Heytesbury Underground Gas Storage (HUGS) Pipeline

Attachment C

EES Self-Assessment

Heytesbury Underground Gas Storage Project – Desktop Assessment of EE Act 1978 Referral Criteria

For Lochard Energy

Document Information

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Document Control

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Vers	Section	Description of Modification	Reason
1	Figures/ Appendices	Update project footprint in maps.	Client request
2	3.3 Waterbody Use	Add information to account for potential effects on groundwater	Dept. Transport & Planning request
3	Throughout Section 2.1	Minor updates, addition of Appendix C	Client request

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Abbreviations

Abbreviation	Description
ASS	Acid Sulfate Soils
CEMP	Construction Environmental Management Plan
CHMP	Cultural Heritage Management Plan
CMA	Catchment Management Authority
CNC	CNC Project Management Pty Ltd
DCCEEW	Australian Government Department of Climate Change, Energy, the Environment and Water
DEECA	Department of Energy, Environment and Climate Action (formerly DELWP)
DELWP	Government Department of Environment, Land, Water and Planning
EE Act	Environment Effects Act 1978
EES	Environmental Effects Statement
EIA	Environmental Impact Assessment
EPBC Act	Environment Protection and Biodiversity Conservation Act 1999
ESC	Erosion and Sediment Controls
EVC	Ecological Vegetation Class
GIS	Geographic Information Systems
HDD	Horizontal Directional Drilling
HUGS	Heytesbury Underground Gas Storage
IGSF	Iona Gas Storage Facility
MEG	Mono-ethylene glycol
MFCT	A new wellsite which can access the Mylor, Fenton Creek and Tregony fields
NPPS	North Paaratte Production Station
NVIM	Native Vegetation Information Management (System)
NVR	Native Vegetation Removal (Report)
PMST	Protected Matters Search Tool
RoW	Right of Way
TPZ	Tree Protection Zone
VBA	Victorian Biodiversity Atlas

1. Introduction

Lochard Energy is proposing to expand the capacity of the Iona Gas Storage Facility (IGSF) through the execution of the Heytesbury Underground Gas Storage (HUGS) Project. Lochard Energy engaged CNC Project Management Pty Ltd (CNC) to undertake a desktop assessment of the HUGS project against the Ministerial guidelines for assessment of environmental effects under the Environment Effects Act 1978 ("EE Act").

The purpose of this report is to assess the potential impact(s) of the project against each of the referral criteria and indicate the likelihood of the project triggering referral under the EE Act.

To assist in quantifying potential impacts of the project against the relevant referral criteria, the project will be assessed individually and collectively. This information will enable the project to consider the feasibility of each sub-project and the overall project and their relevant extent(s).

1.1 Project scope

The HUGS Project includes the following elements:

- A new wellsite (MFCT) which can access the Mylor, Fenton Creek and Tregony fields. At this stage, the project is targeting development of just the Mylor field;
- A new licensed pipeline known as the HUGS pipeline to connect the new wellsite to Lochard's existing gas infrastructure.
- Minor upgrades at the Iona Gas plant to remove inlet system bottlenecks to facilitate higher flows from the expanded network of remote sites. This will involve some piping upgrades. An upgrade to the Train 2 refrigeration system to increase capacity from around 400 kW to 1200 kW of cooling capacity has been considered also, but this is currently out of scope.
- Minor upgrades to the North Paaratte Wellsite and the North Paaratte Production Station to connect in the HUGS pipeline extension.

Figure 1 (next page) shows an overview of the proposed project. Each of the above elements will now be discussed in more detail.

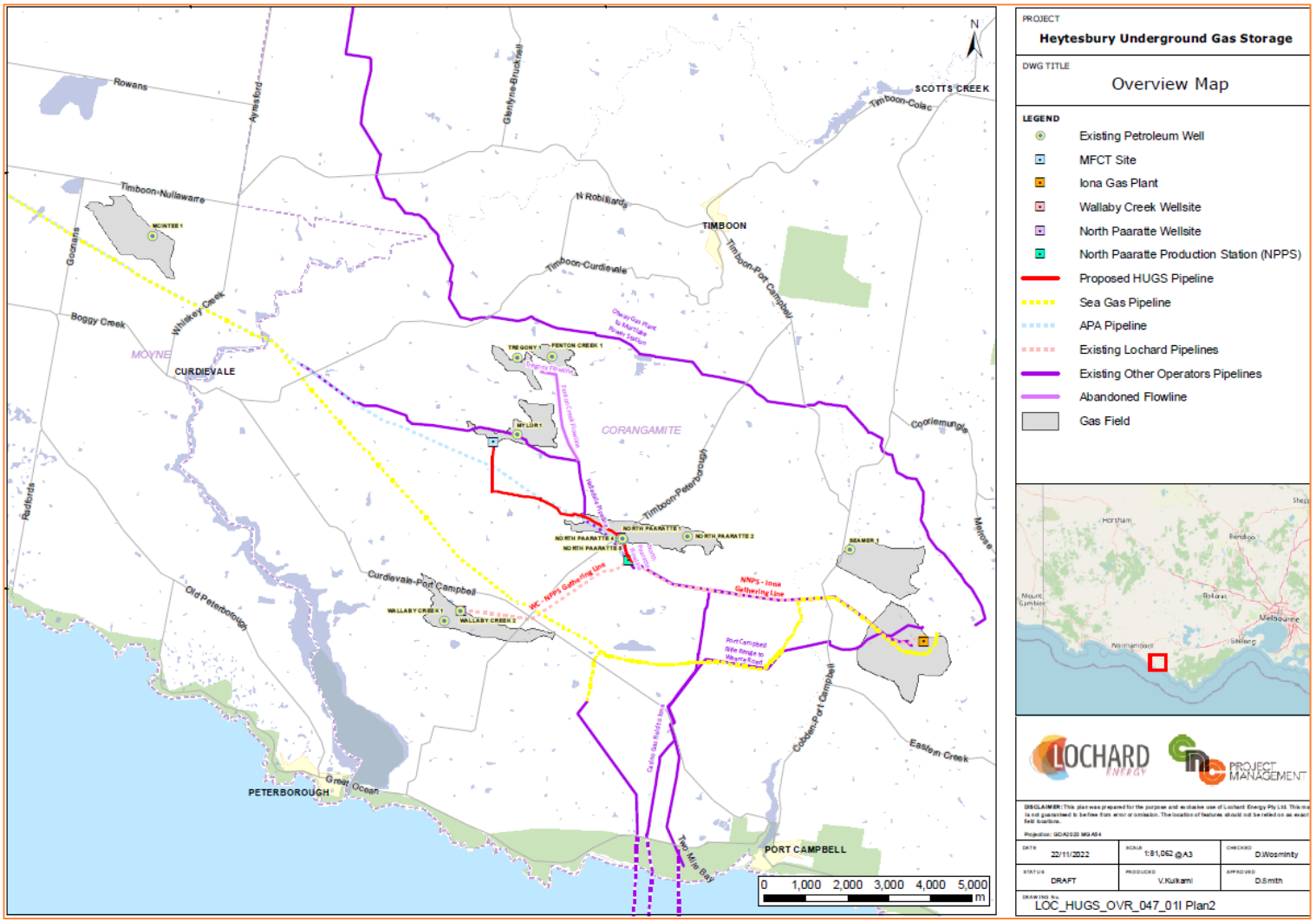

Figure 1: HUGS Project Overview Map

1.1.1 MFCT wellsite

The wellsite has been designed to have minimal facilities and will be remotely operated from the Iona Gas Plant. Key facilities at the sites are:

- 1-2 gas storage wells;
- Flowlines including metering and control valves;
- Pipeline pig launcher and connection to the HUGS Pipeline;
- Renewable power generation for site power (photo-voltaic cells and battery back-up);
- Gas detection, CCTV; and
- Security fencing.

The wellsite will be built in stages, with an initial drilling campaign, followed by construction of the permanent facilities. Two options were assessed in the concept phase, however the project has now settled on the southern location as the preferred site. Representations of the proposed wellsite layouts for both drilling and final operation are shown in Figures 2 and Figure 3. The wellsite size required for the drilling phase is estimated as being approximately 155m x 105m however the final dimensions will be dependent on the actual rig selected. Post drilling the site will reduce in size to approximately 70m x 80m and will include screening to reduce visual impact. The final facilities are expected to be similar to the existing Lochard Energy North Paaratte site (Refer Figure 3).

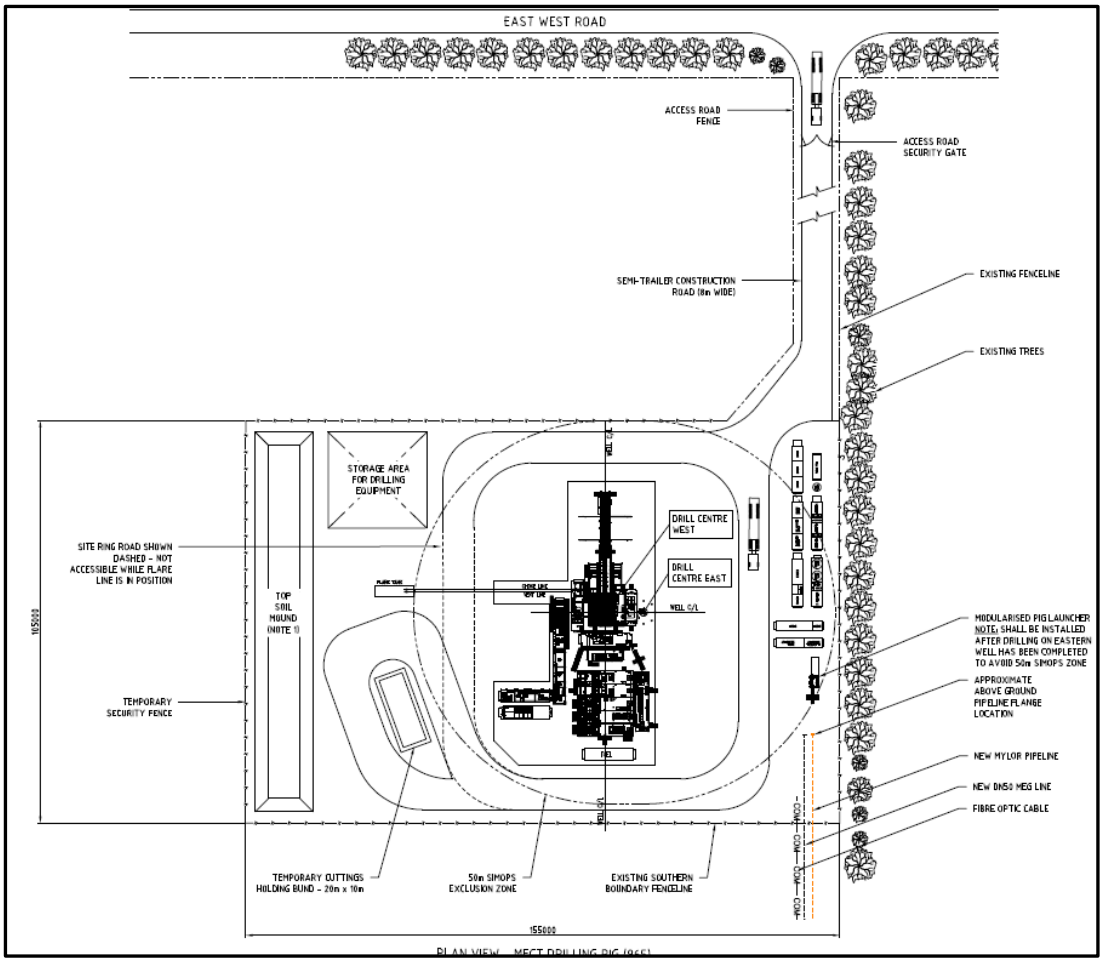

Figure 2: Conceptual wellsite layout (post drilling)

Figure 3: Existing North Paaratte Wellsite

1.1.2 Pipelines

The proposed HUGS Pipeline route is shown in Figure 4 and this element of the project includes the following services all installed in the same trench:

- A 300mm nominal diameter gas pipeline;
- A 50mm Mono-ethylene glycol (MEG) pipeline;
- A Fibre Optic cable for extending communications to the new wellsite.

The pipeline route largely traverses cleared, agricultural farmland with treed native vegetation restricted to road reserves, waterways and scattered paddock trees. The pipeline crosses a small number of minor waterways. During the concept phase, two options were considered for the wellsite location at MFCT, however at the conclusion of the study it has been determined that the southern site is the preferred.

