ATTACHMENT 12: ASSESSMENT OF POTENTIAL IMPACTS TO MNES (THREATENED SPECIES AND MIGRATORY SPECIES)

1.0 POTENTIAL DIRECT AND INDIRECT IMPACTS FROM THE PROPOSED ACTION

Potential impacts on species having a likelihood of occurrence of 'Known', 'Likely' or 'Possible', or those identified by Department of Climate Change, Energy, the Environment and Water (DCCEEW) as of potential concern, are assessed below. The cause of potential impacts has been summarised below.

1.1 Direct impacts

1.1.1 Habitat loss

BNR has completed targeted fauna surveys and has committed to conducting pre-activity clearance surveys that will result in exclusion zones being implemented to ensure all direct impacts to species associated with habitat loss is avoided. Residual impacts associated with the Proposed Action are limited to the removal of foraging habitat which, given the availability of similar habitat in the West Kimberley region, account for less than 0.01% of similar available habitat in the region. Given habitat availability in this area is ubiquitous, and with targeted fauna surveys indicating the absence (or limited presence) of habitat suitable for Matters of NES, BNR does not believe that the Proposed Action will not result in a significant impact from this cause.

1.1.2 Vehicle movement:

Although like all other activities, vehicle movement and operation of infrastructure pose a risk of fauna strike, a standard suite controls will ensure that the likelihood of these events are reduced and as such any impacts would be limited. Based on the expectation that the highest number of traffic movements per day could be up to 20 (during the HFS stage), the increase to regional road traffic along Great Northern Highway is calculated to be <6% of the total number of vehicles that would be expected to be encountered on an average day. The duration of high traffic volume (20 moves per day) is expected to be minimal (~2 weeks) with the remainder of the time requiring a much lower traffic volume. As such any increased traffic attributable to the Proposal is not likely to significantly increase the risk of fauna strike within the Project Area and with the mitigations in place, BNR does not believe that the Proposed Action will result in a significant impact to Matters of NES from this cause. Further information relating to traffic increases arising from the activity is provided in Att 9 – Valhalla Gas Exploration and Appraisal Program Section 38 Assessment – Environmental Review Document, Section 5.5.5.2, pg. 187-189).

1.2 Indirect impacts

1.2.1 Light emissions

The Project Area is situated within two pastoral stations, where vehicle movements associated with the local community are common. As such fauna are likely to be accustomed to traffic movement and artificial lighting used for drilling and HFS activities and subsequently no changes to behaviour are expected to arise from these sources. The largest change to ambient light levels will be associated with well testing / flaring activities that will be 24 hour operations for no more than 90 days per well. Light from flaring will be visible from a further distance than the wellsite but is due to the temporary nature of the activity, the flare heights and natural terrain and vegetation within the Project Area, the

changes to ambient light levels are not expected to be significant. As well testing is for no more than 90 days, ambient light levels will only be altered for a short period of time and will immediately return to ambient levels following completion of the activities. Although flaring may result in an increased change to ambient light levels adjacent to the wellsite, as flaring will occur at differing well sites in a series (not in parallel) impacts will be spread throughout the Project area and are not expected to result in any cumulative impacts to any species that are present within or adjacent to the Project Area. As such, BNR does not believe that the Proposed Action will result in a significant impact to Matters of NES from this cause.

1.2.2 Noiseand Vibration emissions

The Project Area is situated within two pastoral stations, where pastoral, petroleum activities, and vehicle movements associated with the local community are common. As such fauna are likely to be accustomed to noise and traffic movement and any noise would be restricted to short periods of loud activities. Historical monitoring of similar activities indicate that HFS activities typically produce noise levels <65 dB(A) 800 m away from the source indicating a highly localised impact. Given the nature of the activity (being an exploration activity) noise and vibration emissions will be limited to the duration of the activity and immediately return to ambient levels once activities are complete indicating the proposed action will only result in a localised and short-term increase in noise and vibration levels. Further detailed assessment (including a description of modelling and monitoring) is provided in Att 9 – Valhalla Gas Exploration and Appraisal Program Section 38 Assessment – Environmental Review Document, Section 5.5.5.2, pg. 187-189).

1.2.3 Dust emissions

The Project Area is situated within two pastoral stations, where vehicle movements and dust emissions associated with the local community and industry are common. As such fauna are likely to be accustomed to localised dust emissions. Dust is expected to settle on nearby native vegetation and pasture but is unlikely to create anything more than a temporary reduction in photosynthetic capacity because rainfall events tend to remove the dust from foliage. The impact is no different from other light and heavy vehicle traffic travelling over similar surfaces, such as pastoral station vehicles along pastoral tracks and vehicles travelling to the Yungngora Community along the gravel Calwynyardah–Noonkanbah Road. A long-term monitoring program that investigated impacts of dust on vegetation for a significant development in the Pilbara over a five-year period, where high volumes of heavy and light vehicles and earthworks were present, determined that no adverse impacts occurred to plant health or vegetation communities as a result of dust loads associated with construction (Chevron Australia, 2015). Consequently, BNR does not believe that dust generation from the Proposal will result an indirect impact to fauna habitat. Further information relating to dust emissions is provided in Att 9 – Valhalla Gas Exploration and Appraisal Program Section 38 Assessment – Environmental Review Document, Section 5.1.5.4, pg. 103).

1.2.4 Changes to fire regimes

There will be no significant impacts to EPBC Act Listed fauna species as a result of changing fire regimes. Given the high frequency of naturally occurring grass fires onsite, any fire event caused by the proposed action is not expected to substantially degrade habitat critical to the survival of the species. Further to this, standard controls are in place to ensure that fire risks onsite are avoided. As such BNR does not believe that the Proposed Action will result in a significant impact from this cause. A detailed impact assessment relating to fire is provided in Att 9 – Valhalla Gas Exploration and Appraisal Program Section 38 Assessment – Environmental Review Document, Section 5.3.5.5, pg. 130-131).

1.2.5 Introduction or spread of weeds

There will be no significant impacts to EPBC Act Listed fauna species as a result of introduction or spread of weeds (terrestrial or aquatic). Standard hygiene mitigations are implemented across the energy industry that include (but are not limited to) compliance with the Arrive Clean, Leave Clean guidance (Commonwealth of Australia, 2015). With these mitigations in place, BNR does not believe that the Proposed Action will result in a significant impact from this cause. A detailed impact assessment relating to spread of weeds is provided in Att 9 – Valhalla Gas Exploration and Appraisal Program Section 38 Assessment – Environmental Review Document, Section 5.3.5.4, pg. 130).

1.2.6 Indirect impacts to habitat arising from changes to groundwater levels

The disturbance footprint does not intersect any Ramsar wetlands or Wetlands of National Significance. The Fitzroy River is located, ~24 km south and ~26 km west of the Project Area. The closest surface water feature is Mount Hardman Creek which is a non-perennial major watercourse. Mount hardman creek is located approximately ~1 km South-east of the most Muspelheim well site. Modelling indicates that for a single wellsite pumping for the maximum volume of 100 ML a 10 cm drawdown is expected 400 m from the pumping bore reducing to 2 cm at 500 m and 1 mm drawdown at 700 m (Intera Geosciences Pty Ltd, 2023). The model predicted that even with pumping for the maximum volume of 100 ML, groundwater levels would be expected to recover rapidly to within 0.2 m of baseline levels within hours of stopping extraction and to fully recover within weeks. Consequently, water abstraction associated with the proposed action will not cause impacts to surface water features or (potential) Groundwater Dependent ecosystems. This indicates no indirect impacts to threatened species habitat outside of the Project Area will arise from groundwater abstraction. For a detailed assessment please refer to Att 9 – Valhalla Gas Exploration and Appraisal Program Section 38 Assessment – Environmental Review Document, Section 5.4.5.1, pg. 161).

1.2.7 Indirect impacts to habitat arising potential contamination of surficial formations due to lost circulation or well integrity issues, including casing failure

The surface hole section will penetrate the Liveringa aquifer which is utilised throughout the region for agricultural uses. To minimise risk of contamination, the drilling fluid for the surface hole sections comprise low-toxicity mud systems. The surface hole section is installed to well below the Liveringa Formation, ensuring sufficient isolation exists before drilling the next hole section. If loss of the drilling fluids were to occur within the Project Area, these would comprise low toxicity fluids and migration from the Project Area would take ~500 years for water to reach the closest surface water feature and (potential) groundwater dependent ecosystem. As low / nontoxic fluids are used during the installation of the surface hole, even if contamination was to occur, and then even if migration to surface water features or (potential) Groundwater Dependent ecosystems outside of the Project Area was to occur BNR does not believe that the event would result in any impact to vegetation and associated fauna habitat. This indicates no indirect impacts to threatened species habitat outside of the Project Area will arise from potential contamination arising from a subsurface drilling release. For a detailed assessment please refer to Att 9 – Valhalla Gas Exploration and Appraisal Program Section 38 Assessment – Environmental Review Document, Section 5.4.5.2, pg. 163).

