

## ENVIRONMENTAL SCOPING DOCUMENT

PROPOSAL NAME:	MULGA ROCK URANIUM PROJECT
ASSESSMENT NUMBER:	1979
LOCATION:	APPROXIMATELY 240 KILOMETRES (KM) EAST-NORTH-EAST OF KALGOORLIE
LOCAL GOVERNMENT AREA:	SHIRE OF MENZIES
PROPONENT:	VIMY RESOURCES LIMITED
PUBLIC REVIEW PERIOD:	12 WEEKS
EPBC REFERENCE NO:	2013/7083

### 1. Introduction

The above proposal is being assessed by the Environmental Protection Authority (EPA) under Part IV of the *Environmental Protection Act 1986* (EP Act) at the level of Public Environmental Review (PER). This Environmental Scoping Document (ESD) sets out the requirements for the environmental review of the proposal. The purpose of an ESD is to:

- provide proposal-specific guidelines to direct the proponent on the preliminary key environmental factors (PKEFs) or issues that are to be addressed during the environmental review and preparation of the environmental review report;
- identify the required work that needs to be carried out; and
- identify the timing of the environmental review.

The proponent must conduct the environmental review in accordance with this ESD and then report to the EPA in an environmental review report (PER document). As well as the proposal-specific requirements for the environmental review identified in this ESD, the PER document must also address the generic information requirements listed in section 10.2.4 of the EPA's *Environmental Impact Assessment (Part IV Divisions 1 and 2) Administrative Procedures 2012* (Administrative Procedures) and where appropriate Schedule 4 of the *Environment Protection and Biodiversity Conservation Regulations 2000* (EPBC Regulations). When the EPA is satisfied that the PER document adequately addresses both of these requirements, the proponent will be required to release the document for a public review period of 12 weeks.

This ESD has been prepared by the proponent in consultation with the EPA, decision-making authorities and interested agencies consistent with EPA Environmental Assessment Guideline (EAG) 10 – *Scoping a proposal*. This ESD was subject to a two week public review due to the level of potentially significant public interest. The ESD is available on the EPA website ([www.epa.wa.gov.au](http://www.epa.wa.gov.au)) and must be appended to the PER document.

### Assessment under Bilateral Agreement

The proposal has been referred and determined to be a controlled action under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and is being assessed under the Bilateral Agreement between the Commonwealth of Australia and the State of Western Australia made under section 45 of that Act. The relevant matters of national environmental significance (MNES) for this proposal are:

- Listed threatened species and communities (s18 and s18A); and
- The environment because the proposal is a nuclear action (s21 and 22A).

This ESD is inclusive of work required to be carried out and reported on in the PER document in relation to MNES. The PER will include a section identifying MNES and discussing how those matters have been addressed within the PER, including identifying any offsets that would be appropriate.

## **2. The proposal**

The subject of this ESD is Vimy Resources Limited's (Vimy) proposal to develop the Mulga Rock Uranium Project (MRUP), which is located 240km east-north-east of Kalgoorlie. The regional location of the proposal is shown in Figure 1. The project will involve the shallow open pit mining of four poly-metallic deposits with commercial grades of contained uranium hosted in carbonaceous material. Processing will be undertaken on site at a central mill.

The MRUP area is remote, covers an area of 90,190 hectares (ha) of dunefields and is located within a granted mining lease on Unallocated Crown Land in the Shire of Menzies, on the western flank of the Great Victoria Desert. Access is limited and is only accessible by four wheel drive vehicles. The nearest residential town is Laverton which is approximately 200km to the north-west. Other regional residential communities include Pinjin Station Homestead, located approximately 100km to the west; Coonana Aboriginal Community, approximately 130km to the south-south-west; Kanandah Station Homestead, approximately 150km to the south-east; and the Tropicana Gold Mine approximately 110km to the north-east.

Up to 3.5 Million tonnes per annum (Mtpa) of ore will be mined by traditional open cut techniques, crushed, beneficiated and then processed at an on-site acid leach and precipitation treatment plant to produce up to 1,360 tonnes of uranium oxide concentrate (UOC) per year over the life of the Project. Other metal concentrates will be extracted using sulphide precipitation after the uranium has been removed and sold separately. These products will not be classified as radioactive. Vimy also recognises that there may be a potential need for specific processing to remove other radionuclides from by-products to enable transport as non-radioactive and to meet purchasers' specifications. The anticipated life of mine is up to fifteen years, based on the currently identified resources. The drummed UOC will be transported by road from the mine site in sealed seatainers to a suitable port, approved to receive and ship Class 7 materials (expected to be Port Adelaide), for export.

The Project will require clearing of vegetation, mine dewatering and reinjection, creation of overburden (un-mineralised) landforms, construction of on-site processing facilities and waste management systems. Major built infrastructure will include a processing plant, Run of Mine ore stockpile area, construction of above-ground overburden landforms for un-mineralised mined materials, an initial short term above-ground tailings storage facility and water storage/evaporation facilities. Once there is sufficient voids created, tailings will be deposited back into the unlined pits and capped with un-mineralised waste rock and rehabilitated. Rehabilitation of disturbed areas will be undertaken in accordance with an approved Mine Closure Plan.

Required project infrastructure will include mine administration and workshop facilities, fuel and chemical storage, a diesel-fired power plant of up to 12 megawatt (MW) capacity, a saline water borefield and mine water reinjection borefield and associated pipelines and power supply, an accommodation village for a fly-in fly-out workforce, an airstrip, laydown areas and other supporting ancillary infrastructure such as communication systems, roads, waste water treatment plant and solid waste landfill facilities. Transport to site for consumables, bulk materials and general supply items will be via existing public road systems linked to dedicated project site roads.

At completion of operations the site will be decommissioned and rehabilitated in accordance with an approved Mine Closure plan.

The key characteristics of the proposal are set out in Table 1, in accordance with EAG 1 – *Defining the key characteristics of a proposal*. The development envelope encompassing the physical elements of the proposal is delineated in Figure 2.

It should be noted that the key proposal characteristics may change as a result of implementation of the mitigation hierarchy by the proponent on account of the findings of studies and investigations conducted as part of the environmental review.

**Table 1 Key Proposal Characteristics**

Summary of the proposal	
Proposal Title	<b>Mulga Rock Uranium Project</b>
Proponent Name	Vimy Resources Limited
Short Description	<p>This proposal is to develop 4 poly-metallic deposits containing commercial concentrations of uranium and to produce uranium oxide concentrate and other metal concentrates for sale.</p> <p>The proposal includes:</p> <ul style="list-style-type: none"> <li>• open cut pits, mine dewatering and reinjection infrastructure;</li> <li>• low profile un-mineralised overburden waste rock landforms;</li> <li>• haul roads to transport ore to a central processing facility and run of mine stockpile area;</li> <li>• central processing plant including a temporary tailing storage facility and water storage/ evaporation impoundment;</li> <li>• long term tailings storage in mine voids followed by backfilling with un-mineralised overburden;</li> <li>• a water extraction borefield and associated pipelines and power supply;</li> <li>• a reinjection borefield;</li> <li>• associated infrastructure including offices, maintenance workshops, laydown areas, ancillary infrastructure (eg. communications systems, wastewater treatment plant solid waste landfill, etc), accommodation facilities, airstrip, mine roads and fuel and chemical storage; and</li> <li>• up to 12MW diesel fired power station.</li> </ul>

Physical Elements		
Element	Location	Proposed Extent
Open cut pits and dewatering infrastructure	Figure 3 (V1-V9)	Clearing of up to 828ha of native vegetation within a 9,872 ha development envelope.
Reinjection infrastructure – borefield and pipelines	Figure 3 (B2) Figure 2 (Proposed reinjection borefield)	Clearing of up to 36ha of native vegetation within a 9,872ha development envelope.
Waste rock landforms and soil stockpiles	Figure 3 (W1-W14)	Clearing of up to 561ha of native vegetation within a 9,872ha development envelope.
Roads, borrow pits and services	Figure 3 (R)	Clearing of up to 198ha of native vegetation within a 9,872ha development envelope.
Processing plant, Run of Mine stockpiles and administration buildings	Figure 3 (P)	Clearing of up to 40ha of native vegetation within a 9,872ha development envelope.
Extraction borefield and supporting infrastructure	Figure 3 (B1) Figure 2 (Proposed extraction borefield)	Clearing of up to 98ha of native vegetation within a 9,872ha development envelope.
Accommodation village	Figure 3 (C)	Clearing of up to 9ha of native vegetation within a 9,872ha development envelope.
Water storage/ evaporation pond	Figure 3 (E)	Clearing of up to 87ha of native vegetation within a 9,872ha development envelope.
Temporary tailings storage facility	Figure 3 (T)	Clearing of up to 23ha of native vegetation within a 9,872ha development envelope.
Miscellaneous disturbance area (including power generation and reticulation and laydown associated with construction)	Location(s) yet to be determined	Clearing of up to 105ha of native vegetation within a 9,872ha development envelope.
Airstrip	Figure 3 (A)	Clearing of up to 15ha of native vegetation within a 9,872ha development envelope.

