Heytesbury Underground Gas Storage (HUGS) Pipeline

Attachment M

Route Selection Report

Heytesbury Underground Gas Storage Project

HUGS PIPELINE PL007732

ROUTE SELECTION REPORT

UGS-ZE-0142

Rev 4

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1. ABBREVIATIONS, TERMS AND ACRONYMS

Abbreviation or Term	Description
DN	Nominal Diameter
EMAC	Eastern Maar Aboriginal Corporation
ha	hectare
HUGS	Heytesbury Underground Gas Storage
IGSF	Iona Gas Storage Facility
Lochard	Lochard Energy
MCA	Multi-Criteria Analysis
MFCT	Mylor, Fenton Creek and Tregony
NPPS	North Paaratte Production Station
PJ	Peta Joule
Pre-FEED	Pre-Front End Engineering and Design
TJ	Terra Joule

2. INTRODUCTION

Lochard Energy is the proponent of the Heytesbury Underground Gas Storage (HUGS Project), which will expand the storage capacity of the Iona Gas Storage Facility (IGSF). The HUGS Project will provide additional security of supply and reliability to the growing demands for energy storage in the eastern Australian energy market, which will help support the transition to a lower carbon future. The project location is shown in Figure 1.

Underground storage capacity of the IGSF will be increased through the development of the existing Heytesbury depleted gas fields. The Heytesbury depleted gas fields are all natural sandstone formations that have had pre-existing natural gas extracted and are therefore ideal as a natural geological reservoir for the storage of gas.

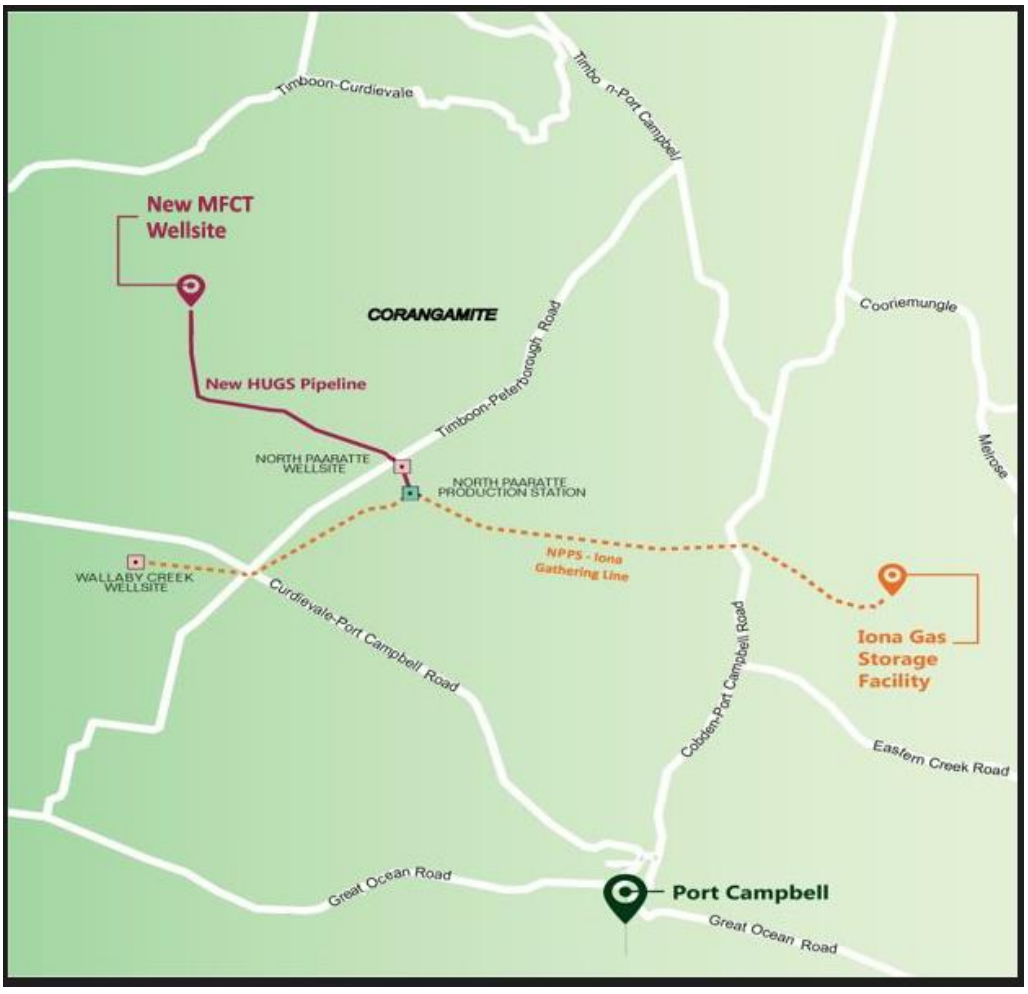

Figure 1 HUGS Project location

2.1 WHAT IS THE HUGS PROJECT?

The HUGS Project is an expansion of the storage capacity of the IGSF, providing additional security of supply and reliability to the growing demands for energy storage in the eastern Australian energy market.

