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landscape and visual.

Environment Effects Statement | May 2021

western outer ring main

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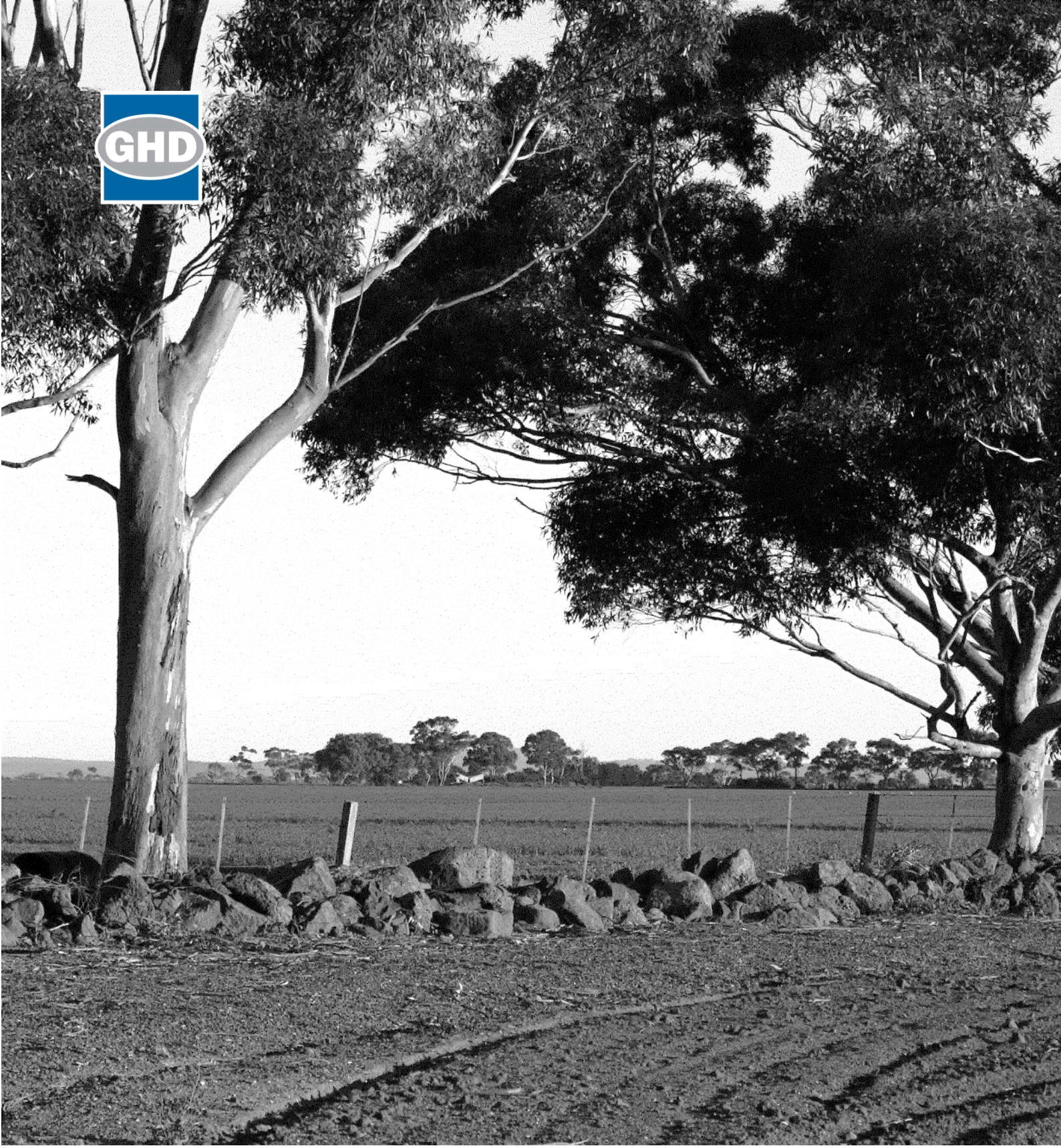

APA VTS (Operations) Pty Ltd

APA Western Outer Ring Main Environment Effects Statement

Landscape and visual report

Prepared for APA
May 2021

Executive summary

This technical report is an attachment to the Western Outer Ring Main Project (the Project) Environment Effects Statement (EES). It provides an assessment of landscape and visual impact associated with the Project and defines the environmental management measures necessary to meet the EES evaluation objectives.

Overview

The Western Outer Ring Main Project is a buried 600 millimetre nominal diameter high pressure gas transmission pipeline between APA's existing Plumpton Regulating Station (approx. 38 kilometres north-west of Melbourne's CBD) and Wollert Compressor Station (approx. 26 kilometres north-east of Melbourne's CBD), providing a high pressure connection between the eastern and western pipeline networks of the Victorian Transmission System (VTS).

The Project includes a new approximately 51 kilometre long buried pipeline, three above ground mainline valves along the pipeline alignment and an additional compressor unit and pressure regulating station at the existing APA Wollert Compressor Station.

APA is the proponent for the Project.

On 22 December 2019, the Minister for Planning determined that the Project requires an Environment Effects Statement (EES) under the Environment Effects Act 1978 (EE Act).

GHD was commissioned to undertake a landscape and visual impact assessment (LVIA) for the purpose of the EES.

Landscape and visual impact assessment context

The purpose of this report is to provide a LVIA of the Project and to define the environmental management measures necessary to meet the EES evaluation objectives. Understanding landscape and visual impact can be a key consideration to planning decisions by identifying the effects of new developments on the quality of views and landscape character.

Existing conditions

Between KP5 and KP25 and KP 35 and KP40 (shown in Figure 1) the landscape context within the study area is predominantly rural, characterised by pastoral or grazing properties with areas of scattered vegetation on private property and established roadside vegetation.

At the northern and southern sections of the Project alignment, the landscape is undergoing a process of change. Residential subdivisions are rapidly transforming the character of the landscape from rural to a highly modified, developed urban environment such as the suburbs of Fraser Rise in Melton (KP0) and Merrifield in the City of Hume (KP30). These areas are characterised with detached single or multi-story residential properties built close to the property boundaries. Major highways, freeways and rail lines are located in the study area.

Adjacent to the alignment there are a number of significant topographical features such as Mount Ridley and Mount Kororoit. The study area has multiple waterways and numerous smaller connecting tributaries. There are three main creeks that run adjacent to and through the Project alignment; Jacksons Creek, Deep Creek and Merri Creek.

Vegetation within the study area mainly comprises dry grasslands and pasture with scattered groups of established trees, established trees along creek corridors, roadside vegetation in dense groups, wind breaks along property boundaries and around paddocks, and scattered native trees.

High value landscapes within the study area include the creek corridors of Jacksons Creek and Deep Creek in the southern sections of the Project alignment, and Merri Creek in the North. High value landscapes also include the rural residential areas that surround the creek corridors.

Impact assessment

Given the temporary nature of the construction activity, the landscape and visual impact of construction activity has been assessed as low. In the context of the rapid development of residential areas within the study area between KP 0−KP 3.15 and KP 28.16 - KP 28.57 and KP 32.07 - KP 51.04, construction activity would be a common occurrence in these urban growth areas. In rural areas, machinery and construction is also sometimes observed in relation to farming activity. In addition, construction activity commonly occurs along major roads and highways as part of road upgrade and maintenance works.

Lighting from 24 hour construction activity has been assessed as low. This is due its temporary nature, low expected levels of lighting and its distance away from sensitive receptors such as residential areas.

The highest landscape character impacts were found to occur along the Deep Creek and Jacksons Creek corridor (between KP10 and KP20) and semi-rural residential areas, where a moderate rating was given. A moderate rating indicates that there will be discernible impacts to the view out of scale with the existing landscape character. The potential for vegetation clearance at these points along the alignment, will alter the character of the landscape during the construction phase. Vegetation clearance may also alter the character of flat to gently undulating farmland and residential areas. However, this would be to a lesser extent and a rating of moderate-low was assigned. A rating of low to negligible was assigned for other highly modified or degraded areas such as extractive industries and land subject to development.

The assessment found that the visual impact of the Project would be low to negligible for 12 of the 16 viewpoints that were assessed. The Project would be located within an existing easement between KP0 to KP8 and KP 42 to KP51 and the visual change to the landscape would be difficult to discern once the Project is complete.

The highest rating for visual impact was moderate for three road crossings, , Oaklands Road (VP09), Mickleham Road (VP10) and Gunns Gully Road (VP12). At these locations, there is potential for vegetation removal or alterations which may result in a visual change to the landscape. However, the change is unlikely to be significant, hence the visual impact at these locations was assessed as moderate.

Environmental management measures

Environmental management measures developed to reduce the risk of landscape and visual impact include the avoidance of tree removal and protection of trees to be retained. Prior to construction, an arborist report would be undertaken on any trees to be retained within or immediately bordering the construction corridor (where required). Vegetation buffers between roads and construction and laydown areas would be maintained where possible. Protection of trees during construction would be in accordance with *AS-4970 Protection of trees on development sites*.

Machinery, materials and temporary infrastructure would be removed as soon as it is no longer required and construction laydown areas would be kept tidy and dust kept to a minimum. Light generated during construction will be managed in general accordance with the requirements in *Australian Standard AS/NZS 4282:2019 Control of the obtrusive effects of outdoor lighting.* Generally, lighting would be designed to minimise off-site light spill.

For loss of trees and shrubs within the approved construction area affecting public spaces or existing screening of private residences from road reserves, where practicable, trees and shrubs will be replaced where reasonably requested and in consultation with the affected landholder and/or responsible authority.