Operational Elements		
Element	Location	Proposed Extent
Water abstraction for process water and domestic supply	The location of the borefield is yet to be determined, but is within an area 30km north east of the processing plant	At this stage, operational demand will require extraction of up to 3 Gigalitres/annum (GL/a) of groundwater. The final volume will depend on the availability for reuse of suitable quality water from mine dewatering.

Operational Elements		
Element	Location	Proposed Extent
Mine dewatering and reinjection infrastructure	Around and down gradient of open pits	Dewatering to allow mining varies over the Life of Mine. Extraction estimated up to 1.5GL/a, with surplus water preferentially reinjected into down gradient paleo-aquifer system where water quality permits, or evaporated from constructed ponds.
Power supply	Yet to be determined	Up to 12MW to be supplied by a small remote area power station.  Borefield and pumping stations- options being considered include mine grid power or small dedicated diesel generators.
Overburden disposal	Initially deposited next to pits in overburden landforms then back filled into mined areas	Up to 40-45Mtpa of overburden.
Waste materials from ore processing	Initially into temporary above ground tailings storage facility but once sufficient mine void established tailings directed back into mine pit voids	Up to 3.5Mtpa of beneficiation rejects and post-leaching tailings material.
Process water reinjection	Location to be determined by further studies but south of process plant and mine dewatering area	Injection of up to 1.5GL/a of excess process water not suitable for reuse due to salinity.
Waste management – wastewater and solid wastes	Yet to be determined	Sufficient to accommodate a workforce of around 200 people.

### 3. Preliminary key environmental factors and scope of work

The key proposal characteristics in Table 1 have informed the identification of the preliminary key environmental factors for the proposal, in accordance with EAG 8 – *Environmental factors and objectives*. The preliminary key environmental factors for this proposal and the EPA's objective for each of those factors are identified in Table 2.

To provide context to the preliminary key environmental factors, Table 2 also identifies the aspects of the proposal that cause the factors to be key factors, and the potential impacts and risks likely to be relevant to the assessment. All of this in turn has informed the work required to be conducted in the environmental review.

Finally, Table 2 identifies the policy documents that establish how the EPA expects the environmental factors to be addressed in the environmental review and the PER document that follows. Impacts associated with proposals are to be considered at a local and regional scale, including evaluation of cumulative impacts, and provide details of proposed management/mitigation measures. This includes whether environmental offsets are required by application of the mitigation hierarchy, consistent with the WA Environmental Offsets Policy, September 2011.

**Table 2 Preliminary key environmental factors and required work**

Flora and Vegetation	
<b>EPA objective</b>	To maintain representation, diversity, viability and ecological function at the species, population and community level.
<b>Relevant aspects</b>	Land and vegetation clearing for mine, mine infrastructure (including waste rock landforms and tailings storage), access tracks, and borefield. Groundwater abstraction and reinjection.
<b>Potential impacts and risks</b>	<p>The proposal involves the clearing of up to 2,000ha of native vegetation which has the potential to cause the loss of conservation significant flora species, important vegetation units and habitat and disruption to ecosystem function.</p> <p>There are also potential indirect impacts on flora and vegetation which may result from dust deposition, altered fire patterns, radiation (potential uptake of radionuclides or other contaminants from dust, groundwater and surface water), the spread of weeds and feral animals, altered hydrological regimes, from dewatering and reinjection, changes in air or surface water quality and accelerated erosion/soil loss or movement.</p>
<b>Required work</b>	<ol style="list-style-type: none"> <li>1. Characterisation of the flora and vegetation within the proposed project area including its relevance within a wider regional context.</li> <li>2. Flora and vegetation surveys to be undertaken in accordance with the requirements of EPA Guidance Statement No.51 in areas that are likely to be directly or indirectly impacted as a result of the proposal – to include a description of the surveys undertaken, the baseline data collected, and the environmental values identified. Details of the methodology used in undertaking targeted flora surveys and in the identification of vegetation mapping units.</li> <li>3. Detailed descriptions of all the direct and indirect impacts associated with the project on the flora and vegetation. A quantitative analysis of the likely extent of these impacts on vegetation units and conservation significant flora species (as defined in Guidance Statement 51, page 29).</li> </ol> <p>Analysis of impacts on vegetation to include:</p> <ul style="list-style-type: none"> <li>• the area (in ha) of each vegetation unit to be impacted (directly and indirectly) in a 'worst case' scenario;</li> <li>• the total area (in ha) of each vegetation unit within the project area;</li> <li>• a summary of the known regional distribution of vegetation units; and</li> <li>• identification of vegetation units which may be a component of threatened or priority ecological communities.</li> </ul> <p>Analysis of impacts on conservation significant species to include:</p> <ul style="list-style-type: none"> <li>• the number of plants, and number of populations of plants, to be impacted (directly and indirectly) in a 'worst case' scenario;</li> <li>• the total number of plants and populations within the local area/study area; and</li> <li>• a summary of the known populations of the species (including distribution, number of populations and the number of plants (or an estimate of the number of plants)).</li> </ul>

	<ol style="list-style-type: none"> <li>4. Assessment of potential radiation impacts using various approaches including the Environmental Risk from Ionising Contaminants: Assessment and Management (ERICA) tool using Australian specific data where available.</li> <li>5. Figures showing the extent of clearing or loss of vegetation and conservation significant flora species, including but not limited to TECs and PECs where clearly identified and defined, Declared Rare Flora (DRF), Priority Flora and other conservation significant flora (new or undetermined flora species), from direct and indirect impacts.</li> <li>6. Targeted surveys of the Project area for <i>Hibbertia crispula</i> (Ooldea Guinea-flower) to establish the predicted local extent and distribution of this Matter of MNES listed species; the PER will address all MNES listed species known to occur or having the potential to occur in the proposed development envelope discussing how any potential direct or indirect impacts on MNES listed species will be avoided or mitigated.</li> <li>7. Completion of checklist for documents submitted for Environmental Impact Assessment (EIA) on terrestrial biodiversity.</li> <li>8. Outline the outcomes/objectives, management, monitoring, trigger and contingency actions, within environmental management plans, to ensure impacts (direct and indirect) are not greater than predicted.</li> <li>9. Discussion of the mitigation hierarchy to the impacts from the proposal upon identified environmental values and an assessment of the residual impacts after the mitigation measures have been implemented.</li> <li>10. Discussion of residual impacts, including as appropriate monitoring programmes to measure residual impacts, and management programmes to further mitigate these residual impacts and to deal with circumstances where outcomes fall short of intended objectives.</li> <li>11. To the extent that residual impacts cannot be avoided, reduced, mitigated, or subsequently restored – the identification of appropriate offsets.</li> </ol>
<b>Relevant Policy, Guidance Statements and Legislation</b>	<p>Australian Radiation Protection and Nuclear Safety Agency (ARPANSA) Technical Report 167 – <i>A review of existing Australian radionuclide activity concentration data in non-human biota inhabiting uranium mining environments</i>.</p> <p>Checklist for documents submitted for EIA on terrestrial biodiversity.</p> <p>Department of Sustainability, Environment, Water, Population and Communities (DSEWPoC) (2012) EPBC Act <i>Environmental Offsets Policy</i>, Canberra, ACT.</p> <p>Department of the Environment, Water, Heritage and the Arts (DEWHA) (2008). Approved Conservation Advice - Ooldea Guinea-flower (<i>Hibbertia crispula</i>) Canberra, ACT.</p> <p><i>Environment Protection and Biodiversity Conservation Act 1999</i>.</p> <p>EPA (2000) Position Statement 2: <i>Environmental Protection of Native Vegetation in Western Australia</i>, Perth, Western Australia.</p> <p>EPA (2002) Position Statement 3: <i>Terrestrial Biological Surveys as an Element of Biodiversity Protection</i>, Perth, Western Australia.</p> <p>EPA (2003) Guidance Statement No. 55: <i>Guidance for the assessment of environmental factors – Implementing best practice in proposals submitted to the environmental impact assessment process</i>, Perth, Western Australia.</p> <p>EPA (2005) Guidance Statement No. 51: <i>Terrestrial Flora and Vegetation Surveys for Environmental Impact Assessment in Western Australia</i> June 2004, Perth, Western Australia.</p> <p>Government of Western Australia (2011) <i>Environmental Offsets Policy</i>, Perth, Western Australia.</p> <p>Government of Western Australia (2014) <i>Environmental Offsets Guidelines</i>, Perth, Western Australia.</p>