The HUGS Project will develop a new wellsite which can potentially access three (3) depleted gas fields being Mylor, Fenton Creek, and Tregony (referred to as the MFCT wellsite). The current plan is to develop the Mylor field with 1-2 new gas storage well(s).

2.2 WHY IS THE HUGS PROJECT BEING DEVELOPED?

The new development is expected to provide a further 2.0 PJ of storage capacity to the IGSF. This increased storage capacity and associated upgrades will increase the peak capacity of Iona by 45 TJ/d. By enabling a ready supply of natural gas for periodic use in the firming of variable renewable energy, the project actively supports the transition to renewable energy.

In order to connect the MFCT wellsite to the Iona facility, a new pipeline is required. This proposed new pipeline (the HUGS Pipeline) will transport gas and potentially hydrogen in the future, to and from the proposed new wellsite and underground gas storage fields. The HUGS Pipeline will be an extension to Lochard's existing gathering line network from the North Paaratte Production Station (NPPS) to the Iona Gas Plant. The new pipeline and the existing gathering lines are bi-directional, which allows gas to be injected into wells for storage, and then to Iona for reprocessing and export.

The HUGS Pipeline is being designed to convey natural gas and hydrogen or blends of these gases.

3. PURPOSE AND OBJECTIVES OF THIS REPORT

The purpose of this Route Selection Report is to provide an overview of the process that enabled the selection of the HUGS Pipeline preferred route between the NPPS and MFCT wellsite.

Multi-Criteria Analysis (MCA) that utilised Lochard Energy's design and engineering experience, local knowledge, discussions with landowners and Traditional Owners to select the pipeline route that was most practical in consideration of constructability, operability, existing land, environmental values, heritage values, surrounding sensitive receptors and capital cost.

The objectives of this Route Selection Report are to demonstrate that:

1. Route aspects and evaluation criteria were developed and applied to route selection to identify the most appropriate preferred route option.
2. The preferred HUGS Pipeline route avoids intensive land use and minimises impact to private landowners and occupiers, third party asset owners and public land managers.
3. The principles of avoidance and minimisation have been applied to existing environmental and heritage values identified along the preferred option assessment corridor. Proximity to receptors has also been thoroughly considered.
4. The preferred pipeline corridor can be validated as the most optimal and suitable route following evaluation of all identified aspects and evaluation criteria.

4. PIPELINE OPTIONS AND PREFERRED OPTION DEVELOPMENT

The development of the preferred HUGS Pipeline Route Option has been an iterative process that has involved external consultant analysis combined with technical input and evaluation from the Lochard Energy project development team.

As the project progressed through its concept phase, the Lochard Energy project and engineering personnel have been able to evaluate the wellsite location and in turn evaluate three (3) valid route options against a weighted Multi-Criteria Analysis (MCA).

4.1 HOW WERE PIPELINE OPTIONS IDENTIFIED?

Initially, Lochard Energy had to determine the best location to extend Lochard's existing pipeline network to new potential wellsites. Lochard's existing gathering line network consists of a DN300 gathering line from NPPS to Iona. At the NPPS site, there is a DN300 branch which continues to the Wallaby Creek site as well as a DN150 line which runs from NPPS to the North Paaratte Wellsite (Refer Figure 2). The extension to the network could potentially be made from either Wallaby Creek or NPPS as both sites were a similar distance from the proposed wellsite location.