Trees and shrubs will be introduced to screen the mainline valves from roads and residences, if reasonably requested by affected landholders and with any necessary approvals granted. The planting of trees and shrubs will be undertaken in consultation with the affected landholder and/or responsible authority. Planting would be undertaken in accordance with the relevant bushfire management overlays for the area.

Conclusion

In the context of the rapid development of residential areas within the study area, construction activity would be a common occurrence in these areas. In rural areas, machinery and construction is also sometimes observed in relation to farming activity. In addition, construction activity commonly occurs along major roads and highways as part of road upgrade and maintenance works. Landscape and visual impact due to construction activity has been assessed as low to negligible.

Landscape character varies across the alignment. Visual impact from the Project was found to be moderate at four locations and low to negligible at all others. The key aspect of change is due to vegetation removal.

With the successful implementation of the environmental management measures, the landscape and visual impact of the Project as a whole would be low to negligible and consistent with the relevant evaluation objective.

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Abbreviations

Abbreviation	Definition
CBD	Central Business District
CEMP	Construction Environment Management Plan
CHMP	Cultural Heritage Management Plans
EES	Environment Effects Statement
EMF	Environmental Management Framework
EPBC	Environment Protection and Biodiversity Conservation
EVC	Ecological Vegetation Class
GPS	Global Positioning System
HDD	Horizontal Direct Drilling
IEMA	Institute of Environmental Management and Assessment
KP	Kilometre Point
LCA	Landscape Character Area
LGA	Local Government Authority
LVIA	Landscape and visual impact assessment
MPS	Municipal Planning Strategy
OMR	Outer Metropolitan Ring road
PIG	Pipeline Inspection Gauge
PSP	Precinct Structure Plan
PPF	Planning Policy Framework
RAP	Registered Aboriginal Party
ROW	Right of Way
SPPF	State Planning Policy Framework
UGB	Urban Growth Boundary
VP	Viewpoint
VTS	Victorian Transmission System
WORM	Western Outer Ring Main
WWCHAC	Wurundjeri Woi-wurrung Cultural Heritage Aboriginal Corporation

Glossary

Term	Definition
APA	APA VTS (Operations) Pty Ltd, trading as APA Group, the proponent for the Project
Environmental management measure	Approaches, requirements or actions to avoid, mitigate or manage potential adverse impacts
Impact	The effect of a project, which can be adverse or beneficial, when measured against an existing condition
Landscape	All aspects of a tract of land, including landform, vegetation, buildings, towns, cities and infrastructure
Landscape character	The combined quality of built, natural and cultural aspects which make up an area and provide its unique sense of place
Landscape effects	Effects on the landscape as a resource in its own right
Landscape value	The relative value that is attached to different landscapes by society. A landscape may be valued by different stakeholders for a whole variety of reasons
Magnitude	The measurement of the scale, form and character of a development project when compared to the existing condition. In the case of visual assessment this also relates to how far the project is from the viewer. Combines with sensitivity, magnitude provides a measurement of impact
Melbourne Strategic Assessment (MSA) area	The area between KP 0−KP 3.15 and KP 28.16 - KP 28.57 and KP 32.07 - KP 51.04 which is within the area having MSA approvals. This approval is an agreement between the Victorian and Australian governments made under Part 10 of the EPBC Act whereby impacts on Matters of National Environmental Significance that are expected to occur within the Melbourne urban growth boundary are defined and accounted for a priori and can be considered early in the development of a plan, policy or program.
Project	The Western Outer Ring Main Project
Sensitivity	The sensitivity of a landscape character zone or view and its capacity to absorb change of the nature of the project. In the case of visual impact this also relates to the type of viewer and number of viewers. Combined with magnitude, sensitivity provides a measurement of impact
Scoping requirements	The EES Scoping requirements for the Project issued by the Minister for Planning in August 2020
Significance	A measure of the importance or gravity of the environmental effect, defined by significance criteria specific to the environmental topic
Study area	Extent of area under consideration for landscape and visual impact
Visual effects	Effects on specific views and on the general visual amenity experienced by people
Visual impact	The impact on the views from residences, workplaces and public places
Sensitive visual receptors	Individuals and/or defined groups of people who have the potential to be affected by a project

1. Introduction

1.1 Purpose of this report

The Western Outer Ring Main (WORM) gas pipeline project (the Project) is a proposed 600 millimetre nominal diameter high pressure gas transmission pipeline that will provide a high pressure connection between the eastern and western pipeline networks of the Victorian Transmission System (VTS).

APA is the proponent for the Project. APA is Australia's largest natural gas infrastructure business. In Victoria, the VTS is owned and maintained by APA and consists of some 2,267 kilometres of gas pipelines. The VTS serves a total consumption base of approximately 2 million residential consumers and approximately 60,000 industrial and commercial users throughout Victoria.

The Project will provide critical infrastructure to support Victoria's high pressure gas supply, network, including distribution, consequent security, efficiency and affordability. The key objectives of the Project are to:

- Improve system resilience and security of gas supply
- Increase the amount of natural gas that can be stored for times of peak demand
- Improve network performance and reliability
- Address potential gas shortages as forecasted by AEMO in the March 2020 Victorian Gas Planning Report update

The Minister for Planning determined on 22 December 2019 that APA and the Western Outer Ring Main (WORM) gas pipeline project requires an Environment Effects Statement (EES) under the *Environment Effects Act 1978* (EE Act). The EES will inform assessment of approvals required for the Project including under the *Pipelines Act 2005*, *Aboriginal Heritage Act 2006* and *Environment Protection and Biodiversity Conservation Act 1999.*

The purpose of this report is to provide a landscape and visual impact assessment (LVIA) of the Project and to define the environmental management measures necessary to meet the EES evaluation objectives.

1.2 Why understanding landscape and visual impact is important

Understanding landscape and visual impact can inform planning decisions by identifying the effects of proposed infrastructure projects on the quality of existing views and landscape character. LVIA is a tool used to identify and assess the significance of changes which may have an impact on these values.

Changes to landscape character and views may have far reaching consequences. It is sometimes closely associated with social, natural environment supporting flora/fauna, cultural and heritage aspects and can affect one's sense of connection to a landscape. Adverse impacts may also be avoided, minimised or mitigated if dealt with from the outset. In some instances, there may be opportunities to enhance landscape character and amenity.

For these reasons, it is important to undertake a LVIA in order to anticipate any adverse effects which may be deemed unacceptable by the community and thus represent a Project risk.

1.3 Limitations, uncertainties and assumptions

This assessment includes the following assumptions and limitations:

- There is no single guidance document on the assessment of landscape and visual impacts specific to Australia, however, the industry typically refers to the guidelines outlined in section 5.11
- The assessment aims to be objective and to describe any potential changes factually. While potential changes resulting from the Project are defined, the significance of these changes requires qualitative (subjective) judgements. This assessment's conclusion therefore combine objective measurement and professional interpretation. While this assessment aims to be objective, it is recognised that visual assessment can be subjective and individuals are likely to associate different visual experiences to the study area.
- The assessment is based on the information provided to GHD at the time of writing
- Existing conditions were assessed in the field on 17th and 18th June, 2020. This was based on a site visit to publicly accessible locations only. A site visit to private residential properties was not undertaken due to COVID-19 restrictions. This includes the intersection of the Project with Merri Creek, which is located within private land. After the initial site visit, a change in the proposed MLV3 location required another site visit to obtain photos for VP12, this site visit was not undertaken by the author due to COVID-19 stage 4 restrictions at that time.
- Due to evolving consideration of construction details, all vegetation within an identified construction corridor is assumed to be cleared unless otherwise stated at road/rail crossings, with considerations given in assessments for reinstatement
- At the date of issuing this report, APA consultation with landowners and the community had not identified feedback of specific relevance to inform the landscape and visual assessment. As consultation is ongoing, relevant matters may be raised in future feedback. A report on consultation and engagement will be attached to the EES.
- This report: has been prepared by GHD for APA VTS (Operations) Pty Ltd and may only be used and relied on by APA VTS (Operations) Pty Ltd for the purpose agreed between GHD and APA VTS (Operations) Pty Ltd as set out in section 1 of this report
- GHD otherwise disclaims responsibility to any person other than APA VTS (Operations) Pty Ltd arising in connection with this report. GHD also excludes implied warranties and conditions, to the extent legally permissible
- The services undertaken by GHD in connection with preparing this report were limited to those specifically detailed in the report and are subject to the scope limitations set out in the report
- The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the date of preparation of the report. GHD has no responsibility or obligation to update this report to account for events or changes occurring subsequent to the date that the report was prepared.
- The opinions, conclusions and any recommendations in this report are based on assumptions made by GHD described in this report. GHD disclaims liability arising from any of the assumptions being incorrect.

This Landscape and Visual Impact Assessment Report (Report):

1. Has been prepared by GHD Pty Ltd (“GHD”) for APA VTS (Operations) Pty Ltd (APA);
2. May only be used for the purpose of informing the Environment Effects Statement and Pipeline Licence Application for the Western Outer Ring Main Project (and must not be used for any other purpose); and
3. May be provided to the Department of Environment, Land, Water and Planning for the purpose of public exhibition as part of the Environment Effects Statement and Pipeline Licence Application for the Western Outer Ring Main Project.