Terrestrial Fauna	
<b>EPA objective</b>	To maintain representation, diversity, viability and ecological function at the species, population and assemblage level.
<b>Relevant aspects</b>	Land and vegetation clearing for mine, mine infrastructure (including waste rock landforms, tailings and water storage), access tracks, and borefield.
<b>Potential impacts and risks</b>	<p>Clearing of vegetation may result in loss or fragmentation of fauna habitat and consequential displacement of fauna or to the isolation of populations or subpopulations of fauna.</p> <p>Death, injury or entrapment of fauna may occur during clearing and construction and from ongoing operations and traffic movements.</p> <p>Indirect impacts through radiation, altered fire regimes, increased access for feral animals to resources, noise and light spill, and any changes in air quality.</p>
<b>Required work</b>	<ol style="list-style-type: none"> <li>1. Characterisation of the terrestrial fauna within the proposed project area including its relevance within a wider regional context.</li> <li>2. Description of all surveys undertaken, the baseline data collected and the environmental values identified. Maps of all sampling sites from all surveys, both within and outside the proposed development envelope, with comparison to mapped fauna habitats.</li> <li>3. Completion of a Level 1 Desktop Study with comparisons of recent fauna surveys conducted at the MRUP with other surveys conducted in the Great Victoria Desert region, including the works by Eric R. Pianka and Department of Parks and Wildlife and WA Museum regional surveys.</li> <li>4. Desktop studies and Level 1 fauna surveys, consistent with EPA Guidance Statement No.56, to provide a comprehensive listing of fauna known or likely to occur in the habitat present, and identification of conservation significant fauna species likely to occur in the development envelope and wider project area.</li> <li>5. Where desktop study and habitat analysis indicates that it is appropriate, conduct targeted Level 2 surveys for conservation significant vertebrate species that are known to or likely to occupy habitats in the project area.</li> <li>6. Further surveys for <i>Sminthopsis psammophila</i> (Sandhill Dunnart) will take the form of a targeted survey utilising specialised wildlife cameras to identify the existence or otherwise of specimens within and surrounding the proposed areas of disturbance in accordance with a Department of Parks and Wildlife approved monitoring programme.</li> <li>7. Ongoing surveys of <i>Notoryctes typhlops</i> (Southern Marsupial Mole) will take the form of a Level 2 Targeted survey and a report of the results using the methodology outlined in the 'Survey guidelines for Australia's threatened mammals: Guidelines for detecting mammals listed as threatened under the EPBC Act' (2010).</li> <li>8. Potentially suitable habitat for the <i>Leipoa ocellata</i> (Malleefowl) has not been identified in the Project Area during fauna, flora and geological surveys over a period of 7 years. Road traverse surveys in sand dune terrain units commenced in 2010.</li> <li>9. A quantitative analysis of the extent of clearing, including area in hectares and percentages of habitat types to be cleared or indirectly impacted, and determination of significance of impact in relation to terrestrial fauna. The analysis is to include identification and mapping of the known regional distribution of conservation significant species affected to assist in the determination of the significance of impacts. The assessment will also include an evaluation of the impact of activities on areas of potential habitat (including an assessment of their condition) for conservation significant species.</li> <li>10. Completion of a Level 1 survey as outlined in Guidance Statement 20 for Short Range Endemic (SRE) fauna, and if required based on findings of the Level 1 survey, a Level 2 comprehensive survey and a report of the results.</li> <li>11. Description (including figures showing extent of clearing) of the expected direct and indirect impacts to vertebrate and SRE invertebrate fauna and their associated habitat from all aspects of the proposal.</li> </ol>



	<p>12. Description of impacts resulting from fauna, both native and feral being attracted to the evaporation ponds.</p> <p>13. Discussion of potential impacts to terrestrial fauna as a result of the proposal, with particular regard to State listed threatened fauna and MNES, and provision of quantitative data on impacts of the proposal to species of conservation significance.</p> <p>14. Evaluation of potential radiation impacts on terrestrial fauna and any other non-human biota, using the ERICA tool with Australian specific data where available.</p> <p>15. Completion of checklist for documents submitted for EIA on terrestrial biodiversity.</p> <p>16. Outline the outcomes/objectives, management, monitoring, trigger and contingency actions, within environmental management plans, to ensure impacts (direct and indirect) are not greater than predicted.</p> <p>17. An application of the mitigation hierarchy to the impacts from the proposal upon identified environmental values and an assessment of the residual impacts after the mitigation measures have been implemented.</p> <p>18. Discussion of residual impacts, including as appropriate monitoring programmes to measure residual impacts, and management programmes to further mitigate these residual impacts and to deal with circumstances where outcomes fall short of intended objectives.</p> <p>19. To the extent that residual impacts cannot be avoided, reduced, mitigated, or subsequently restored – the identification of appropriate offsets.</p>
<b>Relevant Policy, Guidance Statements and Legislation</b>	<p><i>Animal Welfare Act 2002 and Animal Welfare Regulations (Scientific Purposes) Regulations 2003.</i></p> <p>Australian Code for the Care and Use of Animals for scientific purposes 8th Edition (2013).</p> <p>ARPANSA Technical Report 167 – <i>A review of existing Australian radionuclide activity concentration data in non-human biota inhabiting uranium mining environments.</i></p> <p>Benshemesh, J. (2004). <i>Recovery Plan for Marsupial Moles (Notoryctes typhlops and N. caurinu)</i>. 2005-2010. NT Department of Infrastructure, Planning and Environment. Alice Springs.</p> <p>Checklist for documents submitted for EIA on marine and terrestrial biodiversity.</p> <p>Department of Environment and Natural Resources South Australia (2011). <i>National Recovery Plan for the Sandhill Dunnart Sminthopsis psammophila.</i></p> <p>Department of Environment and Conservation (DEC) (2011). Standard Operating Procedure 5.2 – Remote Operation of Cameras, Version 1.0, Perth, Western Australia.</p> <p>DSEWPaC (2011), 'Survey guidelines for Australia's threatened mammals: Guidelines for detecting mammals listed as threatened under the EPBC Act, Canberra, ACT.</p> <p>DSEWPaC (2012) <i>EPBC Act Environmental Offsets Policy</i>, Canberra, ACT.</p> <p><i>Environment Protection and Biodiversity Conservation Act 1999.</i></p> <p>EPA (2002) Position Statement No. 3: <i>Terrestrial Biological Surveys as an Element of Biodiversity Protection</i>, Perth, Western Australia.</p> <p>EPA (2004) Guidance Statement No. 56: <i>Terrestrial Fauna Surveys for Environmental Impact Assessment in Western Australia</i>, Perth, Western Australia.</p> <p>EPA (2009) Guidance Statement No. 20: <i>Short Range Endemic Invertebrate Fauna for Environmental Impact Assessment in Western Australia</i>, Perth, Western Australia.</p> <p>EPA &amp; DEC (2010) Technical Guide: <i>Terrestrial Vertebrate Fauna Surveys for Environmental Impact Assessment</i>, Perth, Western Australia.</p> <p>Government of Western Australia (2011) <i>Environmental Offsets Policy</i>, Perth, Western Australia.</p> <p>Government of Western Australia (2014) <i>Environmental Offsets Guidelines</i>, Perth, Western Australia.</p> <p><i>Wildlife Conservation Act 1950.</i></p>

Subterranean Fauna	
<b>EPA objective</b>	To maintain representation, diversity, viability and ecological function at the species, population and assemblage level.
<b>Relevant aspects</b>	Mining and water abstraction at mine and borefield and water reinjection.
<b>Potential impacts and risks</b>	<p>Groundwater abstraction from the proposed borefield may potentially impact on any subterranean fauna present.</p> <p>Open cut mining, and the mine dewatering that would precede it, may potentially impact on any stygofauna or troglafauna in the affected area. Habitat could be impacted via accidental spills of hydrocarbons.</p> <p>Water reinjection may potentially impact on any subterranean fauna present.</p>
<b>Required work</b>	<ol style="list-style-type: none"> <li>1. Characterisation of the subterranean fauna within the proposed project area including its relevance within a wider regional context.</li> <li>2. Description of the subterranean fauna surveys undertaken, the baseline data collected and the environmental values identified.</li> <li>3. Subterranean fauna surveys to be undertaken in accordance with the requirements of EPA Guidance Statement No.54a and EAG12 in areas that are likely to be directly or indirectly impacted as a result of the proposal – to include a description of the surveys undertaken, the baseline data collected, and the environmental values identified.</li> <li>4. Description of the expected impacts on subterranean fauna from all aspects of the proposal including indirect impacts (i.e. excavation, dewatering, groundwater extraction and re-injection).</li> <li>5. Completion of checklist for documents submitted for EIA on terrestrial biodiversity.</li> <li>6. Outline the outcomes/objectives, management, monitoring, trigger and contingency actions, within environmental management plans, to ensure impacts (direct and indirect) are not greater than predicted.</li> <li>7. An application of the mitigation hierarchy to the impacts from the proposal upon identified environmental values and an assessment of the residual impacts after the mitigation measures have been implemented.</li> <li>8. Discussion of residual impacts, including as appropriate monitoring programmes to measure residual impacts, and management programmes to further mitigate these residual impacts and to deal with circumstances where outcomes fall short of intended objectives.</li> <li>9. To the extent that residual impacts cannot be avoided, reduced, mitigated, or subsequently restored – the identification of appropriate offsets.</li> </ol>
<b>Relevant Policy, Guidance Statements and Legislation</b>	<p>Checklist for documents submitted for EIA on marine and terrestrial biodiversity.</p> <p>DSEWPaC (2012) EPBC Act Environmental Offsets Policy, Canberra, ACT</p> <p><i>Environment Protection and Biodiversity Conservation Act 1999.</i></p> <p>EPA (2007) Guidance Statement No.54a: <i>Sampling methods and survey considerations for subterranean fauna in Western Australia</i> Perth, Western Australia.</p> <p>EPA (2013) Environmental Assessment Guideline <i>for Consideration of subterranean fauna in environmental impact assessment in Western Australia</i>. EAG 12, Perth, Western Australia.</p> <p>Government of Western Australia (2011) <i>Environmental Offsets Policy</i>, Perth, Western Australia.</p> <p>Government of Western Australia (2014) <i>Environmental Offsets Guidelines</i>, Perth, Western Australia.</p>