1.2.8 Indirect impacts to habitat arising potential contamination of aquifers through unplanned fracture heights

Well analysis of the stratigraphy (rock layering) indicates that within the Project area, the top of the Laurel Formation zones of interest for HFS treatment is >2,400 m deep, there is ~1,800 m separation between the targeted Laurel Formation and the surface Liveringa Aquifer, of which ~1,100 m is impermeable hard rock and located directly above the Laurel Formation, the Anderson Formation has a shale layer that acts as a confining geological seal for hydrocarbon migration and therefore would act as an immediate thick containment barrier of impermeable hard rock to unplanned vertical growth of fractures. The proposed vertical extent of the fracture envelope is expected to be ~150 m. It is deemed not plausible, physically, for induced fractures to create a hydraulic connection between the deep back shales and other tight formations and overlying potable aquifers such as the Grant and Poole Sandstone aquifers. This is determined based upon limitations to fracture height growth and potential fault slip. As there is ~1,800 m separation between the targeted Laurel Formation and the surface Liveringa Aquifer, at least 600 m separation between the Laurel Formation and the Grant/Poole Sandstone aquifers, and the predicted vertical extent of fractures for the activities is 150 m. Consequently, the risk to aquifers is extremely low. Given the geological separation between the Laurel Formation and the Liveringa Aquifer (that supports the recharge of Mount Hardman Creek), BNR does not believe it is plausible that fracture heights will extend such that it connects with the Liveringa, which in turn would pollute surface water features, which in turn would cause impacts to threatened species habitat outside of the Project Area. For a detailed assessment please refer to Att 9 – Valhalla Gas Exploration and Appraisal Program Section 38 Assessment – Environmental Review Document, Section 5.4.5.4, pg. 163-164).

1.2.9 Indirect impacts to habitat arising potential contamination of surficial aquifers from an accidental release at the surface of drilling fluids, HFS chemicals, liquid hydrocarbons, or produced formation water

A spill from one of the water retention ponds used to store formation water produced during well testing, drilling fluids, or a spill from a chemical or chemical additive (unmixed) to the ground will result in a varying level of exposure, depending on the volume of release. Standard mitigations will be applied, as BNR plans to install multiple liners for the produced water pond and mud sump, ensuring that the most credible scenario is a small leak from a pond versus a catastrophic failure of both liners. As such the volume of any accidental surface release would be small. Disclosure of all chemicals is required under both the Environmental Protection Act 1986 and Petroleum and Geothermal Energy Act 1967 and all chemicals have been disclosed under the State EIA process (Att 9 – Valhalla Gas Exploration and Appraisal Program Section 38 Assessment – Environmental Review Document, Appendix A). In addition to all chemicals used, previous characterisation of Produced Formation water has been completed indicating, produced formation water is very high in salt at three to five times the salt concentration of sea water, however it is not considered toxic to fauna or humans and has very low levels of heavy metals. although naturally occurring radioactive material (NORM) was detected, the concentrations were well below the exposure concentrations identified by the Australian and New Zealand guidelines for fresh and marine water quality (ANZECC and ARMCANZ, 2018). Consequently, if a surface release was to occur, it would be small in volume. If this did seep through the ground far enough to reach the groundwater, and then even if migration to surface water features or (potential) Groundwater Dependent ecosystems outside of the Project Area was to occur BNR does not believe that the event would result in any impact to vegetation and associated fauna habitat. This indicates no indirect impacts to threatened species habitat outside of the Project Area will arise from potential contamination arising from a surface release. For a

detailed assessment please refer to Att 9 – Valhalla Gas Exploration and Appraisal Program Section 38 Assessment – Environmental Review Document, Section 5.4.5.5, pg. 164-165).

2.0 ASSESSMENT OF THREATENED SPECIES

Table 1 :Threatened Species

Common name	Scientific name	Likelihood of Occurrence	Impact assessment
Greater Bilby	*Macrotis lagotis*	Unlikely	Identified as a species of concern by DCCEEW an impact assessment was undertaken for the Greater Bilby even though the likelihood of occurrence in the Project Area is unlikely. Direct impacts may occur through habitat loss and vehicle movements. However, a recent targeted survey (Ecologica, in prep. 2024) found no evidence that of the Greater Bilby being active or present within the Project Area. The survey did indicate however, that habitat in the south-east of the Project Area is suitable for Greater Bilby, with potential old diggings suggesting that Greater Bilby may have previously foraged within the area. However, no scats, active burrows or fresh tracks were recorded, suggesting that the species does not currently use the area, and as such their presence cannot be confirmed (Ecologica, in prep. 2024). Eco Logical (in prep. 2024) determined that the Proposed Action will require clearing of ~22.5 ha of suitable habitat which comprises only 21 % of the proposed disturbance footprint. Suitable bilby habitat as identified by Eco Logical (in prep. 2024) correspond with broadscale vegetation unit North Fitzroy Plains_700 based upon (Beard, 1979) and Shepherd et al. (2002) which comprise 212,971.66 ha within the local region, Consequently, clearing of 22.5 ha comprises Proposed Action will result in the removal of less than 0.01% of similar habitat in the region. Similar to other ground-dwelling species, fauna strike during traffic movement is a high risk mechanism to this species (Refer to Section 1.1.2). BNR plan to implement the following species-specific management measures: • the disturbance footprint will be scouted for new burrows (within a range of ~75 m) • no clearing will be undertaken within 50 m of any identified burrows • no clearing will be undertaken within 75 m of identified active burrows • vehicle speed limits will be reduced from dusk to dawn to: • 20 km/h in areas where bilbies have been recorded • 40 km in areas where bilbies have not been recorded.

Common name	Scientific name	Likelihood of Occurrence	Impact assessment
			With these mitigations in place and no evidence of active Greater Bilby in the disturbance footprint, any exposure to the Greater Bilby will be minimal and managed, thus it is highly unlikely that any direct impact arising from the Action could be deemed significant. Indirect impacts may occur through light emissions (Section 1.2.1), vibration and noise emissions (Section 1.2.2), dust (Section 1.2.3), changes to fire regimes (Section 1.2.4), or the introduction or spread of weeds (Section 1.2.5). As detailed in Section 1, impacts arising from light, vibration and noise emissions will be limited, and are not expected to significantly impact the species (for example through local displacement) as there is no evidence of active Greater Bilbies in the disturbance footprint. Frequent fire is identified as a known threat to the species (TSSC, 2016), with extensive and intense fires removing vegetation (cover) from large areas, potentially causing increased predation pressure, including by introduced predators. Extensive fires may also affect the availability of food resources (TSSC, 2016). Standard controls will be in place to ensure that fire risks onsite are avoided. Firebreaks will be installed and maintained to ensure clearances between vegetation and the petroleum activities to reduce the risk of fire. Under the Bush Fires Regulations 1954, site preparation, construction and activities (hot work and off-road activities) (i.e. gas flaring) are considered prescribed activities and are regulated accordingly. An assessment against the EPBC Significant Impact Guidelines for Vulnerable species is presented below. An 'important population', as referenced in the criteria below, is a population that is necessary for a species' long-term survival and recovery. This may include populations identified as such in recovery plans, and/or that are key source populations either for breeding or dispersal, populations that are necessary for maintaining genetic diversity, and/or populations that are near the limit of the species range (DEWHA, 2013). The recovery plan (DCCEEW, 2023) states that the Greater Bilby is considered a single population even though fragmentation and isolation may have resulted in local adaptation, and that the concept of 'important populations' (where one occurrence of the Greater Bilby is deemed to be of more value than another) is not relevant to the overall conservation of the Greater Bilby. 1. lead to a long-term decrease in the size of an important population of a species. Secondary signs (i.e. diggings) of the Greater Bilby were recorded within the Project Area during a Targeted Survey completed by (Ecologica, in prep. 2024) however, due to lack scats, active burrows or tracks potential Bilby presence is not confirmed in accordance with the Greater Bilby Survey Guidelines (DBCA, Version 1- 2017). Although Greater Bilby individuals may to utilize the Project Area on occasion, the habitat 'Mixed open woodland over tussock grasses on dune slopes and crests' is well represented more widely and the loss of up to ~22.5 ha of potentially suitable habitat, represents <0.01% of