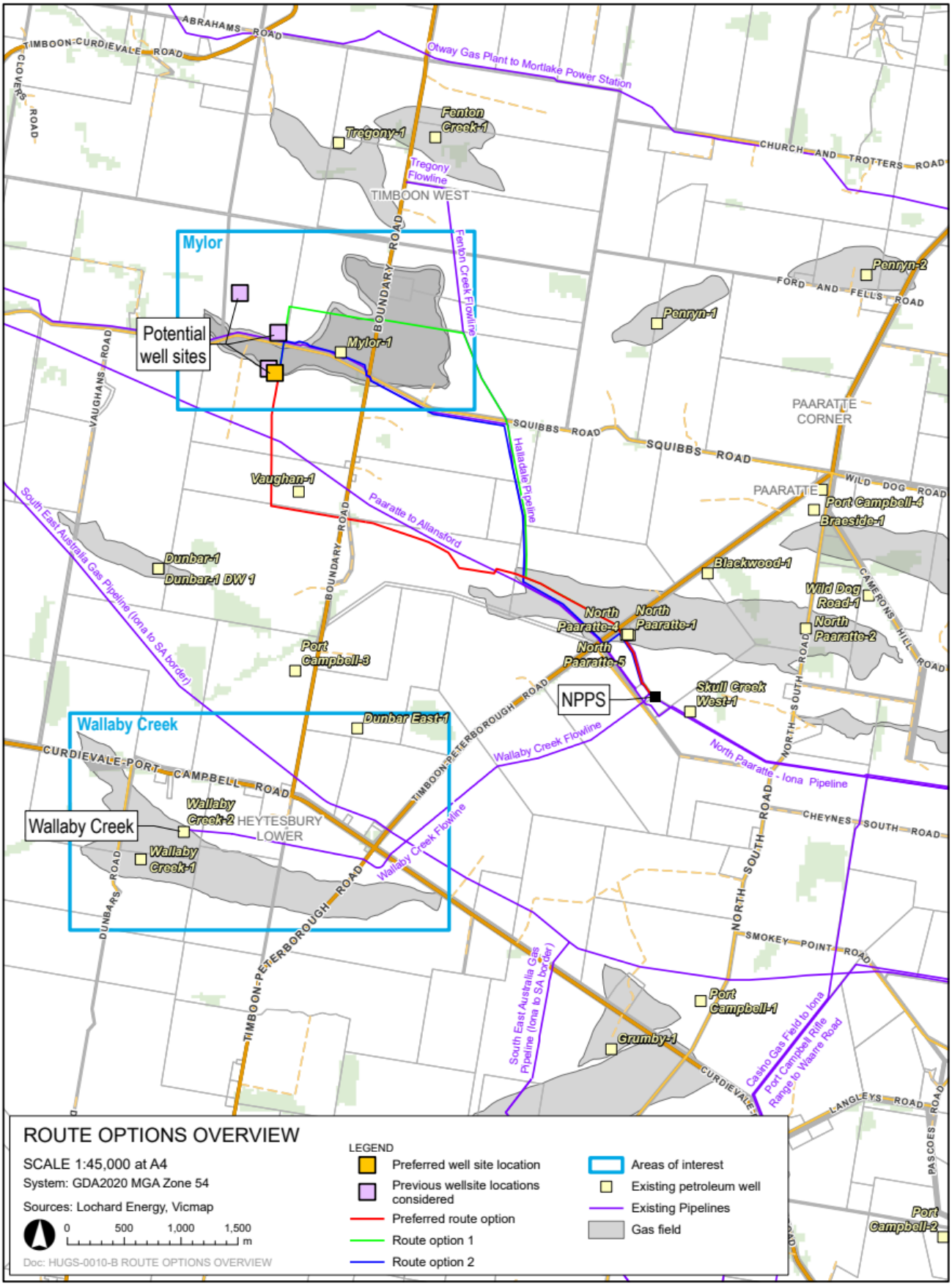

Figure 2: Existing Fields and Pipelines

In addition, there were two (2) potential wellsite options identified for the HUGS Project being the McIntee wellsite; and the MFCT wellsite. Both wellsite locations are not connected to Lochard Energy's existing network of gathering lines so the proposed wellsites would require new pipeline connections to one of several feed-in points to the IGSF. The Mylor field and McIntee field were considered the largest and best prospects for gas storage and therefore an initial decision was made that even if McIntee was developed first, the pipeline should be routed so that there was the potential to connect Mylor in the future.

The distance between NPPS and potential MFCT locations and Wallaby Creek and potential MFCT locations was very similar.

In 2021, Lochard Energy engaged CNC Project Management ('CNC') to undertake a concept pipeline route assessment exercise that analysed a broader arrangement of pipeline connections and options. This included analysis of a pipeline from both Wallaby Creek and NPPS to the McIntee Wellsite via MFCT. The CNC report concluded that an alignment from the proposed McIntee wellsite to Wallaby Creek was most favourable but had pipeline design pressure constraints (rated only to 14.685 MPag).

The decision to extend to the MFCT wellsite from NPPS was made due to the following considerations:

- The existing DN150 line between NPPS and the North Paaratte wellsite is under-sized and constrains production during withdrawal. If the new DN300 extension was routed from NPPS via the North Paaratte wellsite, this would allow for the replacement of this line;
- The distance was slightly shorter from NPPS to MFCT wellsite compared to Wallaby Creek to MFCT;
- The pipeline extension could be rated to 16.0 MPag (matching the existing Iona - NPPS gathering line) which would allow higher injection pressures at the new site; and
- There were other existing pipelines in the route from NPPS and so the ground in some areas has already been disturbed.

The McIntee wellsite was removed from the scope in April 2022 due to cost implications with MFCT wellsite being the most economically viable option for the HUGS Project.

From this point, studies concentrated on the site selection of the MFCT wellsite which in turn influenced pipeline route selection from NPPS.

4.2 DEVELOPMENT OF A SUITABLE MFCT WELLSITE LOCATION

Multiple wellsite location options were considered and evaluated to the north and south of the proposed MFCT site with the southern option being preferred due to the following selection factors:

1. Geology – site was suitable for a stable drilling program.
2. Environmental analysis – there was less impact on environmental values, particularly native vegetation where the southern site required no native vegetation removal.
3. Topography – the southern site was flatter and therefore more amenable to establishment and operation of a wellsite.
4. Cost – the southern option presented a similar drill cost to the original location but was closer to NPPS and subsequently presented a lower cost option to connect to Lochard's established operating pipeline gathering network.

4.3 PIPELINE ROUTE OPTION DEVELOPMENT

Route options considered by CNC were predominantly driven by wellsite selection, leading to a broader assessment of longer corridor options across several prospective wellsites.

Following confirmation of the suitability of the Southern MFCT wellsite location, the content of the CNC report is superseded by this route options report which focuses only on prospective route options from the NPPS to the preferred MFCT wellsite location.

Lochard undertook a multi-criteria analysis of three options. A summary of the Route Options are described below:

Route Option 1 –the route seeks to follow the existing Halladale Pipeline corridor (Beach Energy asset) and the Fenton Creek flowline before travelling west along fence line boundaries across Boundary Road before turning south to cross East and West Road and reaching the MFCT wellsite.