Hydrological Processes	
<b>EPA objective</b>	To maintain the hydrological regimes of groundwater and surface water so that existing and potential uses, including ecosystem maintenance, are protected.
<b>Relevant aspects</b>	Construction and operation of mine, mine infrastructure (including waste rock landforms and tailings storage, landfills, water storage facilities, groundwater abstraction and reinjection), access tracks, and borefield. Mine closure and facility decommissioning.
<b>Potential impacts and risks</b>	Impacts to existing and potential groundwater users, subterranean fauna, flora and vegetation and terrestrial fauna as a result of extraction and reinjection of water.
<b>Required work</b>	<ol style="list-style-type: none"> <li>1. Characterise baseline surface, hydrological and hydrogeological regimes, flood risks and water quality – including description of surveys undertaken, baseline data collected and environmental values identified.</li> <li>2. A H3 Hydrogeological survey for proposed mine dewatering, Managed Aquifer Recharge (MAR) and water supply for the entire project. The hydrological assessment will cover the entire project life, including closure and all of the mine planning options for dewatering, MAR, water supply and contingencies and water disposal. It will take account of impacts on other users, the environment and the maintenance of groundwater aquifer integrity.</li> <li>3. An evaluation of the impact of abstracting and reinjecting water on environmental receptors.</li> <li>4. Contingency plan for water supply should a viable source of water not be identified.</li> <li>5. Predictive assessment of post-mining pit void hydrology and water quality.</li> <li>6. Characterisation of discharge zones identified for injection purposes, including local transmissivity, standing water levels, ground water chemistry and the development of a conceptual model of the receiving aquifer.</li> <li>7. Field studies to assess the suitability of local aquifers to receive up to 1.5 GL/a of water.</li> <li>8. Drilling to assess water supply options.</li> <li>9. Outline the outcomes/objectives, management, monitoring, trigger and contingency actions, within environmental management plans, to ensure impacts (direct and indirect) are not greater than predicted.</li> <li>10. An application of the mitigation hierarchy to the impacts from the proposal upon identified environmental values and an assessment of the residual impacts after the mitigation measures have been implemented.</li> <li>11. Discussion of residual impacts, including as appropriate monitoring programmes to measure residual impacts, and management programmes to further mitigate these residual impacts and to deal with circumstances where outcomes fall short of intended objectives in relation to (a) minimising the potential for contamination, (b) ensuring the sustainable use of any aquifer, and (c) considering the potential for climate change to impact on ground and surface waters hydrological flows over the life of the project.</li> <li>12. To the extent that residual impacts cannot be avoided, reduced, mitigated, or subsequently restored – the identification of appropriate offsets.</li> </ol>
<b>Relevant Policy, Guidance Statements and Legislation</b>	<p>ANZECC and ARMCANZ (2000) <i>Australian and New Zealand Guidelines for Fresh and Marine Water Quality</i>, Canberra, ACT.</p> <p>Department of Water (DoW) (2009) Operational Policy No.5.12 – <i>Hydrogeological reporting associated with a groundwater well license</i>, Perth, Western Australia.</p> <p>DoW (2010) Operational Policy No. 5.08 – <i>Use of Operating Strategies in the Water Licencing Process</i>, Perth, Western Australia.</p> <p>DoW (2011) Operational Policy No. 1.02 - <i>Policy on Water Conservation and Efficiency Plans</i>, Perth, Western Australia.</p> <p>DoW (2011) Operational Policy No.1.01 – <i>Managed aquifer recharge in Western Australia</i>, Perth, Western Australia.</p>

	<p>DoW (2013) Strategic Policy No.2.09 – <i>Use of mine dewatering surplus</i>, Perth, Western Australia.</p> <p>DoW (2013) Water licensing delivery series - Report No.12: <i>Western Australian Water in Mining Guideline</i>, Perth, Western Australia.</p> <p><i>Environment Protection and Biodiversity Conservation Act 1999.</i></p> <p>Government of WA (2004) <i>State Water Quality Management Strategy Document No. 6</i>, Perth, Western Australia.</p> <p><i>Rights in Water and Irrigation Act 1914.</i></p> <p>Waters and Rivers Commission (1994) <i>Goldfields Groundwater Area Management Plan</i>.</p>
<b>Inland Waters Environmental Quality</b>	
<b>EPA objective</b>	To maintain the quality of groundwater and surface water, sediment and biota so that the environmental values, both ecological and social, are protected.
<b>Relevant aspects</b>	Construction and operation of mine, associated mine infrastructure (including waste rock landforms and tailings storage), water reinjection.
<b>Potential impacts and risks</b>	<p>Impacts to groundwater quality from reinjection of blended process and pit water.</p> <p>Contamination of surface water as a result of loss of containment of mine related processes including ore, pregnant liquor solution, temporary tailings, acid and saline process water and spillage of fuels or reagents.</p> <p>Contamination of groundwater as a result of tailings dam, evaporation pond or in situ seepage.</p>
<b>Required work</b>	<ol style="list-style-type: none"> <li>1. Characterise the environmental quality of the inland waters within the proposed project area including its relevance within a wider regional context.</li> <li>2. Describe surveys undertaken to establish water quality, the baseline data collected and the environmental values identified.</li> <li>3. Describe the impacts from this proposal on the associated inland water quality including direct and indirect impacts.</li> <li>4. Develop of a whole of site Water Balance that examines water quality of the various sources and the disposal options. This will include an analysis of the capability of evaporation ponds to hold this saline water and the ability to re-inject such water into aquifers where the water quality is comparable.</li> <li>5. Analysis of expected radionuclides distribution in both extracted ground waters and process effluent and flow path modelling of any water discharged both from reinjection and tails deposition.</li> <li>6. Characterise wastes, including intermediate processing wastes, effluents and tailings according to contaminant and leachable concentrations including base metals present in the deposits to allow for waste processing and tailings seepage issues to be addressed. Leach tests will include the use of onsite water.</li> <li>7. Describe the long term containment of waste material and process water, designed to be consistent with best practice. <ul style="list-style-type: none"> <li>Demonstrate A and B below through multiple lines of evidence: <ol style="list-style-type: none"> <li>A. the effectiveness of the containment.</li> <li>B. that any release of waste material and process water to the environment does not lead to above background levels of radionuclides and other contaminants; or undertake suitable modelling of the long term movement (10,000 years) of waste material and process water or until background levels are reached.</li> </ol> </li> </ul> </li> <li>8. For the proposed pits demonstrate the extent to which enriched remaining (<i>in situ</i>) material and mined waste have the potential to leach metals and metalloids: <ol style="list-style-type: none"> <li>A. Provide a geological/hydrological diagram to show the relationship between mining and mining activities (such as de-watering) and the potential to mobilise metals and metalloids.</li> </ol> </li> </ol>

	<p>B. Characterise clay enriched lignite and lignite including analysis for total sulphur, acid neutralising capacity and metal and metalloid concentrations. Determine if clay enriched lignite and lignite is likely to produce excess acid through appropriate acid base accounting.</p> <p>C. Establish triggers to identify the potential for metal and metalloids to leach and if triggers are exceeded undertake appropriate testing such as sequential leach testing on representative samples of clay enriched lignite and lignite to ascertain the potential for oxidation to release metals and metalloids from neutral or acid mine drainage.</p> <p>D. Where results show that metals and metalloids are likely to be released into the groundwater above background concentrations in the local vicinity to the groundwater drawdown cone and/or pits, undertake an appropriate risk assessment and propose suitable management actions.</p> <p>9. Outline the outcomes/objectives, management, monitoring, trigger and contingency actions, within environmental management plans, to ensure impacts (direct and indirect) are not greater than predicted.</p> <p>10. An application of the mitigation hierarchy to the impacts from the proposal upon identified environmental values and an assessment of the residual impacts after the mitigation measures have been implemented.</p> <p>11. Discussion of residual impacts, including as appropriate monitoring programmes to measure residual impacts, and management programmes to further mitigate these residual impacts and to deal with circumstances where outcomes fall short of intended objectives.</p> <p>12. To the extent that residual impacts cannot be avoided, reduced, mitigated, or subsequently restored – the implementation of appropriate offsets.</p>
<b>Relevant Policy, Guidance Statements and Legislation</b>	<p>DEC <i>Water Quality Protection</i>, Perth, Western Australia.</p> <p>DoW (2009) Operational Policy No.5.12 – <i>Hydrogeological reporting associated with a groundwater well license</i>, Perth, Western Australia.</p> <p>DoW (2010) Operational Policy No. 5.08 – <i>Use of Operating Strategies in the Water Licencing Process</i>, Perth, Western Australia.</p> <p>DoW (2011) Operational Policy No. 1.02 - <i>Policy on Water Conservation and Efficiency Plans</i>, Perth, Western Australia.</p> <p>DoW (2011) Operational Policy No. 1.01 – <i>Managed aquifer recharge in Western Australia</i>, Perth, Western Australia.</p> <p>DoW (2013) Strategic Policy No. 2.09 – <i>Use of mine dewatering surplus</i>, Perth, Western Australia.</p> <p><i>Environment Protection and Biodiversity Conservation Act 1999.</i></p> <p><i>Guidelines No. 10 Mining and Mineral Processing, Above-ground Fuel and Chemical Storage (2000)</i>, Perth, Western Australia.</p>
<b>Air Quality and Atmospheric Gases</b>	
<b>EPA objective</b>	To maintain air quality for the protection of the environment and human health and amenity, and to minimise the emission of greenhouse and other atmospheric gases through the application of best practise.
<b>Relevant aspects</b>	Construction and operation of mine, associated mine infrastructure (including waste rock landforms and tailings storage), and during transport operations.
<b>Potential impacts and risks</b>	<p>The production of dust resulting from mining and processing activities including transporting ore on unsealed access/haul roads, crushing and milling ore to produce fine particles amenable to leaching and the drying and packaging of precipitated uranium concentrate.</p> <p>To the extent that dust contains radioactive material that might be inhaled or ingested it represents a particular hazard to all forms of life that might inhale or ingest it.</p> <p>Power is expected to be provided from local power generation utilising hydrocarbon based fuels (diesel or gas) and this will result in carbon dioxide and sulphur dioxide emissions.</p>