Common name	Scientific name	Likelihood of Occurrence	Impact assessment
			similar habitat in the region and thus is not expected to lead to a long-term decrease in the size of the population of the species. 2. reduce the area of occupancy of an important population. The nature of the clearing, consisting of discrete well sites and access tracks, is not expected to prevent the species using the broader Project Area. Indirect impacts, such as displacement of individuals from the Project Area or surrounds, due to light, dust or noise emissions, are not expected to be of concern. Lighting will be local to the well sites and camp only and will be the minimum required for safe operations (and temporary flaring activities <90 days per well). Noise emissions associated with drilling activities will be local and minor. Thus, the reduction in the area of occupancy will be minimal. All indirect impacts (assessed in Section 1) indicate that any impacts would be localized to the induvial wellsite and adjacent habitat and temporary in nature. 3. fragment an existing important population into two or more populations. As a burrowing marsupial, the species can inhibit up to 18 burrows over several months, with home ranges estimated between 0.19 km^2 to 3.16 km^2 (DCCEEW, 2023) – the Proposed Action is limited to clearing areas for construction of access tracks and well sites which will not cause any populations (local or regional) to be fragmented due to the species' mobility. 4. adversely affect habitat critical to the survival of a species. Although the area is within the known range of Greater Bilby habitat which by its nature is considered critical habitat, the extent of direct impacts to suitable habitat is estimated to be 22.5 ha within the Project Area. In the context of the Proposed Action, potential Greater Bilby habitat was associated with the broadscale vegetation association North Fitzroy Plains_700, of which less than 0.01 %would be impacted by the Proposed Action. Indirect impacts to adjacent vegetation, such as from dust emissions (Section 1.2.3), are not expected to be of concern. As such it is highly unlikely that the Proposed Action would adversely affect a regional population. 5. disrupt the breeding cycle of an important population. Surveys completed by (Eco Logical Australia, 2021) (Att 5 – Valhalla Project Vertebrate Fauna Assessment Summary) (Ecologica, in prep. 2024) (Att 3 – Valhalla Flora and Fauna Survey) did not identify any Greater Bilby burrows within the Project Area, indicating that no breeding is currently known to occur within the Project Area. A Targeted Survey completed by (Ecologica, in prep. 2024)(Att 5 – Valhalla Project Vertebrate Fauna Assessment Summary) summarized that due to lack scats, active burrows or tracks potential Greater Bilby presence is not confirmed. Mitigations to survey for burrows within the disturbance footprint (and avoid impact

Common name	Scientific name	Likelihood of Occurrence	Impact assessment
			to any recorded burrows) prior to clearing will ensure that any direct impacts to local breeding (if this is occurring) will be avoided. 6. modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline. Although Greater Bilby individuals are known to utilize the Project Area on occasion, the habitat 'Mixed open woodland over tussock grasses on dune slopes and crests' is well represented more widely and the loss of up to ~22.5 ha of potential bilby habitat, comprises < 0.01% of similar available habitat within the local region. This indicates the proposed action is unlikely to decrease the availability or quality of habitat to the extent that the species is likely to decline. 7. result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat. It is highly unlikely, given industry standards and best practice mitigations, that the Proposed Action would cause an invasive species to be introduced which would then establish local populations that would cause broader impacts to the habitat (Section 1.2.5). Weed hygiene is a standard construction risk across all industries which can be effectively managed. 8. introduce disease that may cause the species to decline. The Proposed Action is not expected to introduce any diseases to the Project Area. 9. interfere substantially with the recovery of the species; given the above. The on-ground strategies identified in the recovery plan (DCCEEW, 2023) focus on the management of introduced predators, improving and maintaining habitat and establishing and maintaining a metapopulation that maintains genetic diversity and insures against extinction in nature. The Proposed Action is not expected to interfere substantially with the recovery of the species. It should be noted this assessment draws on ecological information gathered during multiple surveys in the Project Area being: • Att 5 Valhalla Targeted Fauna Survey (Ecologica, in prep. 2024) • Att 3 – Valhalla Flora and Fauna Survey (Eco Logical Australia, 2021) • Att 4 – Odin Flora and Fauna Survey (Low Ecological Services, 2020) The 2020 and 2021 surveys were conducted in accordance with State EPA (Western Australian) Guidance, given the surveys were scoped prior to the amendment of the water trigger and requirement to refer under the EPBC Act. The limitations of these surveys are documented within the reports (refer to attachments). Limitations have been considered in

Common name	Scientific name	Likelihood of Occurrence	Impact assessment
			completing the Impact Assessment above and have informed the development of project mitigation measures. A targeted survey (Ecologica, in prep. 2024)(Att 5 – Valhalla Project Vertebrate Fauna Assessment Summary) found no scats, active burrows or tracks for the Greater Bilby, and therefore it's presence is considered 'not confirmed' in accordance with the Survey guideline. For further information regarding mitigations refer to Att 13 – Table of mitigation measures (Flora and fauna).
Northern Quoll	*Dasyurus hallucatus*	Unlikely	Although this species was identified as a species of concern by DCCEEW targeted surveys indicate this species is not likely to utilise habitat within the Project Area, thus the likelihood of occurrence (and subsequent impact) in the Project Area is unlikely (Ecologica, in prep. 2024).Project Area Given the absence of suitable habitat – a detailed impact assessment has not been completed and the general assessment provided in Section 1 is considered suitable for the following indirect impacts for this species: • Light emissions (Section 1.2.1) • Noise and vibration emissions (Section 1.2.2) • Dust emissions (Section 1.2.3) • Changes to fire regimes (Section 1.2.4 • Introduction or spread of weeds (Section 1.2.5) • Indirect impacts to habitat arising from changes to groundwater levels or pollution events (Section 1.2.7 – Section 1.2.9) In summary the proposed action is not expected to cause signficant direct or indirect impacts to this species. For completeness, BNR has completed an assessment against the EPBC Act referral guideline for the endangered Northern Quoll (*Dasyurus hallucatus)* (CoA, 2016). These are addressed below: 1. Result in the loss of habitat critical to the survival of the Northern Quoll. As detailed in the Referral guidelines for the Northern Quoll, Habitat critical to the survival usually occurs in the form of: • off shore islands where the northern quoll is known to exist • rocky habitats such as ranges, escarpments, mesas, gorges, breakaways, boulder fields, major drainage lines or treed creek lines

Common name	Scientific name	Likelihood of Occurrence	Impact assessment
			• structurally diverse woodland or forest areas containing large diameter trees, termite mounds or hollow logs. As detailed by (Eco Logical Australia, 2021) Att 3 – Valhalla Flora and Fauna Survey, Section 5.2.3, pg.63 and (Ecologica, in prep. 2024)(Att 5 – Valhalla Project Vertebrate Fauna Assessment Summary), none of these habitats were present within the Project Area. Consequently, no impacts to habitat critical to the survival of the Northern Quoll is present. The only potential indirect impact identified for this species would be an event causing impacts to habitat **outside** of the Project Area. This could only occur through contamination of surface waters, or contamination of groundwaters that support groundwater dependent ecosystems. A summary assessment of these impact mechanisms is provided in Section 1.0 above and in more detail in Att 9 – Valhalla Gas Exploration and Appraisal Program Section 38 Assessment – Environmental Review Document, Section 5.4.5.1, Section 5.4.5.2, Section 5.4.5.4 and Section 5.4.5.5 pg. 161 - pg.166). The outcome of this assessment is: • the only surface water feature (or potential) GDE within close proximity of the Project Area is Mount Harman Creek • groundwater extraction will cause at worst a 1mm drawdown within 300m of Mount Hardman Creek which would be expected to rapidly recover following cessation of groundwater extraction • a subsurface release is most likely during drilling activities (not HFS activities) and given nontoxic chemicals are used during drilling, the risk of groundwater contamination causing impacts to the Fitzroy River is not credible • a surface release from evaporation ponds is the highest likelihood event for groundwater or surface water contamination, however this risk is well understood with pond design required to include double barriers and leak detection mechanisms (to identify if the first barrier has been breached). • the potential impact to surface water features or groundwater dependent ecosystems is low, and subsequent indirect impacts to species that utilise these habitats is low. Decrease the size of a population important for the long-term survival of the northern quoll and therefore interfere with the recovery of the species. Given the absence of species habitat (in particular critical habitat) such as rocky areas, Eucalypt forests etc. and no previous confirmed records within 100 km of the Project Area (Eco Logical Australia, 2021) (Ecologica, in prep. 2024) Att 3 – Valhalla Flora and Fauna Survey, Appendix C, pg.89, this species is considered as unlikely to occur within the Project Area. As