Route Option 2 –the route utilises a lot more of the Halladale Pipeline corridor, deviating to pick it up at the crossing of the Timboon-Peterborough Road and following it to East and West Road where it turns south to reach the MFCT wellsite.

Route Option 3 –The route option seeks to take a more direct path to the MFCT wellsite, approaching from the south rather than the north like Route Option 1 and Route Option 2. Figure 3 provides an overview of each route option.

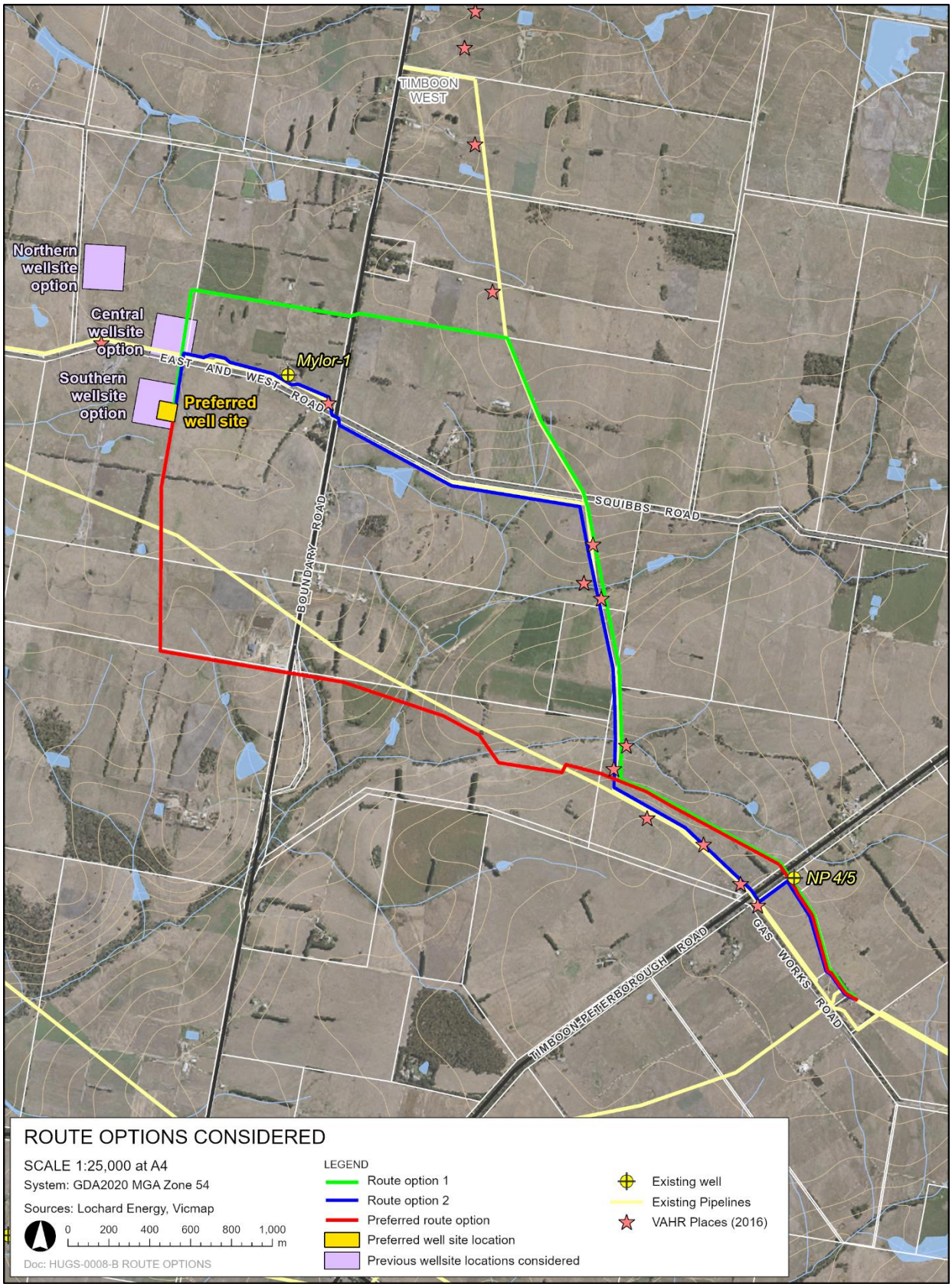

Figure 3: HUGS Pipeline proposed route options

4.3.1 MULTI-CRITERIA ANALYSIS (MCA)

Table 1 details the parameters and weightings used for an objective evaluation of each route option considering the advantages and constraints forms the basis for the MCA. The MCA was prepared and undertaken using all available desktop data and the insight of the Lochard Energy Project Development team.

The aspects in the MCA were selected as the key items that require to be considered in the planning, delivery and operation of a new pipeline asset. The Evaluation Criteria for consideration focus on specific elements of each aspect that, when analysed, enable robust evaluation of each route option.

The weighting of the MCA split the 'Aspects' into broader categories of:

1. Capital cost/ Constructability.
2. Environment and Regulatory approvals.
3. Landowner interest / Traditional Owner considerations / Land use / Community.
4. Operability.