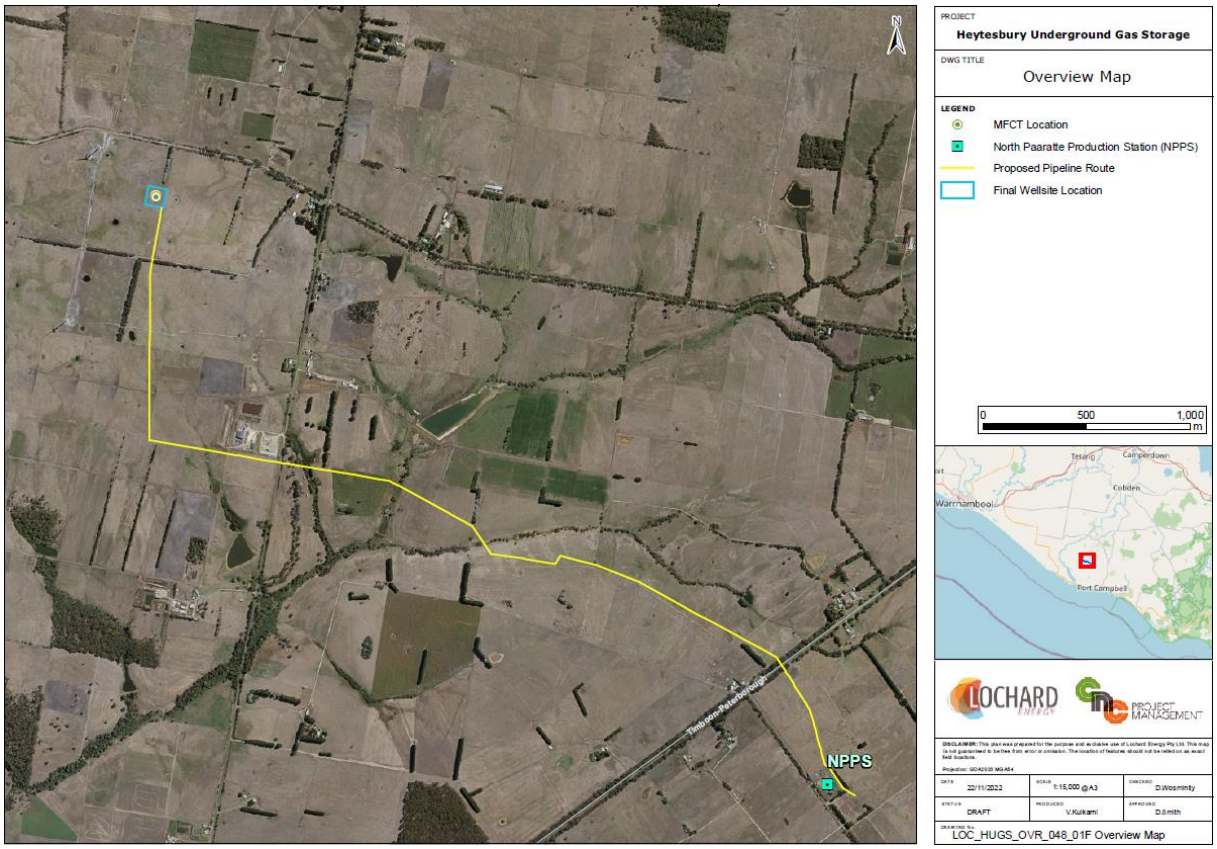

Figure 4: Proposed pipeline route and location of wellsite

1.1.3 Existing remote site upgrades

As part of the project, minor upgrades are required to the North Paaratte Production Station (NPPS) and the North Paaratte wellsite. Representations of the upgrades are shown in Figures 5 and 6. These upgrades are considered very minor and only required to connect the new pipeline to the existing facilities. No change to the overall site footprint is considered

necessary at NPPS and just a small extension at the North Paaratte wellsite to allow for the pipeline connection.

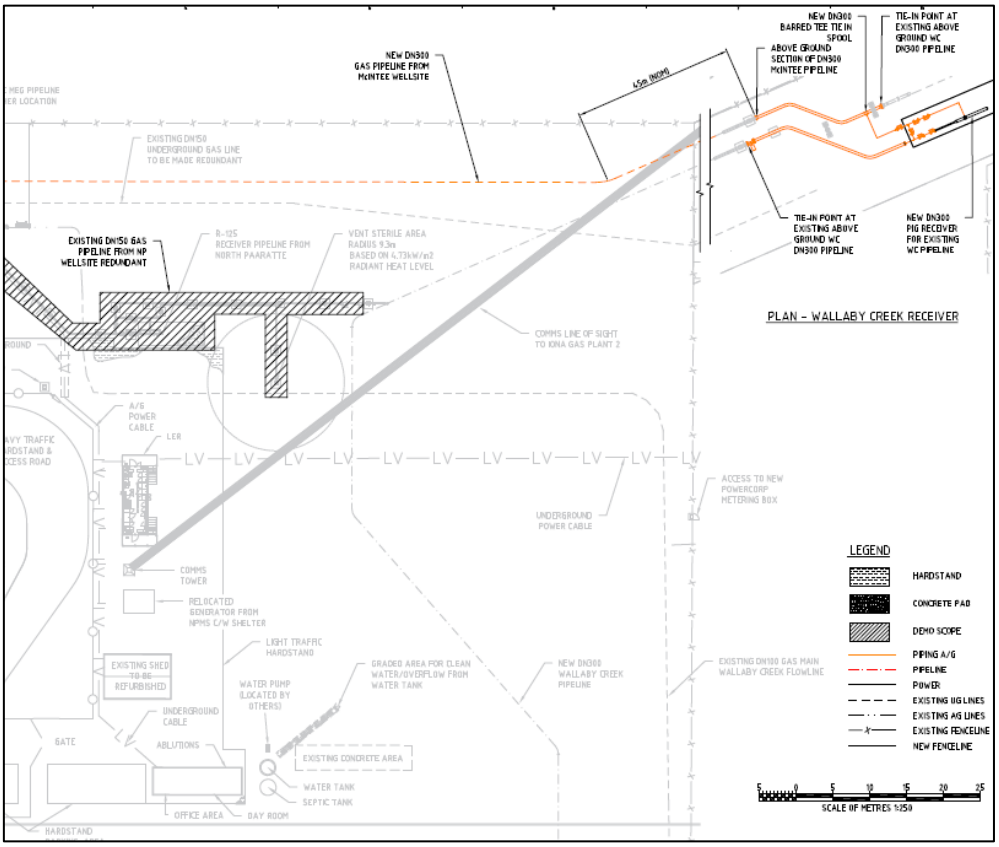

Figure 5: Upgrade at NPPS

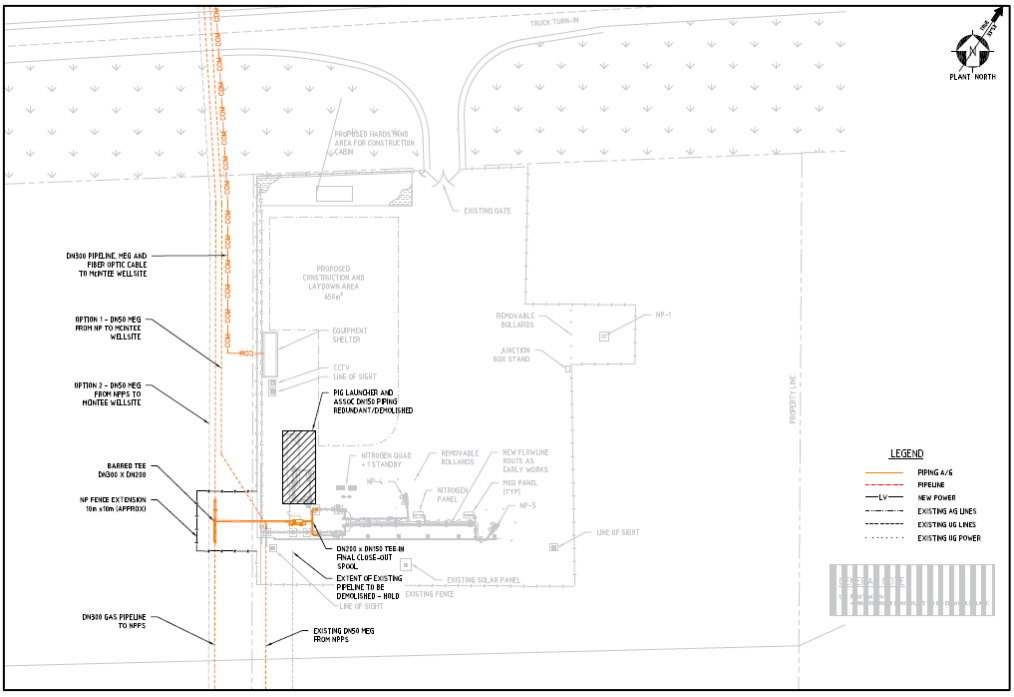

Figure 6: Upgrade at North Paaratte Wellsite

1.2 Location of study area (wellsites and pipeline)

The HUGS Project is located in southwest Victoria, originating in the locality of Paaratte and traversing thorough the locality of Timboon West. The pipeline route and wellsite locations, shown in Figure 7, largely traverse cleared, agricultural farmland with treed native vegetation restricted to road reserves, waterways and scattered paddock trees. The pipeline crosses a number of minor waterways. The pipeline Right of Way (RoW)which is considered as the impact area, is approximately 5km in length and 50m wide. It varies in width to facilitate any construction with wellsite areas of 105m x 155m. The study area is shown in Figure 7. Note that with the recent decision to utilise the southern wellsite option for the development, the project footprint does not extend past East and West road.

Figure 7: The study area identified by green polygon noting that the actual proposed pipeline corridor (red) is smaller (refer Appendix A)

2. EE Act referral criteria: Individual potential environmental effects

The following criteria are those from the Ministerial guidelines for assessment of environmental effects under the Environment Effects Act 1978 (Victorian Government Department of Sustainability and Environment, 2006). This section will assess the project against each of the criteria using existing available information and databases, including:

- Department of Energy, Environment and Climate Action (DEECA) Victorian Biodiversity Atlas (VBA), including the 'VBA_FLORA25, FLORA100 & FLORA Restricted' and 'VBA_FAUNA25, FAUNA100 & FAUNA Restricted' datasets
- DCCEEW's Protected Matters Search Tool for matters protected by the Commonwealth Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act).
- Other sources of biodiversity information were examined including:
- DEECA's NatureKit mapping tool;
- DEECA's Habitat Importance Maps;
- DEECA's Native Vegetation Information Management (NVIM) system;
- Planning Scheme overlays relevant to biodiversity based on http://planningschemes.dpcd.vic.gov.au.

A summary of the assessment results is provided in Section 5 –Tables 2 and 3

2.1 Native vegetation

Criteria

Potential clearing of 10 ha or more of native vegetation from an area that:

- – is of an Ecological Vegetation Class identified as endangered by the Department of Sustainability and Environment (in accordance with Appendix 2 of Victoria's Native Vegetation Management Framework); or
- – is, or is likely to be, of very high conservation significance (as defined in accordance with Appendix 3 of Victoria's Native Vegetation Management Framework); and
- – is not authorised under an approved Forest Management Plan or Fire Protection Plan.

Assessment

Biodiversity assessments of the pipeline and wellsites have been completed (Ecology and Heritage Partners 2022a, 2022b) and identified the quality and extent of all native vegetation within the proposed construction footprints. They determined native vegetation within the study area to be representative of five EVCs, two of which are listed as endangered:

- Lowland Forest (EVC 16) – Vulnerable

- Damp Heath Scrub (EVC 165) – Vulnerable
- Swampy Riparian Woodland (EVC 83) – Endangered
- Swamp Scrub (EVC 53) – Endangered
- Heathy Woodland (EVC 48) – Vulnerable

There were 42 patches of native vegetation recorded in the study area representative of the endangered EVCs. Of these, nine are proposed to be impacted by the works.

Across the entire study area, 68 large trees in patches were recorded in the study area, 11 of those within the pipeline corridor. In addition, there were 15 scattered trees, ten of which were large. This gives a total of 78 large trees considered native vegetation within the study area. Patches of EVC 53 were describes as *containing the occasional emergent Eucalypt* whilst *EVC* 83 patches *comprised a Swamp Gum canopy*.

Results

Per the Ecology and Heritage Partners Biodiversity Assessment:

Lochard Energy (Iona Operations) Pty Ltd are exempt under the *Pipelines Act 2005* from requiring a planning permit under the *Planning and Environment Act 1987* within the proposed pipeline area (wellsites are not exempt), however offsets will still be required if native vegetation removal occurs. The pipeline route has been selected to minimise native vegetation removal through the use of Horizontal Directional Drilling for the road crossings at Boundary Road and Timboon Peterborough Road and to traverse the vegetation east of Boundary road. However, for access to the RoW for construction machinery, it is expected that some vegetation will need to be removed in the road reserves at East and West Road, Boundary Road and Timboon-Peterborough Road. Figure 2b of the report by Ecology and Heritage partners did identify a small overlap with native vegetation at the wellsite access point from East and West road. Lochard has since adjusted the design of the entrance using this information so as to avoid the area of vegetation identified (refer Appendix C UGS-CZ-0776). Lochard is in the process of seeking a planning permit for the wellsite with Corangamite Shire Council which includes the details of how the development will avoid native vegetation at the entrance. Two proposed wellsites were included within the assessment for this project, however only the wellsite south of East and West road will proceed.

The study area is within Location 2, with 0.402ha of vegetation proposed to be removed (including nine large trees) As such, the detailed assessment pathway was implemented as per the Guidelines. The required offset for the native vegetation removal is:

- 0.152 General Habitat Units;
- Nine large trees;
- Minimum Strategic Biodiversity Value of 0.323; and

- Within the Corangamite CMA/ Corangamite Shire Council.

