avoided or minimised.

DRE noted the requirement for separate mining leases for the West Balranald and Nepean deposits (given their physical separation), and requested additional information in relation to the mineral resource, potential acid forming (PAF) material, final land use and landform (including justification for the final void), and rehabilitation objectives. Iluka provided additional information addressing these matters in its Response to Submissions, and DRE confirmed that this information adequately addressed its requirements. DRE recommended a number of standard best practice conditions in relation to rehabilitation objectives, progressive rehabilitation and rehabilitation management planning.

EPA identified a number of potential risks and impacts associated with air quality, noise, water resources, PAF material and waste management, but is satisfied that these issues were adequately addressed in the EIS and could be appropriately managed subject to the preparation of a number of monitoring and management plans.

OEH initially recommended that additional archaeological assessment including subsurface testing be undertaken prior to determination given the potential Aboriginal cultural significance of the project area, and that Iluka provides details of an Aboriginal Cultural Heritage Management Plan for the project. It also recommended that Iluka provides a comprehensive biodiversity offset strategy (using the Biodiversity credit calculator), including additional offsets for the Southern Mallee Conservation Areas (SMCAs) affected by the project. It also recommended that Iluka be required to rehabilitate and secure the SMCAs for ongoing conservation management.

Since the EIS, Iluka undertook additional consultation with OEH and Aboriginal stakeholders, which included a number of meetings. Based on this consultation and additional information provided by Iluka, OEH accepts that its residual issues regarding Aboriginal heritage and biodiversity can be addressed following determination of the project, subject to a number of mitigation and management measures. These are considered in more detail in Section 5 below.

Various agencies within ***DPI*** commented on the project, including DPI Water, Agriculture NSW and Crown Lands.

Following provision of additional information in relation to water licensing, flooding, groundwater modelling and final void salinity, DPI Water indicated it was satisfied that the impacts of the project can be appropriately managed subject to a number of recommendations in relation to:

- obtaining appropriate water licences prior to construction;
- undertaking additional geochemical assessment to confirm the potential for acid mine drainage at the Nepean mine;
- undertaking further investigations to verify the groundwater modelling assumptions;
- calibrating the groundwater model during operations; and
- preparing a Water Management Plan.

DPI Agriculture provided general recommendations relating to:

- managing potential night-lighting impacts;
- traffic impacts, specifically impacts on public roads used by agricultural enterprises; and
- potential land use conflicts between the proposed biodiversity offset areas and agriculture.

Crown Lands advised that Iluka is required to obtain a range of Crown land licences under the *Crown Lands Act 1989*, and requested clarification and/or additional information on rehabilitation standards and impacts on key species associated with the potential fragmentation of the SMCAs.

NSW Heritage Office did not raise any concerns. The Office was satisfied with the historic heritage assessment findings and Iluka's proposed management and mitigation measures. It also recommended that a suitably qualified historical archaeologist should be contacted in the event that any historic heritage objects are uncovered during development of the project.

RMS is satisfied that the project-related traffic can be accommodated on the local and regional road network, subject to a number of road and intersection upgrades, road safety improvements and the preparation of traffic management plans. These are discussed in Section 5 below.

Council has indicated its support for the project subject to the imposition of conditions relating to road upgrade and maintenance contributions, community contributions, and traffic management (including preparation of a Transport Management Plan). Council also believes that the conditions should reflect that preference be given to siting the workforce accommodation facility in Balranald town (rather than in the project area), subject to this option being reasonable and feasible.

Since the EIS, Iluka and Council have agreed to a broad framework for the calculation of road maintenance contributions, as well as agreed in-principle to contributions toward community infrastructure and services for the project (which Council believes should be administered via a Voluntary Planning Agreement).

4.3 Public Submissions

The one supporting public submission was from a local resident in Balranald. The submission highlighted the potential socio-economic benefits of the project.

One public submission objecting to the project was from the neighbouring landowner of Lake Paika Station located to the east of the project area. The submission raised concerns regarding potential air quality and surface water impacts. Further information was also requested relating to the air quality assessment and the proposed air quality and surface water quality monitoring programs, including provision of monitoring data to local residents.

The other public submission objecting to the project was from Lost River Australia Pty Ltd, based at Lost River near Goulburn. The submission raised a number of issues relating to:

- amenity impacts, including air quality;
- local surface water impacts and impacts of water extraction on water availability in the catchment;
- groundwater impacts, including aquifer drawdown and water quality impacts associated with groundwater re-injection;
- public road access (including potential restrictions on access to local public roads by local residents and tourists), road safety and maintenance funding;
- the accuracy of maps, diagrams and descriptions of project components in the EIS;
- environmental hazards related to excavation and processing;
- rehabilitation;
- local socio-economic impacts and assessment of project benefits; and
- greenhouse gas emissions.

5 ASSESSMENT

In its assessment of the merits of the development, the Department has considered the:

- EIS, submissions, RTS, additional information provided by Iluka and advice from government agencies;
- relevant environmental planning instruments, policies and guidelines; and
- relevant provisions of the EP&A Act, including the objects of the Act.

Based on this assessment, the Department considers the key issues to be the potential impacts on biodiversity, Aboriginal heritage, water resources and the local/regional road network.

The following is a summary of the findings of this assessment.

5.1 Biodiversity

Introduction

The project area comprises predominantly agricultural land used for grazing (sheep and cattle) and cropping, interspersed with patches of remnant native vegetation consisting of patches of Chenopod shrubland and Mallee woodland (see Figure 9). Much of the remnant Mallee vegetation is contained within the areas of land covered by the Southern Mallee Conservation Areas (SMCAs).

The EIS includes a specialist ecological assessment undertaken by Niche Environment and Heritage. The assessment included biodiversity offset calculations using OEH's Biobanking Assessment Methodology.

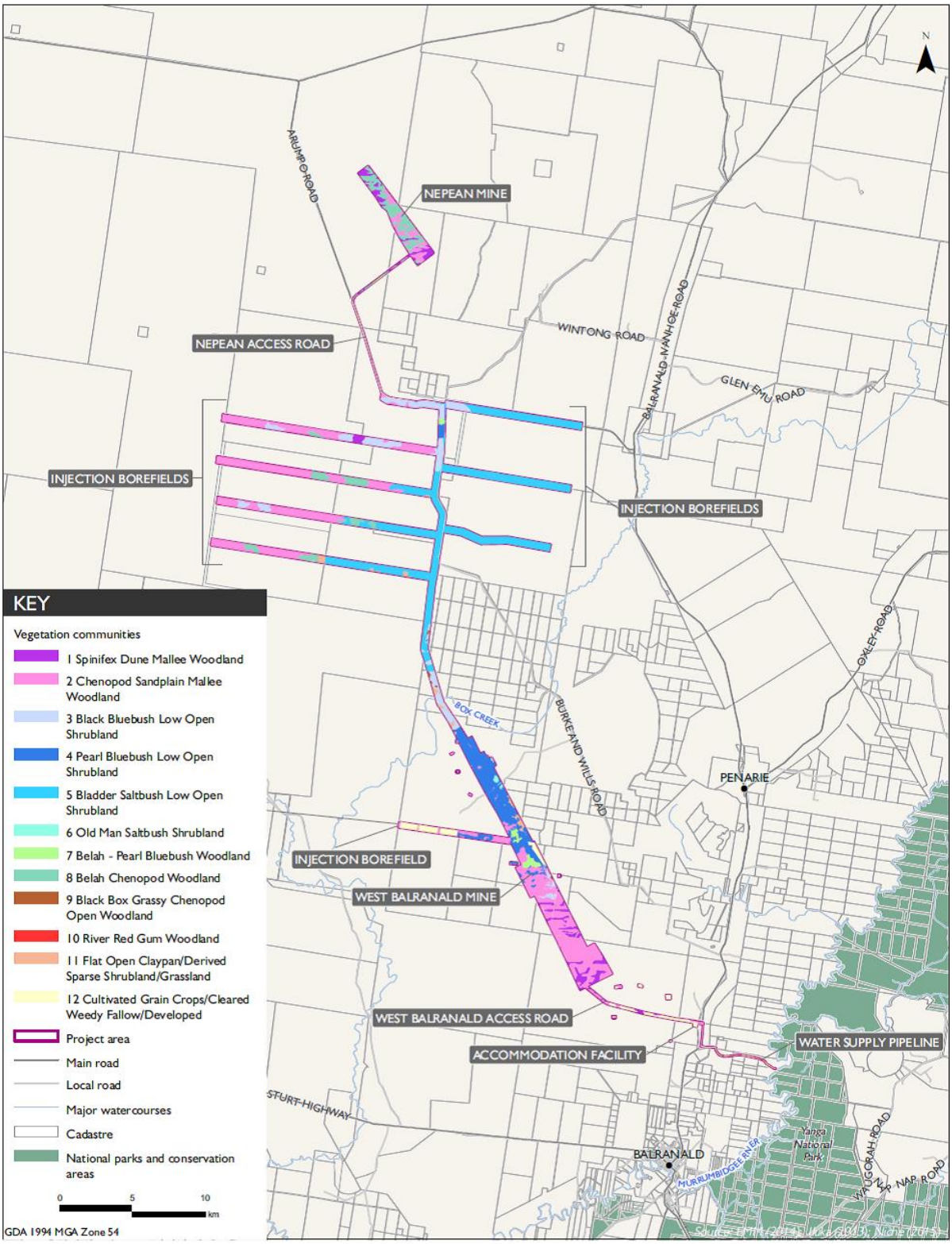

***Figure 9**: Vegetation Communities*

Avoidance and Mitigation

The ecological assessment is based on a number of measures that Iluka would undertake to avoid and/or mitigate impacts, including:

- designing the project to minimise clearing of native vegetation and threatened species habitat, including avoidance of known Malleefowl habitat where practicable, in particular:
  - shortening the southern end of the West Balranald mine footprint to reduce Mallee vegetation clearing and Malleefowl habitat, retaining an east-west vegetation corridor of at least 400m to allow fauna movement and reduce fragmentation; and
  - emplacing overburden within the mining void to minimise out-of-pit emplacement;
- designing the water supply pipeline to avoid impacting known areas of *Acacia melvillei* Shrubland endangered ecological community (EEC);
- using existing fence lines and road corridors for access roads where possible and designing haulage routes to avoid known Malleefowl mounds;
- undertaking pre-clearance surveys and vegetation clearing protocols, including avoiding vegetation clearance during important breeding and roosting periods;
- progressively clearing and rehabilitating available areas of the site; and
- undertaking weed and pest control.

These measures would be supplemented by a biodiversity offset strategy to compensate for the residual biodiversity impacts of the project. The offset strategy is discussed under a separate heading below.

Vegetation and Flora Impacts

The project would disturb (clear) up to approximately 5,160 ha of native vegetation (worst-case scenario[4]), with around 2,000 ha of this vegetation comprising shrubland.

A summary of the native vegetation communities in the project disturbance area is presented below.

Table 2: *Native Vegetation Community Impacts*

Vegetation Community	***Area to be Cleared (ha)***
Spinifex Dune Mallee Woodland	536.4
Chenopod Sandplain/Swale Mallee Woodland	2,051.5
Black Bluebush Low Open Shrubland	284.9
Pearl Bluebush Low Open Shrubland	1,072.1
Bladder Saltbush Low Open Shrubland	558
Old Man Saltbush Shrubland	19.8
Belah - Pearl Bluebush Woodland	114.8
Belah - Chenopod Woodland	438.7
Black Box – Chenopod Open Woodland	6.9
River Red Gum Woodland	3.8
Flat Open Claypan/Derived Sparse Shrubland/Grassland	73.6
Total	**5,160.5**

None of the vegetation communities identified constitute an EEC under the NSW *Threatened Species Conservation Act 1995* (TSC Act) and/or the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

The Lower Murray aquatic EEC (listed under the NSW *Fisheries Management Act, 1994*) does occur in the Murrumbidgee River in the vicinity of the proposed fresh water pipeline for the project, however the project is not expected to have any significant impact on the EEC.

No threatened flora species were recorded within the project area, however 7 threatened flora species were identified as potentially occurring:

- Mossgiel Daisy;
- Winged Peppercress;
- Chariot Wheels;
- *Pterostylis cobarensis*;
- Bitter Quandong;
- Slender Darling Pea; and
- Yellow Swainson-pea.

[4] The Department notes that the likely overall vegetation clearance would be less due to the buffering distances included in the disturbance area calculations.

The ecological assessment includes tests of significance for each of these species, which concluded that the project is unlikely to result in a significant impact on the abundance, range and distribution of any of the species.

Fauna Impacts

The ecological assessment recorded 130 native species and 6 introduced species in the project area, including 93 bird species, 13 bat species, 14 mammals (5 of which are introduced species), 11 reptiles and 5 frog species.

Twenty-six (26) threatened fauna species were either identified on site or considered likely to be found on site due to the presence of preferred habitat, including (see Figure 10):

- 15 bird species;
- 5 bat species;
- 4 reptile species;
- 1 amphibian species; and
- 1 other mammal species (Bolum's Mouse).

The ecological assessment includes tests of significance for each of these species, which concluded that the project either could have, or is likely to have, a significant impact on 6 species such that a viable local population could be placed at risk of extinction. These species are outlined in the following table.

Table 3: *Significantly Impacted Threatened Species*

Species	***Conservation Status***		***Likelihood of Occurrence***	***Likelihood of Significant Impact***
	TSC Act	***EPBC Act***		
Malleefowl (*Leipoa ocellata*)	E	V	Known	Likely
Grey-crowned Babbler (*Pomatostomus temporalis temporalis)*	V	-	Known	Possible
Little Pied Bat *(Chalinolobus picatus)*	V	-	Known	Possible
Jewelled Gecko *(Diplodactylus elderi)*	V	-	Known	Possible
Mallee Worm-lizard (*Aprasia inaurita*)	E	-	Moderate	Possible
Western Blue-tongued lizard *(Tiliqua occipitalis*)	V	-	Known	Possible

V – Vulnerable E – Endangered

As indicated in the table, the tests of significance indicated that one species, the Malleefowl, is likely to be significantly impacted at a local level due to the project, predominately as a result of vegetation and habitat removal.

In this regard, the project would result in the clearance of approximately 2,543 ha of Malleefowl habitat, including approximately 1,571 ha of high to very high quality habitat. This habitat is generally associated with the Mallee vegetation in the project area, with the Malleefowl's life cycle generally restricted to a range of only a few kilometres.