This allowed evaluation criteria that related to social licence to be afforded a greater weighting in the assessment than Capital Cost, Constructability and Operability. The weightings were attributed in this way to ensure that greater consideration was afforded to the receiving environment, including property impact and imposition to established agricultural operations.

Table 1: Multi-Criteria Analysis Aspects, Criteria and Weighting

Aspect	Evaluation Criteria	% Weighting
1. Capital Cost	Overall estimated cost incurred in consideration of materials cost, pipeline length, construction cost (including labour), regulatory effort and cost of securing tenure for the pipeline corridor and any vegetation offsets.	20%
2. Constructability	Constraint analysis of existing topography, land use and location of assets and infrastructure as they relate to ease and speed of construction and commissioning of the new pipeline asset. Consider security risk (accessibility of site to third parties during construction).	
3. Regulatory / Approvals Pathway	Intricacy of regulatory pathway, estimated level of resource commitment and duration to gain consent to commence construction, level of residual uncertainty and risk.	35%
4. Environment	Presence of caveats or covenants, biodiversity (native vegetation, vegetative communities, fauna habitat), watercourse quality and frequency, low-lying land, weed/ pathogen presence, connectivity.	
5. Heritage	Intersection of areas of Cultural Heritage sensitivity, proximity to known/ registered Aboriginal Places.	
6. Landowner, Occupiers, Interests and Asset owners	Number of landowner/ occupiers. Intensity of agricultural land use, impact to agricultural assets and operations,	35%

Aspect	Evaluation Criteria	% Weighting
	landowner sentiment, native title interest, public asset complexity, private asset complexity.	
7. Land-use	Number of affected land parcels, land zoning, encumbrance on existing easements, encumbrance on land use, public land intersection, analysis of potential for future land use conflict.	
8. Community	Public safety risk, impact to public assets, impact to 'business as usual' activities and business operation during construction.	
9. Operability	Operational and maintenance complexity, third party asset interface (including risk of third-party damage), corrosion risk, ease of asset protection during operation.	10%

4.3.2 MCA – SCORING

Each criteria was analysed and attributed with an assessment of high, medium or low risk. Risk allocation was selected based on the criteria fulfilling one or more criteria from the 'rationale for selection' in Table 2.

Table 2: MCA Risk Allocation Rationale

Risk Level	Rationale for Selection	Score
High	- Sustained impact to assessment criteria. - Highest cost option. - Highest impact of all options. - Threats or risks are mostly unknown, some of which would attract additional time or cost to effectively control and manage. - Residual uncertainties are apparent. These will have a cost or schedule impact.	3
Medium	- Moderate impact to assessment criteria. - Middle cost option. - Middle impact of all options. - Threats or risks are mostly known, some or all of which can be managed with effective planning and oversight. - Some residual uncertainties remain outstanding that could impact cost or schedule	2
Low	- Limited impact to assessment criteria. - Least cost option. - Least impact of all options. - Threats or risks, if any, are known and can be managed with effective planning and oversight. - Low level of residual uncertainty that could impact cost or schedule.	1

The preferred option would be the route that scores lowest following the MCA evaluation and subsequent score adjustment to allow for the weighted route selection preferences to be applied.

4.3.3 COMPARISON OF OPTIONS USING MCA

4.3.3.1 SCORING METHODOLOGY

Each pipeline option was analysed using the following methodology:

- Each criteria rated for High (3) / Medium (2) /Low (1) score and then summed.
- Each aspect was then normalised (proportioned equally)
- Criteria sum multiplied by Aspect % weighting.

For example: Route Option 1:

- 6 (Sum of Capital Cost) / 1.14 (normalised score) = 5.26
- 15 (Sum of Constructability) / 1.14 (normalised score) = 13.16
- 13.16+5.26= 18.42 (summed total of Capital cost & Constructability)
- 18.42 x 20% = 3.68 (Totalised Score)

Following detailed evaluation of each option, Route Option 3 was clearly the least risk option with Route Option 1 and Route Option 2 evenly scored. Summary results are presented in Table 3 whilst the full MCA is Appendix A.

Table 3: MCA Results Outcome

Aspect (Weighting)	Route Option 1		Route Option 2		Route Option 3	
	Risk Score	Totalised score	Risk Score	Totalised score	Risk Score	Totalised score
Capital Cost & Constructability (20%)	21/30	3.68	18/30	3.16	12/30	2.11
Regulatory, Environment & Heritage (35%)	16/33	4.44	18/33	5.00	13/33	3.61
Landowner, Land use & Community (35%)	19/33	5.28	19/33	5.28	14/33	3.89
Operability (10%)	4/9	1.18	5/9	1.47	3/9	0.88
Total	**60/105**	**14.58**	**60/105**	**14.91**	**42/105**	**10.49**
Option Ranking	**2nd**		**3rd**		**1st**	

5. PREFERRED PIPELINE ROUTE

5.1 OVERVIEW OF THE PREFERRED PIPELINE ROUTE

Following MCA evaluation, Route Option 3 was adopted as the preferred HUGS Pipeline route. To assess the impacts and refine the route Lochard Energy created a broad study area for further targeted assessment led by specialists including ecologists and representatives of the Eastern Maar Aboriginal Corporation (EMAC) accompanied by archaeologists.