Conclusion

The project requires the removal of 0.402ha of vegetation, which is significantly less than the referral criteria of 10ha or more of native vegetation clearing. The project does not require referral under the native vegetation criteria.

2.2 Threatened species

Criteria

Potential long-term loss of a significant proportion (e.g. 1 to 5 percent depending on the conservation status of the species) of known remaining habitat or population of a threatened species within Victoria.

Assessment

Threatened flora and fauna species records from DEECA's VBA_FAUNA25 and VBA_FLORA25 were downloaded and analysed for proximity to construction areas. The Department of Climate Change, Energy, the Environment and Water (DCCEEW) Protected Matters Search Tool was also utilised for this assessment. For the construction RoW along the pipeline alignment and at the wellsite and access track being considered for MFCT there were no threatened species records. The same result was found at the existing facilities to be upgraded (NPPS, North Paaratte and Iona). To provide landscape context and assess the potential for species and their habitat presence within the construction RoW and ancillary sites, records from within a 5km buffer were also assessed (Figure 8). For the purpose of this exercise, only threatened species have been considered.

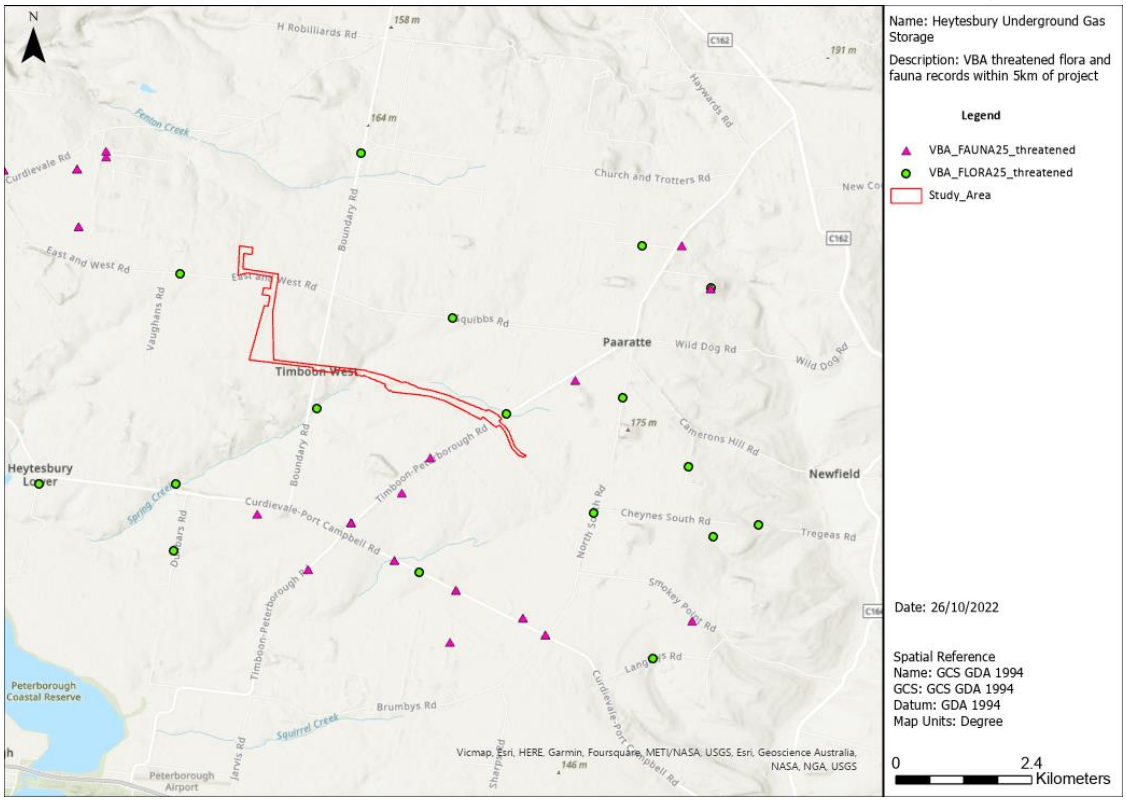

Figure 8: VBA threatened fauna and flora records within 5km of study area

Biodiversity assessments completed by Ecology and Heritage Partners provide further information regarding threatened species and their habitats within the study area.

Results

The VBA contains records of six nationally significant and 42 State significant flora species previously recorded within 10 kilometres of the study area. The PMST identified an additional four nationally significant species which have not been previously recorded but have the potential to occur in the locality. The VBA contains records of 29 nationally significant and 37 State significant fauna species previously recorded within 10 kilometres of the study area. The PMST identified an additional 38 nationally significant species which have not been previously recorded but have the potential to occur in the locality.

One State significant species was recorded during the site assessment, Western Peppermint. Three Western Peppermint trees were recorded within the road reserve of East and West Road and within property 11. This species has limited records within the broader landscape and is largely restricted to native vegetation along roadsides and coastal heathland. Although there is suitable habitat within the study area the size and distinctive features of this species make it unlikely that any additional plants would be recorded within the study area. The Western Peppermint trees identified in the road reserve are not within the proposed pipeline corridor or access areas. There are no proposed impacts to any Western Peppermint with the design for the access to the MFCT being developed so as to avoid a Western Peppermint Tree located near the access point..

The study area is located within a highly modified, predominantly agricultural landscape with much of the surrounding vegetation highly modified, non-indigenous or cleared. Largely consisting of cleared paddocked areas dominated by common pasture grass species, the study area is likely utilised as a foraging resource by common generalist bird species that are tolerant of modified areas.

The native vegetation recorded within the study area and pipeline corridor was generally of low to moderate quality and likely provides habitat for a range of fauna, including foraging nectivorous (nectar-eating) and frugivorous (fruit-eating) birds, as well as opportunistic species such as birds of prey. Areas with good ground cover may also provide habitat corridors for ground-dwelling species such as reptiles and small mammals.

Suitable habitat within the study area and pipeline corridor is largely modified and is unlikely to provide limiting habitat for bird species. Mobile species are likely to utilise the study area transitionally while searching for more suitable habitat and are unlikely to be substantially impacted by the proposed works.

The bird species identified are likely to use the study area transitionally, while moving to more suitable habitat (e.g. Brolga *Antigone rubicunda* and Little Egret *Egretta garzetta*) or for foraging (e.g. birds of prey such as Grey Goshawk Accipiter *novaehollandiae*, Black Falcon *Falco subniger*, Little Eagle *Hieraaetus morphnoides*), while some species may utilise large mature trees (with and without hollows) and dense shrubs for roosting or foraging (e.g. Gang-gang Cockatoo *Callocephalon fimbriatum* and owls).

Several terrestrial species that rely on wetland and riparian habitats may utilise the study area, including Hairy Burrowing Crayfish *Engaeus sericatus*, Otway Bush Yabby *Geocharax tasmanicus*, Swamp Skink Lissolepis coventryi, Southern Toadlet *Pseudophryne semimarmorata*, and White-footed Dunnart *Sminthopsis leucopus*.

Potential impacts to habitat will be reduced by the utilisation of directional drilling/boring within areas of suitable habitat (i.e. patches of native vegetation and riparian areas). Directional drilling/boring should be undertaken as far as practicably possible from areas of native vegetation (within road reserves and creek lines) and suitable habitat (i.e. riparian corridors), however some clearing of vegetation is likely in road reserves to provide access to the ROW for construction equipment. If open cut construction methodologies are required in these areas, mitigation measures such as pre-clearing ecological assessments, salvage and translocation would ensure any potential impacts to species are minimised.

The NVR report generated for the project in the Ecology and Heritage Partners Biodiversity Assessment Report does not identify any impacts to rare or threatened species habitats on site.

Conclusion

There are no records of threatened species in the proposed pipeline and wellsite construction footprints, however there are threatened flora and fauna records in the broader study area.

One threatened flora species (Western Peppermint – FFG Act vulnerable) was recorded during the biodiversity assessments, however there are no proposed impacts to the species.

Native vegetation to be removed is of low to moderate quality and most likely utilised by generalist habitat species. Pre-clearing checks by ecologists will minimise any impacts on native fauna and flora species, including any threatened species with the potential to occur within the site. No impacts to rare or threatened species habitats were identified in the NVR report.

Based on the above information, the project does not require referral under the threatened species criteria.

2.3 Wetlands

Criteria

Potential long-term change to the ecological character of a wetland listed under the RAMSAR Convention or in 'A Directory of Important Wetlands in Australia'.

Assessment

Review of 'Currant Wetland Type' and 'RAMSAR Wetlands' datasets in Naturekit in proximity to the proposed project footprint, construction methods and possible impacts.

Results

Lake Corangamite is the nearest RAMSAR wetland to the project footprint, ~47km to the north east. Lake Corangamite is upstream of the project area in a catchment context and would not be impacted by the project (Figure 9).

There are several mapped wetlands within 5km of the project including freshwater swamps, freshwater marshes and freshwater lakes (Figure 10). They would not be impacted by construction activities associated with the project. None of these wetlands are listed in the Directory of Important Wetlands (Australian Government, 2022).

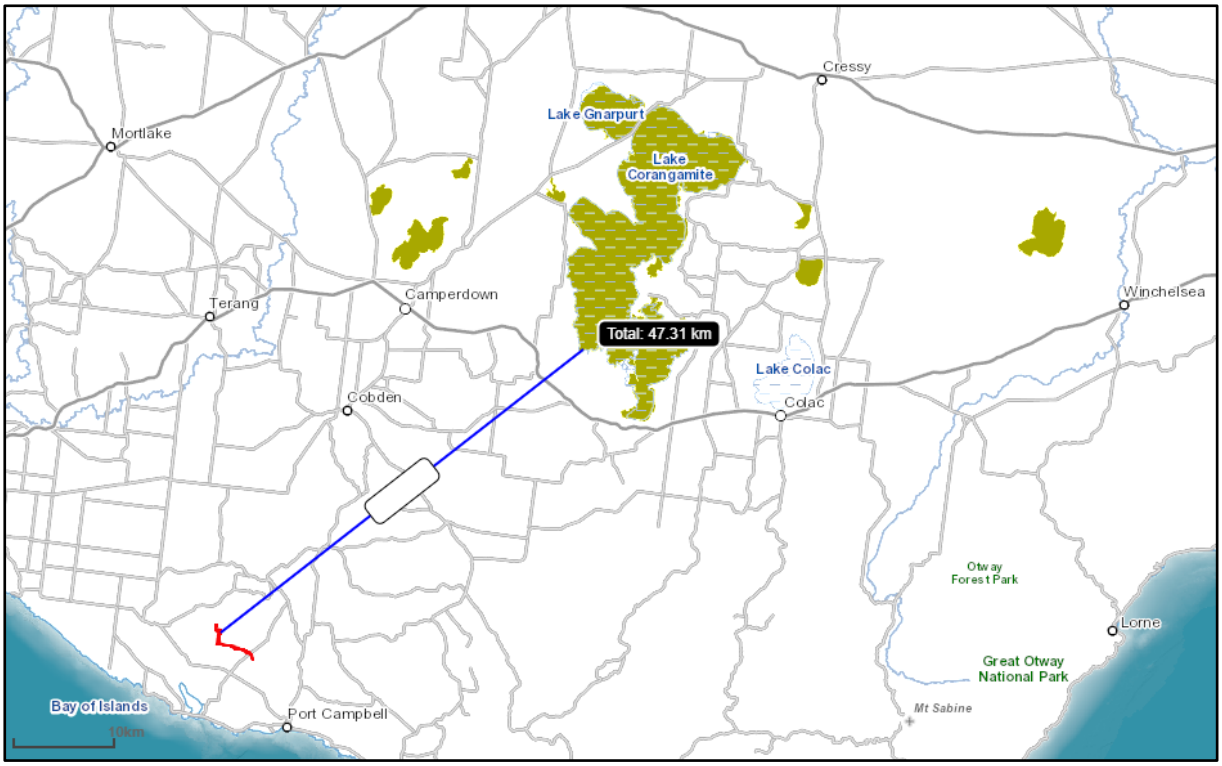

Figure 9: Lake Corangamite RAMSAR site proximity to project (NatureKit, 2022)