A total of 40 Malleefowl-related observations were recorded during the course of the assessments, including:

- old nesting mounds with no evidence of recent use (17);
- footprints indicating presence (12);
- recently used mounds (6);
- actual sightings of birds (2); and
- active mounds (3).

Most of these, including all of the active and recent evidence, were observed in the West Balranald project area.

In addition to the avoidance measures outlined above, Iluka is proposing to implement a number of specific management, mitigation and monitoring measures to reduce the residual impacts on the Malleefowl and the other identified threatened fauna species, including:

- additional pre-clearing surveys for Malleefowl to identify active mounds and ensure that clearing is not undertaking during nesting periods (including using remote cameras and/or aerial surveys);
- undertaking progressive clearing of smaller areas (rather than large areas), with clearing of key habitat timed to avoid sensitive periods for threatened species, including:

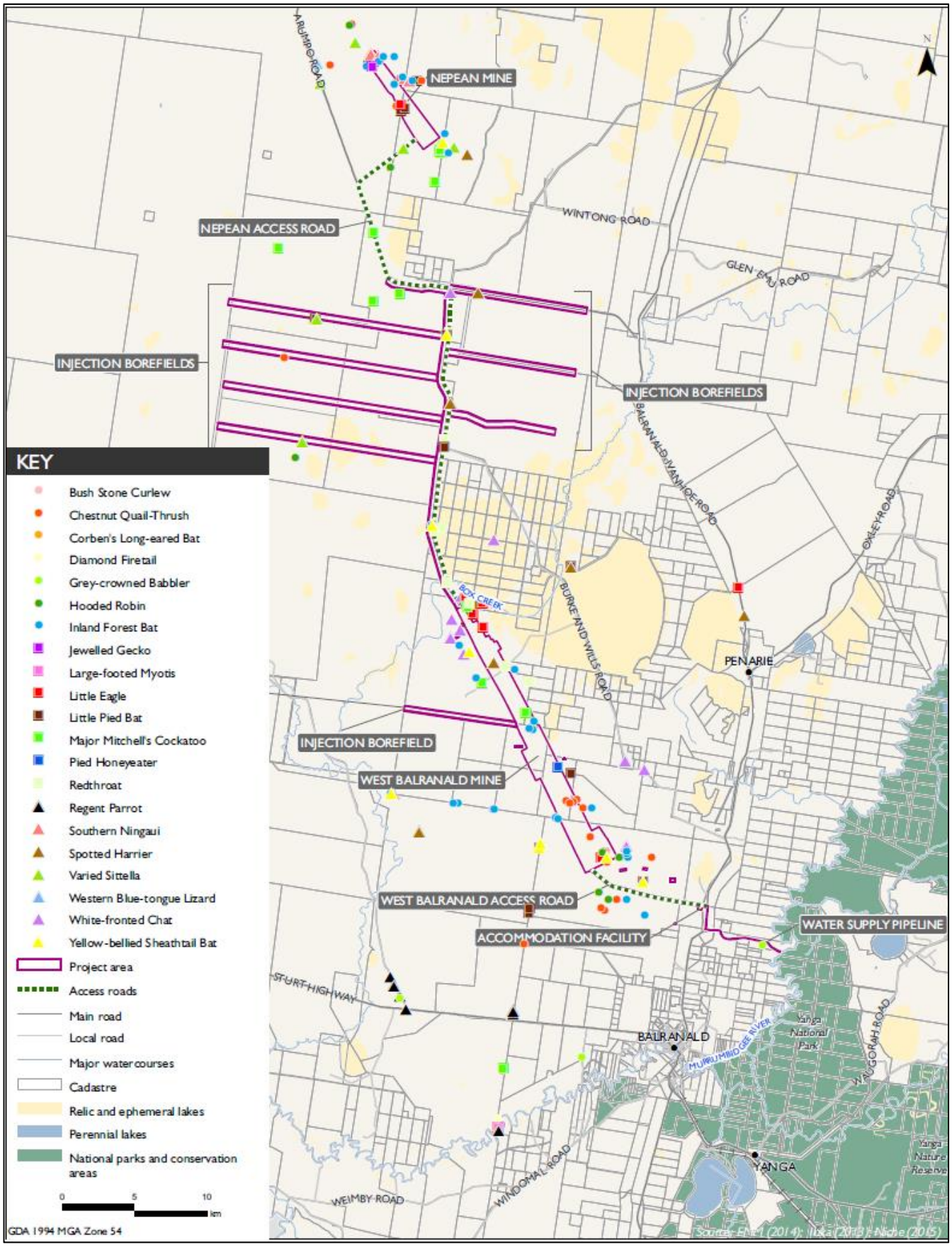

Figure 10: *Threatened Fauna*

  - September to February for Malleefowl habitat, which is the key egg incubation and nesting period; and
  - May to October for Little Pied Bat habitat, which is the species hibernation and spring birthing period;
- best practice vegetation clearance protocols in relation to tree hollows, raptor nests and Malleefowl mounds;
- a fauna rescue strategy should threatened fauna be found during pre-clearance surveys;
- establishing a comprehensive monitoring and management program for key threatened species known or considered likely to be impacted by the project, including implementing a management and monitoring program for the Malleefowl and its mounds (generally in accordance with the Natural Heritage Trust's *National Manual for the Malleefowl Monitoring System*, 2007);
- management of feral animals and pests; and
- re-establishing native woody vegetation for future vegetation corridors as part of the project rehabilitation strategy.

Iluka has also committed to preparing a Biodiversity Management Plan for the project, to be prepared in consultation with OEH. The plan would include a specific Malleefowl management and monitoring plan.

Subject to the implementation of these measures, as well as the proposed offsetting measures (see below), both OEH and the Department are satisfied that the residual impacts of the project on the Malleefowl and other threatened fauna species are acceptable. Whilst the project would impact some 1,571 ha of good quality Malleefowl habitat, and is likely to significantly affect the local population, the project is unlikely to have a significant impact on the regional abundance and distribution of this species, particularly given the large areas of habitat in the region, including the SMCAs (see below).

Biodiversity Offset Strategy

Iluka has assessed its biodiversity offsetting obligations in accordance with applicable State and Commonwealth government policies, including:

- OEH's *NSW Biodiversity Offsets Policy for Major Projects*, and the BioBanking assessment tool; and
- DoE's *Environmental Offsets Policy* (2012), and the Offsets Assessment Guide tool.

Iluka has also developed a separate offset obligation in consultation with OEH to compensate for the impact of the project on the SMCAs. This offset is discussed under a separate heading below.

To date, Iluka has not identified a specific land-based offset area(s) to satisfy its offsetting obligations. OEH is satisfied that this approach is acceptable given the large amounts of similar vegetation and habitat available in the region, as long as Iluka satisfies its offsetting obligations within a reasonable timeframe.

Based on OEH's BioBanking assessment tool, the project would require some 216,791 ecosystem credits[5] to suitably offset the project's biodiversity impacts. The credits required for individual vegetation communities are summarised in the following table. OEH has reviewed and verified these credit calculations.

Table 4: *Summary of BioBanking Analysis*

Vegetation Community	***Area Affected (ha)***	***Ecosystem Credits Required***
Black Bluebush low open shrubland of the alluvial plains and sandplains of the arid and semi-arid zones	284.9	10,014
Black Box open woodland wetland with chenopod understorey mainly on the outer floodplains in south-western NSW	6.9	276
Black Oak - Pearl Bluebush open woodland of the sandplains of the semi-arid warm and arid climate zones	114.8	5,638
Black Oak - Western Rosewood open woodland on deep sandy loams mainly in the Murray Darling Depression Bioregion	439.7	23,557

[5] No separate species credits are required as the ecosystem credits address the offsetting requirements for individual threatened species.

Vegetation Community	***Area Affected (ha)***	***Ecosystem Credits Required***
Bladder Saltbush shrubland on alluvial plains in the semi-arid (warm) zone including Riverina Bioregion	558.0	14,929
Chenopod sandplain mallee woodland/shrubland of the arid and semi-arid (warm) zones	2,051.5	96,249
Disturbed annual saltbush forbland on clay plains and inundation zones mainly of south-western NSW	73.6	2,412
Old Man Saltbush shrubland mainly of the semi-arid (warm) climate zone (south western NSW)	19.8	831
Pearl Bluebush low open shrubland of the arid and semi-arid plains	1,072.0	39,452
Spinifex linear dune mallee mainly of the Murray Darling Depression Bioregion	536.4	23,433
Total	**5,158**	**216,791**

It is noted that Iluka has not applied any discounting to the credit requirements to account for rehabilitation of the affected mining area, given the expected difficulty in rehabilitating the site to good quality Mallee vegetation as a result of the semi-arid environment and poor soils of the area. Both OEH and the Department accept that this approach to offsetting liabilities is conservative and appropriate. Notwithstanding, the Department has recommended conditions requiring Iluka to rehabilitate the project area to restore native vegetation communities and ecosystem function.

Whilst the final size and composition of any land-based offsets to meet these offset credit requirements is not known at this stage, Iluka's assessment indicates that an indicative offset area(s) of some 28,340 ha would be required to meet the credit requirements. However, it is noted that the final offset size will depend on the quality and composition of the offset sites themselves.

OEH is satisfied that there are adequate areas of land available in the applicable bioregions to meet these offset requirements.

Using DoE's Offsets Assessment Guide tool, Iluka has also undertaken an indicative assessment of the required offset for impacts to the applicable Matters of National Environmental Significance (MNES) under the EPBC Act, which for the project is the Malleefowl. The assessment indicates that some 5,000 ha of Malleefowl habitat would be required to meet the Commonwealth's MNES offsets requirements.

The Department accepts that there are large areas of land available in the applicable bioregions to satisfy the applicable biodiversity offset requirements. Subject to the implementation of these offsets, the Department is satisfied that the biodiversity offset strategy would provide an adequate conservation package to ensure that the project is able to be undertaken in a manner that would enhance, or at least maintain, the biodiversity values of the locality over the medium to long term. In this regard, based on Iluka's indicative assessment the project would provide for the in-perpetuity conservation of an area some 5 times larger than the area of land that would be affected by the project.

To ensure that the biodiversity offset strategy is appropriately implemented, the Department has recommended conditions requiring Iluka to retire the required biodiversity offset credits in accordance with the *NSW Biodiversity Offsets Policy for Major Projects,* and to the satisfaction of OEH.

Given the scale and timeframe of the project, the Department has recommended that the biodiversity credits should be retired in two stages to reflect the two major project components – ie. within 3 years of commencement of construction for the West Balranald Mine, and prior to vegetation clearing for the Nepean Mine.

Southern Mallee Conservation Areas (SMCAs)

As discussed in Section 1, the project disturbance area partially overlaps 3 existing SMCAs, which have been set aside as a form of conservation reserve to compensate for the clearing of Mallee vegetation for agricultural land use. Typically, the SMCAs were originally established to conserve like-for-like vegetation at offset ratios of 1:1, with the exception of Chenopod Mallee which had an offset of around 1:2. The title conditions for SMCA lands typically require the following conservation management:

- fencing and destocking;
- no clearing or timber removal; and
- best practice management in accordance with applicable regional guidelines.

Approximately 1,179 ha of a total of 22,574 ha (or approximately 5%) of the 3 SMCAs would be disturbed by the project, as outlined in the following table.

Table 5: *SMCA Impacts*

SCMA Name	*Total Extent of Conservation Area (ha)*	*Extent within Disturbance Area (ha)*
Wampo	17,790	377
Pine Lodge	3,690	800
Hugh Dale	1,094	2
Total	**22,574**	**1,179**

To account for the proposed disturbance to the SMCAs, and in acknowledgement of their existing conservation status, Iluka and OEH have negotiated an additional offsetting (or replacement) requirement for the SMCAs over and above the Biobanking assessment requirement outlined above.

The additional offset liability has been based on the Biobanking calculator and commensurate with the original offset ratios during the establishment of the SMCAs, but is expressed in hectares of land to be retired given that the Biobanking assessment tool does not strictly apply to the SMCA replacements. The additional offset liability amounts to some 2,041 ha of Mallee and Chenopod vegetation communities.

The Department accepts that the additional offset for the SMCAs is reasonable, and has recommended conditions requiring Iluka to identify and secure the replacements to the SMCAs to the satisfaction of OEH.

Cumulative Impacts

The project would be operating in a similar timeframe, and disturbing a similarly large area, as the approved Atlas-Campaspe Mineral Sands Project, located some 20 km to the north of the project. Both mines would be impacting on some of the same threatened species that have overlapping habitat requirements, including the Malleefowl. Notwithstanding, the Department notes that both projects include comprehensive biodiversity offset packages and similar requirements or recommendations for managing impacts, particularly on the Malleefowl.

The Department is satisfied these measures would ensure that any cumulative impacts are adequately managed, and would contribute to an overall net benefit to the conservation and improvement of habitat values for affected threatened species and common species in the region in the medium to long term.

Conclusion

The Department acknowledges that the project would require clearing of over 5,000 ha of native vegetation which includes habitat for a number of threatened species.

However, the Department is satisfied that Iluka has investigated reasonable and feasible measures to avoid and/or minimise the biodiversity impacts of the project. The Department also acknowledges that the disturbance estimates are conservative and the proposed offset credit requirements and associated final offset package would adequately compensate for the project's residual impacts.

The Department acknowledges Iluka's proposal to include a range of mitigation and monitoring measures to minimise, to the greatest extent practicable, the impact on the Malleefowl (although acknowledging that the local population may be significantly impacted in the short-term) and other threatened fauna species.

Much of the existing habitat is degraded and the proposed management measures and significant offset proposal would result in a greater area of higher quality habitat in the medium to long term. The Department is satisfied that these measures would assist in achieving a positive net regional conservation outcome for the Mallee vegetation on which the Malleefowl relies.

Overall, the Department and OEH are satisfied that the potential impacts on fauna species are able to be avoided, mitigated and/or at least offset such that the project would maintain or enhance biodiversity values in the area over the medium to long term.

To ensure this occurs, the Department has recommended conditions requiring Iluka to:

- provide substantial biodiversity offsets by retiring biodiversity credits in accordance with the *NSW Biodiversity Offsets Policy for Major Projects*;
- provide additional land-based offsets to replace the SMCAs affected by the project;
- prepare and implement a comprehensive Biodiversity Management Plan for the project, including detailed management and monitoring plans for threatened fauna species including the Malleefowl; and
- meet a number of rehabilitation objectives, and prepare a detailed Rehabilitation Management Plan for the project.