<b>Required work</b>	<ol style="list-style-type: none"> <li>1. Characterise air quality in the project area, including a description of survey work undertaken, baseline data collected and environmental values identified.</li> <li>2. Describe expected impacts upon air quality from the implementation of the proposal including direct and indirect impacts.</li> <li>3. Modelling of dust emission sources, particularly in relation to near surface mineralisation and dispersion modelling to predict radionuclide activities in airborne and deposited dust and to ensure compliance with NEPM standards.</li> <li>4. Modelling of potential emissions from power generation and the impacts upon sensitive receptors such as mine site accommodation.</li> <li>5. Estimation of potential greenhouse gas emissions associated with the construction and operation of the mine and associated infrastructure.</li> <li>6. Outline the outcomes/objectives, management, monitoring, trigger and contingency actions, within environmental management plans, to ensure impacts (direct and indirect) are not greater than predicted.</li> <li>7. An application of the mitigation hierarchy to the impacts from the proposal upon identified environmental values and an assessment of the residual impacts after the mitigation measures have been implemented.</li> <li>8. Discussion of residual impacts, including as appropriate monitoring programmes to measure residual impacts, and management programmes to further mitigate these residual impacts and to deal with circumstances where outcomes fall short of intended objectives.</li> <li>9. Discussion of proposed best practice management, monitoring and control/mitigation methods to be implemented for a remote site so that the cumulative impacts from all sources do not pose an unacceptable risk to the health and amenity of site personnel or the environment.</li> <li>10. To the extent that residual impacts cannot be avoided, reduced, mitigated, or subsequently restored – the implementation of appropriate offsets.</li> </ol>
<b>Relevant Policy, Guidance Statements and Legislation</b>	<p>DEC (2006) Guidance Notes: Air Quality and Air Pollution Modelling, Perth, Western Australia.</p> <p>DEC (2010) A guideline for managing the impacts of dust and associated contaminants from land development sites, contaminated sites remediation and other related activities, Perth, Western Australia.</p> <p>DEC <i>Western Australia State Greenhouse Strategy – Western Australia Greenhouse Task Force</i> (2004b), Perth, Western Australia.</p> <p><i>Environment Protection and Biodiversity Conservation Act 1999.</i></p> <p>EPA (2002) Guidance Statement No. 12: <i>Minimising Greenhouse Gas Emissions</i>, Perth, Western Australia.</p> <p>National Environmental Protection (Assessment of Site Contamination) Measure (NEPM) 2013, Canberra, ACT.</p> <p><i>National Greenhouse and Energy Reporting Act 2007.</i></p> <p><i>Radiation Safety Act 1975.</i></p>
<b>Human Health</b>	
<b>EPA objective</b>	To ensure that human health is not adversely affected
<b>Relevant aspects</b>	Radioactive material from operation of mine, associated mine infrastructure (including waste rock landforms, tailings storage and evaporations ponds), and transport.
<b>Potential impacts and risks</b>	<p>Uranium and its daughter products (including Thorium, Protactinium, Radium, Radon, Polonium, Bismuth and Lead) are radioactive.</p> <p>There are four pathways by which radioactive material can adversely impact human health:</p> <ul style="list-style-type: none"> <li>• internal exposure from inhalation of dust containing radioactive material;</li> <li>• internal exposure from ingestion of radioactive materials;</li> </ul>

	<ul style="list-style-type: none"> <li>• internal exposure from inhalation of radon and radon decay products; and</li> <li>• external exposure from gamma radiation or 'shine'.</li> </ul> <p>Dust emission from the mining and subsequently the handling and processing of mineralised material containing uranium and its daughter products.</p> <p>Radon gas emanation from disturbed area.</p> <p>Gamma radiation from exposed ore and non-ore materials in the open pit, ore stockpiles, the build-up of salts in the evaporation ponds, exposed tailings material and material being processed, stored and transported.</p> <p>Any contamination of air, soils and groundwater that has the potential to expose humans to radioactive material pathway.</p>
<b>Required work</b>	<ol style="list-style-type: none"> <li>1. Characterisation of expected levels of radioactivity associated with each stage of the process including transportation of the final product.</li> <li>2. Assessment of the potential radiological impacts on workers (including transport workers) and members of the public both during operation and post closure, including a radiological dose assessment.</li> <li>3. Collection and analysis of radiological baseline data.</li> <li>4. Description of potential implications for health and safety due to the mining or processing of lignite materials, during operations and to infrastructure.</li> <li>5. Assessment of risks to human health from bush tucker consumption in the region from radiological sources and other contaminants, based on local diet. Where a local community is not present a hypothetical model should be used, taking into account a 'worst case' scenario.</li> <li>6. Discussion of proposed best practice management, monitoring and control/mitigation methods to be implemented for a remote site so that the cumulative impacts from all sources do not pose an unacceptable risk to the health and amenity of site personnel or the environment.</li> <li>7. Outline the outcomes/objectives, management, monitoring, trigger and contingency actions, within environmental management plans, to ensure impacts (direct and indirect) are not greater than predicted.</li> </ol>
<b>Relevant Policy, Guidance Statements and Legislation</b>	<p>ARPANSA (2005) Radiation Protection Series (RPS) - Code of Practice and Safety Guide for Radiation Protection and Radioactive Waste Management in Mining and Mineral Processing – particularly:</p> <ul style="list-style-type: none"> <li>• RPS F-1 (Fundamentals for Protection Against Ionising Radiation (2014));</li> <li>• RPS 2 (Code of Practice for the Safe Transport of Radioactive Material (2008));</li> <li>• RPS 2.1 (Safety Guide for the Safe Transport of Radioactive Material (2008));</li> <li>• RPS 2.2 (Safety Guide for the Approval Processes for the Safe Transport of Radioactive Materials (2012));</li> <li>• RPS 6 (National Directory for Radiation Protection (NDRP) February 2014);</li> <li>• RPS 7 (Recommendations for Intervention in Emergency Situations Involving Radiation Exposure (2004));</li> <li>• RPS 9 (Code of Practice and Safety Guide for Radiation Protection and Radioactive Waste Management in Mining and Mineral Processing (2005));</li> <li>• RPS 9.1 (Safety Guide for Monitoring, Assessing and Recording Occupational Radiation Doses in Mining and Mineral Processing (2011));</li> <li>• RPS 15 (Safety Guide for Monitoring, Assessing and Recording Occupational Radiation Doses in Mining and Mineral Processing (2011)); and</li> <li>• RPS 16 (Safety Guide for the Predisposal Management of Radioactive Waste (2008)).</li> </ul> <p>ARPANSA (2011) <i>Joint convention on the safety of spent fuel management and on the safety of radioactive waste management</i>, Australian National Report.</p> <p><i>Dangerous Goods Safety Act (2004)</i></p> <p>Department of Mines and Petroleum (DMP) (2010). <i>Managing Naturally-Occurring Radioactive Material (NORM) in Mining and Mineral Processing – Guidelines</i> (Numerous), Perth, Western Australia.</p> <p><i>Environment Protection and Biodiversity Conservation Act 1999.</i></p>