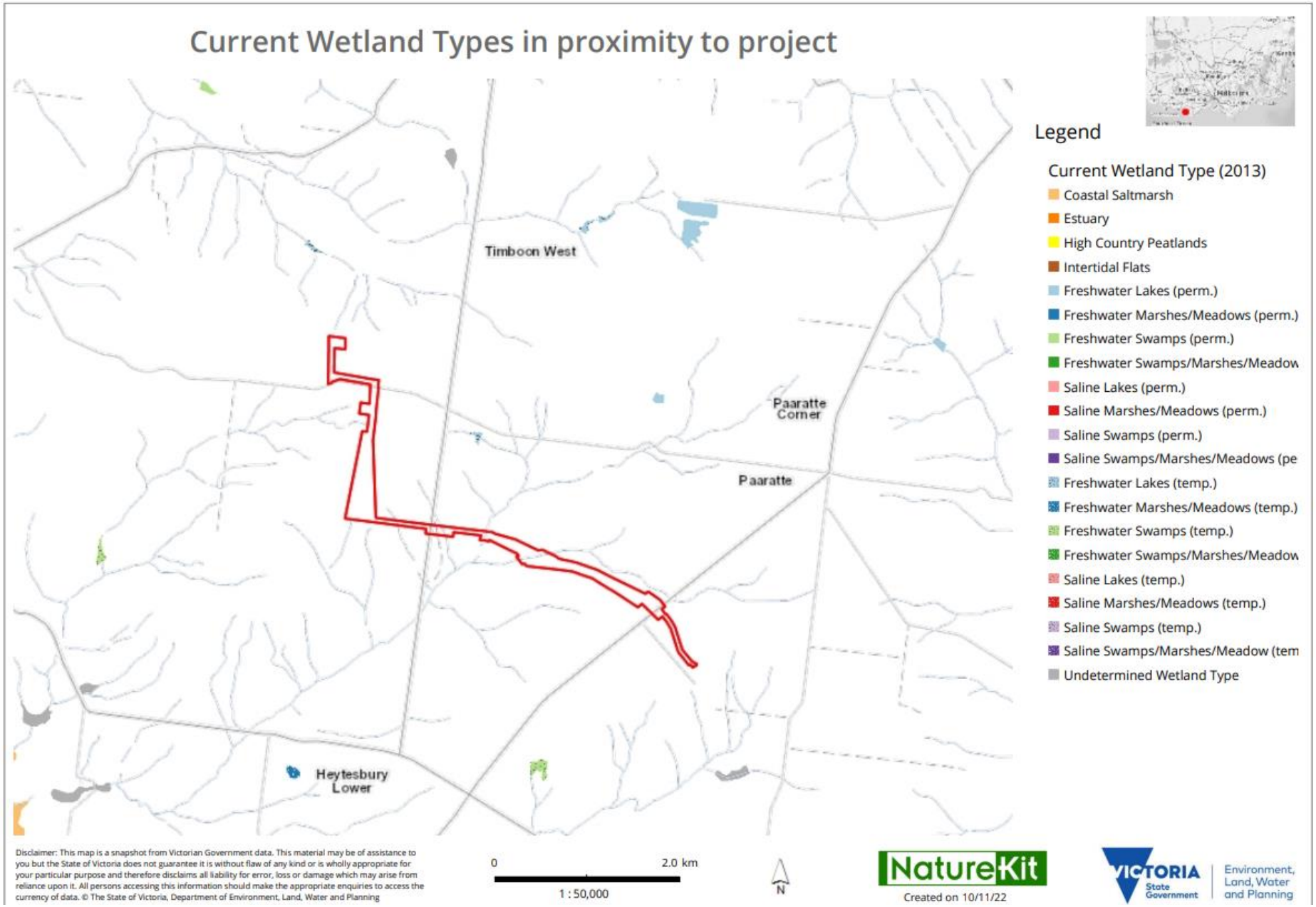

Figure 10: Current wetland types in proximity to project study area (Naturekit, 2022)

Conclusion

The closest wetland to the project is over 1km from the study area, upstream in a catchment context and not hydrologically connected to the project area. It would not be affected by the project. There is a wetland that is downstream of and hydrologically connected to the project area, approximately 3.64km downstream on Mosquito Creek (Figure 11). Waterway management including erosion and sediment controls will be defined in a Construction Environmental Management Plan and when implemented would ensure that the wetland is not impacted by the project. None of the wetlands within 5km of the project are listed in the Directory of Important Wetlands. The nearest RAMSAR Wetland is ~47km north of the project area and would not be impacted by the project.

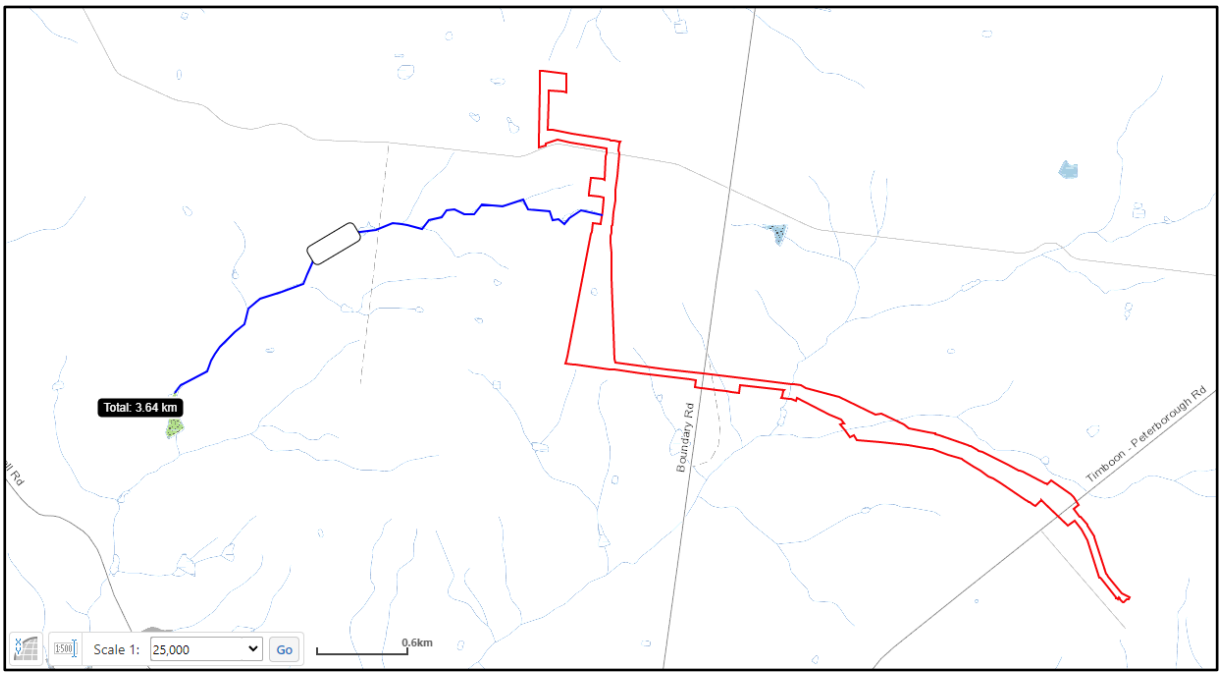

Figure 11: Nearest downstream hydrologically connected wetland to the project area (Naturekit, 2022)

2.4 Aquatic, estuarine and marine ecosystems

Criteria

Potential extensive or major effects on the health or biodiversity of aquatic, estuarine or marine ecosystems, over the long term.

Assessment

Review location of watercourses, wetlands, estuaries and marine systems in proximity to the project along with proposed construction methodologies and likely impacts.

Results

The NPPS-MFCT alignment directly crosses Skull Creek, Leech Creek and Spring Creek (Figure 12) whilst traversing in close proximity to Mosquito Creek. The waterways appear to be minor in a catchment context and would likely have frequent no or low flow status in the warmer months of the year. Construction methodologies have not been finalised and may be either open cut or HDD. If HDD is used, any effects on the health or biodiversity of these systems would be minimal. If more conventional construction methodologies are utilised (open trenching), these will rely on timing of seasonal conditions to be effective (i.e. low/ no flow). Construction would be scheduled between December and April and therefore any potential impacts on the health or biodiversity will be limited.

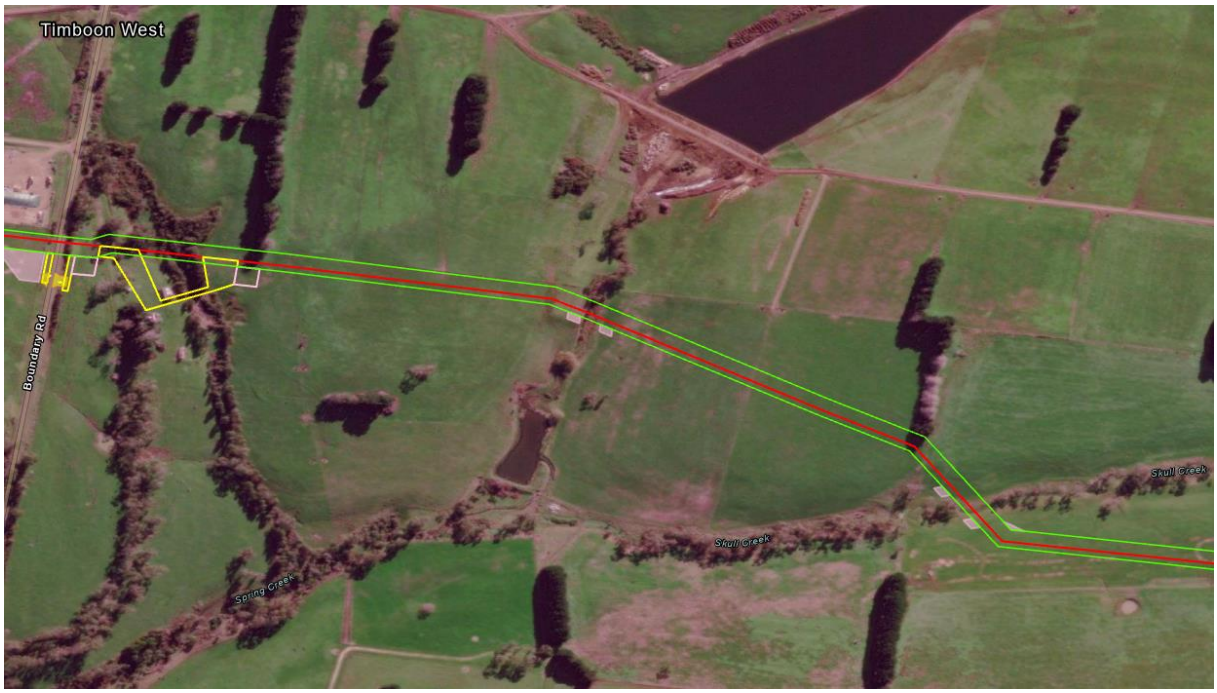

Figure 12: Pipeline study area and ancillary activities at watercourse crossings (2022). Also see Appendix A – map 5 of 10.

Conclusion

Potential impacts on health and biodiversity of aquatic systems will be minimised by both construction methodology and timing. The construction work is planned for the summer months (December – April).

Construction through waterways may involve open trenching, including removal of vegetation and open excavations. These would be subject to an Works on Waterways Permits assessed and issued by Corangamite CMA. Permit applications would be supported by the Biodiversity Assessments, design drawings and proposed construction methodologies to allow the CMA to determine the appropriate permit conditions to ensure an acceptable environmental outcome. Complying with permit conditions combined with an effective CEMP to apply Tree Protection Zones (TPZ's) and Erosion and Sediment Control (ESC)would ensure that effects to health and biodiversity of those systems would be minor and short term in nature.

2.5 Human communities

Criteria

Potential extensive or major effects on the health, safety or well-being of a human community, due to emissions to air or water or chemical hazards or displacement of residences.

Assessment

Review location of towns and residences in proximity to the project along with possible implications of both construction and operations.

Results

MFCT wellsite construction and subsequent drilling operations will have some impact on the farm on which the site is located, however the location has been selected to provide > 500m separation from the nearest residence. Approval for wellsite construction and drilling operations will need to be sought ahead of the activity from Earth Resources Regulation who administer the Petroleum Act and Regulations. Lochard will need to demonstrate through this process how the activity will be managed to minimise impact on nearby stakeholders and EPA noise limits will need to be met. A planning permit will also be required from Corangamite shire Council. A proactive consultation process with relevant stakeholders will be undertaken in advance of formally seeking approval.

The nearest community to the Iona Gas Plant is Port Campbell which is approximately 8 km from the site and has a population of 468 (2016 census). Upgrades within Iona are considered relatively small and will have an insignificant impact on the local community. The Iona Gas Plant is a Major Hazard Facility regulated by Worksafe and as part of upgrade works formal safety assessments will be undertaken, and if necessary, changes made to the Iona Safety Case.

The nearest community to the North Paaratte Wellsite, MFCT wellsite and NPPS is Timboon which is approximately 6km from the sites and has a population of 1202 (2016 census). All of these sites are regulated by Earth Resources under the Petroleum Act and Regulations. As noted in section 1.2.3, changes to NPPS and the North Paaratte wellsite are of a minor nature and will not have any extensive or major effects on the health, safety or well-being of the human community.

There are a number of rural properties (private freehold land) traversed by the proposed pipeline route. The closest residence to the route is ~100m (Figure 13). Lochard will negotiate access for temporary workspace for construction and the right to create an easement via an option deed with all landholders on the pipeline ROW. This work will be undertaken in accordance with the Pipelines Act and associated regulations.