5.2 Aboriginal Heritage

Introduction

The EIS includes an Aboriginal Cultural Heritage Assessment, undertaken by Niche Environment & Heritage in accordance with relevant OEH Guidelines.

The assessment was undertaken in consultation with the local Aboriginal community. In this regard, 6 Registered Aboriginal Parties (RAPs) have been involved in consultation and/or field surveys for the project, including:

- Balranald Local Aboriginal Land Council (LALC);
- Kay Dowdy;
- Balranald Aboriginal Health Service representing the Mutthi-Mutthi people;
- Yarkuma Aboriginal Support Service[6];
- National Koorie Site Management; and
- Kullila Site Consultants.

The Department and OEH are satisfied that the assessment and consultation has been undertaken in accordance with applicable guidelines, including the OEH's *Aboriginal Cultural Heritage Consultation Requirements for Proponents* (2010).

Aboriginal Heritage Context

The project area lies within the traditional country of the Mutthi-Mutthi, Barindji and Yitha Yitha people. The region is rich in archaeological resource and significance, with evidence of Aboriginal occupation occurring in landforms from both the Holocene period (ie. 12,000 years to present) and Pleistocene period (ie. 2.5 million to 12,000 years ago).

The Willandra Lakes Region World Heritage Area (WHA) is located about 23 km to the west of the proposed Nepean mine, 15 km west of the injection borefields and 34 km from the West Balranald mine (see Figure 2).

The WHA provides evidence of a long history of human occupation dating back at least 40,000 years. The ancient riverine landforms and lunette (ie. crescent dune) lake systems are particularly rich in evidence of Aboriginal occupation. Human remains in the WHA – including the Mungo Man and Mungo Lady, dated at around 40,000 years old – are the oldest modern human remains found in Australia to date, and have helped to further understand early migration of homo sapiens across the globe.

The project area is located away from the main ancient lakes system, however the Aboriginal assessment predicted that Holocene sites (about 500 to 3,000 years old) would be located along the Box Creek floodplain. It also predicted that there is the potential for much older sites to occur in the Pleistocene landforms, with the site having some potential to contain very ancient Aboriginal cultural sites potentially with ages similar to those found in the WHA. However, most of the site landforms are of Holocene age.

The archaeological resource in the project area has also been affected by agricultural and other development, droughts and erosion, vegetation clearing, ploughing and grazing.

[6] Withdrawn as a RAP in November 2012 at the RAP's request.

Aboriginal Heritage Impacts

The archaeological assessment identified a total of 383 Aboriginal site/objects in the current project area[7] (see Figure 11). 256 of these are within the project disturbance area and would be directly impacted by the project. The remaining 127 sites are outside the project disturbance area but have the potential to be indirectly impacted. Identified sites were concentrated in areas within proximity to the Box Creek floodplain, with:

- 70 sites in the West Balranald mine area;
- 303 sites in the injection borefields area;
- no sites in the Nepean mine area; and
- 10 sites in the access roads and other areas.

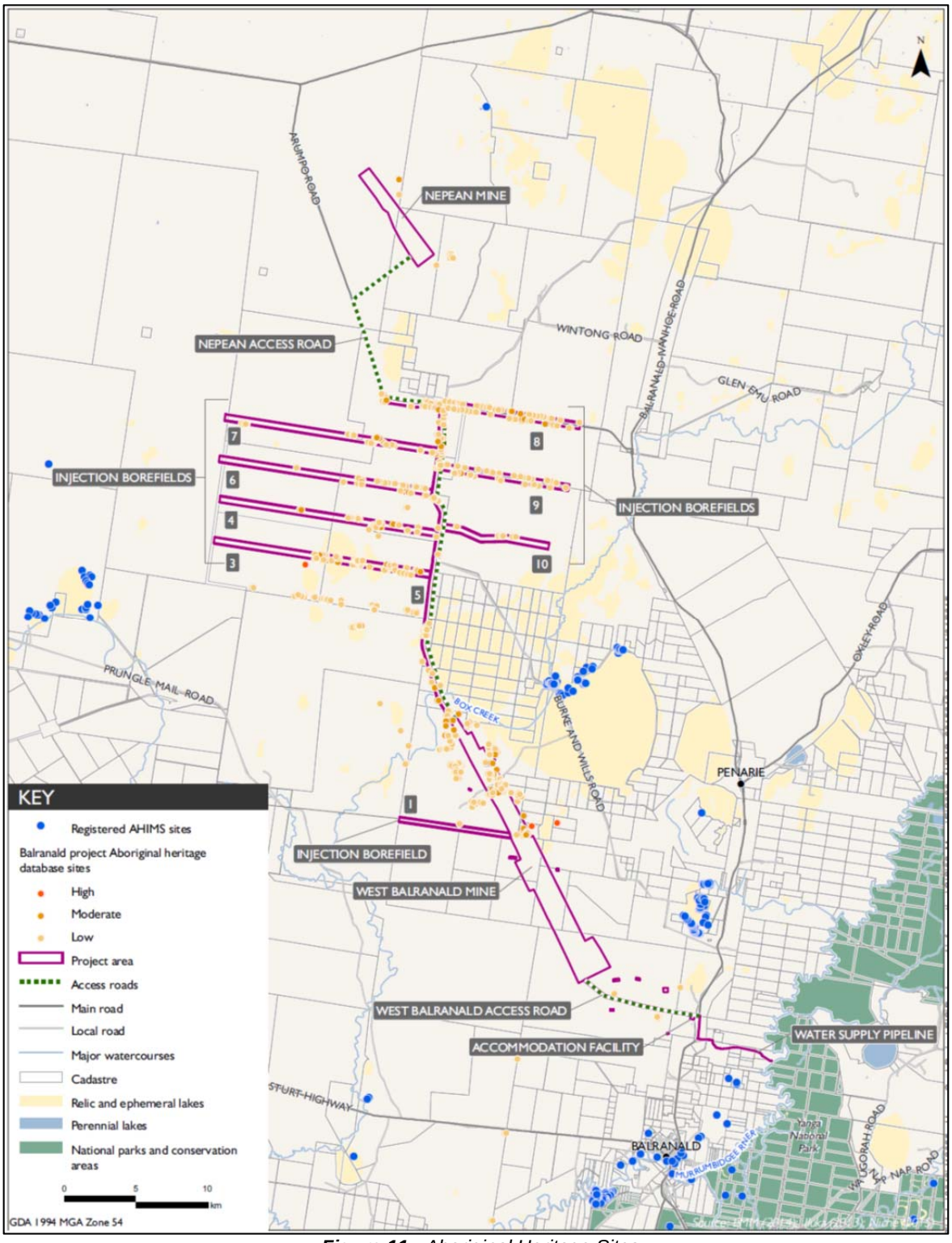

Figure 11: *Aboriginal Heritage Sites*

[7] The assessment identified a total of 548 sites within a wider area that encompassed land that does not form part of the current project area.

The sites comprised stone artefacts (isolated finds and artefact scatters), hearths, a scarred tree, and/or a combination of these. Of the 383 sites, one site (WB40) was assessed as being of high archaeological significance, 61 were considered to be of moderate significance, and 321 were assessed as being of low significance.

The WB40 site is a large, high density archaeological complex containing a diversity of stone artefacts (1,030), hearths, the scarred tree and potential archaeological deposit (PAD). It has high significance for its research and scientific value and for the potential for Pleistocene and Holocene deposits to occur. Approximately one hectare (or 2 percent) of the site is within the project disturbance area for the West Balranald mine.

Based on the predictive modelling and site investigations, the archaeological assessment developed Aboriginal risk mapping across the project area, which is reproduced on Figure 12. As indicated, the higher sensitivity areas include the northern parts of the West Balranald mine and parts of the injection borefields.

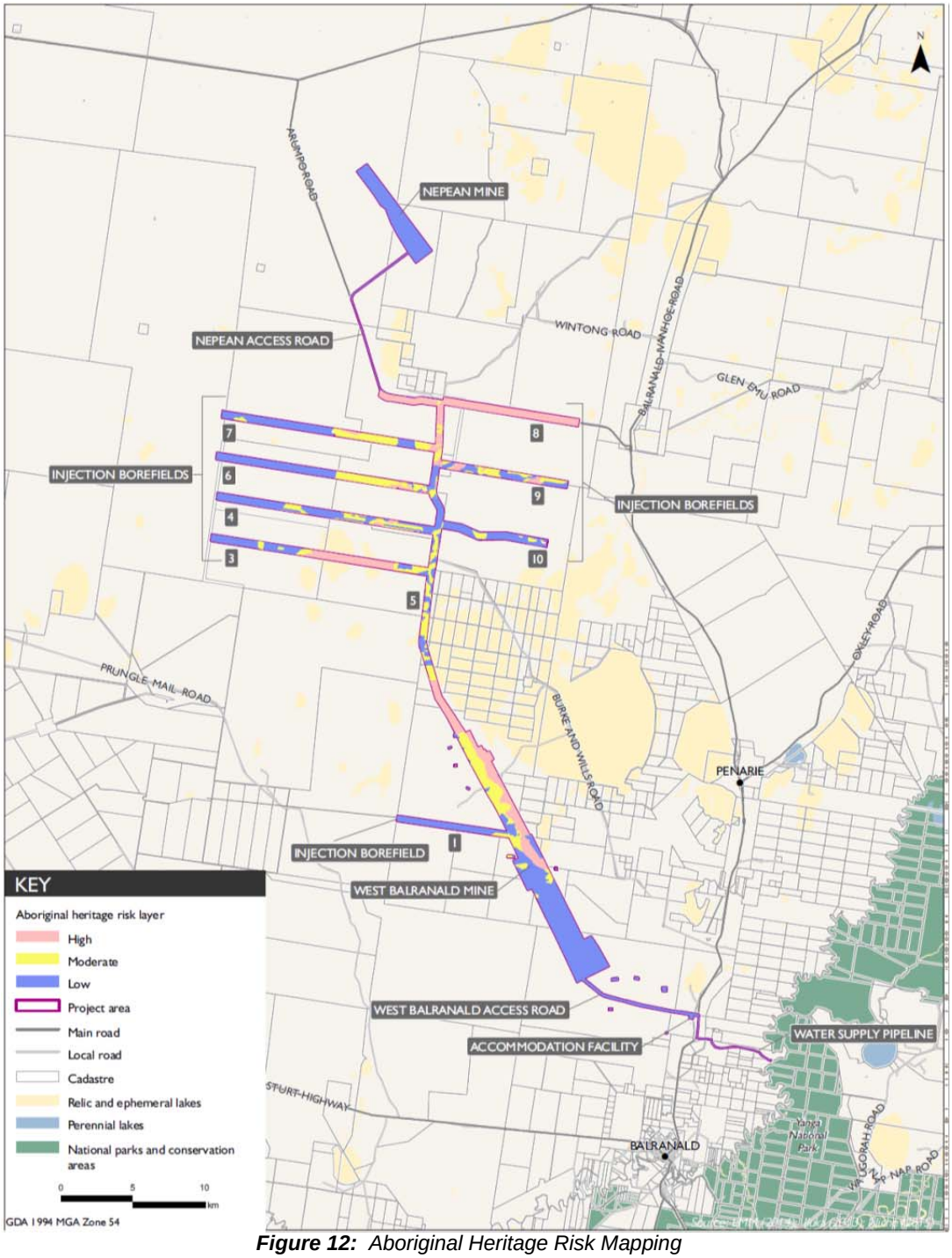

Figure 12: *Aboriginal Heritage Risk Mapping*

The assessment concluded that the project would not have any direct or indirect impacts on the Willandra Lakes WHA given the distance to the WHA and the different nature of the landforms. No outstanding examples of landscapes or features were identified in the project area that have similar values to those found in the WHA.

OEH initially criticised the assessment for not including a subsurface archaeological testing program, noting that a subsurface program was warranted given the high likelihood of Aboriginal heritage impacts as a result of the combination of geomorphology, proximity to the Willandra Lakes WHA and the large number of recorded sites. In addition to this testing, OEH recommended:

- re-assessment of cultural heritage significance based on the results of the recommended subsurface investigations;
- provision of details of an Aboriginal Cultural Heritage Management Plan (ACHMP) for the project, including Trigger Action Response Plans (TARPs) to manage the discovery of significant sites (such as human remains) during the project; and
- further development of management actions in consultation with the Aboriginal stakeholders.

Iluka subsequently undertook additional consultation with OEH and the RAPs, including a number of meetings between February and October 2015. As a result of this consultation, the stakeholders agreed that whilst additional subsurface investigation prior to project determination is preferred, such testing is able to be carried out following approval subject to a testing program and TARPs being established and incorporated into the ACHMP.

Based on this, Iluka has developed a subsurface archaeological testing program and three TARPs. The testing program takes in the key areas where moderate to high significance sites were identified in the project area. Figure 13 shows the proposed excavation program for the West Balranald mine.