Common name	Scientific name	Likelihood of Occurrence	Impact assessment
			such the proposed Action is not expected to lead to a long-term decrease in the size of the population of the species. 2. Introduce inappropriate fire regimes or grazing activities (i.e. increasing the risk of late dry season high intensity fires to the area) that substantially degrade habitat critical to the survival of the northern quoll or decrease the size of a population important for the long-term survival of the species. Suitable habitat for this species is not present, and it is unlikely the Northern Quoll is present in the Project Area. Fire events are well understood, the mitigation measures for preventing or reducing these events are well established. These risks are well managed through existing good practice mitigation measures, which are well understood and implemented by the industry. Due to the absence of habitat, and with standard industry management measures in place, no significant impacts are expected. 3. Fragment a population important for the long-term survival into two or more populations. Noting the absence of suitable habitat and of an important population, clearing will not fragment an important population. 4. Result in invasive species or increases of them that are harmful to the Northern Quoll becoming established in its habitat, namely cane toads, feral cats, red foxes or exotic grasses which increase fire risk. This includes actions which have inadequate quarantine measures in place for movements between the mainland and offshore islands where northern quolls occur. It is highly unlikely, given industry standards and best practice mitigations, that the Proposed Action would cause an invasive species to be introduced which would then establish local populations that would cause broader impacts to the habitat. This is a standard construction risk across all industries which can be effectively managed.
Northern Brushtail Possum	*Trichosurus vulpecula arnhemensis*	Unlikely	Identified as a species of concern by DCCEEW an impact assessment was undertaken for the Northern Brushtail Possum even though the likelihood of occurrence in the Project Area is unlikely. No suitable habitat for this species is present within the Project Area. Only one record 50 km east of the Project Area from 1965 (Eco Logical Australia, 2021). Given the absence of suitable habitat – a detailed impact assessment has not been completed and the general assessment provided in Section 1 is considered suitable for the following indirect impacts for this species:

Common name	Scientific name	Likelihood of Occurrence	Impact assessment
			• Light emissions (Section 1.2.1) • Noise and vibration emissions (Section 1.2.2) • Dust emissions (Section 1.2.3) • Changes to fire regimes (Section 1.2.4 • Introduction or spread of weeds (Section 1.2.5) • Indirect impacts to habitat arising from changes to groundwater levels or pollution events (Section 1.2.7 – Section 1.2.9) In summary the proposed action is not expected to cause significant direct or indirect impacts to this species. For completeness, an assessment against the EPBC Significant Impact Guidelines for Vulnerable species is presented below. An 'important population', as referenced in the criteria below, is a population that is necessary for a species' long-term survival and recovery. This may include populations identified as such in recovery plans, and/or that are key source populations either for breeding or dispersal, populations that are necessary for maintaining genetic diversity, and/or populations that are near the limit of the species range (DEWHA, 2013). The conservation advice (TSSC, 2021) states that 'most of the current population appears to be in the NT, with limited sightings recorded in WA'. The Western Australian population is therefore not considered an important population. 1. lead to a long-term decrease in the size of an important population of a species. Suitable habitat for this species is not present, and it is unlikely the Northern Brushtail Possum is present in the Project Area. Noting the absence of suitable habitat and of an important population, any clearing would not be expected to lead to a long-term decrease in the size of an important population of a species. 2. reduce the area of occupancy of an important population. Suitable habitat for this species is not present, and it is unlikely the Northern Brushtail Possum is present in the Project Area. Noting the absence of suitable habitat and of an important population, any clearing would not be expected to reduce the area of occupancy of an important population. 3. fragment an existing important population into two or more populations. Noting the absence of suitable habitat and of an important population, any clearing would not be expected to fragment an important population. The Proposed Action is limited to clearing

Common name	Scientific name	Likelihood of Occurrence	Impact assessment
			areas for construction of access tracks and well sites which will not cause any populations (local or regional) to be fragmented due to the species' mobility. 4. adversely affect habitat critical to the survival of a species. No habitat critical to the survival of the species is present. 5. disrupt the breeding cycle of an important population. Noting the absence of suitable habitat and of an important population, the disruption to the breeding cycle of an important population is unlikely. 6. modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline. As there is no habitat suitable for the species within the Project Area, the species is not expected to be present. Any clearing would not be expected to modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline. 7. result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat. As there is no habitat suitable for the species within the Project Area, the species is not expected to be present. It is highly unlikely, given industry standards and best practice mitigations, that the Proposed Action would cause an invasive species to be introduced which would then establish local populations that would cause broader impacts to the habitat. This is a standard construction risk across all industries which can be effectively managed. 8. introduce disease that may cause the species to decline. As there is no habitat suitable for the species within the Project Area, the species is not expected to be present. The Proposed Action is not expected to introduce any diseases to the Project Area. 9. interfere substantially with the recovery of the species. As there is no habitat suitable for the species within the Project Area, the species is not expected to be present. The Proposed Action is not expected to interfere substantially with the recovery of the species.
Ghost Bat	*Macroderma gigas*	Unlikely	Although this species was identified as a species of concern by DCCEEW targeted surveys indicate this species is not likely to utilise habitat within the Project Area, thus the likelihood of occurrence (and subsequent impact) in the Project Area is unlikely (Ecologica, in prep. 2024).

Common name	Scientific name	Likelihood of Occurrence	Impact assessment
			Given the nature of the proposed action, and the absence of suitable habitat within the Project area, an impact assessment has not been completed for this species. Project Area
Gouldian Finch	*Erythura hallucatus*	Possible	This species is currently known from 466 records within WA over a range of approximately 800 km, from Broome in the west to Kununurra in the east. A recent record of this species from 2010 is located within 30 km of the Project Area (DBCA, 2021). Its preferred habitat consists of open woodlands that are dominated by Eucalypt trees and support a ground cover of Sorghum and other grasses (TSSC 2016a). Habitat critical for species survival is not possible to be mapped (O'Malley, 2006), however, known breeding habitat for Gouldian Finches in the Northern Territory and Western Australia is characterised by rocky hills with hollow-bearing smooth-barked gums (*Eucalyptus brevifolia or E. tintinnans*) within two to four kilometres of small waterholes or springs that persist throughout the dry season. Although only perennially inundated surface water features are located adjacent to the Project Area (the closest being Mount Hardman Creek), Fauna habitat 1; 'Mixed open woodland over grassland on sandy clay flats and slopes' and Fauna habitat 2; 'Mixed open woodland over tussock grasses on dune slopes and crests' are considered potentially suitable habitat for this species (Att 3 – Section 5.2.3, pp 64). Direct impacts may occur through habitat loss and vehicle movements. However, vehicle movements are considered less of a risk for this species. These are considered no different to other species (and are assessed in Section 1.1.1 and Section 1.1.2 respectively). Standard mitigation will be in place to prevent fauna strike including implementing speed limits, with signage to be installed along access tracks and at well sites to reduce the risk of vehicle movements on all fauna species. In addition to the direct impacts, the general assessment is considered suitable for the following potential indirect impacts for this species: • Light emissions (Section 1.2.1) • Noise and vibration emissions (Section 1.2.2) • Changes to fire regimes (Section 1.2.4)* * vegetation change through altered fire regimes has been identified as one of the factors most likely to have caused past declines, and to be preventing recovery, in Gouldian finch populations (TSSC, 2016). However as standard controls will be in place to ensure that fire risks onsite are avoided, such as firebreaks installed and maintained will reduce the risk of fire. Under the Bush Fires Regulations 1954, site preparation, construction and activities (hot work and off-road activities) (i.e. gas flaring) are considered prescribed activities and are regulated accordingly.

Common name	Scientific name	Likelihood of Occurrence	Impact assessment
			In summary the proposed action is not expected to cause any significant direct or indirect impacts to this species. For completeness, an assessment against the EPBC Significant Impact Guidelines for Endangered species is presented below. 1. lead to a long-term decrease in the size of a population. Gouldian Finches in Western Australia utilise rocky hills with hollow-bearing smooth-barked gums (*Eucalyptus brevifolia* or *E. tintinnans*) for breeding (O'Malley, 2006; Threatened Species Scientific Committee, 2016b). Dry season feeding habitat is limited to spear grasses and native sorghum species, in the wet season the feeding habitat becomes more varies, shifting to a cockatoo grass (*Alloteropsis semialata*), golden beard grass (*Chysopogon fallax*) or spinifex-dominated communities (*Triodia bitextura*; *T. acutispicula*; *T. bynoei*; *T. schinzii*) (O'Malley, 2006). Of the five vegetation communities identified by Ecological (2021), none was recorded to include the presence of smooth-barked gums (*Eucalyptus brevifolia* or *E. tintinnans*), and therefore are not considered to represent potential breeding habitat. However, all contain sorghum grasses (known dry season feeding habitat) and two of the communities contain spinifex-dominated communities (*Triodia* spp.), and one community contains golden beard grass (*Chysopogon fallax*), both known wet season feeding habitat for the Gouldian Finch. Although Gouldian Finch individuals have been recorded 30 km south of the Project Area (Att 3 – Appendix D, pp 89), and may utilize the Project Area on occasion, the habitats within the Project Area are well represented more widely. Utilising broadscale vegetation mapping analysis (North Fitzroy Plains_700 and 699) BNR estimates that the direct impact associated with the proposed action equates to a loss of <0.01% of potential Gouldian Finch foraging habitat in the West Kimberley area. This impact is not expected to lead to a long-term decrease in the size of the population of the species. 2. reduce the area of occupancy of the species. As the clearing of potential Gouldian Finch habitat is limited to feeding habitats, which are ubiquitous in the surrounding area, and not breeding habitat, the Proposed Action is not expected to reduce the area of occupancy of the species. Further, the nature of the clearing, consisting of discrete well sites and access tracks, is not expected to prevent the species using the broader Project Area. Indirect impacts, such as displacement of individuals from the Project Area or surrounds, due to light, dust or noise emissions, are not expected to be of concern and will be temporary in nature. Thus, the reduction in the area of occupancy will be negligible. 3. fragment an existing population into two or more populations.