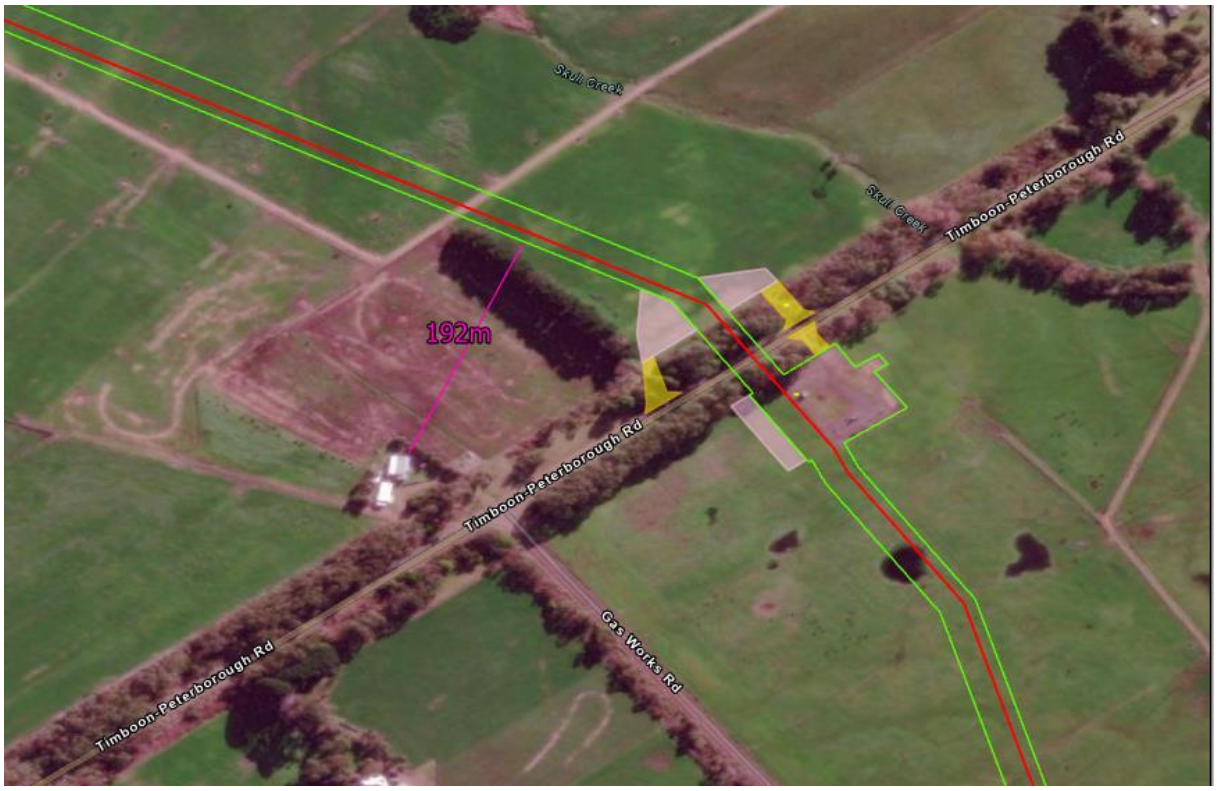

Figure 13: Proximity of nearest residence to pipeline route at Timboon - Peterborough Road (2022)

Conclusion

The most immediate of any potential impacts to residences or communities would be to those close to the pipeline construction RoW and wellsite development and associated with emissions to air (both noise and dust) during drilling and construction. Communities and residences near Iona, North Paaratte and NPPS will experience very minor potential impact related mainly to some additional construction traffic.

For the management of noise and dust emissions during pipeline construction it is standard practice and provisions for these management actions would be made in the Construction Environmental Management Plan (CEMP). Controls implemented to mitigate noise and dust (as well as other impact) for Wellsite construction and Drilling activities will be documents in the Operation Plan which will be approved by Earth Resources. Consultation with landholders will identify other controls so as to minimise the disruption to landowners and occupiers during construction.

Emissions to water would only occur during construction around watercourses and likely only involve sedimentation. Controls for sedimentation are again, standard practice and would be detailed in the project management plans to the acceptable level. Where HDD construction methodologies are used, there is the added possibility of loss of drilling fluid and slurry to the waterway by way of a frac-out. Again, this potential impact would have management procedures identified in the CEMP.

No permanent displacement of residences is envisaged as part of the project. Use of land during construction and acquisition of land either by easement or long-term leases will be covered by an agreement with the relevant landowner or occupier.

2.6 Greenhouse gas emissions

Criteria

Potential Greenhouse Gas emissions exceeding 200,000 tonnes of carbon dioxide equivalent per annum, directly attributable to the operation of the facility.

Assessment

Lochard currently track and report Scope 1 and Scope 2 emissions annually (Table 1). These emissions are as a result of gas storage operations which requires injection into and withdrawal of gas from underground gas storage reservoirs. Currently, the Iona Gas Storage Facility (IGSF) has a working storage capacity of 23.5 PJ of gas. The HUGS project has the potential to increase the storage by up to 3.5 PJ (+14.8%) assuming an equivalent amount of energy is used for gas compression during both injection and withdrawal.

Table 1: IGSF Scope 1 and 2 annual emissions tracking.

Year	Scope 1	Scope 2	Total
Per annum	**tCO2-e**	**tCO2-e**	**tCO2-e**
FY17	73,393	4,300	77,693
FY18	65,830	4,504	70,334
FY19	65,909	4,289	70,198
FY20	63,031	4,056	67,087

The full assessment of the potential Greenhouse Gas Emissions associated with the HUGS project will be undertaken in a separate report and is outside the scope of this study. However, at a screening level, once in operation, the addition of a further 14.8% storage capacity which will require a proportional increase in energy required to inject and withdraw the gas is unlikely to reach a figure exceeding 200,000 tonnes per annum given current scope 1 and 2 emissions are around 70,000 tonnes per annum.

3. EES Referral Criteria: A Combination of Environmental Effects

The following criteria are those from the Ministerial guidelines for assessment of environmental effects under the Environment Effects Act 1978 (Victorian Government Department of Sustainability and Environment, 2006).

- potential clearing of 10 ha or more of native vegetation, unless authorised under an approved Forest Management Plan or Fire Protection Plan;
    - matters listed under the Flora and Fauna Guarantee Act 1988:
    - potential loss of a significant area of a listed ecological community;
    - potential loss of a genetically important population of an endangered or threatened species (listed or nominated for listing), including as a result of loss or fragmentation of habitats; or
    - potential loss of critical habitat; or
- potential significant effects on habitat values of a wetland supporting migratory bird species.
- potential extensive or major effects on landscape values of regional importance, especially where recognised by a planning scheme overlay or within or adjoining land reserved under the National Parks Act 1975;
- potential extensive or major effects on land stability, acid sulphate soils or highly erodible soils over the short or long term;
- potential extensive or major effects on beneficial uses of waterbodies over the long term due to changes in water quality, streamflow's or regional groundwater levels;
- potential extensive or major effects on social or economic well-being due to direct or indirect displacement of non-residential land use activities;
- potential for extensive displacement of residences or severance of residential access to community resources due to infrastructure development;
- potential significant effects on the amenity of a substantial number of residents, due to extensive or major, long-term changes in visual, noise and traffic conditions;
- potential exposure of a human community to severe or chronic health or safety hazards over the short or long term, due to emissions to air or water or noise or chemical hazards or associated transport;
- potential extensive or major effects on Aboriginal cultural heritage;
- potential extensive or major effects on cultural heritage places listed on the Heritage Register or the Archaeological Inventory under the Heritage Act 1995.

This section will assess the criteria above which has not already been substantially considered during the assessment in Section 2. The assessment provided in Section 2 for native vegetation and threatened species has substantiated that the referral triggers for the associated combined effect will not be met.

3.1 Landscape values

Criteria

Potential extensive or major effects on landscape values of regional importance, especially where recognised by a planning scheme overlay or within or adjoining land reserved under the National Parks Act 1975

Assessment

Shapefile of the pipeline and wellsite study area was uploaded to VicPlan to assess tenure, relevant zones and overlays.

Results

The project is subject to the Corangamite Shire planning scheme. The vast majority of the project is zoned as Farming Zone (FZ1) (Figure 14). The exceptions to this are:

- Special Use Zone (SUZ2) at the existing facilities at NPPS;
- Special Use Zone (SUZ2) at the existing facilities at Iona; and
- Vegetation Protection Overlays (VPO2) at Timboon – Peterborough Rd.

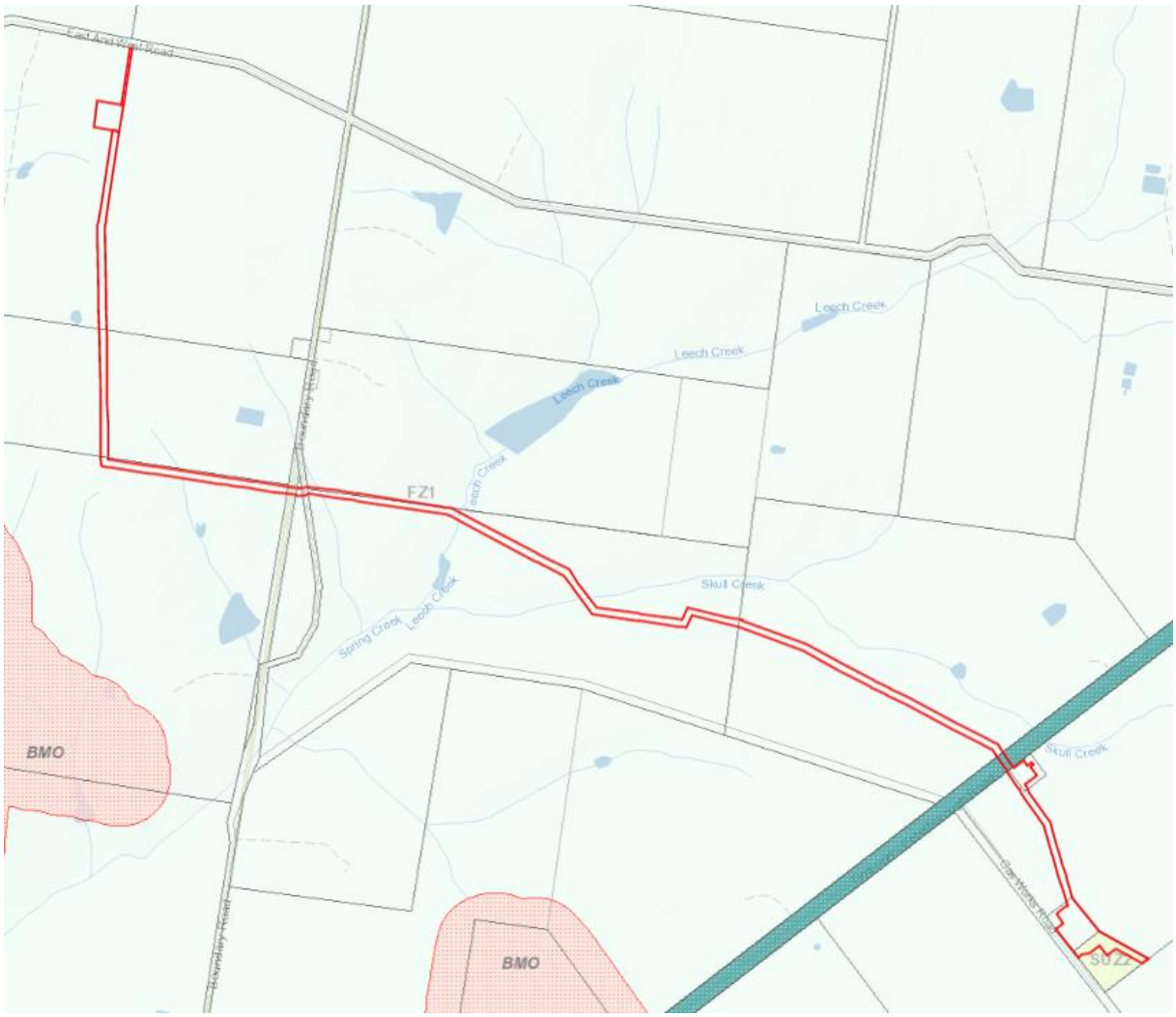

Figure 14: Planning zones and overlays associated with the proposed pipeline corridor (VicPlan, 2022)

Conclusion

The proposed project does not affect any land reserved under the National Parks Act 1975. The only planning scheme overlay encountered by the project alignment is the Vegetation Protection Overlay at Timboon – Peterborough Road. Construction methodologies currently proposed under bore HDD at this location. Any potential effects on landscape values within this overlay area would be minor.

3.2 Land stability and soils

Criteria

Potential extensive or major effects on land stability, acid sulphate soils or highly erodible soils over the short or long term.

Assessment

Review of relevant overlays including:

- Erosion Management Overlay;
- Flood Overlay;
- Land Subject to Inundation Overlay and;
- Salinity Management Overlay.

Review also included 1:100,000 mapsheets showing current mapping of potential Coastal Acid Sulfate Soils (ASS) (Agriculture Victoria)

Results

VicPlan highlighted the absence of all the relevant overlays across the proposed pipeline route and immediate surrounding areas, indicating that any effects on land stability or highly erodible soils over the short or long term is very low.

Maps showing potential ASS (Appendix B and Figure 15) indicate that ASS have been previously discovered at Peterborough, and are likely associate with the Curdies River, however these areas are outside the scope of the project work area.