The services undertaken by GHD in connection with preparing this Report were limited to those specifically detailed in section 5 Methodology of this Report. The opinions, conclusions and any recommendations in this Report are based on assumptions made by GHD when undertaking services and preparing the Report (Assumptions), as specified in section 5 Methodology and throughout this Report. GHD excludes liability for errors in, or omissions from, this Report arising from or in connection with any of the assumptions being incorrect. Subject to the paragraphs in this section of the Report, the opinions, conclusions and any recommendations in this Report are based on conditions encountered and information reviewed at the time of preparation. GHD has not, and accepts no responsibility or obligation to update this Report to account for events or changes occurring subsequent to the date that the Report was signed.

2. EES scoping requirements

The following sections provide an outline of the EES scoping requirements for landscape and visual impact.

2.1 EES evaluation objectives

The scoping requirements for the EES, released by the Minister for Planning, set out the specific environmental matters to be investigated and documented in the Project's EES, and informs the scope of the EES technical studies. The scoping requirements include a set of evaluation objectives. These objectives identify the desired outcomes to be achieved in managing the potential impacts of construction and operation of the Project.

The following evaluation objectives are relevant to landscape and visual impact assessment:

- Minimise potential adverse social, economic, amenity and land use effects at local and regional scales

2.2 EES scoping requirements

The scoping requirements relevant to the landscape and visual impact assessment evaluation objectives are shown in Table 1, as well as the location where these items have been addressed in this report.

Table 1 Scoping requirements relevant to landscape and visual impact

Scoping requirement	Section addressed
Potential for adverse impacts on visual or landscape values, including impacts on amenity from Project lighting	Sections 8, 9 and 10
Identify visual and landscape values near the Project, including public and private vantage points from which elements of the Project may be visible	Sections 8, 9 and 10
Identify dwellings and any other potentially sensitive receptors (e.g. residential, commercial, industrial, recreational areas, etc.) that could be affected by the project's potential effects on air quality, lighting, noise, odour or vibration levels, especially vulnerable receptors including children and the elderly	Sections 10 (lighting) (Note: Noise, vibration, odour and air quality have been dealt with in other reports)
Assess likely noise, vibration, odour, traffic, lighting and visual impacts at sensitive receptors adjacent to the Project during construction and operation (both with and in the absence of the proposed mitigation measures), relative to standards	Sections 8 and 10 (Note: Noise, vibration, odour and traffic have been dealt with in other reports)
Identify options for mitigating or managing visual or landscape impacts of the Project	Sections 9, 10 and 12
Identify potential and proposed design responses and/or other mitigation measures to avoid, reduce and/or manage any significant effects for sensitive receptors during construction and operation arising from specified air pollution indicators, noise, vibration, odour, traffic and lighting, in the context of applicable policy and standards	Sections 9, 10 and 12 (Note: Air pollution, noise, vibration, odour and traffic have been dealt with in other reports)

Scoping requirement	Section addressed
Outline measures to monitor the success of commitments to mitigate or manage effects on social, economic, amenity and land use values during all phases of the Project	Sections 9, 10 and 12 (Note: Social, economic and land use have been dealt with in other reports)
Describe the approach to monitor effects and develop contingency measures to be implemented in the event of adverse residual effects on social, economic, amenity and land use values requiring further management	Sections 9, 10 and 11 (Note: Social, economic and land use have been dealt with in other reports)
Describe any further measures that are proposed to enhance social outcomes, and either manage risks to landscape and recreational values, or enhance visual amenity outcomes both for residents living near the Project and for visitors to the locality, to form part of the EMF	Sections 9, 10 and 11 (Note: Social has been dealt with separately)

2.3 Linkages to other reports

This report relies on or informs the technical assessments as indicated in Table 2.

Table 2 Linkages to other technical reports

Specialist report	Relevance to this technical study
Land use	Information obtained from the land use study relating to precinct structure plans and the potential use of the pipeline easement for public recreation and landscaping.
Biodiversity	Information obtained from the Biodiversity study relating to potential biodiversity and habitat impacts associated with the Project.
Aboriginal and historic heritage report	Information obtained from the Aboriginal and historic heritage report relating to significant heritage sites and impacts associated with the Project

3. Project description

The following sections provide an overview of the Project in terms of the construction, operation and specific elements that are relevant to landscape and visual impact.

3.1 Project overview

The Project provides a new high pressure gas pipeline link between APA's existing Plumpton Regulating Station (approx. 38 kilometres north west of Melbourne's CBD) and Wollert Compressor Station (approx. 26 kilometres north east of Melbourne's CBD).

The Project includes the following key components:

- **A new pipeline**: The pipeline would be approximately 51 kilometres in length. The pipeline would be within a 15 metre wide permanent easement and be buried for its entire length to a minimum depth of cover of 750 millimetres
- **Mainline valves**: Three mainline valves would be located along the pipeline alignment. The area required for mainline valves shall be subdivided to provide ongoing access to APA for any maintenance or inspection activities from the existing roads.
  The mainline valves would be spaced at intervals of approximately 15 kilometres and located within the proposed easement area at approximately KP 6, KP 22 and KP 35.
- **Impressed Current Cathodic Protection (ICCP)**: A number of upstand test-points would be required to be installed for the pipeline above ground. These test points consist of small pole mounted enclosures housing the Impressed Current Cathodic Protection (ICCP) system monitoring equipment. Test-points are typically installed at marker posts and at other key features such as public roads and fence crossings. One location is proposed along the alignment near to MLV2
- The **Wollert Compressor Station upgrade**: The installation of a new Solar Centaur 50 compressor, an end of line scraper station and a pressure regulating station within the existing APA facility at Wollert.

A schematic illustration of the Project context is shown in Figure 1.

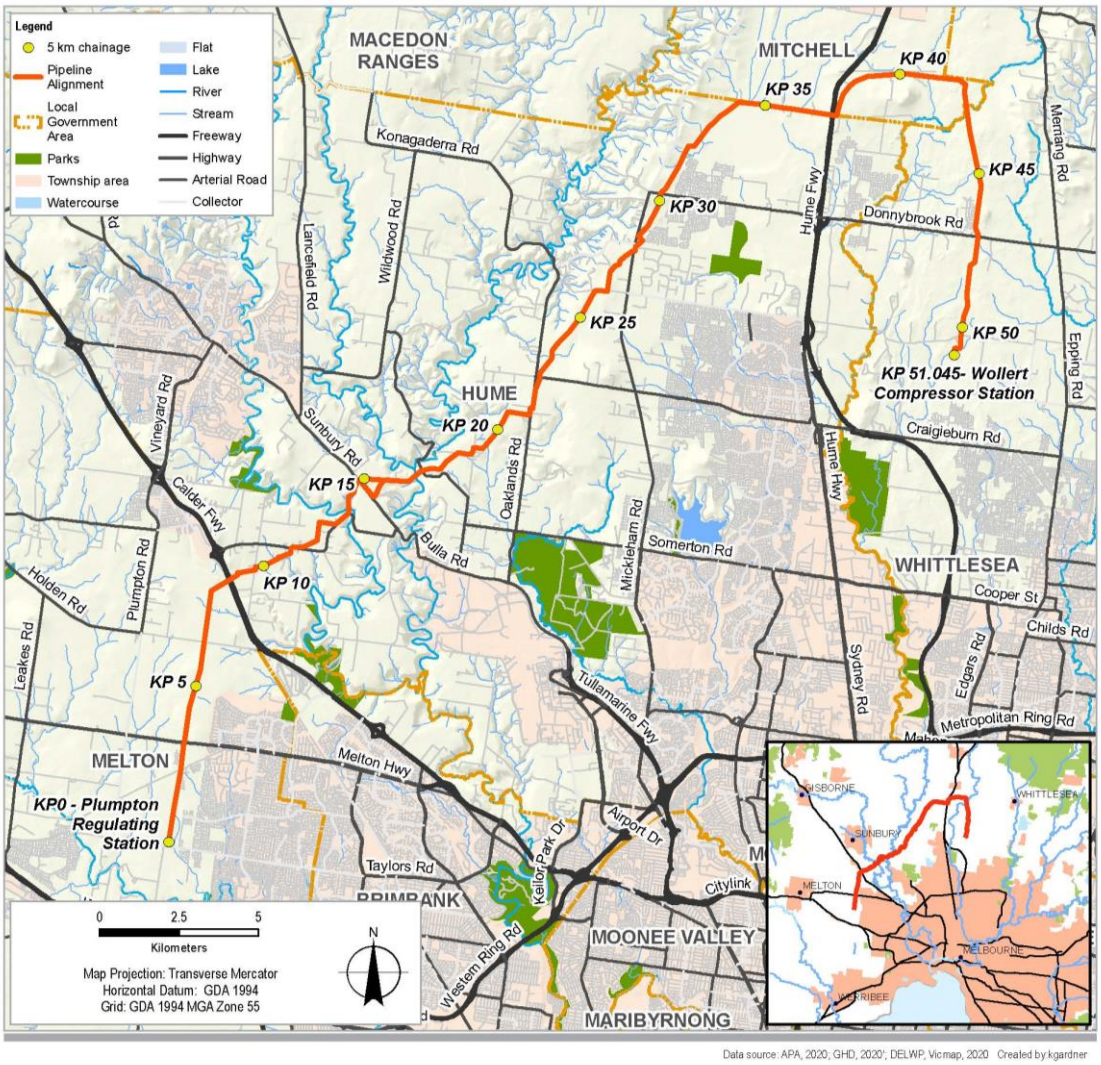


Figure 1 Western Outer Ring Main overview

3.2 Construction

Subject to the staging of the works, construction for the entire Project is expected to take approximately nine months. Key construction activities for the Project include:

- Establishing offsite construction sites, including laydown areas
- Constructing the pipeline
- Constructing three mainline valves
- Construction of upgrades associated with the Wollert compressor station
- Rehabilitation

3.2.1 Construction sites

Two temporary construction sites would be established for construction.