Common name	Scientific name	Likelihood of Occurrence	Impact assessment
			Clearing of access tracks and wellsite's would not result in the fragmentation of populations given the species mobility and home range of >2 km. 4. adversely affect habitat critical to the survival of a species. No habitat breeding habitat is present within the Project Area. No other habitat critical to the survival of the species has been identified for this species (O'Malley, 2006). 5. disrupt the breeding cycle of a population. No breeding habitat is known to be present, thus the Proposed Action is not expected to disrupt the breeding cycle of a population. 6. modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline. Given the presence of suitable foraging habitat, Gouldian Finches may transit through the Project Area, however as no breeding habitat is present and no critical habitat critical for the for the species is listed, the clearing direct impacts of the proposed action will be limited to clearing of potential of the potential Gouldian Finch habitat would be limited to feeding habitats. As these feeding habitats are ubiquitous in the surrounding environment, this impact would be limited to temporary displacement to adjacent feeding habitat, and is unlikely to modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline 7. result in invasive species that are harmful to a species becoming established in the species' habitat. It is highly unlikely, given industry standards and best practice mitigations, that the Proposed Action would cause an invasive species to be introduced which would then establish local populations that would cause broader impacts to this species. This is a standard construction risk across all industries which can be effectively managed. 8. introduce disease that may cause the species to decline. The Proposed Action is not expected to introduce any diseases to the Project Area. 9. interfere with the recovery of the species. Given the above justification for lack of significance of impacts, it is not expected that the Proposed Action will interfere substantially with the recovery of the species.

Common name	Scientific name	Likelihood of Occurrence	Impact assessment
Grey falcon	*Falco hypoleucos*	Possible	The Grey Falcon is an elusive species endemic to mainland Australia. The species occurs in arid and semi-arid Australia and is mainly found where annual rainfall is less than 500 mm (TSSC, 2020). The Grey Falcon has the potential to occur within the Project Area due to their range and habitat requirements, with records occurring across most bioregions of Western Australia from the South-west to the Kimberley region (DBCA 2007-2020) (Eco Logical Australia, 2021). Marginally suitable habitat for this species occurs within the Project Area, though only one local record, from 50 km south of the Project Area (2002) is known (Eco Logical Australia, 2021). Direct impacts may occur through habitat loss and vehicle movements. Collision with traffic is a credible risk with six cases of Grey Falcons being found injured or dead along roads between 2007 and 2017 (TSSC, 2020). However as only marginally suitable habitat for the Grey Falcon is found in the Project Area (Eco Logical Australia, 2021), this species is not expected to be present all the time and at foraging within or transiting through the area from time to time. (refer to Section 1.1.2 for additional information regarding traffic movement and potential for fauna strike). To mitigate the risk of vehicular strike, speed limits will be enforced, with signage to be installed along access tracks and at well sites to reduce the risk of vehicle movements on all fauna species. Given the presence of potential habitat is limited to foraging (not breeding) – a detailed impact assessment has not been completed and the general assessment provided in Section 1 is considered suitable for the following indirect impacts for this species: • Light emissions (Section 1.2.1) • Noise and vibration emissions (Section 1.2.2) • Dust emissions (Section 1.2.3) • Changes to fire regimes (Section 1.2.4 • Introduction or spread of weeds (Section 1.2.5) In summary the proposed action is not expected to cause any significant direct or indirect impacts to this species. For completeness, an assessment against the EPBC Significant Impact Guidelines for Vulnerable species is presented below. An ‘important population’, as referenced in the criteria below, is a population that is necessary for a species’ long-term survival and recovery. This may include populations identified as such in recovery plans, and/or that are key source populations either for breeding or dispersal,

Common name	Scientific name	Likelihood of Occurrence	Impact assessment
			populations that are necessary for maintaining genetic diversity, and/or populations that are near the limit of the species range (DoE, 2013). 1. lead to a long-term decrease in the size of an important population of a species. No records are known from the Project Area therefore decreasing the size of an important population is unlikely to occur as a result of the Proposed Action. No direct impacts are planned, but should they occur (through fauna strike) they would be limited to transient individuals with limited potential for local or regional population impacts given the absence of breeding habitat in the Project Area. The impact of fauna strike is present across the Project Area currently given the movement of trucks and traffic associated with pastoral activities. It is highly unlikely, given the additional mitigations that will be put in place (speed limits etc.) that the Proposed Action would cause significant direct or indirect impacts significant enough to disrupt local or regional populations of the Grey Falcon. reduce the area of occupancy of an important population. The nature of the clearing, consisting of discrete well sites and access tracks, is not expected to prevent the species using the broader Project Area. Indirect impacts, such as displacement of individuals from the Project Area or surrounds, due to light or noise emissions, are not expected to be of concern. All additional emissions (light, noise, dust and vibrations) will be highly localised and limited to the duration of the activity with all emissions ceasing on completion of activities at each wellsite ensuring any behavioural impacts are limited. Thus, even if an important population was present in the region, any reduction in the area of occupancy will be minimal. 2. fragment an existing important population into two or more populations. Given the lack of records from the Project Area or surrounds, and the nature of the clearing, which is not expected to prevent the species using the broader Project Area, no fragmentation of an important population is likely. 3. adversely affect habitat critical to the survival of a species. Given the lack of records from the Project Area or surrounds, and the absence of critical habitat, no impact to habitat critical to the survival of a species is likely. 4. disrupt the breeding cycle of an important population. Given the lack of records from the Project Area or surrounds, and the nature of the clearing, which is not expected to prevent the species using the broader Project Area, no impact to the breeding cycle of an important population is likely.

Common name	Scientific name	Likelihood of Occurrence	Impact assessment
			5. modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline. Given the lack of records from the Project Area or surrounds, and the limited nature of clearing, no significant impact to habitat, leading to a decline of the species, is likely. 6. result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat. It is highly unlikely, given industry standards and best practice mitigations, that the Proposed Action would cause an invasive species to be introduced which would then establish local populations that would cause broader impacts to the habitat and subsequently the Grey Falcon. This is a standard construction risk across all industries which can be effectively managed. 7. introduce disease that may cause the species to decline. The Proposed Action is not expected to introduce any diseases to the Project Area. 8. interfere substantially with the recovery of the species; given the above. The Proposed Action is not expected to interfere substantially with the recovery of the species.
Purple-crowned fairy-wren (western)	*Malurus coronatus coronatus*	Unlikely	Identified as a species of concern by DCCEEW an impact assessment was undertaken for the Purple-crowned fairy-wren (western) even though the likelihood of occurrence in the Project Area is unlikely. The Purple-crowned Fairy-wren (western) inhabits dense, riparian vegetation in the wet-dry tropics of Western Australia and the Northern Territory and it is found near permanent rivers and springs (or associated billabongs and swamps). No permanent water sources are located within or adjacent to the Project Area. Given the absence of suitable habitat – a detailed impact assessment has not been completed and the general assessment provided in Section 1 is considered suitable for the following indirect impacts for this species: • Light emissions (Section 1.2.1) • Noise and vibration emissions (Section 1.2.2) • Dust emissions (Section 1.2.3) • Changes to fire regimes (Section 1.2.4 • Introduction or spread of weeds (Section 1.2.5) • Indirect impacts to habitat arising from changes to groundwater levels or pollution events (Section 1.2.7 – Section 1.2.9)