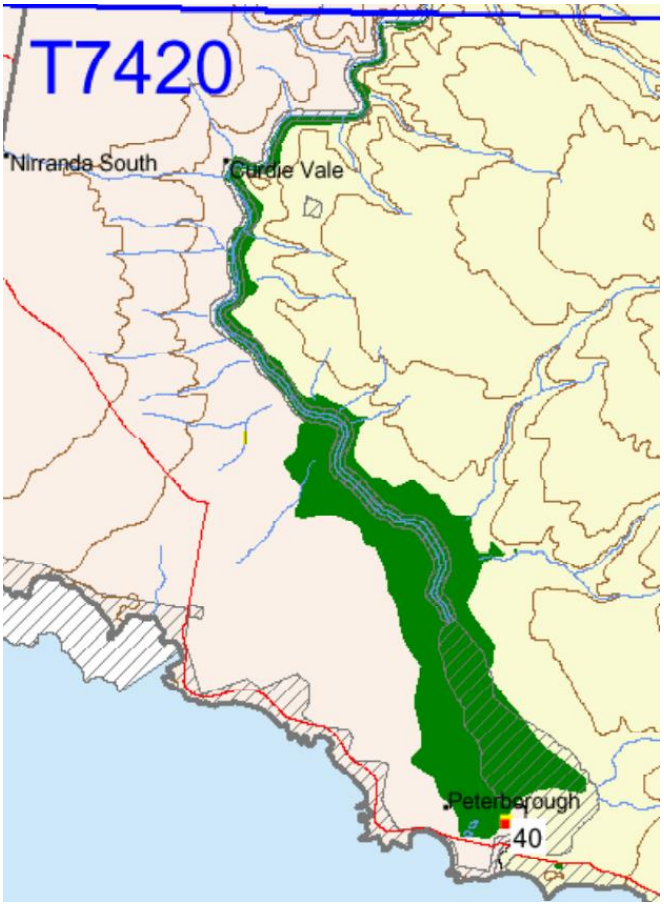

Figure 15: Potential ASS (green) along the Curdies River. ASS at <1m depth (red) at Peterborough (Agriculture Victoria 2022)

Conclusion

There does not appear to potential extensive or major effects on land stability, acid sulphate soils or highly erodible soils over the short or long term as a result of this project. A CEMP will identify management actions for erosion and sediment control and contingency plans for discovery of potential acid sulfate soils.

3.3 Waterbody use

Criteria

Potential extensive or major effects on beneficial uses of waterbodies over the long term due to changes in water quality, streamflow's or regional groundwater levels.

Assessment

Watercourses and waterbodies associated with the project and geographic area have been previously assessed in Sections 2.3 and 2.4. In this section, further assessment is provided on any likely effects on the uses of these hydrological features attributable to the project.

Conclusion

Construction timing and methodology around watercourses, will be paramount to minimising any short-term effects on water quality or streamflow. Streamflow would be expected to be maintained at all times. This would be achieved at minor watercourses by either:

- Construction via HDD,
- Construction during no-flow or;
- Construction during low flow with adequate bypass pumping in place.

As the project does not require the extraction or use of any water to operate, it is not expected to have any effect on the regional groundwater levels. Water used for construction (i.e. dust suppression and pressure testing) would be sourced from approved local sources. The project would protect groundwater assets by implementing best practice drilling practices and gas storage.

Lochard's drilling practices are designed to protect all the aquifers and isolate them from one another. Steel casing lines the wellbore and is cemented in place from the bottom of the well to surface. Both casings and cement are pressure tested and electronically logged to ensure a lasting robust seal across all different underground formations. This technique has been used for the existing gas wells at Iona. Monitoring is ongoing once a well is established. Pressure and other testing is conducted on an ongoing basis to ensure integrity of the well is maintained.

The gas storage well proposed for Mylor will intersect several aquitards and aquifers (refer Figure16 showing well barriers, aquifers and aquitards). The Port Campbell Limestone and Dilwyn Formation provide water for farmers and the domestic water supply. The deeper

formations of the Pebble Point, Paaratte and Nullawarre Greensand are saline and not beneficial use aquifers at this location. The Waarre Formation, which contains the gas reservoir, is deeper at depths of 1,000 to 2,000 metres with the gas storage reservoir at Mylor is at approximately 1,620-1,700 true vertical metres below surface which is 1086 vertical metres below the Dilwyn acquifer and separated by three aquitards or sealing layers.

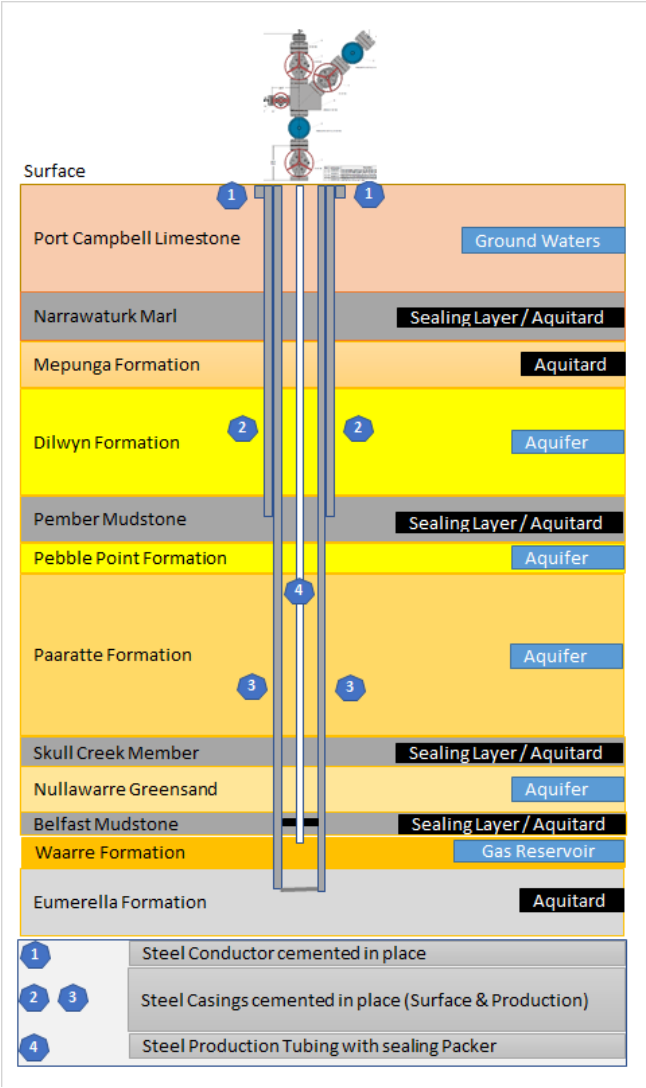

Figure 16: Example of drilling practices in relation to local soil formations, ground waters and aquifers.

A summary of the controls to prevent contamination of ground water during the life cycle of the proposed gas storage well(s) is listed below:

- Water-based drilling fluid designed to minimize risks during the drilling of the well associated with losses to the formation. Components selected to minimize impact on the environment.

- Installation of well control equipment during drilling/testing per API (American Petroleum Institute) requirements.

- Steel casing strings will be cemented in place from the bottom of the well to surface. Casing is pressure tested to confirm integrity. Surface casing set below the Dilwyn Formation to isolate shallow aquifers prior to drilling into any hydrocarbon bearing formations.

- Installation and verification of cement barriers to isolate hydrocarbon bearing zones and aquifers.

- The well design includes multiple mechanical barriers separating the gas production from the Waarre from the aquifers (refer Figure 16).

- Monitoring of well integrity is ongoing once the well is established through pressure monitoring, and periodic maintenance, inspection, and tubular integrity logging.

- Production of formation water is not planned during gas storage operations.

- Monitoring of ground water quality before the commencement of work, post drilling and during operation through the use of an existing bore located on a nearby farm approximately 640m from the top-hole location of the proposed Mylor-2 well which is approximately 17m deep and can be used to test ground waters. A monitoring program will be developed by Lochard for the operational phase.

Works on all designated water courses would be subject to approval under Works on Waterways Permits issued by the Corangamite Catchment Management Authority (CMA).

The HUGS project is not expected to have extensive or major effects on beneficial uses of waterbodies during construction or operation.

3.4 Social and economic wellbeing

Criteria

Potential extensive or major effects on social or economic wellbeing due to direct or indirect displacement of non-residential land use activities.

Assessment

Applying previous assessments of land tenure and project in context with non-residential land use.

Results

The vast majority of the project footprint is within the Farming Zone (FZ) as identified in the Victorian Planning Provisions. Direct (construction) and indirect (operation) impacts on this land will be managed by management plans such as the CEMP for pipeline works and Operation Plans for Petroleum Activities. Consultation with Individual landowners and occupiers will also identify measures to minimise impact which can be captured in individual Property Management Plans. Ongoing use of this land by the adjoining landholders will be

subject to the previous of these. In nearly all cases, the placement of an underground pipeline asset does not significantly impact farming operations post completion and rehabilitation.

Conclusion

Loss of land for pipeline construction will be short term during construction and rehabilitation with the entire process expected to span no longer than 18 months along the pipeline RoW. The final size of the permanent wellsite will be around 1 ha and will be covered by a long terms lease with the affected landowners.

Upgrades to Iona, North Paaratte wellsite and NPPS will be almost entirely within the existing operational area, with just a 25m^2 extension required at the North Paaratte Wellsite for the pipeline connection.

The HUGS project will not have extensive or major impact on social or economic wellbeing due to displacement of non-residential land use activities.

3.5 Residential displacement and access

Criteria

Potential for extensive displacement of residences or severance of residential access to community resources due to infrastructure development.

Assessment

Extension of the assessment made in Section 5: Human Communities to account for access to community resources.

Results

The closest and most significant communities to the project are Peterborough, Port Campbell and Timboon. None of these towns will be directly impacted by the project. There are a number of rural residences situated in proximity to the proposed alignment and wellsites which would be consulted with prior to delivery and agreements made for use of their land (if required). The MFCT Wellsite location was selected to be at least 500m from the nearest residence

Likely impact to community access to resources could come from increased traffic on local roads during construction, and potentially short-term road closures. All works would be subject to local council work within road reserve permits.

Conclusion

No extensive displacement of residences or severance of residential access to community resources due to the infrastructure development of the HUGS project.

3.6 Human health

Criteria

Potential exposure of a human community to severe or chronic health or safety hazards over the short or long term, due to emissions to air or water or noise or chemical hazards or associated transport

Assessment

This was assessed in Section 2.5 Human Communities to a sufficient level.

Conclusion

Provided the project is constructed and operated in line with all relevant approvals and permits, it is very unlikely that any short or long-term exposure of a community to health or safety hazards would occur.

3.7 Cultural heritage

Criteria

- Potential extensive or major effects on Aboriginal cultural heritage;
- Potential extensive or major effects on cultural heritage places listed on the Heritage Register or the Archaeological Inventory under the Heritage Act 1995.

Assessment

The relevant legislative requirements under the Aboriginal Heritage Act (2006) and Aboriginal Heritage Regulations 2018).

Lochard Energy engaged Ochre Imprints to complete a desktop review of Aboriginal Cultural Heritage Sensitivity along the pipeline ROW and for the potential options for the MFCT site. An initial study was completed in 2022 [Ref-2] with a subsequent report produced in 2023 focussed on just the MFCT wellsite [Ref-11]. The reports found no areas of cultural sensitivity for the wellsite options for MFCT that would trigger the requirement for a Cultural Heritage Management Plan (CHMP) however the associated pipeline (HUGS Pipeline) does cross areas of potential cultural heritage sensitivity and does trigger a mandatory CHMP. Following consultation with the Registered Aboriginal Party, it has been determined to proceed with a CHMP covering both the MFCT wellsite and associated HUGS Pipeline.

Figure 16 show the Cultural heritage overlay for the proposed pipeline route and wellsite locations.