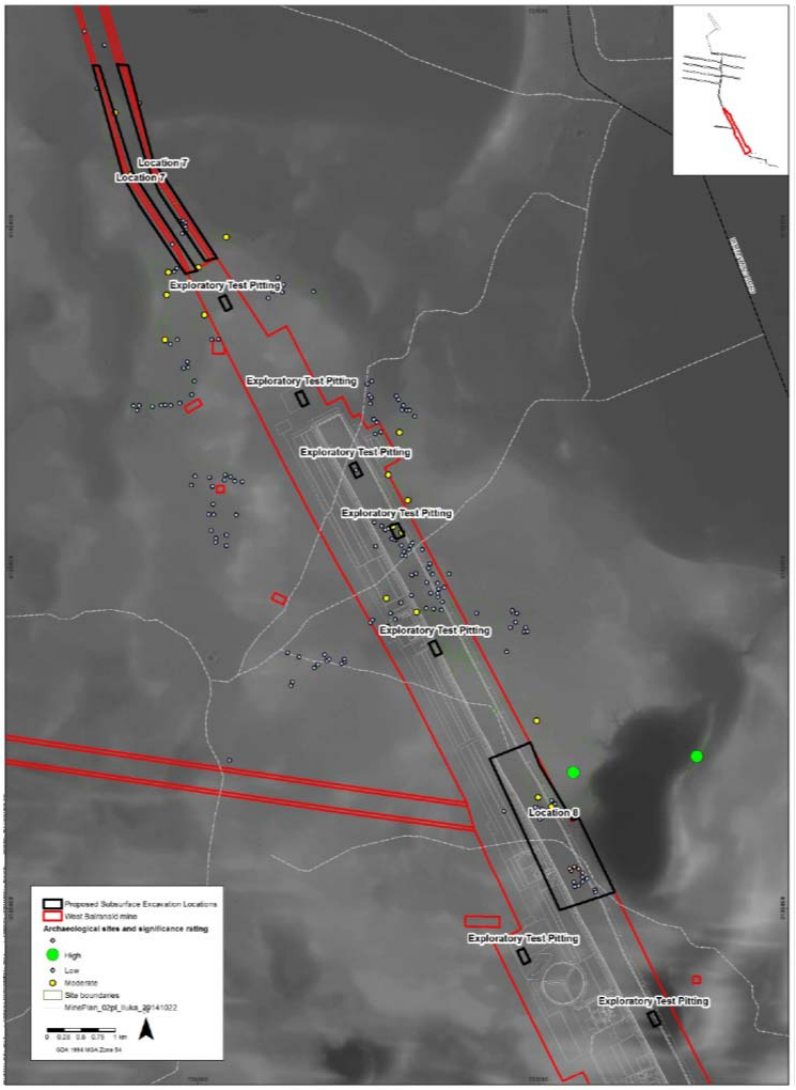

Figure 13: *Proposed Subsurface Testing Program – West Balranald Mine*

The three TARPs provide protocols for the management of:
- unauthorised ground disturbance;
- discovery and assessment of additional Aboriginal sites; and
- discovery of potential human remains.

OEH has reviewed and accepts these documents apart from some recommended minor additions to address cumulative impacts and the potential for discovery of megafauna assemblages (which are known to occur in the region). OEH considers that the TARPs are well considered, address their purpose and importantly are presented in a simple manner that is easy to follow regardless of an individual's skill sets in heritage or comprehension of related legislation.

The Department accepts that Iluka has explored reasonable and feasible measures to minimise the project's impacts on Aboriginal heritage values as far as practicable, including minimising impacts on the highly significant WB40 site. The Department also supports the precautionary approach to development in the areas of moderate to high risk through the implementation of the additional surface testing program and the TARPs.

The assessment indicates that whilst the site does have some Pleistocene deposits and areas of higher Aboriginal risk (see Figure 13), the potential for the project area to contain highly significant Aboriginal sites on the scale of those found in the Willandra Lakes WHA is low given the different geomorphology and landscape.

However, the Department believes that the TARPs should be strengthened in regard to what to do in the unlikely event that sites of very high significance or human remains are identified during the project, particularly in relation to avoidance measures. At present the TARPs require that if a site of very high significance is identified, then OEH, the RAPs and the Department are to be notified/consulted, then the construction/operations managers are required to determine whether the sites can be avoided. If not, then management and mitigation measures (eg. further excavation and/or salvage) are to be developed in consultation with the stakeholders.

The Department believes that the decision of whether a highly significant site should be avoided should not be left to the discretion of Iluka's construction/operations manager. Rather, the Department believes that this decision should be made following detailed consultation with OEH and the Aboriginal stakeholders, with the Department having ultimate responsibility for deciding whether such sites should be avoided. The Department has recommended conditions in this regard.

In summary, the Department's recommended conditions require Iluka to:
- protect Aboriginal heritage sites outside the project disturbance area;
- establish an Aboriginal Cultural Heritage Working Group to advise on Aboriginal issues associated with the project;
- develop and implement a detailed ACHMP in consultation with OEH and the Working Group, including:
    - a Geomorphic Assessment to assist in defining the subsurface testing program and other ACHMP components;
    - a Subsurface Archaeological Testing Program;
    - an Archaeological Salvage Program for identified Aboriginal sites within the project disturbance area;
    - TARPs to manage additional Aboriginal risks (as described above); and
    - a Cultural Heritage Management Program; and
- obtain separate approval from the Secretary for the disturbance of any additional high or very high significance sites identified during the project, with any proposal to disturb such sites accompanied by a report that:
    - is prepared in consultation with OEH and the Working Group;
    - assesses the significance of the identified site/s;
    - considers reasonable and feasible measures to avoid the sites;
    - describes proposed measures to manage the sites; and
    - is approved by the Department prior to undertaking any disturbance in the vicinity of the sites.

With the implementation of these measures, the Department is satisfied that the project is able to be managed in a manner that appropriately manages impacts on the region's Aboriginal heritage values.

5.3 Traffic and Transport

Introduction

The EIS includes a traffic impact assessment undertaken by EMM in accordance with the relevant guidelines, including the *Guide to Traffic Generating Developments* (RTA 2002) and the *Guide to Road Design* (Austroads 2010). The assessment also included a Road Safety Audit for the mine access and haulage route, undertaken by TrafficWorks.

The assessment considers the potential impacts associated with increased project-related traffic during both the construction and operational phases of the project, and upgrades to the road network.

Transport Routes

The primary access routes for the project would be via the regional road network including the Sturt Highway and Balranald-Tooleybuc Road (both State roads under the jurisdiction of RMS), and Balranald-Ivanhoe Road (a regional road under the jurisdiction of Council) (see Figures 14 and 15). These roads are all approved B-Double routes and carry relatively high proportions of existing heavy vehicle traffic.

Oversize vehicles would be used to move some large plant and equipment from Iluka's existing operations in Victoria to the project area during the construction phase. Oversize vehicle access would generally be along the Sturt Highway via Robinvale/Euston, west of Balranald.

These transport routes also include a number of local Council-managed roads within Balranald urban area including Market Street (Sturt Highway), Piper Street, O'Connor Street, Moa Street and McCabe Street (see Figure 15). McCabe Street is an approved B-Double route and all project-related heavy vehicles would be directed to use this route, apart from oversize vehicles which would use the Piper Street/O'Conner Street/Moa Street access route, which is also an approved B-Double route.

From the regional road network, access to the West Balranald project area is proposed to be provided via a private access road (the West Balranald Access Road) to be constructed from the Balranald-Ivanhoe Road to the project area. Access to the Nepean project area would be provided via the Nepean Access Road, which would be constructed from the West Balranald project area to the Nepean project area, and include sections of the existing Burke & Wills and Arumpo public roads (local roads under the jurisdiction of Council).

Prior to construction of the West Balranald and Nepean access roads, Iluka proposes to access parts of the project area (eg. the injection borefields) via Burke & Wills Road and Arumpo Road, from the Balranald-Ivanhoe Road (see Figure 16). These roads are unsealed, dry weather only roads with sections of single lane that carry very low volumes of traffic, associated mostly with farms and occasional tourists (caravans and campervans) travelling to Mungo National Park.

During operations, HMC and ilmenite product would be transported from the project area via the Nepean and West Balranald access roads, Balranald-Ivanhoe Road, McCabe Street, Sturt Highway, Balranald-Tooleybuc Road and the wider regional road network (see Figure 17). Processing waste by-products would also be trucked back to the project area via this route, for emplacement in the West Balranald pit.

Traffic Impacts

The traffic assessment assessed the project-related traffic impacts at the peak stage of mine construction in 2018 (which included the overlap period of mine construction and operations), and the peak stage of mine operations in 2020.

The Balranald-Ivanhoe Road is predicted to carry the highest volume of traffic generated by the project, with up to an additional 304 vehicle movements per day during construction and 354 vehicle movements per day during operation, including up to 150 B-Double movements for the transport of mine product. The greatest increase would be on the section of Balranald-Ivanhoe Road south of the West Balranald mine access road, in which the project operational traffic would result in a 62-80% increase in daily traffic and a 166-210% increase in the heavy vehicle traffic volume. However, these increases are off relatively low base traffic levels and total traffic volumes (ie. 798 to 929 daily vehicle movements) would remain below the level where widening of the existing 7.0 m wide carriageway would be warranted under Austroads road design standards (ie. over 1,000 vehicles daily).