One offsite compound for pipeline works nominally 200 metres x 200 metres, including laydown and storage areas. This would be located on a site where the activity is permitted under the relevant Planning Scheme, most likely within an existing industrial area.

The second temporary laydown area and construction offices would be established for the Wollert Compressor Station construction works. The site laydown area and construction offices for the compressor station equipment would be located within the existing compressor site area at Wollert.

3.2.2 Pipeline construction area

The Project would require a construction area for the pipeline, which would typically comprise a 30 metre wide corridor along the Project. Most construction activity would be located within this construction area. The activities and facilities within the construction corridor would include access tracks and additional work areas such as vehicle turn around points and additional work spaces for crossings, stockpiling materials and storage of pipe. Additional work areas up to 50 m x 50 m or 50 m x 100 m (such as for vehicle turn-around points, areas to accommodate HDD) would be required in some locations.

3.2.3 Pipeline construction methodology

The techniques used to construct the underground pipeline would include various methods including, open trench construction and alternative techniques at certain locations such as horizontal directional drilling (HDD) or horizontal boring.

Where crossing watercourses, major roads, rail line reserves or other constraints, the pipeline may be constructed using trenchless construction techniques such as HDD or shallow horizontal boring, to avoid construction disturbance within the sensitive area.

The pipeline construction sequence starts with survey works and continues with site establishment (including laydown area), clearing and grading, pipe stringing, pipe bending, welding and coating, open trench construction, lowering pipe into trench, hydrostatic testing, commissioning, and finally rehabilitation.

There would be dedicated access points into the construction corridor with vehicular movements along the Project alignment kept within the construction corridor.

3.2.4 Construction of other facilities

The construction sequence for the Wollert Compressor Station works starts with survey works and continues with site establishment (including laydown area), bulk earthworks, civil works (concrete slab and footings), mechanical works, electrical and instrumentation works, hydrostatic testing, commissioning, and site completion.

Various components of the compressor are assembled offsite. When delivered to site the various components are assembled together in-situ. Cranes are used to lift the compressor into place with all connecting pipework fitted.

3.3 Operation

Following the reinstatement of land as part of the pipeline construction, the land would be generally returned to its previous use. When commissioned, the pipeline would be owned and maintained by APA. The pipeline would be contained within a 15 metre wide permanent easement corridor (within the area that formed the 30 metre construction corridor). Routine corridor inspections would be undertaken in accordance with APA procedures and AS2885 to monitor the pipeline easement for any operational or maintenance issues.

Excavating or erecting permanent structures, buildings, large trees or shrubs over the underground pipeline would be prohibited in accordance with the *Pipelines Act 2005* and pursuant to easement agreements with landowners.

Maintenance and inspections of the mainline valves and the Wollert Compressor Station would also be conducted periodically in accordance with APA procedures. The activities usually include vegetation management, valve and compressor operation and corrective maintenance.

The key operation and maintenance phase activities include:

- Easement maintenance (vegetation control, weed management, erosion and subsidence monitoring)
- Pipeline, mainline valves and compressor station maintenance
- Specialist pigging operations
- Cathodic protection surveys for mechanical and electrical preventative and corrective maintenance
- Monitoring and routine inspections and surveillance

3.4 Activities and design considerations relevant to landscape and visual impact

This assessment has focussed on the following key Project components from a landscape and visual impact perspective:

- Construction works comprising the sight of vehicles, machinery and construction crews as they move along the Project alignment
- Temporary construction camps and laydown areas
- Night time lighting associated with construction works
- Removal of vegetation as part of the construction phases of the Project
- Three mainline valves. Mainline valves would be finished with hardstand areas and chain wire fenced to exclude members of the public. APA's security fence design for MLV sites has been developed to deter unauthorised access while maintaining a low visual amenity impact across a broad range of environments that APA pipelines traverse. The design would see the barbed wire installed vertically straight and situated 3m above ground level to ensure that only intruders would be effected by the barbs and it is safe for the public and animals to pass by the fence. The height of the fencing at each mainline valve facility would be approximately three metres. There would be no lighting at the mainline valve facilities A permanent access point will be provided for all MLV's from adjacent roads. A typical mainline valve facility is shown in Figure 2. APA intends to submit a subdivision application for each of the three MLV sites and acquire these for the Project.

- The pipeline easement, including signage and potential removal or other changes to existing vegetation and landscape character
- Road and creek crossings
- Proposed works at Wollert compressor station, including pipeline termination point

Figure 2 Typical mainline valve facility

4. Legislation, policy and guidelines

The EES is prepared under the EE Act and will inform assessment of approvals required for the Project. The legislation relevant to the principal approvals required for the Project is:

- Commonwealth approval under the Environment Protection and Biodiversity Conservation Act 1999 (Cth) (EPBC Act). For the component of the Project that is located outside of the Melbourne Strategic Assessment (MSA) program area, the Project requires assessment and approval under the EPBC Act, under the assessment bilateral agreement with Victoria made under section 45 of the EPBC Act.

  The MSA program is the Victorian Government's approach to managing the impact of urban development in Melbourne's growth areas on significant vegetation communities, plants and animals. Areas within the approved Melbourne Strategic Assessment (MSA) area occur between approximately KP 0 to KP 3.15, KP 28.16 to KP 28.57 and KP 32.07 to KP 51.04. Areas outside of the MSA occur approximately between KP 3.15 - KP 28.16 and KP 28.57 –KP 32.07.

- Pipeline Licence approval is required under the Pipelines Act 2005 (Vic) (Pipelines Act) for the Western Outer Ring Main Project. The Pipeline Licence application is exhibited with the EES.

  Section 49 of the Pipelines Act requires that the following matters be considered before granting a licence:

  (a) the potential environmental, social, economic and safety impacts of the proposed pipeline

  (f) the assessment of the Environment Effects Minister in relation to the proposed pipeline, if an assessment has been made

  (g) any written comments received from the Planning Minister or the relevant responsible authority on the effect of the proposed pipeline on the planning of the area through which it is to pass

  (h) any written comments received from the Water Minister and from the relevant Crown Land Minister on the impact of the proposed pipeline

  Section 3 of the Pipelines Act sets out the objectives of the Act including:

  (a) to facilitate the development of pipelines for the benefit of Victoria

  (e) to protect the public from environmental, health and safety risks resulting from the construction and operation of pipelines

  (f) to ensure that pipelines are constructed and operated in a way that minimises adverse environmental impacts and has regard for the need for sustainable development

  Section 4 of the Pipelines Act sets out the principles of sustainable development to be given regard in implementing the Act including that decision-making should be guided by a careful evaluation to avoid serious or irreversible damage to the environment wherever practicable and an assessment of the risk-weighted consequences of various options.

  Section 54(c) of the Pipelines Act states that conditions on a licence may include conditions concerning the protection of the environment.

- Cultural Heritage Management Plan (CHMP) under the Aboriginal Heritage Act 2006 (Vic) (AH Act). Two CHMPs are currently in progress for the Project (CHMP 16593 and CHMP 16594).

A number of legislative, policy, guidance and standard documents were found to be relevant to this landscape and visual impact assessment and are discussed further in this report. The key legislation, policy and guidelines that apply to the landscape and visual impact assessment for the Project are summarised in the sections below.

4.1 State legislation

Victorian State legislation includes the following acts that are relevant to this study as shown in Table 3.

Table 3 Victorian State legislation

Legislation	Relevance to this study
Heritage Act 1995	The *Heritage Act 1995* provides the protection of State significant historic heritage places and objects that are significant to the history and development of Victoria.
Planning and Environment Act 1987	The *Planning and Environment Act 1987* establishes a framework for planning the use, development and protection of land in Victoria and includes a number of items relevant to landscape and visual assessment.

4.1.1 Planning Policy Framework

As part of the planning scheme Amendment VC148, the Planning Policy Framework (PPF) has replaced the former State Planning Policy Framework (SPPF) and now includes all state and regional policies under the *Planning and Environment Act 1987*. In future, the PPF will also replace the Local Planning Policy Framework (LPPF) and include the new Municipal Planning Strategy (MPS). The primary objectives of the PPF are to:

- Strengthen planning policy
- Enable the better alignment of state planning policy with local planning policy
- Be easier to navigate and use than the currently separate state, regional and local policy frameworks
- Ensure policy is consistent across state, regional and local tiers
- Simplify the review and update of policy

The PPF provides an integrated context for spatial planning, land use and development for use by planning and responsible authorities.

As the PPF is not yet fully integrated, for the purpose of this report, relevant policies to this study at State and regional level are outlined in Table 4. The relevant local policy is outlined in section 4.2 under Local Planning Policy Framework. Further information on the Precinct Structure Plans (PSP), planning zones and overlays is provided in Technical report K *Land use and planning*.