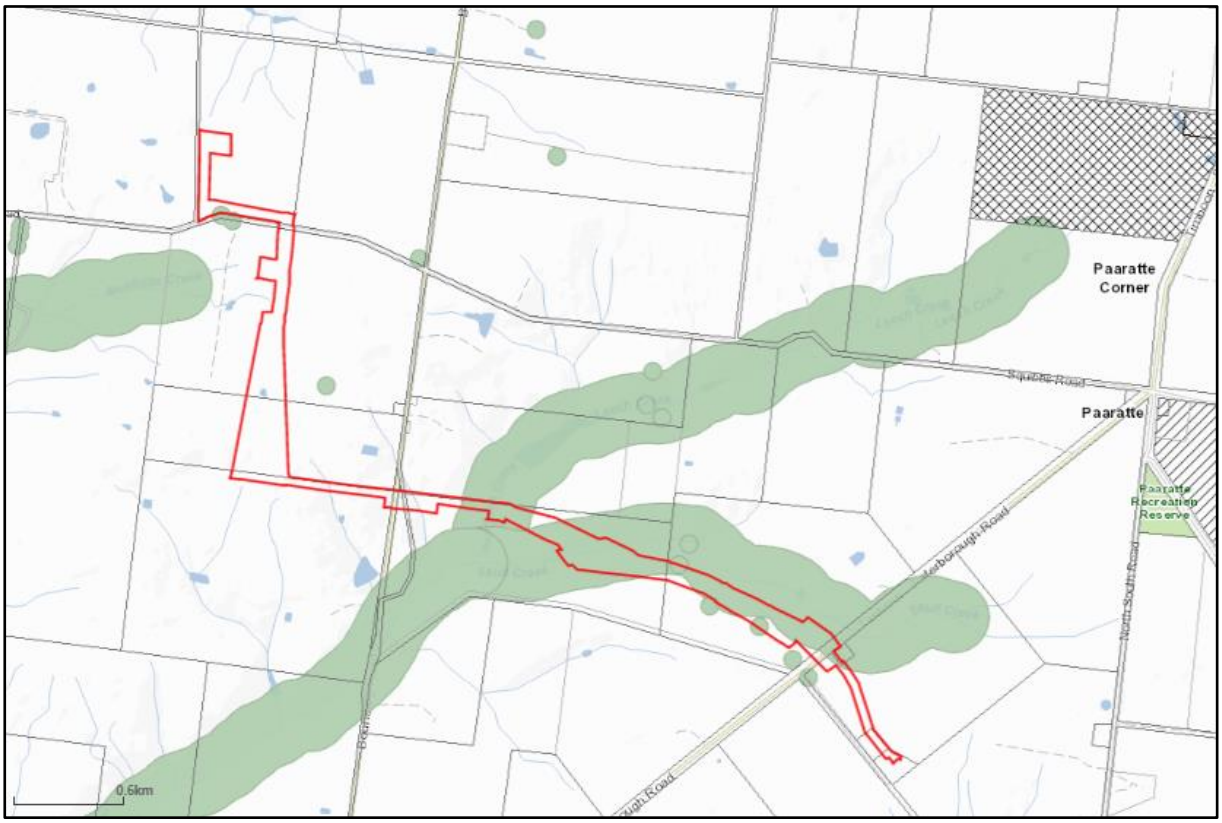

Figure 17: Proposed project study area impacting areas of cultural heritage sensitivity (VicPlan, 2022).

Results

The proposed pipeline route crosses areas within areas of sensitivity at a number of locations. These appear to show areas of sensitivity associated with natural watercourses (linear polygons) and those associated with known heritage sites (small circles). Under the AH Regulations (2018), a Cultural Heritage Management Plan (CHMP) required when a 'high impact activity' is planned in an area of 'cultural heritage sensitivity'. A Cultural Heritage Management Plan (CHMP) is a written report prepared by a heritage advisor. It includes results of an assessment of the potential impact of a proposed activity on Aboriginal cultural heritage. It outlines measures to be taken before, during and after an activity in order to manage and protect Aboriginal cultural heritage in the activity area.

Typically, construction of a licensed pipeline is considered high impact as are the wellsite and drilling work and therefore, as recommended by Ochre Imprints, a CHMP is required.

Conclusion

The project will require a CHMP under the provisions of the Aboriginal Heritage Regulations 2018. The preparation of a CHMP by a registered heritage advisor is an opportunity for the project to work with the relevant Registered Aboriginal Party (RAP), the Eastern Maar Aboriginal Corporation to ensure that impacts to heritage are minimalised and managed to an acceptable level.

The development of a CHMP and its approval by the RAP and the Victorian Government (Department of First People, State Relations) is an effective method of reducing any potential impacts to heritage to a level where referral under the EE Act would not be required. CHMP 18865 is being prepared for the HUGS pipeline and wellsite with a Standard Assessment complete and a Complex Assessment underway.

4. Original Iona EES

The original development of Iona was subject to an EES. A review has been undertaken to assess the impact of HUGS relative to the original Iona EES (Refer Appendix B).

It has been determined that the changes proposed by HUGS are within the original approvals provided when Iona was developed.

5. Conclusions and recommendations

A desktop assessment has been undertaken to determine whether the HUGS project will trigger the requirement for an EES under the Environmental Effects Act (1978). The pipeline and wellsite largely traverse highly disturbed agricultural land in the Farming Zone of Victorian Planning Provisions. The study assessed the impact using a relatively conservative 25m wide RoW for the length of the 5.5km pipeline alignment. The final wellsite size was taken as being no larger than 1 ha based on the preliminary layouts. All works at Iona, North Paaratte Wellsite and NPPS are within areas operated by Lochard Energy. The desktop study assessed the project against the referral criteria for individual potential environmental effects (Table 2) and a combination of two or more potential effects (Table 3).

Table 2: Summary of individual potential environmental effects referral criteria assessment

Item	Criteria	Assessment
Native Vegetation	Potential clearing of 10 ha or more of native vegetation that: • is of an Ecological Vegetation Class identified as endangered by the Department of Sustainability and Environment (in accordance with Appendix 2 of Victoria's Native Vegetation Management Framework); or • is, or is likely to be, of very high conservation significance (as defined in accordance with Appendix 3 of Victoria's Native Vegetation Management Framework); and • is not authorised under an approved Forest Management Plan or Fire Protection Plan.	The project requires the removal of 0.402ha of vegetation, which is significantly less than the referral criteria of 10ha or more of native vegetation clearing.
Threatened Species	Potential long-term loss of a significant proportion of known remaining habitat or population of a threatened species within Victoria.	There are no records of threatened species in the proposed pipeline and wellsite construction footprints. Pre-clearing checks by ecologists will minimise any impacts on native fauna and flora species, including any threatened species with the potential to occur within the site. No impacts to rare or threatened species habitats were identified in the NVR report.
Wetlands	Potential long-term change to the ecological character of a wetland listed under the Ramsar Convention or in 'A Directory of Important Wetlands in Australia'.	Lake Corangamite is the nearest RAMSAR wetland to the project footprint, ~50km to the north east. Lake Corangamite is upstream of the project area in a catchment context and would

Item	Criteria	Assessment
		not be impacted by the project.
Aquatic, Estuarine and Marine Ecosystems	Potential extensive or major effects on the health or biodiversity of aquatic, estuarine or marine ecosystems, over the long term.	Potential impacts on health and biodiversity of aquatic systems will be minimised by both construction methodology and timing
Human communities	Potential extensive or major effects on the health, safety or well-being of a human community, due to emissions to air or water or chemical hazards or displacement of residences.	Minor impact only on the local community.
Greenhouse Gas Emissions	Potential Greenhouse Gas emissions exceeding 200,000 tonnes of carbon dioxide equivalent per annum, directly attributable to the operation of the facility.	A detailed assessment was not undertaken as part of this report. The HUGS project represents a likely 14.8% increase in gas storage capacity, and based on annual scope 1 and 2 emissions of 70,000 tonnes per annum for the existing operation, it is not considered likely that the 200,000 tonnes per annum figure will be exceeded.

Also assessed was the combination of two or more of the following types of potential effects on the environment that might be of regional or State significance, and therefore warrant referral of a project. These are summarised in Table 3.

Table 3: Summary of combination of two or more potential environmental effects referral criteria assessment

Item	Criteria	Assessment
Landscape Values	Potential extensive or major effects on landscape values of regional importance, especially where recognised by a planning scheme overlay or within or adjoining land reserved under the National Parks Act 1975	The proposed project does not affect any land reserved under the National Parks Act 1975.
Land Stability and soils	Potential extensive or major effects on land stability, acid sulphate soils or highly erodible soils over the short or long term.	VicPlan highlighted the absence of all the relevant overlays across the proposed pipeline route and immediate surrounding areas, indicating that any effects on land stability or highly erodible soils

Item	Criteria	Assessment
		over the short or long term is very low.
Waterbody use	Potential extensive or major effects on beneficial uses of waterbodies over the long term due to changes in water quality, streamflow's or regional groundwater levels.	The HUGS project is not expected to have extensive or major effects on beneficial uses of waterbodies during construction or operation. The processes planned by Lochard for drilling and operation of the gas storage wells mitigate potential risk to groundwater.
Social and economics wellbeing	Potential extensive or major effects on social or economic well-being due to direct or indirect displacement of non-residential land use activities.	The HUGS project will not have extensive or major impact on social or economic wellbeing due to displacement of non-residential land use activities.
Residential displacement and access	Potential for extensive displacement of residences or severance of residential access to community resources due to infrastructure development.	No extensive displacement of residences or severance of residential access to community resources due to the infrastructure development of the HUGS project.
Human Health	Potential exposure of a human community to severe or chronic health or safety hazards over the short or long term, due to emissions to air or water or noise or chemical hazards or associated transport	Provided the project is constructed and operated in line with all relevant approvals and permits, it is very unlikely that any short or long-term exposure of a community to health or safety hazards would occur.
Cultural heritage	Potential extensive or major effects on Aboriginal cultural heritage. Potential extensive or major effects on cultural heritage places listed on the Heritage Register or the Archaeological Inventory under the Heritage Act 1995.	The MFCT wellsite does not cover any areas of cultural heritage sensitivity. CHMP 18865 is being developed by Lochard given the pipeline route will traverse some areas of potential cultural heritage sensitivity. Due diligence work completed has indicated that it is highly unlikely that there will be extensive or major effects on Aboriginal cultural heritage.

Lochard Energy has completed desktop and field environmental studies and is part of the way through a complex assessment for aboriginal cultural heritage. These studies have informed the revised pipeline route (which is within the study area) to minimise the impact of the project, however the studies completed to date indicate that it is likely that there will be no significant risks for these criteria. If further studies identify areas of concern, Lochard could take the following mitigation steps:

- Reduced the width of the pipeline RoW;
- Horizontal Directional Drilling (HDD) under boring or potentially;
- Re-routing sections of alignment.

6. References

1. Agriculture Victoria, Victorian Resources Online, 2022, Coastal Acid Sulfate Soils, accessed 07/03/2022 at http://vro.agriculture.vic.gov.au/dpi/vro/vrosite.nsf/pages/soil_acid_sulfate_soils
2. Ochre Imprints, 2022, *Cultural Heritage Due Diligence – Heytesbury Underground Gas Storage*
3. Ecology and Heritage Partners Pty Ltd, Biodiversity Assessment: Heytesbury Underground Gas Storage (HUGS) Gas Pipeline, Victoria, V2 February 2023
4. Victoria State Government Department of Environment, Land, Water and Planning, 2022, NatureKit 2.0 Biodiversity Database, accessed 01/03/22 at https://maps2.biodiversity.vic.gov.au/Html5viewer/index.html?viewer=NatureKit
5. Victoria State Government Department of Environment, Land, Water and Planning, 2022, VicPlan, accessed 07/03/2022 at https://mapshare.vic.gov.au/vicplan/
6. Victoria State Government Department First People State Relations, 2022, Cultural Heritage Management Plans,
7. /03/2022 at https://www.firstpeoplesrelations.vic.gov.au/cultural-heritage-management-plans
8. Victorian State Government Department of Environment, Land, Water and Planning , 2017 *Guidelines for the removal, destruction or lopping of native vegetation accessed* 28/02/2022 at https://www.environment.vic.gov.au/__data/assets/pdf_file/0021/91146/Guidelines-for-the-removal,-destruction-or-lopping-of-native-vegetation,-2017.pdf
9. Victorian State Government Department of Environment, Land, Water and Planning , 2017 *Exemptions-from-requiring-a-planning-permit-to-remove,-destroy-or-lop-native-vegetation-Guidance* accessed 28/02/2022 at:https://www.environment.vic.gov.au/__data/assets/pdf_file/0018/91251/Exemptions-from-requiring-a-planning-permit-to-remove,-destroy-or-lop-native-vegetation-Guidance.pdf
10. Victorian State Government Department of Sustainability and Environment, 2006, *Ministerial guidleines for assessment of environmental effects under the Environmental Effects Act 1978* accessed at *https://www.planning.vic.gov.au/__data/assets/pdf_file/0033/95487/DSE097_EES_FA.pdf*
11. Ochre Imprints, 2023, MFCT Wellsite *Cultural Heritage Due Diligence – Heytesbury Underground Gas Storage Project (HUGS)*
12.