Refinement to proposed access locations, construction methodology, activity sequencing, additional workspace and pipeline alignment were also undertaken in consultation with landowners and technical specialists. Table 4 summarises the key Route selection and refinement activities that have been undertaken in relation to the preferred HUGS Pipeline route.

Table 4: Summary of HUGS Preferred Pipeline Route Improvement and Refinement

Activity	Chronology and Description
Initial Site Survey	December 2021 – Initial site survey to identify the route as an option. This was conducted from public roads and marked up into the route option that was evaluated using the MCA (Route Option 3).
Landowner liaison	Commenced April 2022. Landowner engagement commenced following approval of the Pipeline Consultation Plan for the Project in 2022 and has continued consistently since then to enable understanding of existing on-farm assets and operations so that pipeline construction can minimise disruption and disturbance to those operations.
Constructability Site Walk Through	June 2022. Site visit with construction personnel with a focus on optimising constructability and evaluating whether landowner requests raised during initial consultation could be incorporated into route selection. During this survey, the option to follow the route of the existing APA line on the western side of Boundary Road was assessed at the request of the landowner. At the site visit, it was deemed that the construction risk was too great to parallel the route of the APA line due to the presence of a number of dams.
Ecology Assessment	A field assessment was undertaken in August 2022 by Ecology and Heritage Partners. The output of this assessment was used to refine the pipeline route and workspace areas to minimise the impact on flora and fauna within the nominated study area. The result of the refinements was that the amount of native vegetation impacted has been reduced from the original value of 0.570 to 0.131 ha [Ref-1].
Cultural Heritage Standard Assessment	25 November 2022. This determined that a Complex Assessment was required.
Cultural Heritage Complex Assessment	14-16 March, 20-23 March, 26-27 April, 17-18 July and 24-25 August 2023. The result of the field surveys was that three (3) artefacts were located on the eastern side of Leech Creek. In consultation with EMAC, the pipeline alignment was moved to the south and the workspace area reduced to 15m wide for approximately 22m to avoid the area of cultural heritage sensitivity.
Pipeline Design	Ongoing. Design has been updated continually to reflect avoidance and minimisation of impacts identified via specialist studies or landowner / stakeholder feedback.

This process of continual improvement highlights the main methods by which the principles of avoidance and minimisation have been applied to ensure that the overall impact of the HUGS

Pipeline's construction and operation has been minimised to a level that is as low as is reasonably practicable.

6. CONCLUSION

The HUGS Pipeline Route selection process involved the comprehensive assessment of feasible pipeline options that could encompass the construction and operation of a new high pressure gas pipeline from the North Paaratte Production Station to the proposed MFCT wellsite.

A multi-criteria analysis was undertaken, evaluating three (3) pipeline route options. Criteria was weighted to promote selection of a route that minimised impact on land use, existing agricultural business operation, environmental and heritage areas.

The result of the evaluation recommended that the shortest route option (i.e. pipeline route option 3) be selected as the preferred HUGS Pipeline Route option. The preferred HUGS Pipeline Route was encapsulated in a study area which has been subjected to further assessment and refinement.

The pipeline route refinement process provides evidence that the principles of avoidance and minimisation have been applied to a point where the preferred HUGS Pipeline Route option now reflects the most optimum alignment in consideration of the existing environment including topographic constraints, native vegetation values, habitat values, heritage values, proximity to receptors and ongoing agricultural operations. Constructability and operability have also been refined to minimise overall project risk to Lochard, stakeholders, landowners, public and maximise project effectiveness.

The optimisation of the pipeline route and construction envelope is now considered to be complete and the nominated pipeline corridor is presented, in addition to this supporting document, for consent under Pipelines Act 2005.

7. REFERENCES

1. Biodiversity Assessment: Heytesbury Underground Gas Storage (HUGS) Gas Pipeline, Victoria, Ecology and Heritage Partners, Rev V3, October 2023