Table 4 State and regional planning policies

Legislation	Relevance to this study
12 Environmental and Landscape Values State policy: *12.01-2S Native vegetation management* *12.03-1S River corridors, waterways, lakes and wetlands* *12.05-2S Landscapes*	This policy states that planning should protect, restore and enhance sites and features of landscape value. The Project should align with the policy's State objective for native vegetation (Clause 12.01-2S) in relation to the removal of vegetation and ensuring that there is no net loss to biodiversity as a result of the removal, destruction or lopping of native vegetation. The Project needs to align with the policy's State objectives for river corridors, waterways, lakes and wetlands (Clause 12.03-1S) in relation to Deep and Jacksons Creek. All development should ensure that it responds to and respects the significant environmental, conservation and cultural aesthetics of water bodies. Development should ensure that it does not compromise bank stability, increase erosion or impact on the creek. The Project needs to align with the policy's State objectives for landscapes (Clause 12.05-2S) to protect and enhance significant landscapes and open spaces that contribute to character, identity and sustainable environments. It states that planning for development should not detract from the natural qualities of significant landscape areas. Planning should improve landscape qualities, open space linkages and environmental performance in significant landscapes and open spaces, including green wedges, conservation areas and non-urban areas. This policy also recognises the natural landscape for its aesthetic value, as a fully functioning system and those important natural features should be protected and enhanced.
15 Built Environment and Heritage State policy: *15.01-5S Neighbourhood character* *15.01-6S Design for rural areas* *15.03-1s Heritage conservation* *15.03-2S Aboriginal cultural heritage*	This policy states that planning should ensure all land use and development appropriately responds to its surrounding landscape and character and that sites with significant aesthetic value should be protected. Planning should promote excellence in the built environment, create places that contribute positively to the local character and sense of place, and enhance the amenity of the area. The Project should align with the policy's State objectives for neighbourhood character (Clause 15.01-5S) to recognise, support and protect neighbourhood character and sense of place. Aligned strategies include ensuring that development responds to neighbourhood character, and emphasises the underlying natural character and existing vegetation. The Project should align with the policy's State objectives for design for rural areas (Clause 15.01-6S) to ensure development respects the values areas of rural character. Aligned strategies include ensuring that the scale and appearance of development protects and enhances rural character, and the existing visual amenity. The Project should align with the policy's state objective to conserve and protect places of heritage significance as stated in Clause 15.03-1S. Aligned strategies include encouraging appropriate development that respect the places with identified heritage values.

Legislation	Relevance to this study
	The Project should align with the policy's state objective for Aboriginal cultural heritage (Clause 15.03-2S) to ensure the protection and conservation of places of Aboriginal cultural heritage significance. Aligned strategies include ensuring the permit approvals align with the recommendations of any relevant Cultural Heritage Management Plan.
19 Infrastructure State policy: *19.01-3S Pipeline infrastructure*	This policy states that planning should ensure development of social and physical infrastructure is provided in a way that is efficient, equitable, accessible and timely. The Project should align with the policy's State objective for pipeline infrastructure (19.01-13) to ensure that gas, oil and other substances are delivered safely to users at minimal risk to the environment, people and infrastructure. Aligned strategies include planning for the development of pipeline infrastructure subject to the Pipelines Act 2005. Existing transmission-pressure gas pipelines should be recognised in planning schemes and protected from residential development or sensitive land uses. New pipelines should be planned along routes that have adequate buffers to residents, and other sensitive land uses such as waterways or environmentally sensitive sites.
Koroit PSP	The Koroit PSP was gazetted in 1 February 2018. This PSP is located within the study area south of Taylors Road and accounts for the existing gas pipeline at this location. Reasonably foreseeable land uses within the study area will be predominately residential in nature, with some provisions for drainage and "conservation area". Typical examples of residential interfaces with the gas pipeline easement are shown in Sections 31-32 (page 124-125) of the PSP, which show a shared use path over the easement, and carriageways adjacent acting as a buffer between the easement at residential properties.
Plumpton PSP	The Plumpton PSP was gazetted on 1 February 2018 and broadly applies to the initial 3 km of the study area, within the Melton LGA, from Taylors Road to the Melton Highway. The existing gas pipeline easement is within the PSP, with relevant key objectives and requirements seeking to utilise gas pipeline easements for their open space benefits, and to ensure sensitive uses are located adjacent to the easement. Foreseeable land uses alongside the pipeline easement would be predominately residential. The easement crosses several minor roads and is surrounded by water retention ponds at the southern end. Other foreseeable land uses within the study area include local open space, education and community facilities. Typical examples of residential interfaces with the gas pipeline easement are shown in sections 32-33 (page 136-137) of the PSP, which show a shared use path over the easement and carriageways adjacent acting as a buffer between the easement and residential properties.

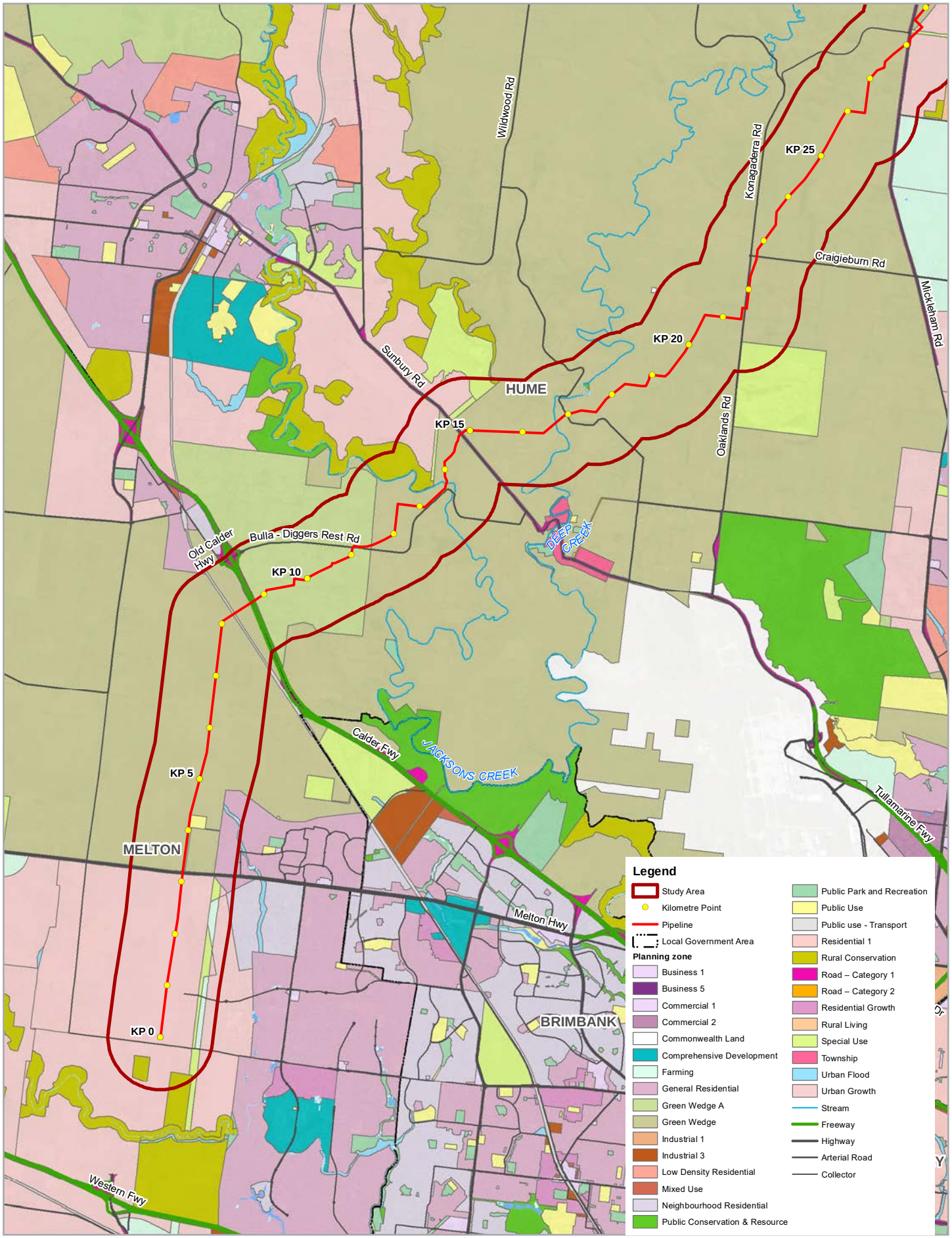
Legislation	Relevance to this study
Sunbury South PSP	The Sunbury South PSP does not directly interface with the Project, however is within the study area. The PSP was gazetted in January 2019 and applies to an area to the southeast of Sunbury. Foreseeable land uses defined in the PSP within the study area are a mix of residential, local open space, drainage, and utility (electricity) easements. The PSP does not directly account for the Project.
Lindum Vale PSP	The Lindum Vale PSP was gazetted in July 2019 and applies to land bordered by Mount Ridley Road to the south, Mickleham Road to the west, the Merrifield West PSP to the north and the suburb of Mickleham to the east. At this location, the Project alignment is within the Public Acquisition Overlay for the Outer Metropolitan Ring (OMR) Road, which is defined and protected within the PSP. The PSP does not directly account for the Project. Land adjacent to the Project alignment is shown to be set aside for residential areas and open space with a transmission line easement next to the Project alignment at the northern end. Key objectives within the Lindum Vale PSP that relate to landscape and visual impact are: • *Create a high amenity urban environment through the protection of indigenous trees and high value cultural heritage* • *Retain and protect native grasslands and indigenous trees, predominantly River Red Gums and Grey Box Gums* • *Protect dry stone walls* • *Protect the privacy of and minimise visual impact to existing rural-residential lots* • *Create appropriate landscape character along Mount Ridley Road.* Landscape character objectives relevant to the landscape and visual impact are: *All public areas, including streets and drainage areas must be landscaped and planted to reflect the unique open woodland landscape of the precinct.*