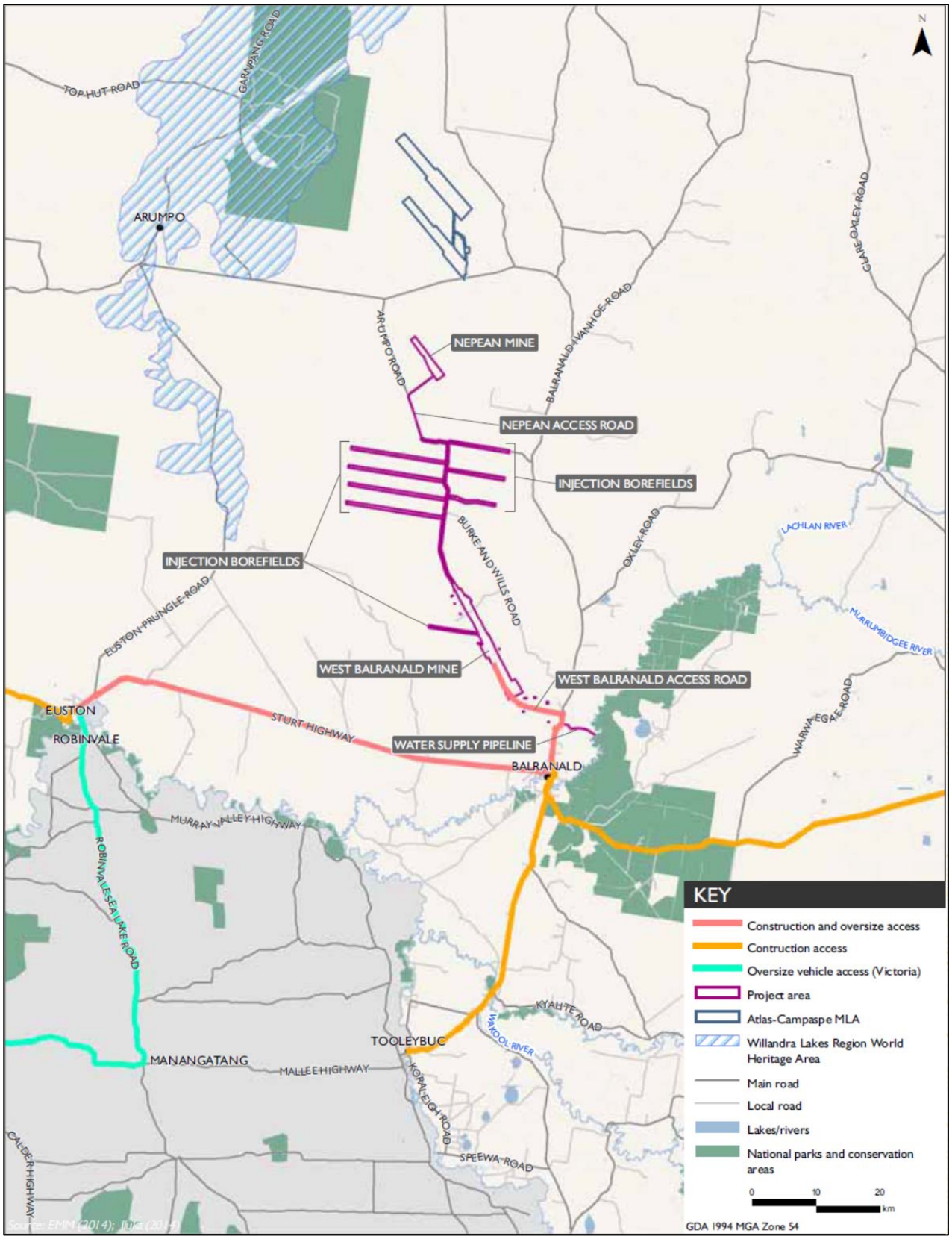

Figure 14: *Construction Transport Routes*

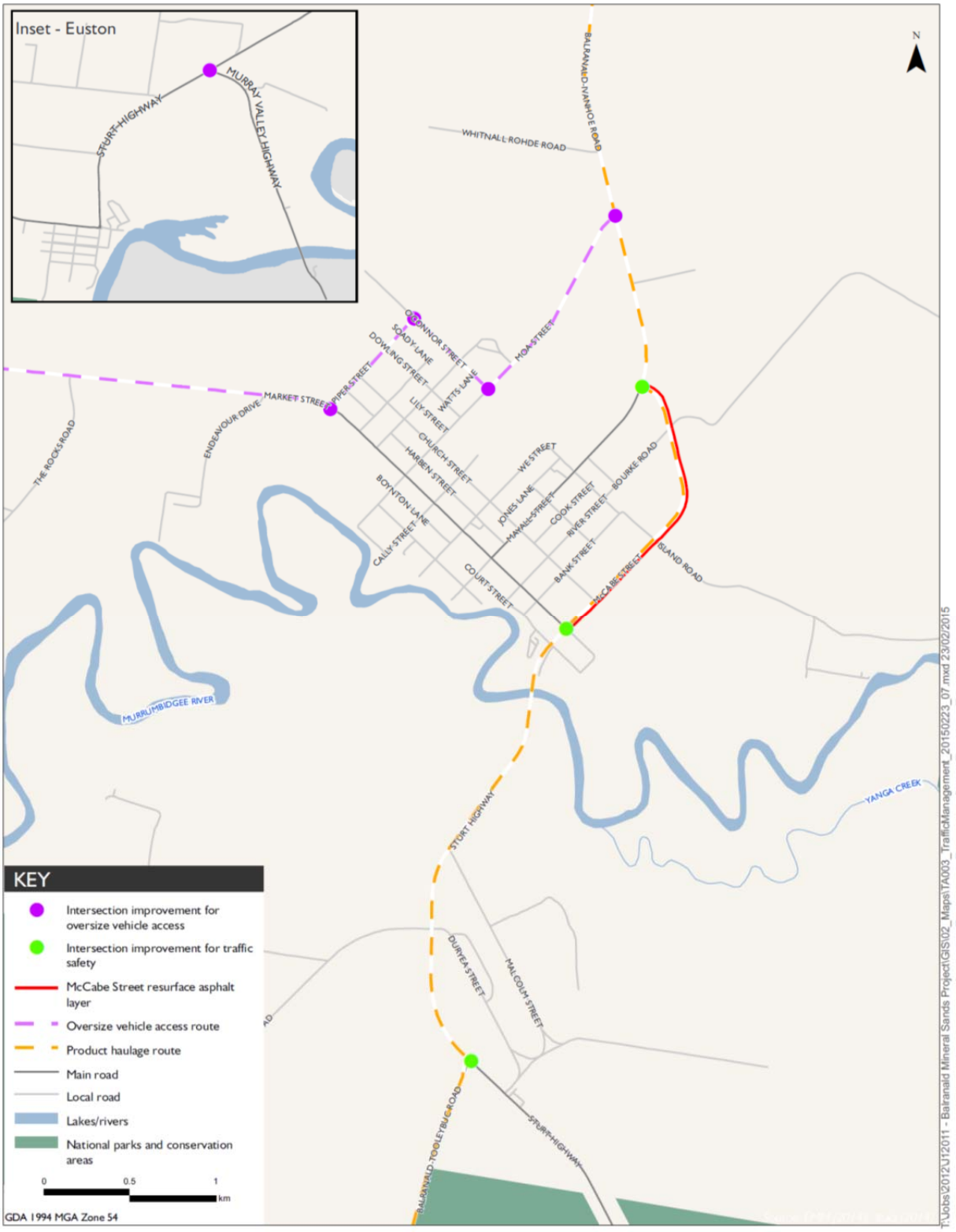

Figure 15: *Balranald Access Routes, showing proposed traffic upgrade works*

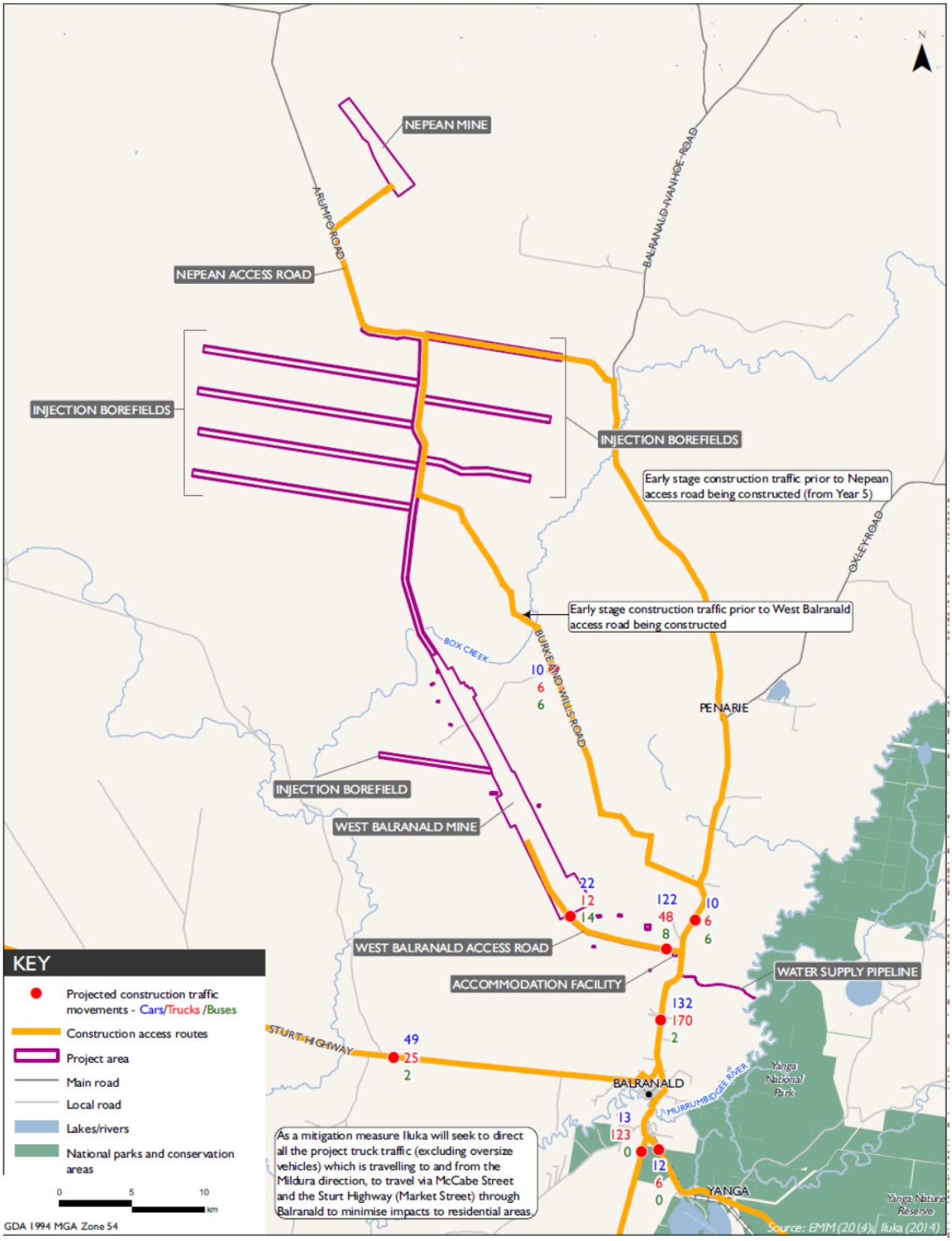

Figure 16: *Proposed construction access via local roads*

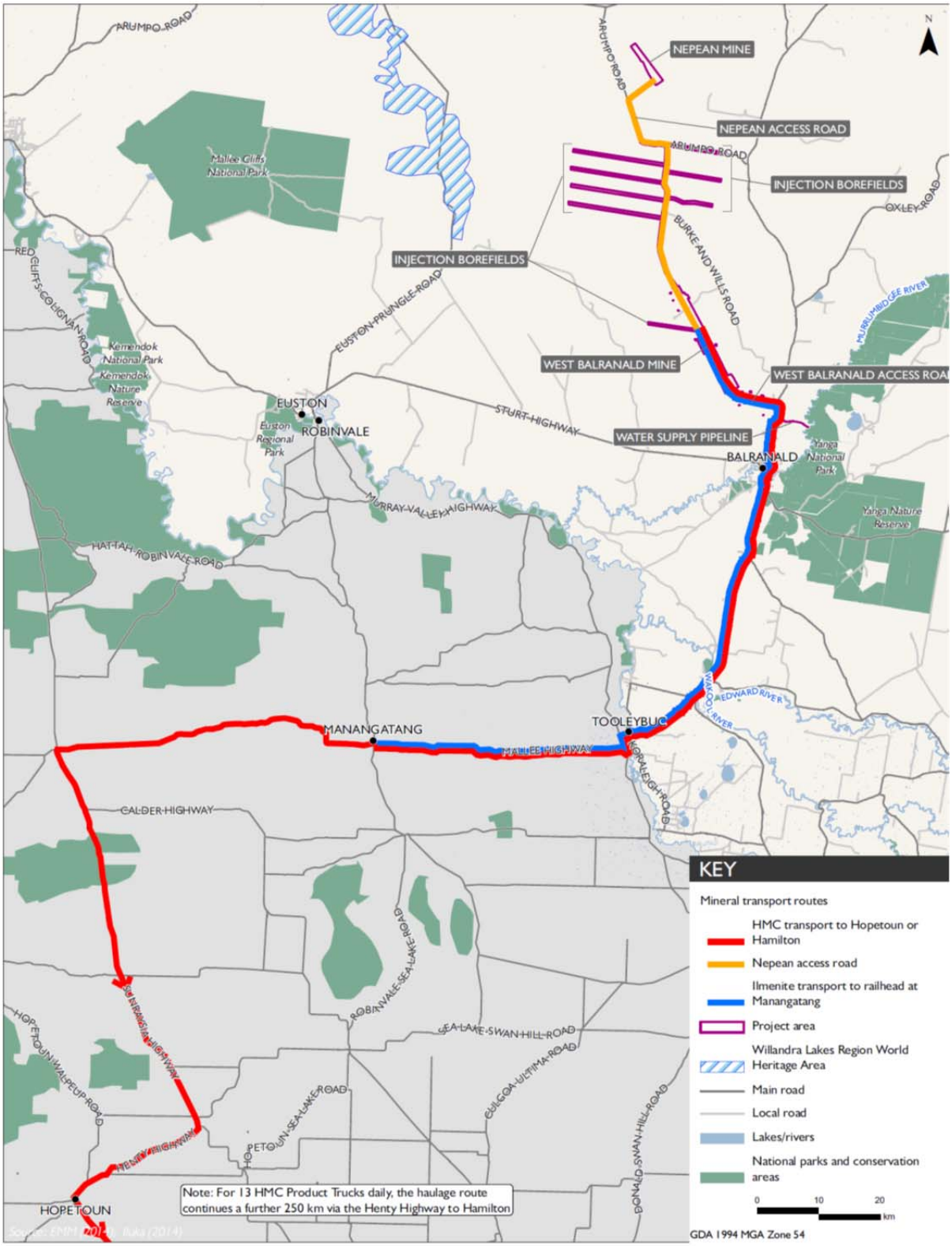

Figure 17: *Mineral Transport Route*

With regard to the Balranald urban area roads, the daily traffic volumes would increase by between 1% on Market Street and 61% on Moa Street. In order to minimise the potential traffic impacts to residential areas on routes such as Piper Street, O'Connor Street and Moa Street, Iluka has committed to directing all operational heavy vehicle traffic (apart from oversize vehicles) via McCabe Street and the Sturt Highway (Market Street) while travelling through Balranald (see Figure 15).

The traffic assessment concluded that the increase in traffic, although significant in terms of relative traffic volumes, is not expected to materially affect the capacity, performance and safety of the local and regional road network, subject to a number of upgrades and works (see below). This includes

performance of the various intersections along the transport routes, with the project not expected to change the existing levels of service (which are currently good at either 'A' or 'B').

The RMS and Council both accept that the regional and local road network can accommodate the project, however this would be subject to a number of road and intersection upgrades and works, contributions towards road maintenance, and other traffic management measures. These aspects are addressed below.

Road Upgrades and Maintenance

Iluka is proposing to undertake a number of road upgrades including road surface (pavement) and intersection improvements along the main transport routes to accommodate the predicted traffic volumes and allow for the transportation of mine product in road trains. The proposed upgrade, realignment and intersection works include:

- constructing the West Balranald Access Road, comprising a new unsealed two-lane access road off Balranald-Ivanhoe Road to the processing area at the West Balranald mine, and including a new intersection with Balranald-Ivanhoe Road;
- upgrade/construction of the Nepean Access Road, comprising construction of new private access roads and upgrade of sections of two existing public roads (Burke and Wills Road and Arumpo Road) and associated intersection to provide access to the Nepean mine;
- upgrade of the following intersections:
    - Sturt Highway (HW14) / Balranald-Tooleybuc Road;
    - the two intersections on Murray Street in Tooleybuc;
    - Sturt Highway (HW14) / Murray Valley Highway;
    - McCabe Street / Balranald-Ivanhoe Road (MR67); and
- implementation of a number of traffic management and road improvement works in Balranald urban area (see Figure 15).

The RMS supports these works, but also recommended conditions in relation to:

- requiring Iluka to undertake a number of other traffic safety improvements (eg. signage, lighting) as identified in Iluka's road safety audit as being of high and medium risk;
- intersection upgrade detail and signage requirements for the identified upgrades;
- timing requirements for completion of the identified upgrades;
- dilapidation surveys and make good arrangements for project-related damage;
- preparation of traffic management plans;
- monitoring and recording of project-related traffic movements;
- restrictions of project-related traffic (including employees and contractors) to the dedicated transport routes, and prohibition of the use of other local roads; and
- standard road works approvals and deed requirements, as well as ensuring that all the identified works are undertaken by Iluka at no cost to government.

Iluka accepts all of these recommendations, apart from two recommendations in relation to the design standard and timing of some intersection upgrades.

Firstly, the RMS recommended that the Sturt Highway / Balranald-Tooleybuc Road intersection be upgraded to provide a Channelised Right Turn (CHR) on the Sturt Highway, which is consistent with the recommendations of Iluka's road safety audit. Iluka has argued that the current Auxiliary Right Turn (AUR) already does not meet the current Austroads standard, and therefore it should not be required to upgrade the intersection given that the project would not add significantly to traffic on the intersection. Notwithstanding, Iluka agreed to the upgrade if it only requires a change to linemarking on the road (ie. no pavement upgrade required).

However, RMS has reconfirmed that it does not have any current plans for upgrade of the intersection, and that Iluka's own road safety audit identified the intersection as high risk, particularly at night. With the proposed 24 hour product haulage, RMS maintains that the upgrade should be undertaken by Iluka (prior to the commencement of product haulage).

Given the project-related traffic on the intersection (particularly at night), and the identified safety risks, the Department agrees with RMS that Iluka should be responsible for upgrade of this intersection to provide a CHR, and has recommended conditions in this regard.

Secondly, the RMS recommended that the two intersections on Murray Street in Tooleybuc be constructed with an asphalt wearing course to the satisfaction of RMS. Iluka has argued that these works may not be required if the RMS proceeds with a new bridge over the Murray River which

bypasses Murray Street, and/or if subsequent geotechnical assessment identifies that a new wearing course is not required.

The RMS noted that it currently has no financial commitment to the new bridge, but agreed to reword the recommendation such that timing and requirement for the works could be further considered 6 months prior to the commencement of product haulage. The Department agrees with this approach, and has recommended conditions in this regard.

Council also supports Iluka's proposed road upgrades, subject to agreement being reached with regard to contributions towards the upgrades and ongoing road maintenance, particularly for:

- Burke & Wills Road and Arumpo Road;
- Balranald-Ivanhoe Road (MR67); and
- Balranald urban area roads, including McCabe Street, Piper Street, O'Connor Street and Moa Street.

It is noted that the identified road upgrades would be the responsibility of Iluka to implement, to the satisfaction of the applicable roads authority (ie. RMS or Council).

With regard to ongoing road maintenance, Iluka has committed to contributing towards the maintenance of affected roads under the care and control of Council for its fair share of induced deterioration. To this end, Iluka and Council have held a number of meetings to discuss road maintenance contributions and have agreed on a framework for deriving an equitable road maintenance agreement.

The Department is satisfied that Council and Iluka are progressing the development of an adequate road maintenance agreement for the project, and that this agreement would provide for appropriate contributions towards the ongoing maintenance of Council-controlled roads affected by the project. The Department has recommended conditions requiring this agreement to be reached prior to the commencement of any construction works for the project.

The Department acknowledges that the project would result in significant increases in traffic along the haulage route. However, with the implementation of the proposed road and intersection upgrades, the Department is satisfied that the increase in traffic can be safely accommodated on the local and regional road network.