Common name	Scientific name	Likelihood of Occurrence	Impact assessment
			In summary impacts to this species are not expected to be significant.An assessment against the EPBC Significant Impact Guidelines for Endangered species is presented below. 1. lead to a long-term decrease in the size of an important population of a species. Suitable habitat for this species is not present, and it is unlikely the Purple-crowned fairy-wren (western) is present in the Project Area. Noting the absence of suitable habitat and of an important population, any clearing would not be expected to lead to a long-term decrease in the size of an important population of a species. 2. reduce the area of occupancy of an important population. Suitable habitat for this species is not present, and it is unlikely the Purple-crowned fairy-wren (western) is present in the Project Area. Noting the absence of suitable habitat and of an important population, any clearing would not be expected to reduce the area of occupancy of an important population. 3. fragment an existing important population into two or more populations. The Proposed Action is limited to clearing areas for construction of access tracks and well sites which will not cause any populations (local or regional) to be fragmented. 4. adversely affect habitat critical to the survival of a species. No habitat critical to the survival of the species is present. 5. disrupt the breeding cycle of an important population. Noting the absence of suitable habitat and of an important population, the disruption to the breeding cycle of an important population is unlikely. 6. modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline. As there is no habitat suitable for the species within the Project Area, the species is not expected to be present. Any clearing would not be expected to modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline. The only potential indirect impact identified for this species would be an event causing impacts to habitat **outside** of the Project Area. This could only occur through contamination of surface waters, or contamination of groundwaters leading to contamination of surface waters. A summary assessment of these impact mechanisms is provided in Section 1.0 above and in more detail in Att 9 – Valhalla Gas Exploration and Appraisal Program Section 38 Assessment

Common name	Scientific name	Likelihood of Occurrence	Impact assessment
			– Environmental Review Document, Section 5.4.5.1, Section 5.4.5.2, Section 5.4.5.4 and Section 5.4.5.5 pg. 161 - pg.166). The outcome of this assessment is: • the only surface water feature (or potential) GDE within close proximity of the Project Area is Mount Harman Creek (~1 km) and closest permanent water feature, the Fitzroy River, is located ~24 km from the Project Area • groundwater extraction will cause at worst a 1 mm drawdown within 300 m of Mount Hardman Creek which would be expected to rapidly recover following cessation of groundwater extraction with no impacts to Fitzroy River • a subsurface release is most likely during drilling activities (not HFS activities) and given nontoxic chemicals are used during drilling, the risk of groundwater contamination causing impacts to Mount Hardman creek and Fitzroy River is not credible • a surface release from evaporation ponds is the highest likelihood event for groundwater or surface water contamination, however this risk is well understood with pond design required to include double barriers and leak detection mechanisms (to identify if the first barrier has been breached). 7. result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat. It is highly unlikely, given industry standards and best practice mitigations, that the Proposed Action would cause an invasive species to be introduced which would then establish local populations that would cause broader impacts to the habitat. This is a standard construction risk across all industries which can be effectively managed. 8. introduce disease that may cause the species to decline. The Proposed Action is not expected to introduce any diseases to the Project Area. 9. interfere substantially with the recovery of the species; given the above.

Common name	Scientific name	Likelihood of Occurrence	Impact assessment
			The Proposed Action is not expected to interfere substantially with the recovery of the species.
Largetooth sawfish, Freshwater sawfish	*Pristis pristis*	Unlikely	Identified as a species of concern by DCCEEW no direct impacts are credible for this species given the absence of habitat within the Project Area. Consequently, the only potential for exposure to this species is through indirect impacts. Records show the Largetooth sawfish *(Pristis pristis*), may inhabit the Fitzroy River ~24 km south and ~26 km west of the Project Area. Given the distance from the disturbance footprint, indirect impacts arising from light, dust noise and vibration emissions are not considered credible. The only potential indirect impact identified for this species would be an event causing impacts to habitat **outside** of the Project Area. This could only occur through contamination of surface waters, or contamination of groundwaters leading to contamination of surface waters. A summary assessment of these impact mechanisms is provided in Section 1.0 above and in more detail in Att 9 – Valhalla Gas Exploration and Appraisal Program Section 38 Assessment – Environmental Review Document, Section 5.4.5.1, Section 5.4.5.2, Section 5.4.5.4 and Section 5.4.5.5 pg. 161 - pg.166). The outcome of this assessment is: • the only surface water feature (or potential) GDE within close proximity of the Project Area is Mount Harman Creek (~1km) with Fitzroy River located ~24 km from the Project Area • groundwater extraction will cause at worst a 1mm drawdown within 300m of Mount Hardman Creek which would be expected to rapidly recover following cessation of groundwater extraction with no impacts to Fitzroy River • a subsurface release is most likely during drilling activities (not HFS activities) and given nontoxic chemicals are used during drilling, the risk of groundwater contamination causing impacts to Mount Hardman creek and Fitzroy River is not credible • a surface release from evaporation ponds is the highest likelihood event for groundwater or surface water contamination, however this risk is well understood with pond design required to include double barriers and leak detection mechanisms (to identify if the first barrier has been breached). An assessment against the EPBC Significant Impact Guidelines for Vulnerable species is presented below. An ‘important population’, as referenced in the criteria below, is a population that is necessary for a species’ long-term survival and recovery. This may include populations identified as such in recovery plans, and/or that are key source populations either for breeding or dispersal,

Common name	Scientific name	Likelihood of Occurrence	Impact assessment
			populations that are necessary for maintaining genetic diversity, and/or populations that are near the limit of the species range (DoE, 2013). The conservation advice (DCCEEW, 2014) states that they inhabit the sandy or muddy bottoms of shallow coastal waters, estuaries and river mouths, as well as the central and upper reaches of freshwater rivers and isolated water holes, with records of largetooth sawfish up to 400 km inland. Within Western Australia, Largetooth sawfish have been recorded in numerous drainage systems in fresh and saline water, including the Fitzroy, Durack, Robinson and Ord Rivers (Western Australia). 1. lead to a long-term decrease in the size of an important population of a species. Suitable habitat for this species is not present, and it is unlikely the Largetooth sawfish or Freshwater sawfish is present in the Project Area. Noting the absence of suitable habitat and of an important population, any clearing would not be expected to lead to a long-term decrease in the size of an important population of a species. Records show the Largetooth sawfish (*Pristis pristis*), may inhabit the Fitzroy River. However given the distance from the disturbance footprint (~24 km south and ~26 km west of the disturbance footprint) no direct or indirect impacts to the Fitzroy River are expected. For more detailed assessment refer to Section 1.2.7 – Section 1.2.9. 2. reduce the area of occupancy of an important population. Suitable habitat for this species is not present, and it is unlikely the Largetooth sawfish or Freshwater sawfish is present in the Project Area. Noting the absence of suitable habitat and of an important population, any clearing would not be expected to reduce the area of occupancy of an important population. Records show the Largetooth sawfish (*Pristis pristis*), may inhabit the Fitzroy River. However, given the distance from the disturbance footprint (~24 km south and ~26 km west of the disturbance footprint) no direct or indirect impacts to the Fitzroy River are expected. For more detailed assessment refer to Section 1.2.7 – Section 1.2.9. 3. fragment an existing important population into two or more populations. Suitable habitat for this species is not present, and it is unlikely the Largetooth sawfish or Freshwater sawfish is present in the Project Area. Further, the Proposed Action is limited to clearing areas for construction of access tracks and well sites which will not cause any populations (local or regional) to be fragmented. 4. adversely affect habitat critical to the survival of a species. No habitat critical to the survival of the species is present in the Project Area.

Common name	Scientific name	Likelihood of Occurrence	Impact assessment
			Records show the Largetooth sawfish (*Pristis pristis*), may inhabit the Fitzroy River. However, given the distance from the disturbance footprint (~24 km south and ~26 km west of the disturbance footprint) no direct or indirect impacts to the Fitzroy River are expected. For more detailed assessment refer to Section 1.2.7 – Section 1.2.9. 5. disrupt the breeding cycle of an important population. Noting the absence of suitable habitat and of an important population, the disruption to the breeding cycle of an important population is unlikely. 6. modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline. Records show the Largetooth sawfish (*Pristis pristis*), may inhabit the Fitzroy River. However, given the distance from the disturbance footprint (~24 km south and ~26 km west of the disturbance footprint) no direct or indirect impacts to the Fitzroy River are expected. For more detailed assessment refer to Section 1.0.result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat. It is highly unlikely, given industry standards and best practice mitigations, that the Proposed Action would cause an invasive species to be introduced which would then establish local populations that would cause broader impacts to the habitat. This is a standard construction risk across all industries which can be effectively managed. 7. introduce disease that may cause the species to decline. The Proposed Action is not expected to introduce any diseases to the Project Area. 8. interfere substantially with the recovery of the species; given the above. The Proposed Action is not expected to interfere substantially with the recovery of the species. In summary, the proposed Action is not expected to cause any change to habitat (directly or indirectly through any identified impact mechanisms) and subsequently, no significant impact to this species is expected to occur.
Northern Blue-tongue Skink	*Tiliqua scincoides intermedia*	Possible	The Consultation Document on Listing Eligibility and Conservation Actions for the Northern Blue-tongue Lizard (DAWE, 2021) states that occurs across the wet–dry tropics of northern Australia, from north-western Queensland west of Cape York, as far as the Mt Isa district near Cloncurry, west across to the Kimberley region of Western Australia. Although the northern blue-tongue skink occurs in a wide variety of ecosystems It has been predominantly detected near seasonal or permanent water sources. No temporary or permanent water sources are present within the Project Area. However other habitats (such as