Legislation	Relevance to this study
Merrifield West PSP	The Merrifield West PSP was gazetted in June 2018, after the initial Merrifield West Structure Plan was approved by the Minister for Planning in June 2012. It applies to land bordered by the OMR acquisition overlay to the west, the future Merrifield North PSP to the north, the Merrifield Central Employment and Folkstone Employment Area PSPs to the east and Mickleham to the south. At this location, the Project alignment is within the Public Acquisition Overlay for the OMR road, which is defined and protected within the PSP. The PSP does not directly account for the provision of the Project. The PSP indicates that the future land use directly along the Project alignment will be 'conventional density residential', with open space, education, mixed use, town centre and community facility uses also located within the study area.
Lockerbie North PSP	The Lockerbie North PSP was gazetted in June 2012 and is bordered by the Beveridge Township to the west and the OMR footprint to the south. The PSP does not directly interface with the Project alignment, however its southern extent is within the study area. The PSP does not directly account for the provision of the Project. The PSP indicates that the future land use within the study area will be 'conventional density residential' along with two water retarding basins.
Lockerbie PSP	The Lockerbie PSP was gazetted in June 2012, and applies to land generally bordered by the township of Kalkallo to the southwest, the OMR footprint to the north, Merri Creek to the east and Donnybrook Road to the south. The Project alignment is located at the southern extent of then Public Acquisition Overlay for the OMR footprint. The PSP does not directly account for the provision of the Project. The PSP indicates that future land uses directly adjacent to the Project alignment would be 'conventional residential', with other land uses within the study area including education, open space, and commercial.
Donnybrook-Woodstock PSP	The Donnybrook-Woodstock PSP was gazetted in November 2017 and is bordered by the OMR footprint to the north and east, Donnybrook Road to the south and the Melbourne-Sydney train line to the west. The existing gas pipeline easement at this location is provided for in the PSP. Guidelines within the PSP specify that subdivision design adjacent should ensure road crossings are at 90 degrees to the pipeline. There is also provision for a shared use path along the gas pipeline, with designs shown on page 91. These show a shared use path over the easement and adjacent carriageways which act as a buffer between the easement and residential properties. Adjacent land uses shown in the PSP are predominately residential with some water retarding basins. There is a conservation area associated with Merri Creek at the northern extent of the PSP.

Legislation	Relevance to this study
Shenstone Park PSP	The Shenstone Park PSP is currently in preparation but was exhibited to the public in September 2019. The area subject to the proposed PSP is bordered by the Donnybrook-Woodstock PSP to the north and the Melbourne-Sydney train line to the west. The draft PSP provides for the existing gas pipeline easement at this location. *Requirements in the PSP specify that 'All infrastructure (including but not limited to roads, drainage, or utility) must only cross the APA gas pipeline at 90 degrees unless with the consent of the pipeline owner or operators (APA VTS) and be engineered to protect the integrity of the pipeline'*. Proposed adjacent land uses are residential with some areas of open space along the alignment.

4.2 Local Policy

The areas of local policy that are relevant to this study are outlined in this section. Figure 3 shows the planning zones within and adjacent to the study area. Figure 4 shows the planning overlays within and adjacent to the study area.



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Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55

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APA VTS (Operations) Pty Ltd
Western Outer Ring Main Gas Project

Project No. 31-12529997
Revision No. B
Date 30/11/2020

Planning zones

Figure 3

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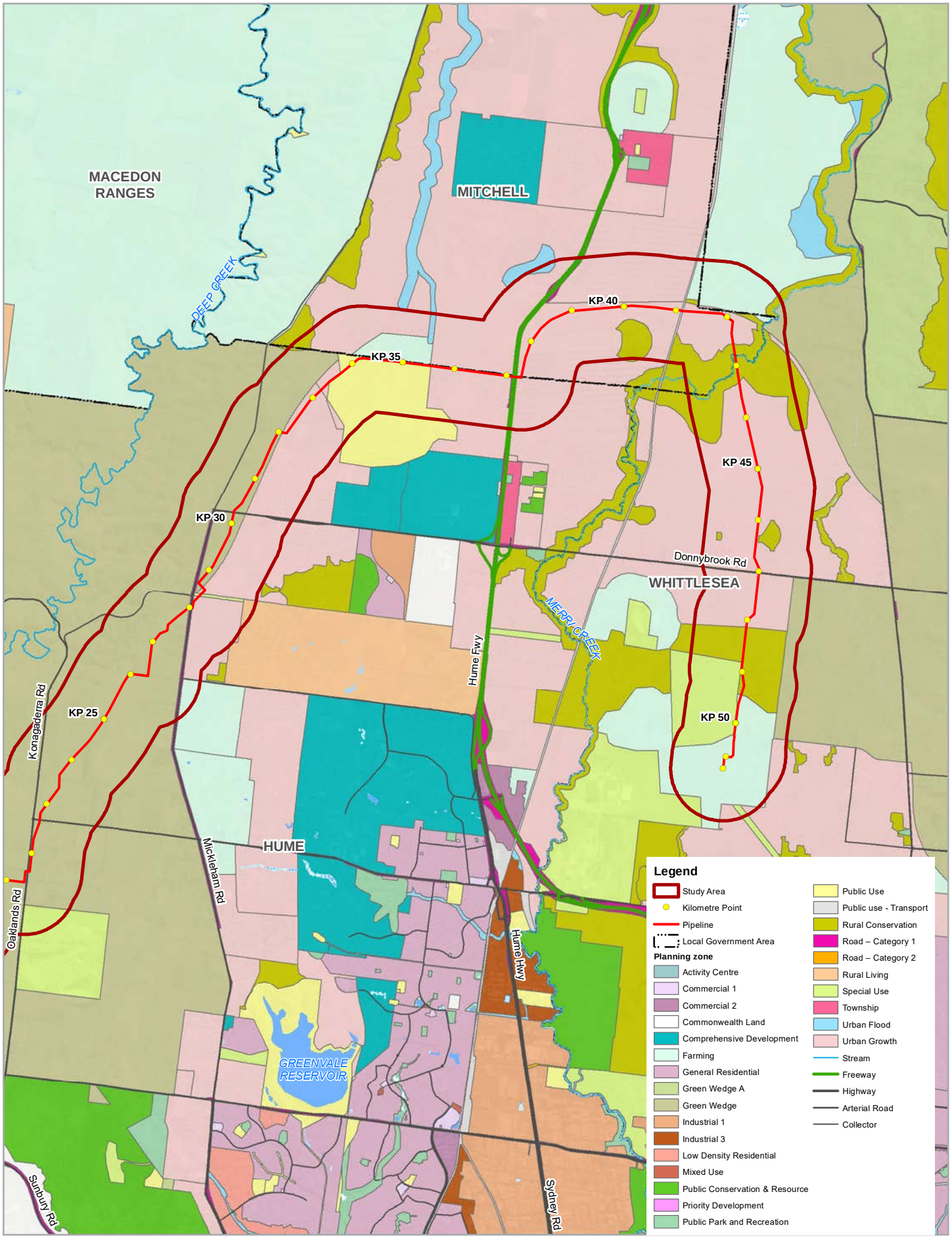

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Western Outer Ring Main Gas Project

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Planning zones

Figure 3.1

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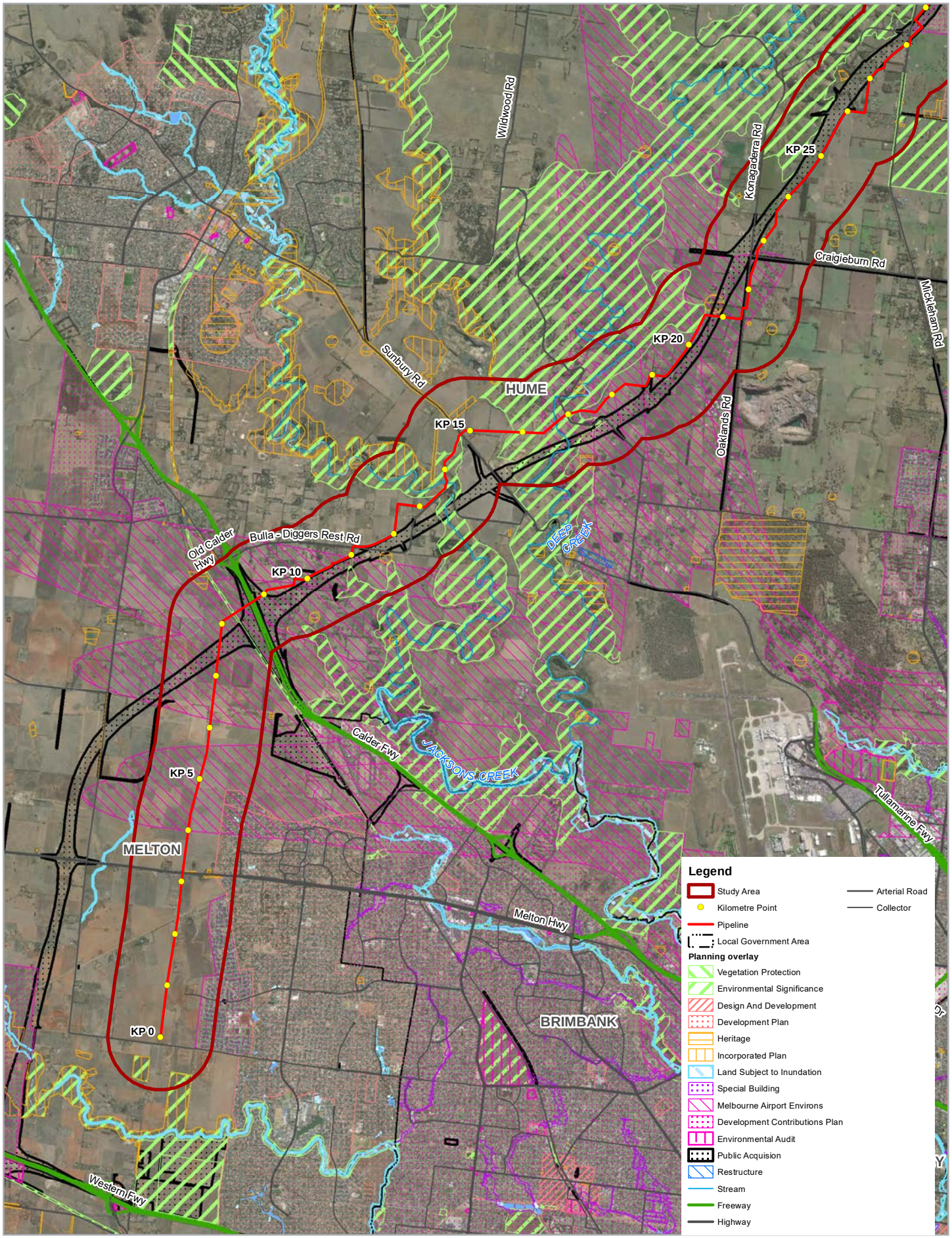