The Department has recommended a number of traffic-related conditions requiring Iluka to:

- complete a number of upgrade works along the transport route (including rectifying any high and medium risk items identified in the road safety audit) to the satisfaction of the relevant roads authority prior to commencement of the relevant stages of the development;
- finalise a road maintenance agreement with Council prior to construction;
- prohibit project-related traffic using local roads to access the site other than roads that form part of the haulage route, except in emergencies;
- keep records of the amount of product and waste product transport associated with the project; and
- prepare a comprehensive Traffic Management Plan that includes a Road Transport Protocol.

5.4 Water Resources

Introduction

Water management during construction and operation of the development is a key consideration for the project. Iluka's proposed dry mining method would require:

- the mine area to be dewatered ahead of the progress of the open cut;
- the dewatered groundwater to be re-injected into the same groundwater aquifer;
- water for the processing of the ore; and
- the application of water to various mining and processing activities for dust suppression.

The development has the potential to impact on groundwater quality and quantity and associated private landholder bores, properties and infrastructure, as well as groundwater dependant ecosystems and surface water quality, including the Murrumbidgee River and ephemeral water courses.

The EIS includes a number of water-related assessments, including a:

- groundwater assessment undertaken by Jacobs;
- peer review of the groundwater assessment by Hugh Middlemiss;

- surface water management report (including flood assessment) undertaken by WRM Water + Environment;
- water assessment (including water balance) undertaken by EMM;
- groundwater dependent ecosystem assessment undertaken by CDM Smith; and
- geochemistry assessment undertaken by Earth Systems.

Catchment Context

Little significant runoff is produced within the project area given the semi-arid climate, the flat landscape and the permeable nature of the regional soils.

The site is located largely in the Box Creek Catchment, which is an ephemeral watercourse that receives distributary flows from the Lachlan River during large flow events (see Figure 18). Box Creek in the vicinity of the project area has no defined beds and flows only on rare occasions in response to heavy local rainfall or large flooding events. Generally, any runoff within the catchment drains to one of a number of dry relic lakes (Muckee Lake, Tin Tin Lake, and Pitarpunga Lake) and minor depressions which are a feature of the area.

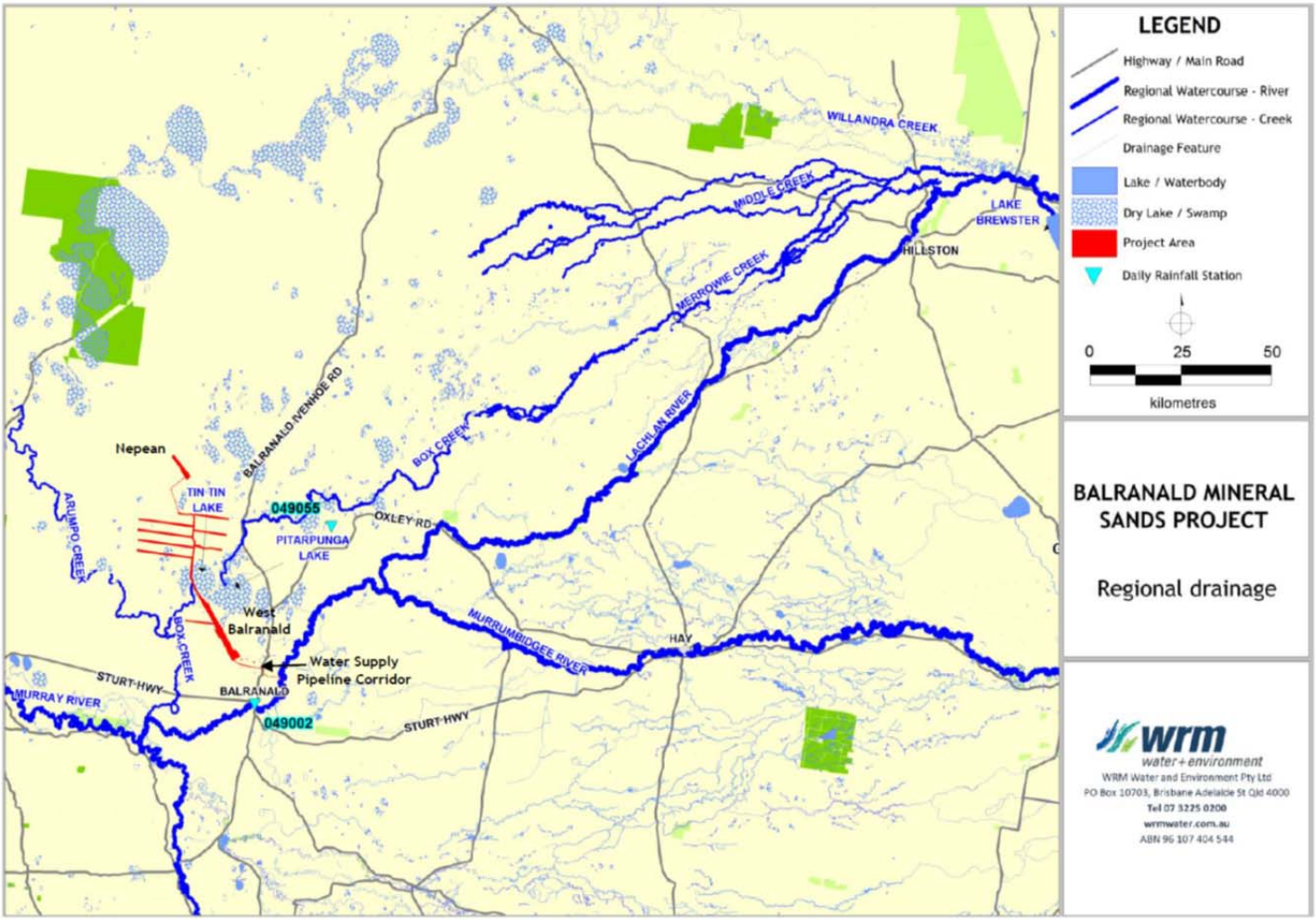

Figure 18: *Catchment Context*

Box Creek drains into the Murrumbidgee River some 30 km south-west of the project area, after merging with Arumpo Creek. The Murrumbidgee River joins the Murray River about 40 km south-west of the project site. A small part of the project area (the water supply pipeline corridor) is located in the Murrumbidgee River catchment.

The Murrumbidgee River and Murray River contain fresh water supplies that are widely used in the region for town water supply and irrigation.

Groundwater Aquifer Context

The project area is within the alluvial sediments of the Murray Basin, with the sediments ranging in thickness from 250 to 290 metres. Alluvial formations in the vicinity of the project area are shown on Figure 19, and include (from lowest to highest) the Olney Formation, Gerra Clay, Loxton-Parilla Sands and the Shepparton Formation. The Loxton-Parilla Sands host the targeted mineral deposits.

Groundwater in the vicinity of the project area is typically saline. The salinity of the Shepparton Formation and the Loxton-Parilla Sands are similar, with very high salinity averaging 48 to 56 mS/cm respectively, which is comparable to the salinity of seawater (ie. 53 to 60 mS/cm). The salinity of groundwater in the Olney Formation is lower at an average of 9.3 mS/cm, although this is generally still too saline for drinking water and most irrigation.

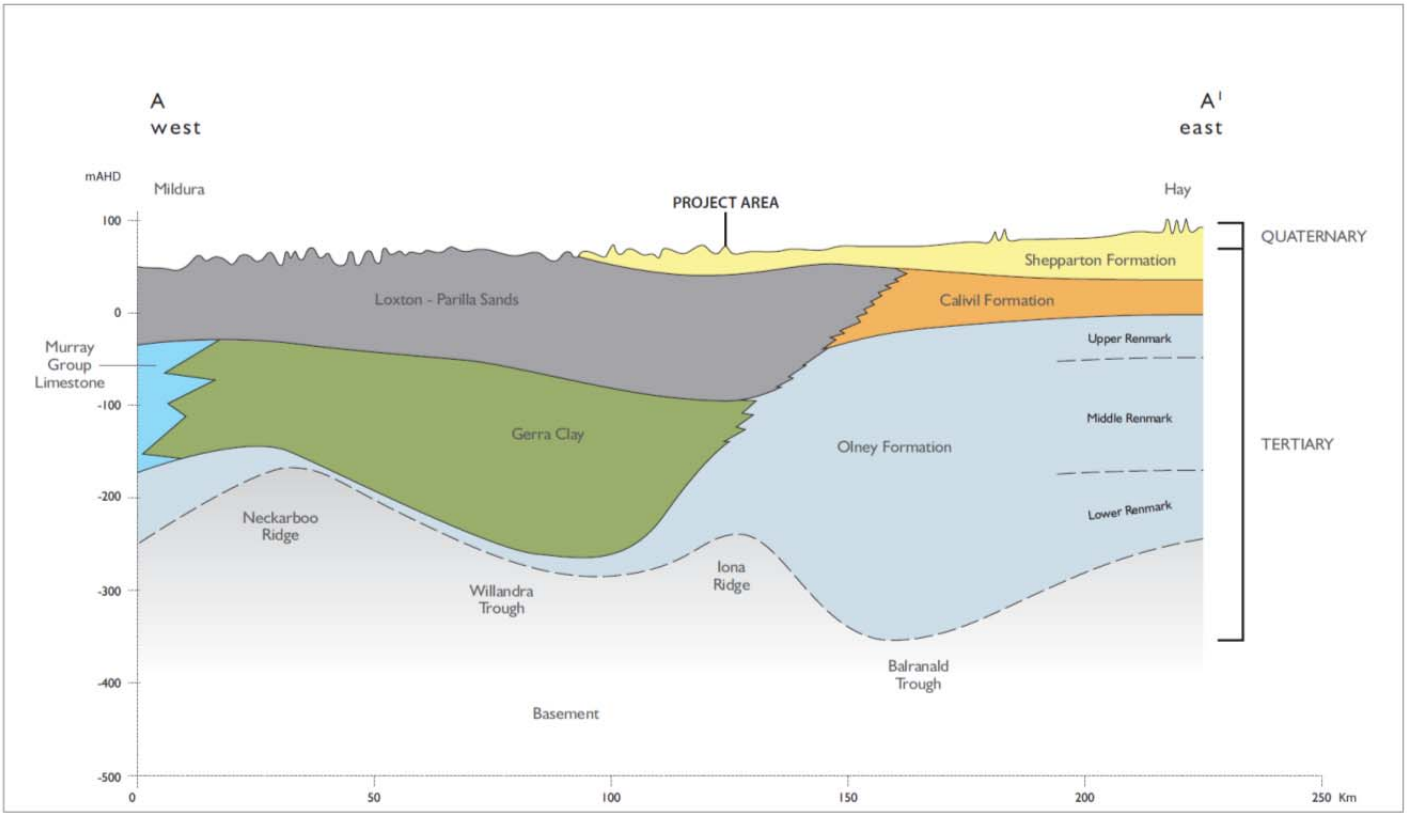

Figure 19: *Regional Geology Cross Section*

Groundwater Impacts

Extensive dewatering and re-injection bore systems are proposed to facilitate the dry-mining operation. Dewatering would be required up to a rate of up to 1,300L/s at the West Balranald mine and 190 L/s at the Nepean mine. The water would be re-injected into the same aquifer in the injection borefields at comparable rates. The off-path re-injection borefield would be located approximately 5 to 30 kilometres from mining operations and connected by a network of pipeline infrastructure.

Extraction of groundwater would mostly be from the Loxton-Parilla Sands aquifer. Within the six year peak abstraction period Iluka predicts it would abstract between 20,000 to 30,000ML per year, with around 90% being re-injected into the aquifer. As outlined above, this groundwater source is highly saline and not suitable for stock watering or cropping. It is hence classified as a less productive water source. The re-injection would be managed to ensure that saline groundwater does not mound and create near-surface salinity issues.

DPI Water has assessed the potential impacts on groundwater level, pressure and quality and is satisfied that the impacts would not exceed the Level 1 minimal harm assessment criteria of the NSW Aquifer Interference Policy.

There are 112 privately owned bores within 65km of the development area. Iluka's assessments indicate that private bores in close proximity to the mine site would not be significantly affected, with no change in groundwater level exceeding 2 metres and no change in water quality. DPI Water and the Department accept these conclusions, but the Department has nevertheless recommended a condition requiring Iluka to provide compensatory water supplies to any landowner whose water

entitlements are adversely affected by the development. The Department has also recommended conditions requiring Iluka to prepare and implement a detailed Groundwater Management Plan incorporating a comprehensive groundwater monitoring and verification regime.

Groundwater Dependent Ecosystems

There are no high priority groundwater dependent ecosystems (GDEs) listed under the Lower Murrumbidgee Groundwater Water Sharing Plan that are likely to be affected by the proposal. Further assessment of other potential GDE's in the vicinity of the project area was undertaken by Iluka, which found that some areas of Black Box vegetation near the West Balranald mine have the potential to experience impacts from groundwater drawdown. Although these impacts are not considered to be significant they are considered to warrant the development of a monitoring and adaptive management plan.

The Department is satisfied that the proposed development does not pose any significant risk to high priority GDEs and has recommended that monitoring and management of the groundwater dependent Black Box vegetation be included as part of the Groundwater Management Plan.

The Department and DPI Water are satisfied that drawdown has been minimised as far as practicable (through the groundwater reinjection system), that groundwater users in the area would not be adversely affected, and that mitigation and management measures proposed by Iluka are appropriate. Consequently, the Department and DPI Water are satisfied that the proposed development would not result in any significant or permanent impacts on groundwater resources in the area, subject to the implementation of groundwater monitoring and adaptive management measures. The Department notes that all groundwater extracted and used by Iluka would need to be appropriately accounted for and licensed under the *Water Management Act 2000* and the rules of the Water Sharing Plan.

Surface Water and Flooding Impacts

As outlined above, little significant runoff is produced within the locality as heavy rainfall is not a regular feature of the semi-arid climate. Consequently, the project is not expected to result in any significant impacts to Box Creek or the Murrumbidgee River, subject to standard best practice surface water management measures (eg. diversion of any clean run-on water around disturbance areas, and collection and treatment of run-off water from disturbance areas). The Department has recommended conditions in this regard.