	<p>International Commission on Radiological Protection (ICRP) relevant publications.</p> <p>IAEA RS-G-1.6 <i>Occupational Radiation Protection in the Mining and Processing of Raw Materials</i>.</p> <p><i>Mines Safety and Inspection Act 1994</i>.</p> <p><i>Nuclear Non-Proliferation (Safeguards) Act 1987</i>.</p> <p><i>Radiation Safety Act 1975</i>.</p> <p>Radiation Safety (General) Regulations 1983-2003.</p> <p>Radiation Safety Transport of Radioactive Materials (2008) Transport Code.</p>
<b>Heritage</b>	
<b>EPA objective</b>	To ensure that historical and cultural associations, and natural heritage, are not adversely affected.
<b>Relevant aspects</b>	Land and vegetation clearing for mine, mine infrastructure (including waste rock landforms and tailings storage), access tracks, and borefield.
<b>Potential impacts and risks</b>	Disturbance to Aboriginal heritage sites and/or cultural associations within the area.
<b>Required work</b>	<ol style="list-style-type: none"> <li>1. Characterisation of heritage within the proposed project area including its relevance within a wider regional context.</li> <li>2. Description of surveys for Aboriginal heritage sites within the project area, data collected and significance of sites identified.</li> <li>3. An assessment of impacts on any Aboriginal sites of significance in accordance with EPA Guidance Statement No.41.</li> <li>4. Description of impacts on heritage sites and/or cultural associations associated with the development of the proposal.</li> <li>5. Measures proposed to be undertaken in order to ensure impacts on heritage sites and/or cultural associations are avoided or minimised and where not possible what measures would be implemented to restore or otherwise offset any impacts.</li> <li>6. Outline the outcomes/objectives, management, monitoring, trigger and contingency actions, within environmental management plans, to ensure impacts (direct and indirect) are not greater than predicted.</li> </ol>
<b>Relevant Policy, Guidance Statements and Legislation</b>	<p><i>Aboriginal Heritage Act 1972</i>.</p> <p>Department of Aboriginal Affairs and Department of Premier and Cabinet (DAA &amp; DPC) (2013) <i>Aboriginal Heritage - Due Diligence Guidelines, Version 3.0</i>, Perth, Western Australia.</p> <p><i>Environment Protection and Biodiversity Conservation Act 1999</i>.</p> <p>EPA (2004) Guidance Statement No.41: <i>Assessment of Aboriginal Heritage</i>, Perth, Western Australia.</p>
<b>Rehabilitation and decommissioning</b>	
<b>EPA objective</b>	To ensure that premises are decommissioned and rehabilitated in an ecologically sustainable manner.
<b>Relevant aspects</b>	Land and vegetation clearing for the mine, mine and plant infrastructure (including waste rock landforms and tailings storage), access tracks, borefield and reinjection development sites.
<b>Potential impacts and risks</b>	The Strategic Framework for Mine Closure (Australian and New Zealand Minerals and Energy Council and the Minerals Council of Australia (ANZMEC/MCA) emphasises that mine closure planning is not an “end of mine process” but is integral to the “whole of mine life” Plan.



	<p>Closure plans must adequately consider the long term physical, chemical, biological and social land use effects on the natural ecosystems.</p> <p>Poor rehabilitation and closure procedures, planning, and management practices may result in a number of undesirable impacts. Primary areas of concern are associated with the post closure physical stability of built infrastructure potentially resulting in increased risk to the public and the environment and lack of chemical stability such that contaminants can migrate into receiving environments at concentrations that are harmful.</p>
<b>Required work</b>	<ol style="list-style-type: none"> <li>1. Conceptual characterisation of project area once operations have ceased, infrastructure has been decommissioned and area has been rehabilitated.</li> <li>2. Comparison between initial conditions and expected post-closure conditions identifying residual impacts resulting from implementation of proposal including all expected rehabilitation measures.</li> <li>3. Closure planning is initially conceptual and progressively becomes more detailed following start up as operational changes take effect, rehabilitation techniques and technologies are tested and advances in knowledge from monitoring are obtained.</li> <li>4. A preliminary Radioactive Waste Management Plan (RWMP) will be prepared and included in the PER. The RWMP will: <ul style="list-style-type: none"> <li>• Consider the PKEFs and demonstrate how the environmental objectives of the ARPANSA Radiation Protection Series (incl. RPS6, RPS 9 and RPS 15) and International Atomic Energy Agency (IAEA) Safety Standard SSR-5 'Disposal of Radioactive Waste' 2011 are to be achieved.</li> <li>• Identify, characterise and classify each waste stream (including intermediate processing waste) associated with the operation of the mine, in accordance with ARPANSA RPS20.</li> <li>• Include controls and determine risk categories for the management of tailings, process and surface waters based on Australian National Committee On Large Dams Incorporated (ANCOLD) guidelines entitled 'Guidelines on tailings dams Planning, Design, Construction, Operation and Closure' (May 2012)</li> </ul> </li> <li>5. A conceptual mine closure plan will be developed as an initial planning and consultation tool to guide the project direction in respect to closure outcomes and best practice technology goals during design and construction. The plan will be prepared in accordance with EPA/DMP Guidelines for Preparing Mine Closure Plans (2011), the site Radiation Management Plan and the Mining Code (2005) and will cover radiological considerations in respect to long term secure management and disposal of radioactive materials and plant under planned and unplanned scenarios. Further guidance would be obtained from IAEA Nuclear Energy Series publications.</li> <li>6. Review of potential impacts from radiation associated with the project to non-human biota will be analysed using a program known as ERICA. Australian specific data will be used where available.</li> <li>7. Physical and geochemical characterisation of process residues, waste rock and overburden.</li> <li>8. An assessment of the radon exhalation performance of the cap and its significance will be undertaken.</li> <li>9. Long term behaviour and performance of built landforms and associated containment systems, including tailings storage facility capping systems, modelled under a range of climatic events including appropriate landform evolution modelling.</li> <li>10. Estimate of waste quantities and documentation of expected timing of land disturbance, waste generation and progressive rehabilitation.</li> <li>11. Sequencing of mining, tailings deposition/backfilling and progressive rehabilitation.</li> <li>12. Assessment of hydrological characteristics of the post-closure voids.</li> <li>13. A conceptual diagram of pits post-closure.</li> <li>14. Determination of expected cumulative residual impacts post closure, ongoing monitoring and remediation measures required if appropriate and any offset measures required where remediation is deemed not sufficient.</li> </ol>

<b>Relevant Policy, Guidance Statements and Legislation</b>	<p>ANCOLD (2012) <i>Guidelines on Tailings Dams- Planning, Design, Construction, Operation and Closure</i> May 2012</p> <p>ANZMEC &amp; MCA (2000) <i>Strategic Framework on Mine Closure</i> - Discussion Paper</p> <p>ARPANSA (2005). <i>Management in Mining and Mineral Processing</i></p> <p>ARPANSA Technical Report 167 – <i>A review of existing Australian radionuclide activity concentration data in non-human biota inhabiting uranium mining environments.</i></p> <p>APRANSA (2011) <i>Joint convention on the safety of spent fuel management and on the safety of radioactive waste management</i>, Australian National Report.</p> <p><i>Contaminated Sites Act (2003)</i> (WA) Perth.</p> <p>Department of Industry, Tourism and Resources (2006) <i>Mine Closure and Completion, Leading Practice Sustainable Development Program for the Mining Industry</i>. Dept. of Industry Tourism and Resources, Canberra, ACT.</p> <p>DMP &amp; EPA (2011) <i>Guidelines for Preparing Mine Closure Plans</i>, Perth, Western Australia.</p> <p>DMP (2013) Code of Practice- <i>Tailings Storage Facilities in Western Australia</i>. Perth, Western Australia.</p> <p><i>Environment Protection and Biodiversity Conservation Act 1999.</i></p> <p>Environment Protection and Biodiversity Conservation Act 1999, <i>Offsets Policy</i>, October 2012, Canberra, ACT.</p> <p>EPA (2006) Guideline for the Assessment of Environmental Factors: <i>Guidance Statement No. 6. Rehabilitation of Terrestrial Ecosystems</i>. Environmental Protection Authority, Perth, Western Australia.</p> <p>IAEA (2009). <i>Establishment of Uranium Mining and Processing Operations in the Context of Sustainable Development</i>. Nuclear Energy Series- NF-T-1.1</p> <p>IAEA (2010). <i>Best Practice Environmental Management of Uranium Mining</i>: Nuclear Energy Series No NF-T-1.2</p> <p>Mining Code (2005). <i>Code of Practice and Safety Guide for Radiation Protection and Radioactive Waste Management in Mining and Mineral Processing</i>.</p>
<b>Offsets</b>	
<b>EPA objective</b>	To counterbalance any significant residual environmental impacts or uncertainty through the application of offsets.
<b>Relevant aspects</b>	Residual environmental impacts or uncertainty resulting from implementation of proposal and subsequent application of mitigation hierarchy to reduce impacts and/or uncertainty.
<b>Potential impacts and risks</b>	<p>The proposal necessarily involves the clearance of potentially as much as 2000ha of land which will impact the associated flora and fauna.</p> <p>The proposal involves the extraction and reinjection of significant amounts of water and this may potentially impact both the areas from where the water is taken due to drawdown and where it is reinjected due to quality differences and water mounding. This could impact on associated groundwater dependent ecosystems.</p> <p>The proposal involves initially returning processed waste material to an above ground tailings storage facilities which could potentially damage the environment if some of the contained material was subsequently able to migrate away from the facility.</p> <p>The proposal involves the handling of radioactive material which has the potential to harm human health if not managed properly.</p> <p>There is a risk of accidental release of radionuclides into the environment and contamination of air, soils and groundwater and to a consequent impact on non-human biota in the region.</p>

<b>Required work</b>	<ol style="list-style-type: none"> <li>1. All the potential impacts and risks needs to be considered in the context of the application of mitigation measures and other management techniques to control or lessen or rectify the impacts and risks, and to then determine the residual impacts and risks.</li> <li>2. The application of the residual impact significance model to show whether there are significant residual impacts. Should significant residual impacts be determined Vimy will propose an offsets package to be included in the PER document.</li> </ol>
<b>Relevant Policy, Guidance Statements and Legislation</b>	<p>Environment Protection and Biodiversity Conservation Act 1999 <i>Offsets Policy</i>, October 2012, Canberra, Australian Capital Territory</p> <p>EPA (2014) Environmental Protection Bulletin No.1: <i>Environmental Offsets</i>, Perth, Western Australia.</p> <p>Government of WA Environmental Offsets Policy, September 2011, Perth, Western Australia;</p> <p>Government of WA Environmental Offsets Guidelines, August 2014, Perth, Western Australia;</p>

#### 4. Stakeholder consultation

The EPA expects that the proponent will consult with stakeholders who are interested in, or affected by, the proposal. This includes decision-making authorities (DMAs), other relevant State government departments and local government authorities, environmental non-government organisations and the local community.