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Western Outer Ring Main Gas Project

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Planning overlays

Figure 4

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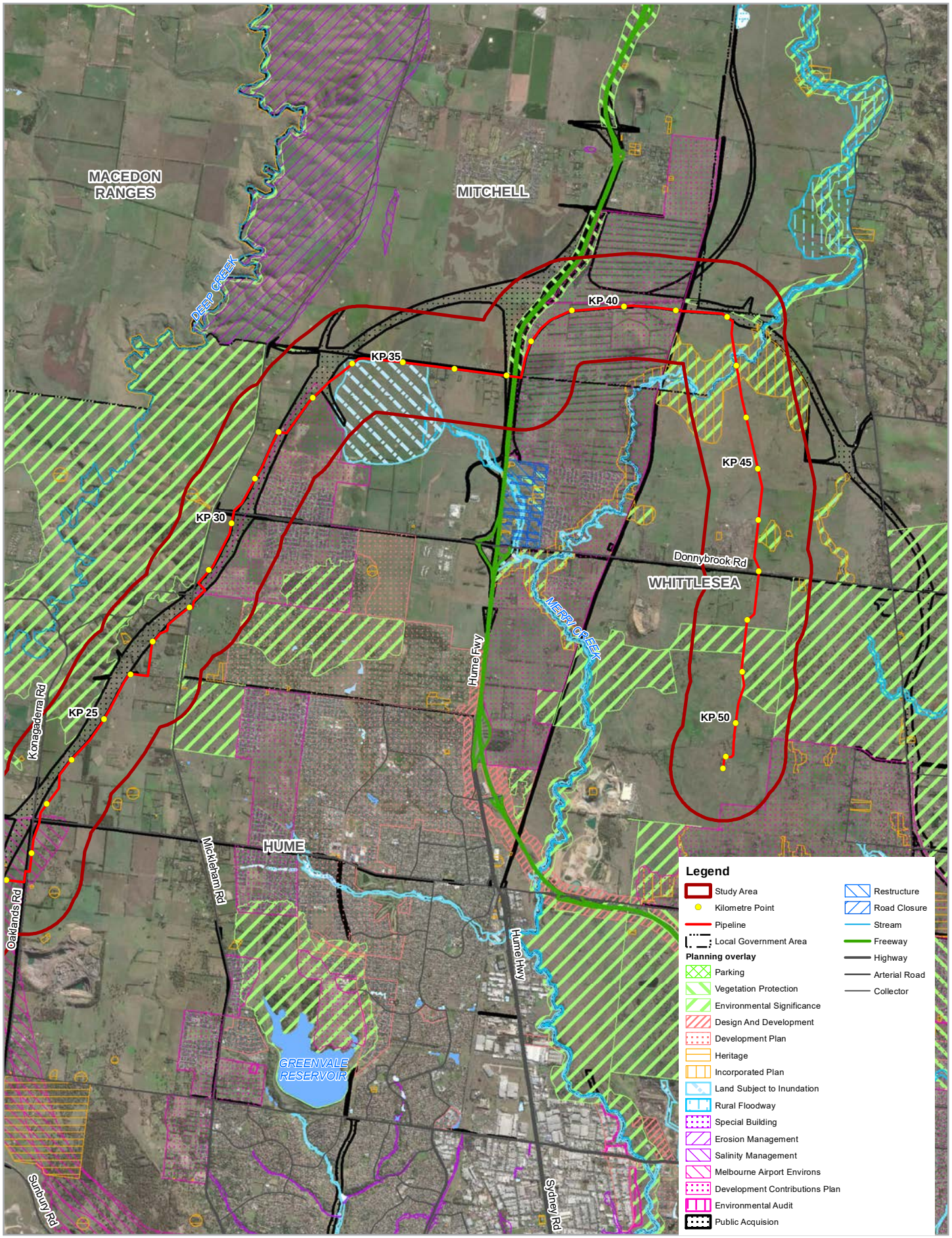
Data source: DELWP, VicMap, 2020; Geoscience australia 2012, GHD, 2020,Vicmap basemap imagery Created by: sacevedo



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APA VTS (Operations) Pty Ltd
Western Outer Ring Main Gas Project

Planning overlays

Project No. 31-12529997
Revision No. B
Date 30/11/2020

Figure 4.1

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Data source: DELWP, VicMap, 2020; Geoscience australia 2012, GHD, 2020,Vicmap basemap imagery Created by: sacevedo

4.2.1 Local Planning Policy Framework

Local Planning Policies are tools used to implement the objectives and strategies of the Municipal Strategic Statement (MSS). As outlined in section 4.1.1, in future, all local planning policies will be included in the PPF and the MSS will be replaced by the Municipal Strategic Strategy for each planning scheme.

The local policies that are relevant to this study are outlined in Table 5.

Table 5 Local planning policies

Legislation	Relevance to this study
Melton Planning Scheme *Municipal Strategic Statement* *21: 03 Environmental and Landscape Values*	Within Melton City Council the alignment falls outside of the Urban Growth Boundary (UGB). The boundary is designed to protect green wedge land by restricting urban development to within the boundary. The UGB is intended to ensure the specific characteristics and objectives of the green wedges are reflected in decision-making. The Project should align with the objectives and strategies under **Clause 21.03 Environmental and Landscape Values** to prevent the loss of the remaining biodiversity areas within the Victorian Volcanic Plains. Aligned strategies include protecting significant large old trees and patches of native vegetation as well as minimising the removal of indigenous vegetation.
Local Planning Policies (Melton) *22.14 Dry Stone Wall* *22.16 Rural Landscape Character Policy*	The Project should align with the objectives of **Clause 22.14 Dry Stone Wall** as this is expressive of the natural and history and cultural history of the area. Aligned objectives include conservation and repair of dry stone walls and discouraging the demolition of dry stone walls. The alignment crosses over areas of dry stone wall and should consider the objectives of this clause prior to any development. Aligned objectives include consideration given to viewing corridors and recognising the importance of rural landscape character to the City of Melton.
Hume Planning Scheme *Local Planning Policy* *22.08 Natural Environment and Environmental Risk*	The Project should align with the objectives of **Clause 21.08 Natural Environment and Environmental Risk** outlined in the Hume Planning Scheme. The Clause describes the important biodiversity and significant landscape elements of the municipality, with objectives to 'protect and enhance indigenous flora, fauna and habitat' and 'protect and enhance the visual quality of rural and urban landscapes.'
Mitchell Shire Planning Scheme *Municipal Strategic Statement* *21: 03 Environment and Landscape Values*	The Project should align with the objectives set out in **Clause 21.03 Environment and Landscape Values**. This Clause considers the significant environments and landscapes of Mitchell shire including its steep to gently undulating hills and volcanic plains. There is a large amount of private land containing national and state significant native vegetation within the Mitchell Shire. Roadside vegetation also contains remnant indigenous vegetation with vulnerable species. Aligned objectives include ensuring to 'protect and enhance indigenous flora, fauna and habitat' and 'protect and enhance the visual quality of rural and urban landscapes'

Legislation	Relevance to this study
Whittlesea City Council *Municipal Strategic Statement* *21: 05 Environment and Landscape Values*	The Project should align with the objectives set out in **Clause 21.05 Environment and Landscape Values** in the Whittlesea City Council planning scheme. This Clause aims to recognise areas of environmental sensitivity and the protection of biodiversity and native vegetation. Aligned objectives relevant to this assessment include limiting the removal of native vegetation and ensuring replacement strategies where necessary. The Clause also highlights the importance of enhancing the landscape value by retaining important identified natural features in new developments.
Victorian Planning Provisions	As shown in Figure 3 and Figure 4. Further as follows.
GWZ – Green Wedge Zone	Majority of the Project area is within the Green Wedge Zone (GWZ). The Project should align with the purpose of the GWZ 'to protect and conserve green wedge land for agricultural, environmental, and historic landscape.' All development should encourage sustainable land management strategies and protect the character of the open rural and scenic landscapes.
RCZ – Rural Conservation Zone	Areas of the Project within Mitchell Shire (KP 42-43) and Whittlesea City Council (KP 48-50) is zoned as Rural Conservation Zone (RCZ). The Project should align with the purpose of this zone 'to protect and enhance natural resources and areas of significant biodiversity.' The Project should also aim to conserve and enhance the cultural significance of open rural and scenic non-urban landscapes. The Project should ensure that any development protects the landscape qualities of the site and surrounds and retains any vegetation and fauna habitats including buffers along waterways and property boundaries.
ESO1 – Environmental Significance Overlay (Hume)	The Project should align with the objectives of the Environmental Significance Overlay (ESO) for Hume 'to protect areas along watercourses from development and loss of vegetation that may damage the streamside environment as a visual, conservation, ecological and recreation resource.' The overlay also aims to ensure that development and management of land is compatible with the natural environmental character and landscaped qualities of the watercourse and surrounds.
ESO6 – Environmental Significance Overlay (Mitchell) *ESO4 – Environmental Significance Overlay (Whittlesea)*	Areas of the alignment within Mitchell Shire Council and Whittlesea city council are subject to ESO6. This overlay is due to the presence of significant remnant vegetation and areas that provide habitat for threatened flora fauna. The Project should align with the ESO6 objectives 'to enhance the landscape values of the area and ensure that any development or management of land in areas of significance does not have detrimental impacts on the biodiversity value.' The overlay aims to maintain the integrity of the sites environmental significance and provide for the long-term preservation of flora and fauna.