The majority of mine infrastructure for the West Balranald and Nepean mines is located outside of the flood extent area. However, flood simulation modelling shows that a small part of the West Balranald mine and the Nepean access road could be impacted by floodwater, originating from the Lachlan River via Muckee Lake in a 1:100 year flood event (see Figures 20 and 21).

The water management system at the West Balranald mine, including the runoff collection dam, non-saline water storage dam, process water dam and a small bund wall adjacent the pit (see Figure 21) would be configured and designed to prevent long-term inundation of the mine pit and surrounding area. The project is unlikely to result in any significant effect on flood levels or flows in the region.

The Department and DPI Water are satisfied that appropriate mitigation measures have been proposed to ensure that surface water quality impacts are minimised, and that any residual impacts would be limited due to the climate of the area and its remoteness from any significant surface water resource. Nevertheless, the Department has recommended conditions requiring the development of a Surface Water Management Plan to ensure that any localised impacts are appropriately managed and monitored.

Acid Mine Drainage

The dewatering and mining of the West Balranald deposit would result in the desaturation and exposure of large volumes of organic overburden and ore. With this exposure of susceptible sulphides to oxidation there is some risk of acid and metalliferous drainage generation. Organic overburden is proposed to be backfilled into the mined void below the natural groundwater level as soon as possible after extraction. Lime dosing is also proposed in order to treat acidic conditions. Mine water management would ensure that any acidic stockpile and mining plant runoff is appropriately captured and treated. With groundwater flow towards the pit it is not expected that altered pH conditions would mobilise widely. Similar conditions are not expected at the Nepean mine.

The Department and DPI Water are satisfied that with appropriate mitigation, monitoring and management the risk of surface or groundwater geochemical impacts can be minimised to an

appropriate level. The Department has recommended conditions requiring Iluka to manage the potential for acid mine drainage as part of the Surface Water and Groundwater Management Plans.

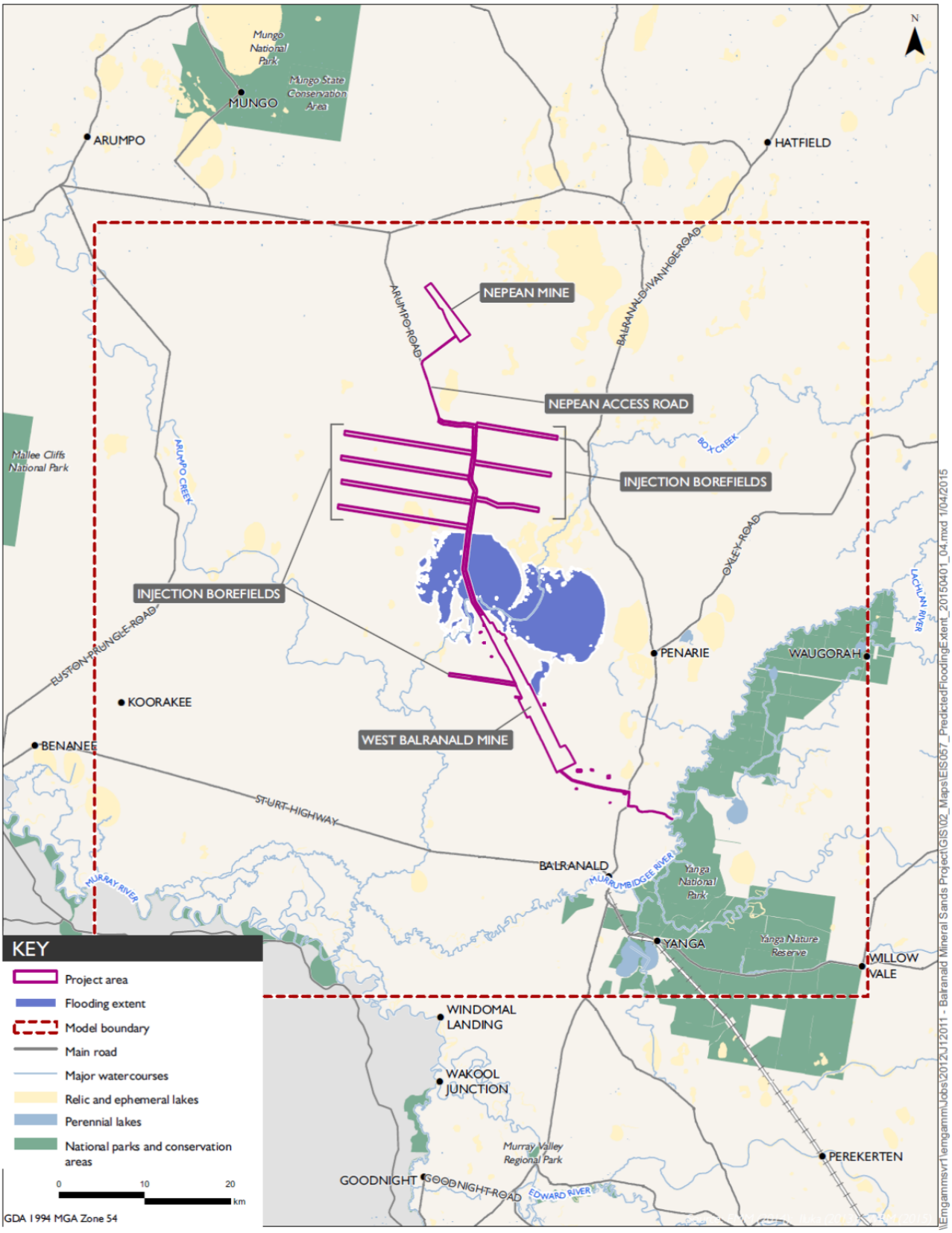

Figure 20: *Flooding Extent*

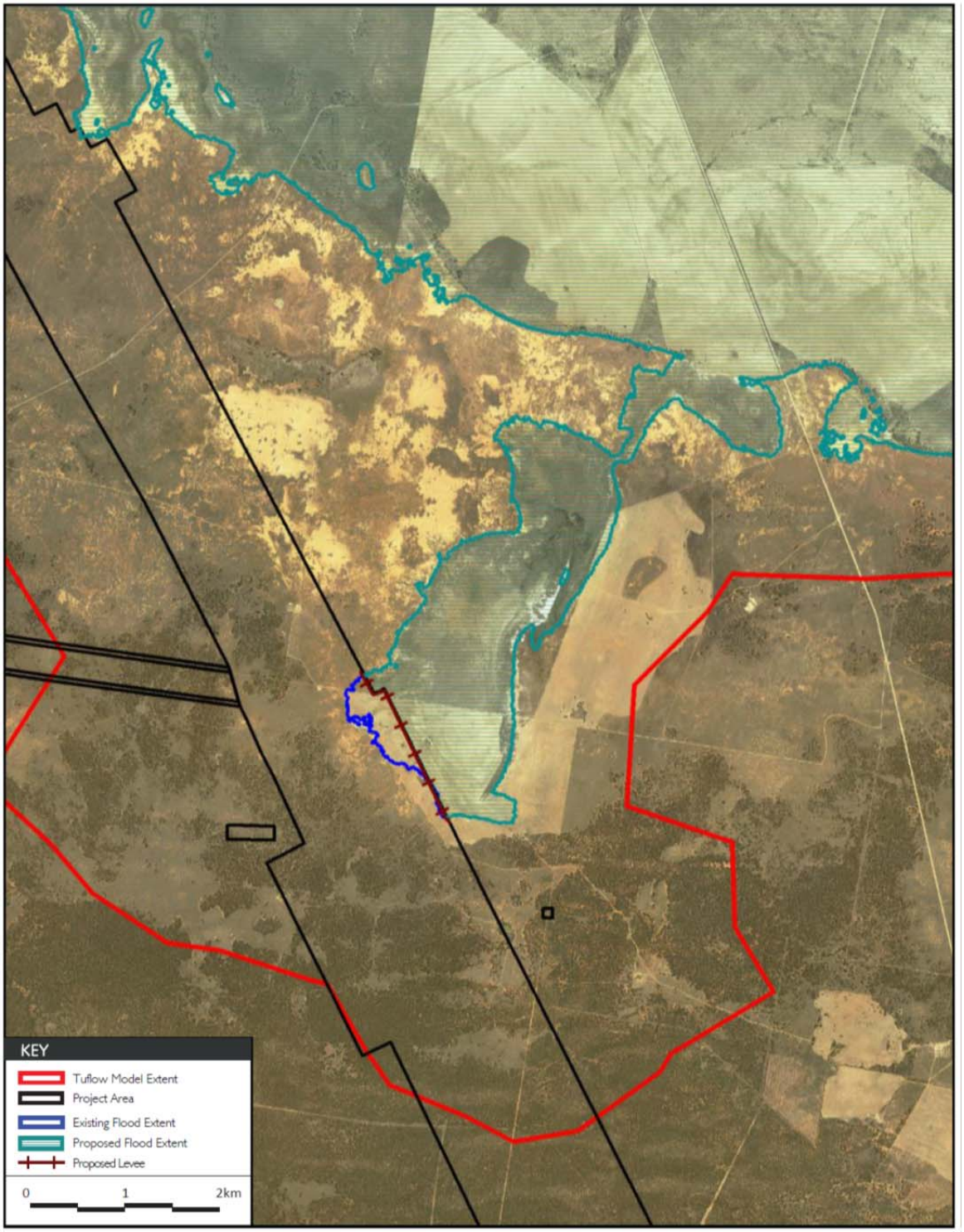

Figure 21: *Flooding Extent – West Balranald Mine*

Water Balance and Water Sharing

The mine is predicted to require an average of 20,050 ML of water per year during operations, comprising 19,345 ML/yr for process water, 690 ML/yr for dust suppression and 15 ML/yr for workforce consumption. Construction requirements would include 300 ML over the first 3 years. These demands are proposed to be addressed by a combination of water sources including (saline) extracted groundwater, mine affected water runoff, the Murrumbidgee River via pipeline, and potable water trucked to the site.

The vast majority of water demand (ie. 19,615 ML/yr) would be provided by the saline groundwater, which would be used for process plant water and dust suppression. An average of 450 ML/yr would be sourced from the Murrumbidgee River, which would be used for rehabilitation and some mine infrastructure processes and personnel use (eg. toilet flushing). Approximately 5 ML/yr of trucked

water would be used for personnel potable water use (eg. drinking water). Construction water would be sourced from groundwater from the Olney Formation.

Water balance calculations indicate that adequate water supply would be available to meet all stages of the project.

Iluka would need to obtain water licences (WALs) from relevant water sharing plans (WSPs) for its extraction of water from the Murrumbidgee and groundwater aquifers. There is adequate capacity and/or market depth within both these water sources to meet the demands of the project. Iluka is confident that it would be able to obtain the necessary further WALs prior to operation. Iluka would also seek credit for the groundwater returned to the same aquifer through the reinjection system.

Both the Department and DPI Water understand that whilst Iluka has yet to secure all necessary water entitlements under both the relevant WSPs for all stages of the development, it is a commercial risk for the company that entitlements may not be available at the time that Iluka require them. The Department has recommended that Iluka be required to ensure that it has sufficient water entitlements for all stages of the development, and if necessary, adjust the scale of operations to match its available licences and allocation.

Conclusion

The Department is satisfied that the proposed development is unlikely to significantly impact local and regional surface water and groundwater resources, and that the development can be suitably managed to ensure an acceptable level of environmental performance.

To ensure this occurs, the Department has recommended conditions requiring Iluka to:

- obtain applicable water licences for the development;
- ensure that it has sufficient water for all stages of the development, and if necessary, adjust the scale of mining operations on site to match its available water supply;
- provide compensatory water supply to any landowner whose water supply is adversely affected by the development;
- comply with a range of water management performance measures and rehabilitation objectives;
- prepare and implement a comprehensive Water Management Plan for the development, including a:
  - water balance;
  - surface water management plan and monitoring program; and
  - groundwater management plan and monitoring program.

5.5 Other Issues

Table 6: *Assessment of Other Issues*

Issue	*Consideration*	*Recommendation*
Noise	<u>*Construction Noise*</u> • Iluka's construction noise assessment identified that one residence, R13, would exceed the noise criteria set out in the EPA's *Interim Construction Noise Guidelines* (ICNG) during night-time construction of the haul road. • Iluka subsequently advised that it has purchased the property on which R13 is located. <u>*Operational Noise*</u> • Iluka's modelling predicted that one privately-owned residence, R5, would be likely to experience noise levels above the project specific noise level (PSNL) criterion of 35 dB(A) under worst case conditions and following reasonable and feasible mitigation measures. • Residence R5 is expected to experience significant noise impacts of greater than 40 dB(A). Under the Department's *Voluntary Land Acquisition and Mitigation Policy* (VLAMP), this receiver would be entitled to voluntary acquisition on request.	The Department has recommended conditions requiring Iluka to: • acquire Property R5, at the landowner's request; • implement additional noise mitigation measures (eg. double glazing, insulation and/or air conditioning), on the residence on Property R5, at the landowner's request; • comply with applicable operational noise criteria; • implement all reasonable and feasible measures to minimise all noise emissions associated with the project; • prepare and implement a Noise Management Plan (NMP) for the project; and • make the NMP and monitoring results publicly available on its website.