Appendix A – HUGS Pipeline Multi-Criteria Analysis

Aspect	Criteria for Evaluation	Route Option 1	Score	Route Option 2	Score	Route Option 3	Score
1. Capital Cost (10%)	Relative length of route option	Total Length 6.1 km		Total Length 5.63 km		Total Length 5.3 km	
		High	3	**Medium**	2	**Low**	1
	Variation in capital cost between options	>15%		>7%		0%	
		High	3	**Medium**	2	**Low**	1
	Score		6.0		4.0		2.0
2. Constructability (10%)	Design and engineering complexity	Relative low number of bends, paralleling existing high pressure pipeline and flow line, longer option requiring more resources to design		Higher number of bends, special crossings, longer distance paralleling existing high pressure pipeline		Relatively low number of bends, perpendicular crossing of roads and high pressure assets.	
		Medium	2	**Medium**	2	**Low**	1
	Terrain risk/ ground stability risk/ assessment of slope >3 degrees	~1.75km > 3degree slope		~1.3km >3 degree slope		~0.6km >3 degree slope	
		Medium	2	**Medium**	2	**Low**	1
	Number of technical/ trenchless crossings	4 - Timboon-Peterborough rd, Boundary Rd and East West Rd x 2		3 - Timboon-Peterborough rd and East West Rd x 2		2 - Timboon-Peterborough rd and Boundary Rd incl. watercourse	
		Low	1	**Low**	1	**Low**	1
	Number of encumbered construction sections where full construction width (~30m) would not be achievable.	Would be possible to obtain 30m corridor for the majority of the route.		Dam to the south of Squibbs rd would be constrained. Cross road crossing would be constrained		Would be possible to obtain 30m corridor for the majority of the route.	
		Low	1	**Low**	1	**Low**	1
	Construction access suitability (existing cleared gateways; can drill rigs, cranes, etc gain access?)	Good access subject to landowner consultation and coordinated heavy vehicle movement over existing buried pipeline assets.		Good access subject to landowner consultation and coordinated heavy vehicle movement over existing buried pipeline assets.		Good access subject to landowner consultation and coordinated heavy vehicle movement over existing buried pipeline assets.	
		Low	1	**Low**	1	**Low**	1
	Proximity to other operating assets (power lines, pipelines, other buried services)	Proximity to Halladale pipeline adds complexity.		Proximity to Halladale pipeline and Fenton Creek flowline adds complexity.		Option with least proximity to Lochard Energy assets and 3rd party assets	
		High	3	**High**	3	**Low**	1
	Number of roads intersected	4		3		2	
		High	3	**Medium**	2	**Low**	1
	Number of pipeline crossings/ known assets	4		4		5	
		Medium	2	**Medium**		**High**	
	Score		15.0		14.0		10.0
Capital Cost & Constructability Totalised Score			**2.10**		**1.80**		**1.20**
3. Regulatory / Approval Pathway (11.7%)	Number of residual uncertainties associated with the planning pathway	No unique uncertainties associated with this route option		No unique uncertainties associated with this route option		No unique uncertainties associated with this route option	
		Low	1	**Low**	1	**Low**	1
	Length of third party easements overlapped/encountered	3.76km		5.2km		0.65km	
		Medium		**High**	3	**Low**	1
	Risk to schedule of residual uncertainty	No unique schedule risk associated with this route option		No unique schedule risk associated with this route option		No unique schedule risk associated with this route option	
		Low	1	**Low**	1	**Low**	1

Aspect	Criteria for Evaluation	Route Option 1	Score	Route Option 2	Score	Route Option 3	Score
	Score		4.0		5.0		3.0
4. Environment (11.7%)	State or Federal reserves, designations or caveats	Nil		Nil		Nil	
		Low	1	**Low**	1	**Low**	1
	EPBC/ State listed flora or fauna species. Listed Threatened Ecological communities or Ecological Vegetation Classes	No native vegetation present outside of road corridors that could not otherwise be avoided during detailed design		No native vegetation present outside of road corridors that could not otherwise be avoided during detailed design		No native vegetation present outside of road corridors that could not otherwise be avoided during detailed design	
		Low	1	**Low**	1	**Low**	1
	Intersection of mapped EVCs	3,686m^2 of EVC 165 Damp Heath Scrub impacted. Areas of mapped EVC largely limited to road reserves. No obvious mapped EVC that could not be avoided		5,667m^2 of EVC 165 Damp Heath Scrub impacted. Areas of mapped EVC largely limited to road reserves. No obvious mapped EVC that could not be avoided		1,238m^2 of EVC 165 Damp Heath Scrub impacted. Areas of mapped EVC largely limited to road reserves. No obvious mapped EVC that could not be avoided	
		Medium	2	**High**	3	**Low**	1
	Watercourses intersected	4 - Skull Creek and Leech Creek and two minor ephemeral drainage lines		3 - Skull Creek, Leech Creek and 1 unnamed watercourse		4 - Skull Creek, Leech Creek and 2 unnamed watercourses	
		Low	1	**Low**	1	**Low**	1
	Dams/ Wetlands	Nil		Nil		Nil	
		Low	1	**Low**	1	**Low**	1
	Low lying areas/ floodplain	No obvious areas away from the watercourses		No obvious areas away from the watercourses		No obvious areas away from the watercourses	
		Low	1	**Low**	1	**Low**	1
	Score		7.0		8.0		6.0
5. Heritage (11.7%)	Cultural Heritage Sensitivity intersected	2.16km Intersected Intersects CH sensitivity in proximity to registered Aboriginal Places, Skull creek and Leech Creek		2.26km Intersected Intersects CH sensitivity in proximity to registered Aboriginal Places, Skull creek and Leech Creek		2.65km Intersected Intersects CH Sensitivity in proximity to at least one registered Aboriginal Place and in proximity to Skull Creek and Leech Creek	
		Medium	2	**Medium**	2	**High**	3
	Proximity to registered Aboriginal Places	Within 20m:2 20m - 200m:4		Within 20m:6 20m - 200m:0		Within 20m:1 20m - 200m:5	
		High	3	**High**	3	**Medium**	2
	Score		5.0		5.0		5.0
Regulatory / Approvals Pathway, Environment, Heritage Totalised Score			**5.6**		**6.3**		**4.9**
6. Landowner, Occupiers, Interests and Asset owners (11.7 %)	Native Title claim or determination	Uncertainty over public land crossed		Uncertainty over public land crossed		Confirmed that native title has been extinguished over the activity area	
		Medium	2	**Medium**	2	**Low**	1
	Number of landowners, occupiers and public land managers intersected	8		5		7	
		Medium	2	**Low**	1	**Medium**	2
	Resource permits intersected	PPL1, PPL4 (Lochard) No unique intersections associated with this route option		No unique intersections associated with this route option		No unique intersections associated with this route option	
		Low	1	**Low**	1	**Low**	1