The proponent must document the stakeholder consultation undertaken and the outcomes, including any adjustments to the proposal and any future plans for consultation. This is to be addressed in a specific section of the PER document and, in addition, key outcomes of consultation are to be reported against the preliminary key environmental factors as relevant.

It is expected that as a part of the consultation with DMA's there will be discussion around each agency's specific regulatory approvals, and a demonstration that other factors can be managed by another regulatory body.

#### 5. Other factors or matters

During assessment of proposals, other factors or matters will be identified as relevant to the proposal, but not of significance to warrant further assessment by the EPA, or impacts can be regulated by other statutory processes to meet the EPA's objectives.

These factors do not require further work as part of the environmental review, or detailed discussion and evaluation in the PER document, although they must be included in the PER document in a summarised, tabular format noting that the PER document will be subject to public review.

It is also important that the proponent be aware that other factors or matters may be identified during the course of the environmental review that were not apparent at the time that this ESD was prepared. If this situation arises, the proponent must consult with the EPA to determine whether these factors and/or matters are to be addressed in the PER document, and if so, to what extent.

#### 6. Agreed assessment timeline

Table 4 sets out the timeline for the assessment of the proposal agreed between the EPA and the proponent. Proponents are expected to meet the agreed timeline, and in doing so, provide adequate, quality information to inform the assessment.

**Table 4 Assessment Timeline**

Key Stages of Assessment	Agreed Completion Date
EPA approval of ESD	9 March 2015
Proponent submits first adequate draft PER document	27 March 2015
Office of the Environmental Protection Authority (OEPA) provides comment on first adequate draft PER document	8 May 2015 (6 weeks)
Proponent submits adequate revised draft PER document	5 June 2015 (4 weeks)
EPA authorises release of PER document for public review	19 June 2015 (2 weeks)
Proponent releases authorised PER document for public review	26 June 2015 (1 week)
Public review of PER document	18 September 2015 (12 weeks)
EPA provides Summary of Submissions	9 October 2015 (3 weeks)
Proponent provides Response to Submissions	30 October 2015 (3 weeks)
OEPA reviews the Response to Submissions	27 November 2015 (4 weeks)
OEPA assesses proposal for consideration by EPA	29 January 2016 (7 weeks + 2 weeks Xmas)
Preparation and finalisation of EPA assessment report (including two weeks consultation on draft conditions with proponent and key Government agencies)	4 March 2016 (5 weeks)

If any stage in the agreed timeline is not met or inadequate information is submitted by the proponent, the timing for the completion of subsequent stages of the process will be revised. Equally, where the EPA is unable to meet an agreed completion date in the timeline, the proponent will be advised and the timeline revised.

The proponent should refer to EPA's EAG 6 – *Timelines for environmental assessment of proposals* for information regarding the responsibilities of proponents and the EPA for achieving timely and effective assessment of proposals.

## **7. Decision-making authorities**

At this stage, the EPA has identified the authorities listed in Table 5 as DMAs for the proposal. Additional DMAs may be identified during the course of the assessment.

**Table 5 Decision-making authorities**

<b>Decision-making authority</b>	<b>Relevant legislation</b>
Western Australian Minister for Environment	<i>Environmental Protection Act 1986</i> <i>Wildlife Conservation Act 1950</i>
Minister for Water	<i>Rights in Water and Irrigation Act 1914</i>
Minister for Mines and Petroleum	<i>Mining Act 1978</i>
Minister for Aboriginal Affairs	<i>Aboriginal Heritage Act 1972</i>
Minister for Health	<i>Radiation Safety Act 1975</i>
Minister for Lands	<i>Land Administration Act 1997</i>
Department of Environment Regulation	Part V of the <i>Environmental Protection Act 1986</i>
Department of Mines and Petroleum	<i>Mining Act 1978</i> <i>Dangerous Goods and Safety Act 2004</i> <i>Mines Safety and Inspection Act 1994</i>
Radiological Council of Western Australia	<i>Radiation Safety Act 1975</i>
Commonwealth Minister for Environment	<i>Environment Protection and Biodiversity Conservation Act 1999</i>
Department of Parks and Wildlife	<i>Wildlife Conservation Act 1950</i>
Department of Aboriginal Affairs	<i>Aboriginal Heritage Act 1972</i>
Department of Water	<i>Rights in Water and Irrigation Act 1914</i>
Shire of Menzies	<i>Planning Development Act 2005</i>

## 8. Parallel processing

The EP Act constrains DMAs from making any decision that could have the effect of causing or allowing the proposal to be implemented. However, the proponent is encouraged to pursue other approvals in parallel with the EPA's assessment noting that the constraint only relates to making an approval decision.

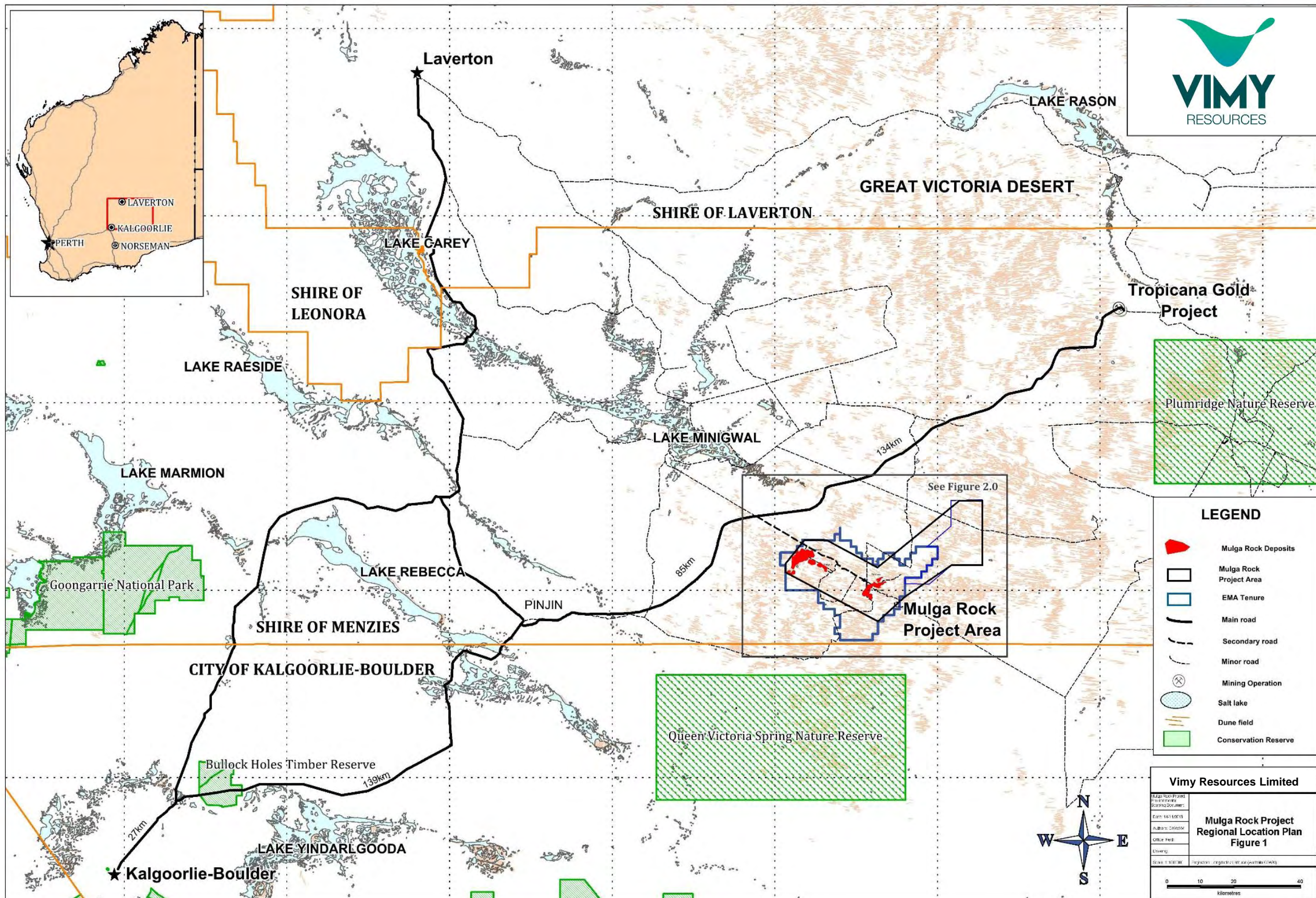
## 9. PER document

When the EPA is satisfied with the standard of the PER document (refer to section 4.4 of EAG 6) it will provide written authorisation for the release of the document for public review. The proponent must not release the PER document for public review until this authorisation is provided.