Issue	*Consideration*	*Recommendation*
	• No cumulative noise impacts are predicted. *Traffic Noise* • The noise assessment concluded that the predicted operational and construction road traffic noise levels would satisfy the EPA's *Road Noise Policy* (RNP) criteria at all nearby receivers for all assessed roads.	
Air Quality	• With standard best practice dust control measures in place, Iluka's air quality assessment indicates that the project would comply with the applicable annual-average impact assessment criteria at all receiver locations under the worst case operating scenarios for all analytes, including fine particulate matter (PM_{10}), very fine particulate matter ($PM_{2.5}$), total suspended particulates (TSP), dust deposition, trace metal/metalloid pollutants and respirable crystalline silica (RCS). • The assessment did identify a very low risk of exceedance of the 24-hour $PM_{2.5}$ criteria and a low risk (ie. 2.3% probability) of exceedance of the 24-hour PM_{10} criteria at one location (R5) during Year 4 of operations. • However, the Department is satisfied that with the implementation of Iluka's proposed mitigation and management measures, exceedances of the criteria at this location can be avoided. Notwithstanding, as noted above this receiver is predicted to be impacted by project-related noise and the Department has recommended conditions requiring Iluka to acquire the property at the request of the landowner. • Both the Department and the EPA are satisfied that Iluka has adequately demonstrated that the development would not significantly impact local or regional air quality, and is able to comply with relevant EPA air quality criteria at all sensitive receivers with the implementation of appropriate mitigation, management and monitoring measures.	The Department has recommended conditions requiring Iluka to: • comply with applicable air quality criteria; • implement all reasonable and feasible measures to minimise dust; • prepare and implement a detailed Air Quality Management Plan (AQMP) for the project; and • make the AQMP and monitoring results publicly available on its website.
Greenhouse Gas (GHG)	• Iluka's GHG assessment predicts that the project would generate 0.62 $MtCO_2$-e of scope 1 and 3.9 $MtCO_2$-e of Scope 2 and 3 emissions over the life of the mine. • These emissions are equivalent to 0.029% (scope 1) and 0.038% (scope 2 and 3) of Australia's annual emissions. • Iluka has committed to a range of measures to reduce GHG emissions from the development, including improving energy use and efficiency and investigating the use of renewable energy sources. • The Department accepts that the GHG emissions generated by the project would be relatively minor.	The Department has recommended a condition requiring Iluka to implement measures to minimise GHG emissions generated by the development.
Non-Indigenous Heritage	• Iluka's non-indigenous heritage assessment did not identify any Commonwealth, State or local heritage items within the project area. • The assessment concluded that no historic heritage sites or values would be impacted by the project.	None required.
Visual	• Visual impacts of the development would be mainly temporary, such as the processing plant, telecommunication towers, lighting and	The Department has recommended conditions requiring Iluka to implement all reasonable and feasible measures to minimise visual and lighting impacts of

Issue	*Consideration*	*Recommendation*
	numerous stockpiles. Longer term impacts are expected to be minimal and associated with landscape changes such as vegetation clearance and landform alterations. • Rehabilitation of the project area would ensure that the final landform replicates the existing landform as far as possible. Revegetation would also assist in re-integration of the site into the landscape. • The EIS concluded that due to the distances between representative viewpoints and the mining area as well as the screening provided by existing vegetation, the development would have negligible visual and lighting impacts. • Iluka has committed to a number of measures to mitigate visual and lighting impacts including the use of directional and low wattage lighting and the progressive rehabilitation of disturbed areas. • The Department accepts that the visual and lighting impact of the development would be minor.	the development on residential receivers.
Agriculture	• The low rainfall, lack of irrigation water sources and poor land and soil capability of the area (mostly Classes 5/6 and 6, with a very small area of Class 4) combine to constrain land use to low intensity sheep and cattle grazing and limited cropping in the vicinity of the project area. • Iluka proposes to rehabilitate the mine site progressively as mining proceeds to provide for continued low intensity grazing and/or conservation. • The EIS indicates that following mining there would be negligible changes to the land and soil capability of the site. However, it is expected that the mine void (approximately 52 hectares) and some 28,000 hectares of biodiversity offset land would be permanently removed from agricultural production. • The Department is satisfied that the development would have minimal impacts on the agricultural resources and enterprises of the region.	The Department has recommended conditions requiring Iluka to comply with a number of rehabilitation objectives, including that the land is returned to its pre-existing land capability classification to enable future agricultural use.
Hazards and Risk / Waste	• The EIS includes an assessment of risk for hazards associated with radioactive mine materials, including products (HMC and mineral concentrates) and by-products, bushfire and dangerous goods. • The assessments indicate that the risks (including radioactive risks) posed to human health and the environment by the project would be negligible, with the implementation of appropriate controls. • Iluka has committed to implementing a range of hazard and risk management measures, particularly in relation to the management of tailings, overburden (including PAF material) and radioactive waste. • The Department is satisfied that similar arrangements to transport and emplace MSP process waste have been effective at the contemporary Ginkgo and Snapper mines, and the Department has recommended conditions to ensure these measures are adopted at the project.	The Department has recommended conditions requiring Iluka to appropriately manage bushfire risk, dangerous goods, radioactive waste and other wastes, in accordance with the EPA Environment Protection Licence for the development.

Issue	*Consideration*	*Recommendation*
Bulk Sampling Activity	• The Department has considered the extension and intensification of the bulk sampling activity (as identified in Section 1) as part of its assessment of the project. • Based on this assessment, the Department is satisfied that the activity would be undertaken within the project disturbance area for the wider West Balranald mine, and that the impacts would be consistent with those of the existing bulk sampling activity and/or the wider proposed mine. • Nonetheless, the Department notes that Iluka would be required to obtain all necessary other approvals for the continuation of the bulk sampling activity (eg. water licences), and comply with all of the relevant conditions prior to undertaking the activity, such as preparing applicable management plans and monitoring programs and undertaking applicable road upgrades.	The Department has recommended conditions restricting the bulk sampling activity to a maximum of 100,000 tonnes of mineral ore. The Department also notes that Iluka would be required to comply with all applicable conditions of consent of the wider development consent prior to and during the undertaking of the bulk sampling activity.
Workforce Accommodation Facility	• The Department has assessed the impacts of the proposed on-site accommodation facility as part of the project and is satisfied that the facility would not have significant impacts on local community services and infrastructure. • However, both Council and Iluka have stated a preference that the accommodation facility be constructed in Balranald town (subject to separate approval), as such a location would provide a greater level of amenity for the residents of the facility.	In recognition of Iluka and Council's agreed preference for the accommodation facility to be located in Balranald town, the Department has recommended a condition allowing Iluka to construct the accommodation facility on the site only if it has demonstrated that constructing the accommodation facility in Balranald town is not reasonable or feasible.
Rehabilitation	• The project would disturb a total of approximately 5,386 ha of land, which would be progressively rehabilitated to support land uses similar to pre-existing land uses. • The rehabilitated land area would include a relatively small final void in the West Balranald mine (approximately 40 ha size by 13 m deep). • Both OEH and DRE are supportive of Iluka's proposed rehabilitation measures.	To ensure that the project is rehabilitated appropriately, the Department has recommended conditions requiring Iluka to: • prepare a Rehabilitation Management Plan; • progressively rehabilitate the site, and minimise the total disturbance area exposed at any time; and • comply with a number of rehabilitation objectives, including removing redundant infrastructure, restoring rural land capability and vegetation, minimising the size and depth of the final void, ensuring public safety and ensuring the site is maintained in a safe, stable and non-polluting condition.
Socio-Economic	• The project would generate a peak construction workforce of up to 225 employees for 3 years and an operational workforce of up to 550 employees for 11 years. • The project is also estimated to contribute total net production benefits of $148 M, $132 M of which are estimated to accrue to Australia. • During operations, the project is estimated to contribute: o $965 M and $720 M in annual direct and indirect output or business turnover regionally and for NSW respectively; o $300 M and $196 M in annual direct and indirect value added regionally and for NSW respectively; o $82 M and $58 M in annual direct and indirect household income regionally and	The Department has recommended a condition requiring Iluka to enter into a VPA with Council to provide for contributions towards community infrastructure and services, with a focus on local employment opportunities.

Issue	*Consideration*	*Recommendation*
	for NSW respectively; and o 1,289 and 771 extra direct and indirect jobs created regionally and for NSW respectively. • Council supports the socio-economic benefits of the project, but has requested that Iluka be required to focus its employment procurement on the local area, and undertake a study to maximise the retention of workers in the region at the completion of the project. • Council and Iluka have since agreed the broad terms of a contributions package for the project, which includes: o $600k towards community support o a 5% local employment target; o youth training contributions; and o 50% contribution to an employment study. • The Department is satisfied that the development would have a positive socio-economic impact on the locality and region.	

6 RECOMMENDED CONDITIONS

The Department has prepared recommended conditions of consent for the project (see Appendix E). These conditions are required to:

- prevent, minimise, and/or offset adverse impacts of the project;
- set standards and performance measures for acceptable environmental performance;
- ensure regular monitoring and reporting; and
- provide for the ongoing environmental management of the project.

7 SECTION 79C

Section 79C(1) of the EP&A Act outlines the matters that a consent authority must take into consideration when determining development applications. These matters can be summarised as:

- the provisions of environmental planning instruments (including draft instruments), development control plans, planning agreements, the EP&A Regulations and any coastal zone management plan;
- the impacts of the development;
- the suitability of the site;
- any submissions; and
- the public interest.

Section 5 of the Act also outlines a range of objects that must be considered when making decisions under the Act, and Sections 5A to 5D further outline provisions to be considered with regard to threatened species (including species, populations and ecological communities) and their habitats. The Department has given consideration to the requirements and other provisions of sections 5A to 5D. In particular, these matters include:

- the factors in Section 5A(2), known as the '7 part test of significance';
- the threatened species assessment guidelines[8] identified in Section 5A(1); and
- the register of critical habitat as identified in Section 5B.

The Department has considered all of these matters in its assessment of the project. In summary, the Department believes that:

- the project can be undertaken in a manner that is consistent with the aims, objectives and provisions of the applicable environmental planning instruments, other applicable planning documents and the EP&A Regulations (see Section 3.3 and Appendix D);

[8] *Threatened Species Assessment Guidelines – The Assessment of Significance*, prepared by the then Department of Environment and Climate Change, dated August 2007.

- the project can be undertaken in a manner that is generally consistent with the objects of the Act as described in Section 3.6;
- the impacts of the project can be adequately minimised, managed, or at least compensated for, to an acceptable standard (see Section 5);
- the site is suitable for the project, as it contains State significant mineral resources within a region recognised as having the primary economically recoverable mineral sands resources in NSW, is relatively sparsely populated, and is a permissible development on the land. The project site and surrounds predominantly comprises cleared grazing land, with the majority of native vegetation of limited conservation value due to historic grazing. The operation of the project would not compromise the long-term use of the land for agricultural purposes;
- the project is considered to be in the public interest, particularly as it would:
  - be consistent with the NSW Government's vision for economic growth in regional areas through the development of the mineral sands industry in western NSW;
  - assist in ensuring continued supply of valuable minerals for a range of industrial and commercial purposes;
  - generate significant economic benefits for the region and State of NSW; and
  - facilitate employment for up to 225 personnel during construction and 550 personnel during operations.

8 CONCLUSION

The Department has assessed the development application, EIS, submissions, RTS and additional information provided by Iluka in accordance with the requirements of the EP&A Act.

Based on its assessment, the Department is satisfied that Iluka has designed the project in a manner that achieves a reasonable balance between maximising the efficiency of the resource extraction and minimising the potential impacts on surrounding land users and the environment.

The Department has drafted a detailed set of conditions to ensure that the project complies with applicable criteria and standards, and to ensure that the predicted residual impacts are effectively minimised, mitigated and/or at least compensated for.

Importantly, the project would result in benefits to the wider community by helping to meet the demands for mineral sands resources including ilmenite, of which little is currently produced in NSW.

In addition, the project would provide associated flow-on benefits to the local community through job creation, capital investment, infrastructure improvements and Iluka's proposed community funding contributions. The project aligns with a number of State and regional strategic plans that recognise that mineral sands mining within the Murray Basin is a key industry that will help grow and diversify the NSW economy by increasing local employment opportunities in regional areas.

Given that the benefits of the project can be realised without significant adverse impacts, the Department considers that the project is in the public interest, and should be approved subject to strict conditions.

Mike Young 5.4.16.
Director
Resource Assessments

David Kitto 5/4/2016
Executive Director
Resource Assessments and Business Systems

APPENDIX A:
ENVIRONMENTAL IMPACT STATEMENT

See website at http://majorprojects.planning.nsw.gov.au/index.pl?action=view job&job id=5285

APPENDIX B:
SUBMISSIONS

See website at http://majorprojects.planning.nsw.gov.au/index.pl?action=view job&job id=5285

APPENDIX C:
RESPONSE TO SUBMISSIONS

See website at http://majorprojects.planning.nsw.gov.au/index.pl?action=view job&job id=5285

APPENDIX D:
ENVIRONMENTAL PLANNING INSTRUMENTS

SEPP (State and Regional Development) 2011
As addressed in Section 3.1, the project meets the criteria for State Significant Development under the *State Environmental Planning Policy (State and Regional Development) 2011.*

SEPP No 33 – Hazardous and Offensive Development
Mining of mineral sands is not identified as a potentially hazardous or offensive industry. However, the proposed development may be determined to be a potentially hazardous development if the storage of dangerous goods exceeds the requirements of *Hazardous and Offensive Development Application Guidelines: Applying SEPP 33* (DP&I 2011) (Applying SEPP 33). The assessment demonstrated that the development would not be potentially hazardous if the appropriate controls were implemented. Consequently, the Department is satisfied that the proposal is generally consistent with the aims, objectives, and requirements of SEPP 33.

SEPP No.44 – Koala Habitat Protection
The Department is satisfied that the project site does not contain any areas of core Koala habitat, and that the project is generally consistent with the aims, objectives, and requirements of SEPP 44.

SEPP No.55 – Remediation of Land
A preliminary investigation was conducted for the development and concluded that no further investigation was required. The Department is satisfied that the development area does not have a significant risk of contamination given its historical land-use, and that the development is generally consistent with the aims, objectives, and provisions of SEPP 55.

SEPP (Infrastructure) 2007
In accordance with clause 104 of the Infrastructure SEPP, the application was referred to RMS. The matters raised in RMS' submission on the project were considered by the Department, and the Department has recommended conditions of approval in relation to the classified road network.

SEPP (Mining, Petroleum Production and Extractive Industries) 2007
Under clause 7 of the Mining SEPP, the development is permissible with consent. Part 3 of the Mining SEPP lists a number of matters that a consent authority must consider before determining an application for consent for development for the purposes of mining, including:

- the significance of the resource;
- certain non-discretionary development standards in relation to noise, air quality, blasting and aquifer interference;
- compatibility with other land uses;
- natural resource management and environmental management;
- resource recovery;
- transport; and
- rehabilitation.

The Department has considered all of these matters in its assessment report. Based on its assessment of the development, the Department is satisfied that the development is able to be managed in a manner that is generally consistent with the aims, objectives and provisions of the SEPP.

Balranald Local Environmental Plan 2010
The zoning and permissibility of the development under the Balranald LEP is addressed in Section 3.2 of this report.

There are no other provisions of the LEP that substantially govern the development, and the Department is satisfied that the project can be managed in a manner that is generally consistent with the aims, objectives and provisions of the LEP.

APPENDIX E:
RECOMMENDED CONDITIONS OF CONSENT

See website at http://majorprojects.planning.nsw.gov.au/index.pl?action=view job&job id=5285