Common name	Scientific name	Likelihood of Occurrence	Impact assessment
			spinifex and tussock grassland) are present. Given the use of a wide range of habitats, BNR has assumed that all habitat types within the Project Area may be suitable for this species which on the basis of clearing 106 ha of vegetation, equates to a loss of <0.01% of similar habitat throughout the West Kimberley area. Given the absence of temporary or permanent water sources within the Project Area, and on the understand that suitable habitat is available throughout the West Kimberley, BNR does not believe the proposed action is expected to lead to a long-term decrease in the size of the population of the species. Given the preference for a wide range of habitats, (nothing identified as unique to the Project Area) the general assessment provided in Section 1 is considered suitable for the following indirect impacts for this species: • Light emissions (Section 1.2.1) • Noise and vibration emissions (Section 1.2.2) • Dust emissions (Section 1.2.3) • Changes to fire regimes (Section 1.2.4 • Introduction or spread of weeds (Section 1.2.5) • Indirect impacts to habitat arising from changes to groundwater levels or pollution events (Section 1.2.7 – Section 1.2.9) An assessment against the EPBC Significant Impact Guidelines for Endangered species is presented below. 1. lead to a long-term decrease in the size of a population. Although the species might utilize the Project Area on occasion, the habitats within the Project Area are well represented more widely. Given the use of a wide range of habitats, BNR has assumed that all habitat types within the Project Area may be suitable for this species which on the basis of clearing 106 ha of vegetation, equates to a loss of <0.01% of similar habitat throughout the West Kimberley area. This impact is not expected to lead to a long-term decrease in the size of the population of the species. 2. reduce the area of occupancy of the species. The nature of the clearing, consisting of discrete well sites and access tracks, is not expected to prevent the species using the broader Project Area. Indirect impacts, such as displacement of individuals from the Project Area or surrounds, due to light dust, or noise emissions, are not expected to be of concern. Lighting will be local to the well sites and camp only and will be the

Common name	Scientific name	Likelihood of Occurrence	Impact assessment
			minimum required for safe operations. Noise emissions associated with drilling activities will be local and minor. Thus, the reduction in the area of occupancy will be negligible. 3. fragment an existing population into two or more populations. Clearing of access tracks and wellsite's would not result in the fragmentation of populations given the species mobility and home range of ~4 ha. 4. adversely affect habitat critical to the survival of a species. No habitat critical to the survival of the species has been identified for this species. 5. disrupt the breeding cycle of a population. Although the species might utilize the Project Area on occasion, the habitats within the Project Area are well represented more widely. No impact to the breeding cycle is anticipated. 6. modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline. The nature of the clearing, consisting of discrete well sites and access tracks, is not expected to prevent the species using the broader Project Area or result in a population decline. It is highly unlikely, given industry standards and best practice mitigations, that the Proposed Action would cause an invasive species to be introduced which would then establish local populations that would cause broader impacts to this species. This is a standard construction risk across all industries which can be effectively managed. 7. introduce disease that may cause the species to decline. The Proposed Action is not expected to introduce any diseases to the Project Area. 8. interfere with the recovery of the species. Given the above justification for lack of significance of impacts, it is not expected that the Proposed Action will interfere substantially with the recovery of the species.
Mertens' Water Monitor	*Varanus mertensi*	Possible	The Conservation Advice for Mertens' water monitor (DCCEEW, 2023) states that the species occurs patchily across tropical northern Australia, from the west Kimberley in Western Australia (WA), across the Top End of the Northern Territory (NT), to the wet tropics in far north Queensland (Qld). Mertens' water monitor is a highly aquatic lizard that seldom ventures more than 5–10 m from the edge of the water except when transiting among core aquatic activity areas (Mayes 2006). This species is recorded from:

Common name	Scientific name	Likelihood of Occurrence	Impact assessment
			• Perennial and semi-permanent pools in upper catchment areas, including springs, seeps, swamps, creeks and gorges, • The margins of permanent streams, rivers and lakes in lower catchment areas, • Floodplain billabongs, lagoons, swamps and soaks, • Perennial waterholes in woodlands, and • Man-made irrigation channels and the margins of dams. No permanent or perennial surface water features are located within the Disturbance Footprint, with the closest surface water feature, Mount Hardman Creek, **located** approximately 1 km from the Disturbance Footprint. As such no direct impacts to this species are expected. The only potential indirect impact identified for this species would be an event causing impacts to habitat **outside** of the Project Area. This could only occur through contamination of surface waters, or contamination of groundwaters leading to contamination of surface waters. A summary assessment of these impact mechanisms is provided in Section 1.2.7- Section 1.2.9 above. The outcome of this assessment is: • the only surface water feature (or potential) GDE within close proximity of the Project Area is Mount Harman Creek (~1km) with Fitzroy River located ~24 km from the Project Area • groundwater extraction will cause at worst a 1mm drawdown within 300m of Mount Hardman Creek which would be expected to rapidly recover following cessation of groundwater extraction with no impacts to Fitzroy River • a subsurface release is most likely during drilling activities (not HFS activities) and given nontoxic chemicals are used during drilling, the risk of groundwater contamination causing impacts to Mount Hardman creek and Fitzroy River is not credible • a surface release from evaporation ponds is the highest likelihood event for groundwater or surface water contamination, however this risk is well understood with pond design required to include double barriers and leak detection mechanisms (to identify if the first barrier has been breached). An assessment against the EPBC Significant Impact Guidelines for Endangered species is presented below. 1. lead to a long-term decrease in the size of a population.

Common name	Scientific name	Likelihood of Occurrence	Impact assessment
			The small amount of clearing, away from the only known significant aquatic habitat, is not expected to lead to a long-term decrease in the size of the population of the species. Indirect impacts from pollution events are assessed above with the outcome identifying a very low risk (if even credible) impact to surface water bodies and subsequent species habitat. 2. reduce the area of occupancy of the species. The small amount of clearing, away from the only known significant aquatic habitat, is not expected to reduce the area of occupancy of the species. 3. fragment an existing population into two or more populations. Clearing of access tracks and wellsite's would not result in the fragmentation of populations given the species mobility and use of aquatic habitats. 4. adversely affect habitat critical to the survival of a species. No aquatic habitat, representing foraging and habitat breeding habitat is present within the clearing footprint. Indirect impacts from pollution events are assessed above with the outcome identifying a very low risk (if even credible) impact to surface water bodies and subsequent species habitat. 5. disrupt the breeding cycle of a population. No breeding habitat is known to be present in the clearing footprint, thus the Proposed Action is not expected to disrupt the breeding cycle of a population. 6. modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline. The small amount of clearing, away from the only known significant aquatic habitat, is not expected to modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline. Indirect impacts from pollution events are assessed above with the outcome identifying a very low risk (if even credible) impact to surface water bodies and subsequent species habitat. 7. result in invasive species that are harmful to a species becoming established in the species' habitat. It is highly unlikely, given industry standards and best practice mitigations, that the Proposed Action would cause an invasive species to be introduced which would then establish local populations that would cause broader impacts to this species. This is a standard construction risk across all industries which can be effectively managed. 8. introduce disease that may cause the species to decline.

Common name	Scientific name	Likelihood of Occurrence	Impact assessment
			The Proposed Action is not expected to introduce any diseases to the Project Area. 9. interfere with the recovery of the species. Given the above justification for lack of significance of impacts, it is not expected that the Proposed Action will interfere substantially with the recovery of the species.
Red Goshawk	*Erythrotriorchis radiatus*	Possible	The Conservation Advice for the Red Goshawk (DCCEEW, 2023) and SPRAT profile suggests that the Red Goshawk is very sparsely dispersed across approximately 15 % of coastal and sub-coastal Australia, from western Kimberley Division (north of 19°S) to northeastern NSW. The Red Goshawk utilizes wooded and forested lands, with tall open forest and woodland, or tall fringing woodlands along rivers in grasslands, shrub-lands, and low open woodlands preferred. Nests are in tall trees within 1 km of and often beside, permanent water (river, swamp, pool), usually in fairly open, biologically rich forest or woodland. No permanent water sources are present within the Project Area, with the closest located over 26 km away (Fitzroy River). The closest surface water body is associated with Mount Hardman Creek (located ~1 km away.) Given the absence of suitable breeding habitat within the Project Area (i.e. absence of water courses and tall open forest), clearing of vegetation is not expected to result in direct impacts to this species. The only potential indirect impact identified for this species would be an event causing impacts to habitat **outside** of the Project Area. This could only occur through contamination of surface waters, or contamination of groundwaters leading to contamination of surface waters. A summary assessment of these impact mechanisms is provided in Section 1.2.7- Section 1.2.9 above. The outcome of this assessment is: • the only surface water feature (or potential) GDE within close proximity of the Project Area is Mount Harman Creek (~1 km) with Fitzroy River located ~24 km from the Project Area • groundwater extraction will cause at worst a 1mm drawdown within 300m of Mount Hardman Creek which would be expected to rapidly recover following cessation of groundwater extraction with no impacts to Fitzroy River • a subsurface release is most likely during drilling activities (not HFS activities) and given nontoxic chemicals are used during drilling, the risk of groundwater contamination causing impacts to Mount Hardman creek and Fitzroy River is not credible