Appendix A: Proposed pipeline corridor

Appendix B: Assessment of original Iona EES

EES coverage	EES considerations and findings	Relevant triggers as per Ministerial Guidelines	Potential impacts of HUGS	Impacts in addition to or greater than EES coverage	Referral required ?
Clearance of native vegetation	• No significant impacts on the flora and fauna of the study area are envisaged • In summary, the development of a gas storage plant and associated pipelines are unlikely to have any significant net impacts on the overall ecology of the area.	Potential clearing of 10 ha or more of native vegetation from an area that: – is of an Ecological Vegetation Class identified as endangered by the Department of Sustainability and Environment (in accordance with Appendix 2 of Victoria's Native Vegetation Management Framework); or – is, or is likely to be, of very high conservation significance (as defined in accordance with Appendix 3 of Victoria's Native Vegetation Management Framework); and – is not authorised under an approved Forest Management Plan or Fire Protection Plan	The project does not involve the clearing of greater than 10 ha of native vegetation. Estimated total amount is 0.402 ha. No identified native flora and fauna of significance.	No	No
		Potential long-term loss of a significant proportion (e.g. 1 to 5 percent depending on the conservation status of the species) of known remaining habitat or population of a threatened species within Victoria	14 flora species and 15 fauna species had records within 5km of the project footprint and Habitat Importance Modelling encroaching the footprint. None were found to constitute >1% of the total state wide modelled habitat.	No	No
		Potential clearing of 10 ha or more of native vegetation, unless authorised under an approved Forest Management Plan or Fire Protection Plan	The project does not involve the clearing of 10 ha or more native vegetation as specified.	No	No
		Matters listed under the Flora and Fauna Guarantee Act 1988: ○ potential loss of a significant area of a listed ecological community; or	No FFG listed species had records within the proposed construction footprint. 14 flora species and 15 fauna species had records within 5km of the project footprint and Habitat Importance Modelling	No	No

EES coverage	EES considerations and findings	Relevant triggers as per Ministerial Guidelines	Potential impacts of HUGS	Impacts in addition to or greater than EES coverage	Referral required ?
		○ potential loss of a genetically important population of an endangered or threatened species (listed or nominated for listing), including as a result of loss or fragmentation of habitats; or ○ potential loss of critical habitat; or ○ potential significant effects on habitat values of a wetland supporting migratory bird species.	encroaching the footprint. None were found to constitute >1% of the total state wide modelled habitat.		
Surface water	Potential issues identified: • management of wastewater and control of runoff; • site drainage; • erosion; • changes in catchment behaviour due to development; • lowering of water quality; • pipeline integrity at stream crossings; and • management of water from localised dewatering. Identified the need for: • avoidance of soil erosion and sediment transport to streams; • management of stormwater runoff impacts	Potential long-term change to the ecological character of a wetland listed under the Ramsar Convention or in 'A Directory of Important Wetlands in Australia.	There are no wetlands listed under the Ramsar Convention or in 'A Directory of Important Wetlands in Australia on the IGP. See Section 2.3 of this report	No	No
		Potential extensive or major effects on the health, safety or well-being of a human community, due to emissions to air or water or chemical hazards or displacement of residences	Section 2.5/3.3 of this report. There are no potential extensive or major effects on the health, safety or well-being of a human community, due to emissions to surface water during drilling, operation or at well end-of-life.	No	No
		Potential exposure of a human community to severe or chronic health or safety hazards over the short or long term, due to emissions to air or water or noise or chemical hazards or associated transport.	Section 2.5/3.3 of this report. There is no potential exposure of a human community to severe or chronic health or safety hazards over the short or long term due to emissions to surface water.		
		Potential extensive or major effects on the health or biodiversity of aquatic, estuarine or marine ecosystems, over the long term	There are no potential extensive or major effects on the health or biodiversity of aquatic, estuarine	No	No

EES coverage	EES considerations and findings	Relevant triggers as per Ministerial Guidelines	Potential impacts of HUGS	Impacts in addition to or greater than EES coverage	Referral required ?
	on existing catchment runoff characteristics • avoidance of uncontrolled off-site wastewater runoff. Conclusions: • The risks of contamination of surface water are extremely low. • Water direction to interceptor pit, ponds, and constructed wetland to water collection pond. • Water will flow, under controlled conditions, from the Water Collection Pond via a licenced discharge point. Water quality in this pond will be monitored regularly.		or marine ecosystems expected during drilling, operation or at well end-of-life. See section 2.4 of this report.		
		Potential extensive or major effects on land stability, acid sulphate soils or highly erodible soils over the short or long term	There are no potential extensive or major effects on land stability, acid sulphate soils or highly erodible soils during drilling, operation or at well end-of-life.	No	No
Air emissions	• Nitrogen dioxide, sulphur dioxide and carbon monoxide (from operation, including diesel backup generator and flare) emissions and potential for Mercaptan odour were identified. • Air dispersion modelling was undertaken for carbon monoxide (CO), nitrogen dioxide (NO) and sulphur dioxide (SO2). Levels for each were modelled at	Potential extensive or major effects on the health, safety or well-being of a human community, due to emissions to air or water or chemical hazards or displacement of residences	There are no potential extensive or major effects on the health, safety or well-being of a human community, due to emissions to air during drilling, operation or at well end-of-life. See Section 2.6 of this report	No	No
		Potential exposure of a human community to severe or chronic health or safety hazards over the short or long term, due to emissions to air or water or noise or chemical hazards or associated transport	There is no potential exposure of a human community to severe or chronic health or safety hazards over the short or long term due to emissions to air. Sections 2.5/ 3.3 of this report.	No	No

EES coverage	EES considerations and findings	Relevant triggers as per Ministerial Guidelines	Potential impacts of HUGS	Impacts in addition to or greater than EES coverage	Referral required ?
	well below SEPP requirements. • Found that exhaust emissions are unlikely to cause any significant impact because of the small number of vehicles and equipment in use during construction or operation. • Recognition of dust emissions during construction and need for implementation of dust suppression controls. Overall conclusion: • Emissions of nitrogen dioxide, sulphur dioxide and carbon monoxide are minimal with minimal impacts on local air quality.				
Chemicals and waste management	• Identified need for management of wastewater and control of runoff. States that liquid wastes other than production formation waters will be collected and disposed of off-site in accordance with regulatory requirements.	Potential extensive or major effects on the health, safety or well-being of a human community, due to emissions to air or water or chemical hazards or displacement of residences.	There are no potential extensive or major effects on the health, safety or well-being of a human community, due to chemical hazards. Operational and general wastes will be generated by the project and managed as per controls listed. Hazardous materials used could include diesel fuel, drilling	No	No

EES coverage	EES considerations and findings	Relevant triggers as per Ministerial Guidelines	Potential impacts of HUGS	Impacts in addition to or greater than EES coverage	Referral required ?
	• Identifies need for no dumping or littering of any waste products from construction activity or by construction personnel, along roadsides or within remnant vegetation to protect surrounding environment.		materials, lubricants and maintenance/cleaning related chemicals.		
		Potential exposure of a human community to severe or chronic health or safety hazards over the short or long term, due to emissions to air or water or noise or chemical hazards or associated transport.	There is no potential exposure of a human community to severe or chronic health or safety hazards over the short or long term due to chemical hazards.	No	No
Groundwater	• Identified the need for protection of aquifers from well and pipeline construction and from contaminated surface waters. • Production formation waters will not be directly discharged to land, and are to be reinjected into the formation of origin. • Recognition that new wells will be drilled through the Dilwyn Formation. • Standard petroleum industry practices, such as the use of well casing, will ensure that there are no adverse effects to the Dilwyn waters during well installation or operation.	Potential extensive or major effects on the health, safety or well-being of a human community, due to emissions to air or water or chemical hazards or displacement of residences.	The controls proposed by Lochard for the drilling and operation of the additional gas storage wells mitigate the risk of potential degradation of groundwater quality through cross contamination / water flow across strata leading to contamination.	No	No
		Potential exposure of a human community to severe or chronic health or safety hazards over the short or long term, due to emissions to air or water or noise or chemical hazards or associated transport.	The controls proposed by Lochard for the drilling and operation of the additional gas storage wells mitigate the risk of potential exposure of a human community to severe or chronic health or safety hazards over the short or long term due to emissions to ground water. At Iona there are already 6 gas storage wells with a further 3 storage wells located across Wallaby Creek and North Paaratte and so the addition of gas storage wells from the HUGS project do not change the current risk profile.	No	No

EES coverage	EES considerations and findings	Relevant triggers as per Ministerial Guidelines	Potential impacts of HUGS	Impacts in addition to or greater than EES coverage	Referral required ?
Greenhouse gas emissions	• Found that the project was "expected to provide significant net benefits in regard to greenhouse gas and in this regard is considered to be consistent with government policy and community expectations" with specific focus on GHG benefits for generation of electricity compared to use of coal. • Predicted a production volume of 19072 tonnes of CO2 by 2010. • Recognised fugitive emissions and recommended that these be minimised by the use of a leak-detection and maintenance program and best available technology. • The flare could be expected to be used at a high flow volume about 5 or 6 times a year for an average of 10 minutes and up to a maximum of about 30 minutes.	Potential greenhouse gas emissions exceeding 200,000 tonnes of carbon dioxide equivalent per annum, directly attributable to the operation of the facility.	Potential activities that may contribute to emissions during drilling phase include flaring, combustion of diesel and venting (if needed). Scope 1 and 2 emissions have been calculated. Refer to Section 2.6 for further details.	No	No
Noise and vibration	Noise: • Identified potential sources of noise:	Potential significant effects on the amenity of a substantial number of residents, due to extensive or major, long-term changes in visual, noise and traffic conditions.	There are no potential significant effects on the amenity of a substantial number of residents,	No	No

EES coverage	EES considerations and findings	Relevant triggers as per Ministerial Guidelines	Potential impacts of HUGS	Impacts in addition to or greater than EES coverage	Referral required ?
	○ Construction activities and equipment; ○ Particular components of operating plant; ○ Vehicles (for example, tankers). • Outlined applicable noise limits and timing for construction and operation based on EPA Interim Guidelines for Control of Noise from Industry in Country Victoria, Interim Country Noise Guidelines, and EPA Noise Control Guidelines • Background noise levels were low enough at times for minimum guideline noise limits to apply (based on EPA Interim Guidelines for Control of Noise from Industry in Country Victoria which specifies a night limit of 32 dB(A) for industrial premises operating 24 hours per day). • Recommended noise abatement measures for incorporation into plant design to achieve 32 dB(A) at exposed residential premises (recognising at		due to extensive or major, long-term changes in noise conditions.		

EES coverage	EES considerations and findings	Relevant triggers as per Ministerial Guidelines	Potential impacts of HUGS	Impacts in addition to or greater than EES coverage	Referral required ?
	that time that noise data was indicative only). • Found that anticipated construction noise would be below limits. Vibration: • All surrounding houses are in excess of 700 m from the project site therefore there is no potential for adverse vibration impacts at any of the houses surrounding the preferred site. Overall conclusion: By adoption of appropriate noise mitigation measures, it is possible to operate the plant with minimal impact on the acoustic environment of the surrounding residential neighbours.				
Visual amenity	A visual impact assessment found that: • Topography and existing vegetation played a role in reducing visibility from residences and most roads. • Found to have visibility for parts of some local roads	Potential significant effects on the amenity of a substantial number of residents, due to extensive or major, long-term changes in visual, noise and traffic conditions.	There are no potential significant effects on the amenity of a substantial number of residents, due to extensive or major long-term changes in visual conditions due to the short term nature of the project. The drilling rig will be visible from Boundary Rd and East-West Rd.	No	No

EES coverage	EES considerations and findings	Relevant triggers as per Ministerial Guidelines	Potential impacts of HUGS	Impacts in addition to or greater than EES coverage	Referral required ?
	such as the Port Campbell – Cobden road. • Night lighting found to have the greatest potential visible impact due to low light of surrounding area.	Potential extensive or major effects on landscape values of regional importance, especially where recognised by a planning scheme overlay or within or adjoining land reserved under the National Parks Act 1975.	As above.	No	No
Public safety	The following public safety risks were assessed (as part of determining a suitable site for the plant to minimise risk to the local population): • Fatality on site; • Vehicle movements associated with hazardous chemicals / transport activities; • Risks associated with pipelines; and • Risks to pipelines and plant from natural hazards. Potential mitigation options were outlined for each.	Potential exposure of a human community to severe or chronic health or safety hazards over the short or long term, due to emissions to air or water or noise or chemical hazards or associated transport	Impact to existing above ground infrastructure on-site during well construction activities. Collision with another wellbore while drilling. Hazardous materials could include diesel fuel, any hazardous drilling materials, lubricants and maintenance/cleaning related chemicals.	No	No
		Potential significant effects on the amenity of a substantial number of residents, due to extensive or major, long-term changes in visual, noise and traffic conditions.	No potential significant effects on the amenity of a substantial number of residents, due to extensive or major, long-term changes in traffic conditions.	No	No
Aboriginal and non-aboriginal cultural heritage	Outlined surveys conducted to identify both aboriginal and non-Aboriginal heritage values at each potential plant site, their findings and limitations. Found that no Aboriginal or non-Aboriginal sites or artefacts were located in any of the areas surveyed.	Potential extensive or major effects on Aboriginal cultural heritage.	No potential extensive or major effects on Aboriginal cultural heritage. No locations of Aboriginal cultural heritage significance identified.	No	No
		Potential extensive or major effects on cultural heritage places listed on the Heritage Register or the Archaeological Inventory under the Heritage Act 1995.	No potential extensive or major effects on non-Aboriginal cultural heritage. No locations of non-Aboriginal cultural heritage significance identified.	No	

EES coverage	EES considerations and findings	Relevant triggers as per Ministerial Guidelines	Potential impacts of HUGS	Impacts in addition to or greater than EES coverage	Referral required ?
Socioeconomic impacts	Extensively describes the existing socioeconomic environment, including the primary agricultural land use. Considers need for neighbouring landholder access to groundwater and use of dams for farming. Found that the economic impact would be positive for the area with additional long term jobs to area and positive local, state and national economic contributions. Added energy security for the greater community.	Potential for extensive displacement of residences or severance of residential access to community resources due to infrastructure development	No potential for extensive displacement of residences or severance of residential access to community resources due to this project.	No	No

Appendix C UGS-CZ-0776 Road Entrance Plan