The proponent is responsible for advertising the release and availability of the PER document in accordance with instructions that will be issued to the proponent by the EPA. The EPA must be consulted on the timing and details for advertising.

## **Figure 1 – Regional location**

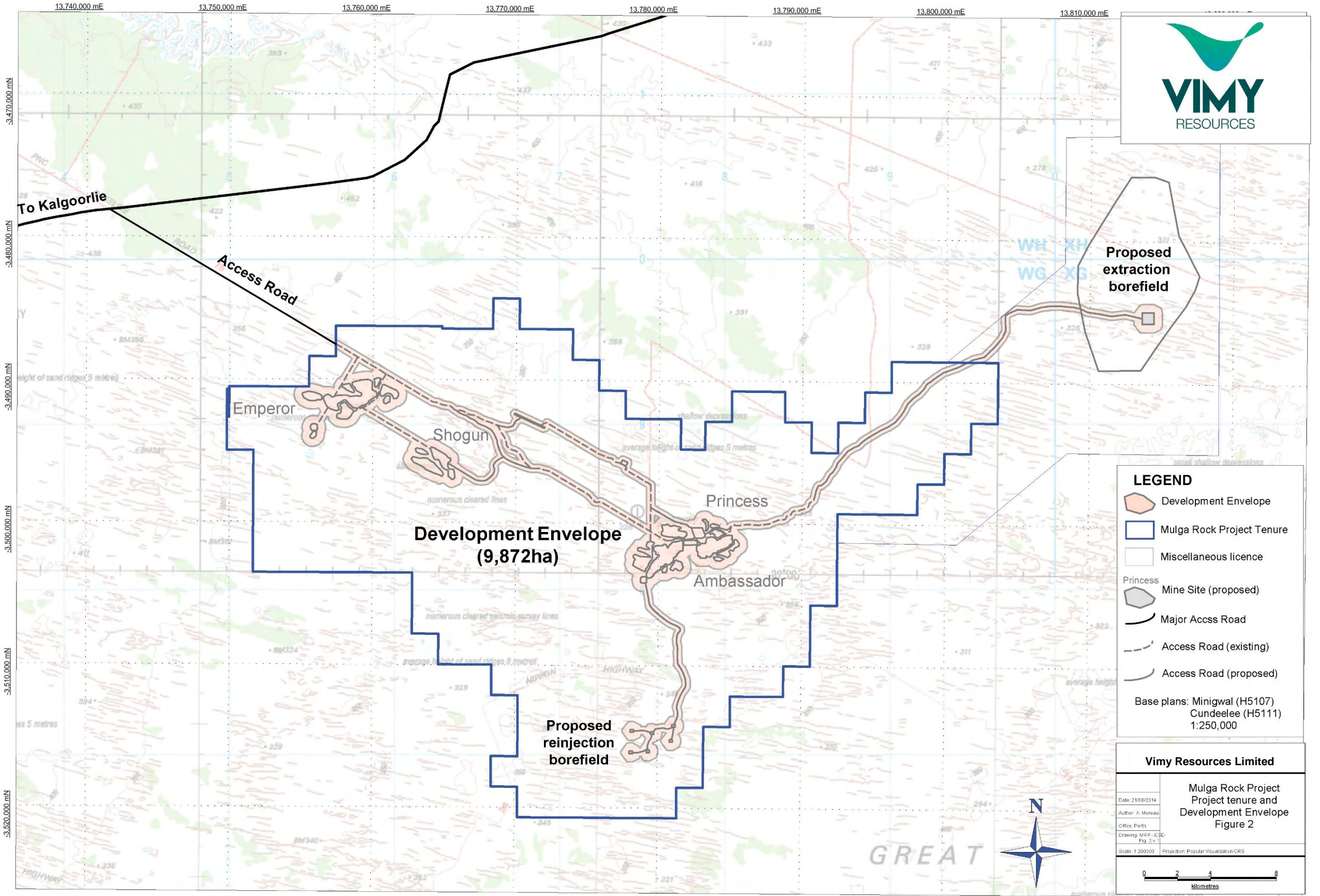






## **Figure 2 – Development envelope**





**Proposed  
extraction  
borefield**

Emperor

Shogun

Princess

Ambassador

**Development Envelope  
(9,872ha)**

**Proposed  
reinjection  
borefield**

**LEGEND**

- Development Envelope
- Mulga Rock Project Tenure
- Miscellaneous licence
- Princess Mine Site (proposed)
- Major Access Road
- Access Road (existing)
- Access Road (proposed)

Base plans: Minigwal (H5107)  
Cundeelee (H5111)  
1:250,000

**Vimy Resources Limited**

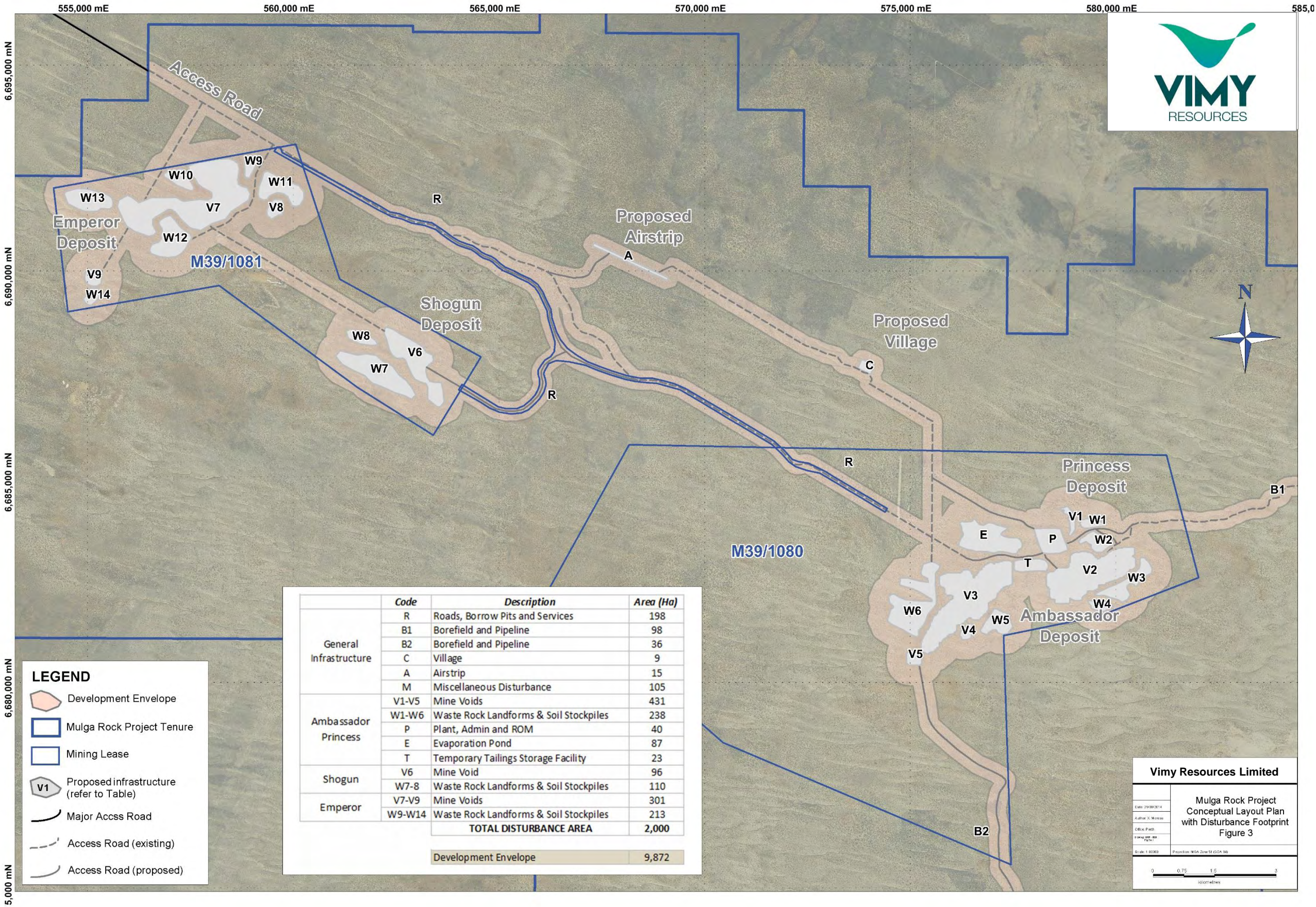
Mulga Rock Project  
Project tenure and  
Development Envelope  
Figure 2

Date: 21/08/2014  
Author: X. Moreau  
Office: Perth  
Drawing: M&P-ESD  
Fig. 2 v.1  
Scale: 1:200,000 | Projection: Popular Visualization CRS



### **Figure 3 – Conceptual layout**





**Vimy Resources Limited**

Code: 21007201-6	<b>Mulga Rock Project Conceptual Layout Plan with Disturbance Footprint Figure 3</b>
Author: J. Morales	
Client: Path	
Project: 21007201-6	
Scale: 1:80000	Projection: MGA Zone 51 (GDA 94)

0

0.75

1.5

3

kilometres