Common name	Scientific name	Likelihood of Occurrence	Impact assessment
			• a surface release from evaporation ponds is the highest likelihood event for groundwater or surface water contamination, however this risk is well understood with pond design required to include double barriers and leak detection mechanisms (to identify if the first barrier has been breached). An assessment against the EPBC Significant Impact Guidelines for Endangered species is presented below. 1. lead to a long-term decrease in the size of a population. The small amount of clearing, away from the only known significant permanent water, is not expected to lead to a long-term decrease in the size of the population of the species. Indirect impacts from pollution events are assessed above with the outcome identifying a very low risk (if even credible) impact to surface water bodies and subsequent species habitat. 2. reduce the area of occupancy of the species. The small amount of clearing, away from the only known significant permanent water, is not expected to reduce the area of occupancy of the species. Indirect impacts from pollution events are assessed above with the outcome identifying a very low risk (if even credible) impact to surface water bodies and subsequent species habitat. 3. fragment an existing population into two or more populations. Clearing of access tracks and wellsite's would not result in the fragmentation of populations given the species mobility. 4. adversely affect habitat critical to the survival of a species. The clearing footprint does not include areas adjacent to permanent water, which is most likely to represent nesting habitat. Indirect impacts from pollution events are assessed above with the outcome identifying a very low risk (if even credible) impact to surface water bodies and subsequent species habitat. 5. disrupt the breeding cycle of a population. Red goshawks typically breed in trees >20 m tall with an open limb and canopy structure. These trees commonly occur in proximity to, or along, a watercourse or wetland. Breeding pairs of red goshawks maintain the same territories (including nest sites) year after year, and the removal of actual or potential nest trees is detrimental to the species' ongoing persistence in an area.

Common name	Scientific name	Likelihood of Occurrence	Impact assessment
			Given no individuals were recorded during the survey, and no breeding habitat is known to be present in the clearing footprint (given no impacts adjacent to permanent water), the Proposed Action is not expected to disrupt the breeding cycle of a population. 6. modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline. The small amount of clearing, away from the only known significant permanent water, is not expected to modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline. 7. result in invasive species that are harmful to a species becoming established in the species' habitat. It is highly unlikely, given industry standards and best practice mitigations, that the Proposed Action would cause an invasive species to be introduced which would then establish local populations that would cause broader impacts to this species. This is a standard construction risk across all industries which can be effectively managed. 8. introduce disease that may cause the species to decline. The Proposed Action is not expected to introduce any diseases to the Project Area. 9. interfere with the recovery of the species. Given the above justification for lack of significance of impacts, it is not expected that the Proposed Action will interfere substantially with the recovery of the species.

Table 2: Migratory Species

Common name	Scientific name	Likelihood of Occurrence	Impact assessment
Common Sandpiper	*Actitis hypoleucos*	Possible	The Common Sandpiper is a marine migratory bird species which utilise a wide range of coastal wetlands inland wetlands, with varying levels of salinity, and is mostly found around muddy margins or rocky shores and rarely on mudflats. No permanent or perennial surface waters are present within the Disturbance Footprint, thus the species are only likely to be present (if at all) when conditions are favorable (e.g. after periods of heavy rainfall) (Eco Logical Australia, 2021). Two records from 2009 occur 10 km north of the Project Area. Sections of the Project Area are likely to provide marginally suitable habitat seasonally after major rainfall events. Given the Project Area only provides marginal habitat for this species, the general assessment provided in Section 1 is considered suitable for the following direct and indirect impacts for this species: • Habitat loss (Section 1.1.1) • Vehicle movement (fauna strike) (Section 1.1.2) • Light emissions (Section 1.2.1) • Noise and vibration emissions (Section 1.2.2) • Dust emissions (Section 1.2.3) • Changes to fire regimes (Section 1.2.4 • Introduction or spread of weeds (Section 1.2.5) • Indirect impacts to habitat arising from changes to groundwater levels or pollution events (Section 1.2.7 – Section 1.2.9) Based on the, at most, potential periodic occurrence of the species in the Project Area, and the nature of the clearing, consisting of discrete well sites and access tracks, it is not considered likely that the Proposed Action will: • substantially modify (including by fragmenting, altering fire regimes, altering nutrient cycles or altering hydrological cycles), destroy or isolate an area of important habitat for a migratory species. • result in an invasive species that is harmful to the migratory species becoming established in an area of important habitat for the migratory species.

Common name	Scientific name	Likelihood of Occurrence	Impact assessment
			• seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of a migratory species Therefore, it is considered that the proposed works are unlikely to have a significant impact on the Common Sandpiper.
Fork-tailed swift	*Apus pacificus*	Possible	The Fork-tailed swift is a migratory bird species that is almost an exclusively aerial species. They mostly occur over dry or open habitats, including riparian woodland and tea-tree swamps, low scrub, heathland or saltmarsh. They are also found at treeless grassland and sandplains covered with spinifex, open farmland and inland and coastal sand-dunes. They may utilise habitat within the Project Area only when conditions are favorable (e.g. after periods of heavy rainfall) (Eco Logical Australia, 2021). One record from 2010 occurs 15 km west of the Project Area. Although potentially present throughout the area, it is unlikely that the proposed action will directly impact this species (via fauna strike or habitat clearing) given their almost exclusively aerial behaviors. Given the Project Area only provides marginal habitat for this species, the general assessment provided in Section 1 is considered suitable for the following direct and indirect impacts for this species: • Habitat loss (Section 1.1.1) • Light emissions (Section 1.2.1) • Noise and vibration emissions (Section 1.2.2) • Dust emissions (Section 1.2.3) • Changes to fire regimes (Section 1.2.4 • Introduction or spread of weeds (Section 1.2.5) • Indirect impacts to habitat arising from changes to groundwater levels or pollution events (Section 1.2.7 – Section 1.2.9)

Common name	Scientific name	Likelihood of Occurrence	Impact assessment
			Based on the at most potential periodic occurrence of the species in the Project Area, and the nature of the clearing, consisting of discrete well sites and access tracks, it is not considered likely that the Proposed Action will: • substantially modify (including by fragmenting, altering fire regimes, altering nutrient cycles or altering hydrological cycles), destroy or isolate an area of important habitat for a migratory species. • result in an invasive species that is harmful to the migratory species becoming established in an area of important habitat for the migratory species. • seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of a migratory species given the nature of these species, all direct and indirect habitats Therefore, it is considered that the proposed works are unlikely to have a significant impact on the Fork-tailed swift.
Sharp-tailed sandpiper	Calidris acuminata	Possible	The Sharp-tailed sandpiper is a migratory bird species which prefers muddy edges of shallow fresh or brackish wetlands, with inundated or emergent sedges, grass, saltmarsh or other low vegetation. Although the species may utilize inland waterways, they migrate from this habitat once it has dried out. No permanent or perennial surface waters are present within the Disturbance Footprint, thus the species are only likely to be present (if at all) when conditions are favorable (e.g. after periods of heavy rainfall) (Eco Logical Australia, 2021). Although potentially present throughout the area, it is unlikely that the proposed action will directly impact this species (via fauna strike or habitat clearing) given their preference for habitats associated with water bodies. Given the Project Area only provides marginal habitat for this species, the general assessment provided in Section 1 is considered suitable for the following direct and indirect impacts for this species: • Habitat loss (Section 1.1.1) • Light emissions (Section 1.2.1) • Noise and vibration emissions (Section 1.2.2) • Dust emissions (Section 1.2.3) • Changes to fire regimes (Section 1.2.4

Common name	Scientific name	Likelihood of Occurrence	Impact assessment
			• Introduction or spread of weeds (Section 1.2.5) • Indirect impacts to habitat arising from changes to groundwater levels or pollution events (Section 1.2.7 – Section 1.2.9) Based on the at most potential periodic occurrence of the species in the Project Area, and the nature of the clearing, consisting of discrete well sites and access tracks, it is not considered likely that the Proposed Action will: • substantially modify (including by fragmenting, altering fire regimes, altering nutrient cycles or altering hydrological cycles), destroy or isolate an area of important habitat for a migratory species. • result in an invasive species that is harmful to the migratory species becoming established in an area of important habitat for the migratory species. • seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of a migratory species Therefore, it is considered that the proposed works are unlikely to have a significant impact on the Sharp-tailed sandpiper.

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