Aspect	Criteria for Evaluation	Route Option 1	Score	Route Option 2	Score	Route Option 3	Score
	Third party easements or assets intersected	Beach Energy x 3 Epic Energy x 1 Property access x 1 Telstra (rd reserves)		Lochard flow line x 1 Beach Energy x 1 Epic Energy x 1 Telstra (rd reserves)		APA x 2 Beach Energy x 1 Epic Energy x 1 Telstra (rd reserves and ~KP4.95)	
		Low	1	**Low**	1	**Low**	1
	Score		6.0		5.0		5.0
7. Land-use (11.7 %)	Variation in Number of land parcels between identified options	8		5		11	
		Medium	2	**Low**	1	**High**	3
	Land Zoning	Farming Zone - no issue		Farming Zone - no issue		Farming Zone - no issue	
		Low	1	**Low**	1	**Low**	1
	Intrusiveness on agricultural operations	Impacts centre-pivot irrigation and a number of high intensity forage paddocks. Intersects 6 x dairy tracks and dairy cattle access to dairy track for 630m		Impacts centre-pivot irrigation and a number of high intensity forage paddocks. Intersects 6 x stock accesses incl. 2 x main dairy accesses.		Impacts a number of high intensity forage paddocks and 4 x dairy accessed incl. one main dairy access.	
		High	3	**High**	3	**Medium**	2
	Public land intersection	4x road parcel boundaries intersected		3 x road boundaries intersected		2 x road boundaries intersected	
		High	3	**Medium**	2	**Low**	1
	Future land use conflicts	No obvious or unique land use conflict		No obvious or unique land use conflict		No obvious or unique land use conflict	
		Low	1	**Low**	1	**Low**	1
	Score		10.0		8.0		8.0
8. Community (11.7%)	Amenity risk to receptors (dust, noise, visual impact)	Reasonably good separation from residential receptors. At least 200m buffer. Vegetation screening for most of the route.		Very close to four residential receptors		Good separation from residential receptors. At least 200m separation from closest receptor.	
		Low	1	**High**	3	**Low**	1
	Impact to road users (school bus routes, closures, temporary diversions)	No unique impacts associated with this route option		No unique impacts associated with this route option		No unique impacts associated with this option	
		Low	1	**Low**	1	**Low**	1
	Score		2.0		4.0		2.0
Landowner, Occupiers, Interests and Asset owners, Land use, Community Totalised Score			**6.30**		**5.95**		**5.25**
9. Operability (10%)	Operational and maintenance complexity (access, line of sight, third party asset crossings, proximity to 3rd party infrastructure)	Proximity to Halladale pipeline adds complexity		Proximity to Halladale pipeline adds complexity		Crossing Paaratte to Allansford pipeline twice adds minor complexity	
		Low	1	**Medium**	2	**Low**	1
	Risk of third party damage	Proximity to Halladale pipeline adds risk of damage during maintenance activities but could be managed.		Proximity to Halladale pipeline adds risk of damage during maintenance activities but could be managed.		Damage by 3rd party asset owner limited to parallel crossing only.	
		Medium	2	**Medium**	2	**Low**	1
	Asset protection during operation (marker posts, above ground assets)	Low exposure to public land other than road crossings		Longer exposure to Squibbs Road		Low exposure to public land other than road crossings	
		Low	1	**Low**	1	**Low**	1
	Score		4.0		5.0		3.0
Operability Totalised Score			**0.40**		**0.50**		**0.30**

Appendix B – Preferred Pipeline Route Map


666000
666500
667000
667500
668000
668500
669000
669500
670000
670500
671000
671500
5733500
5733000
5732500
5732000
5731500
5731000
5730500
East And West Road
Unnamed
Proposed MFCT well site
Squibbs Road
Boundary Road
North Paaratte-5
North Paaratte-4
Timboon-peterborough Road
Gas Works Road
North South Road
LOCHARD ENERGY
Disclaimer:
Lochard Energy makes no warranty in relation to the accuracy, reliability, completeness or suitability of the data and does not accept liability for any loss, damage or costs, including consequential damage, in relation to any use of the data in this map.
Terang
Camperdown
Cobden
Colac
Warrnambool
Allansford
Port Campbell
Apollo Bay
LOCATION DIAGRAM
0 100 200 300 400 500 m
LEGEND
Proposed pipeline route
Pipeline corridor
Proposed MFCT well site
Existing well
Existing pipeline
PROJECT
Heytesbury Underground Gas Storage (HUGS)
TITLE
PROJECT OVERVIEW
DATE 29/08/2024
STATUS ISSUED FOR INFORMATION
PRODUCED AC
SCALE 1:15,000 at A3
DATUM GDA2020 MGA Zone 54
CHECKED IS
FILE HUGS-0009-D PROJECT OVERVIEW
REV D