Legislation	Relevance to this study
ESO4 – Environmental Significance Overlay (Mitchell) *ESO4 – Environmental Significance Overlay (Whittlesea)*	Areas of the alignment within the Mitchell Shire Council and Whittlesea City Council are subject to the ESO4. This overlay is due to the presence of significant remnant vegetation and areas that provide habitat for threatened flora fauna. The Project should align with the ESO4 objectives for Mitchell shire 'to enhance the landscape values of the area and ensure that any development or management of land in areas of significance does not have detrimental impacts on the biodiversity value.' The overlay aims to maintain the integrity of the sites environmental significance and provide for the long-term preservation of flora and fauna.
Heritage Overlay (Melton and Hume)	Sections of the proposed alignment within Melton and Hume are subject to Heritage Overlays (HO). A full list of all the Heritage Overlay Schedules that the alignment falls under or is within 1km of the Project alignment is provided in Appendix C. The Project should align with the objectives of the HO 'to conserve and enhance heritage places of natural or cultural significance as ensure development does not adversely affect the significance of heritage places.'

4.2.2 Other relevant strategies

Other council policies and strategies relevant to this study is outlined in Table 6.

Table 6 Other relevant council strategies

Strategies	Relevance to this study
The Western Plains North Green Wedge Management Plan (WPNGWMP)	The alignment south of Calder Freeway falls within the Western Plains North Green Wedge Management Plan (WPNGWMP). Its purpose is to provide a framework to support sustainable land use, management, and development of the City of Melton's Western Plains North Green Wedge. The Project should align with the objectives of the management plan to protect biodiversity, significant views and rural landscapes throughout the area. Strategies relevant to this Project include identifying and protecting key views and landscapes within the Green Wedge from inappropriate development.
Melton Landscapes – Significant Landscape Features Strategy, May 2016	The Significant Landscape Features Strategy was a recommendation out of the Western Plains North Green Wedge Management Plan. The purpose of this strategy is to identify significant landscape features within the City of Melton and outline the existing and potential future threats and challenges to the protection of these assets. The Strategy recommends a range of measures to ensure landscapes of importance are adequately protected and managed into the future. This includes planning scheme policy and controls to guide decision making and other actions for the community and stakeholders to assist in long-term landscape management.

Strategies	Relevance to this study
	The Project should align with relevant strategies in the Project such as to protect and respect cultural heritage and minimise the visual impact on structures in the landscape such as the dry stone walls. The strategy aims to maintain a positive contribution to the rural land uses and minimise the impact of signage and infrastructure from significant viewing corridors
Hume Biodiversity Planning Policy, Hume City Council, 2016	Hume City Council has a biodiversity planning policy that provides guidance to ensure that native vegetation, scattered indigenous trees and waterways are appropriately considered in all development. The Project should align with objectives of this policy such as reducing the impact of development on biodiversity and promoting native and indigenous vegetation in the area.
Whittlesea Green Wedge Management Plan 2011-2021	The *Whittlesea Green Wedge Management Plan 2011-2021* was developed in partnership with the community, local businesses, government departments and other agencies. The management plan incorporates a 10 year action plan for the green wedge area. The plan promotes and encourages a balance of land uses. It does not promote changing existing green wedge zones to urban zones or recommend changes to the Urban Growth Boundary. The Project should align with the objectives of the plan to secure the ongoing productive capacity of the Whittlesea Green Wedge and enhance its rural and natural landscape character. The Project should also aim to ensure the biodiversity, environmental, heritage and cultural values of the Green Wedge are protected.

4.3 Summary of findings

The assessment of relevant Commonwealth, state and local legislation, policies and guidelines has identified that the existing landscape character and views along the Project alignment are considered key values and require protection. A review of these key values has informed the study.

A key reoccurring value was the protection of the rural landscape character and that development is sympathetic to viewing corridors and these are not adversely impacted. Protection of rural landscapes for their vegetation and heritage values, is legislated at State and local level.

State strategies regarding environment and landscape values identify significant biodiversity corridors and the retention of remnant vegetation as key to the protection of the existing landscape character and views.

The municipalities of Melton and Hume identify significant views and vistas across the western volcanic plains as important contributing factors to the existing landscape character and should be protected.

The topography and vegetation has been identified as key contributing factors to the overall landscape character and backdrop to many views within the study area. Local policy identifies vegetation as an important asset to screen existing and new development.

Both Green Wedge and Rural Conservation Zones have objectives relevant to landscape and visual protection for new developments. Two key overlays and associated schedules within the study area are used to protect landscape character and views within the Project area. These include Environmental Significance Overlay and Heritage Overlay. A list of Heritage Overlays within 1km of alignment has been provided in Table C-3 in Appendix C.

There are provisions within some PSPs, such as Donnybrook-Woodstock PSP and Plumpton PSP for use of the gas pipeline easement for shared use paths and landscaping. There also provisions that allow for a landscape buffer between the easement and adjacent residential areas.

The above landscape and visual values have been taken into consideration in the LVIA of the construction and operational phases of the Project. Figure 3 shows the planning zones within and adjacent to the study area. Figure 4 shows the planning overlays within and adjacent to the study area.

5. Methodology

The following sections outline the methodology adopted to undertake the LVIA.

5.1 Overview of method

This section describes the method that was used to assess the potential landscape and visual impacts of the Project. A risk based approach was applied to prioritise the key issues for assessment and inform measures to avoid, minimise and offset potential effects. Figure 5 shows an overview of the assessment method.

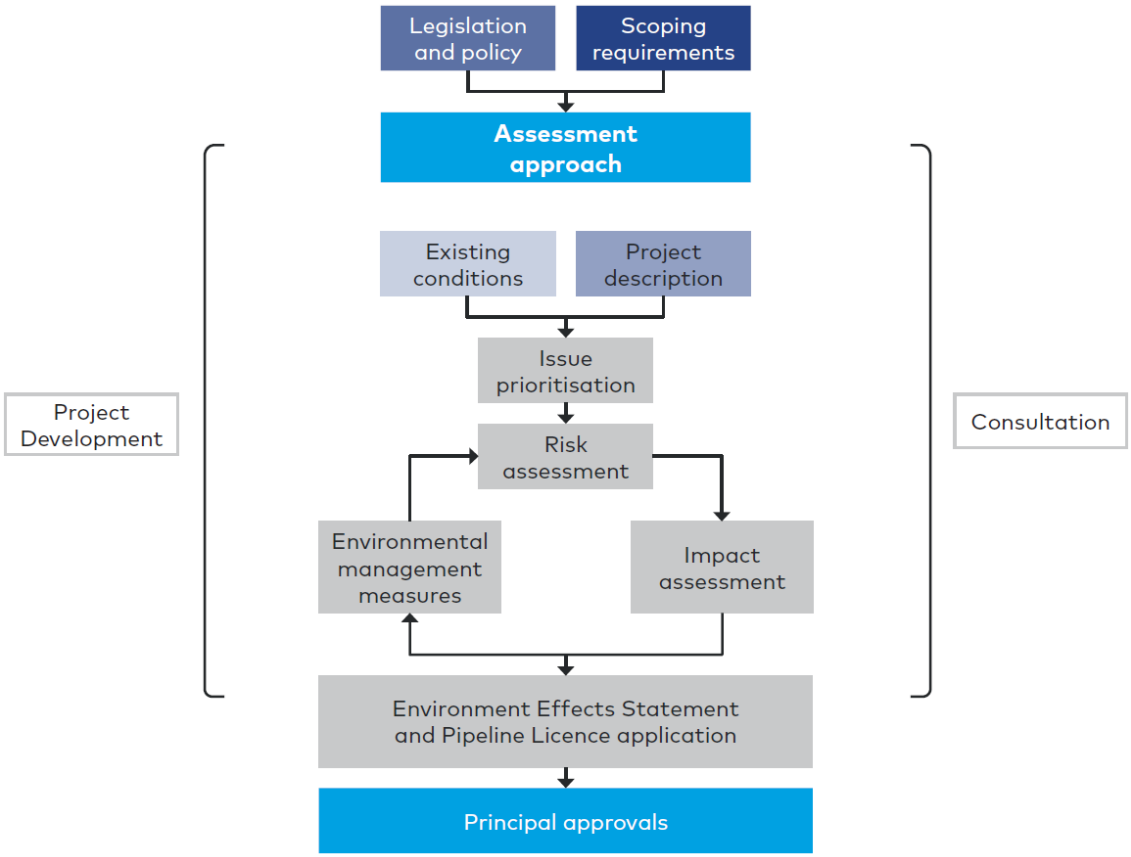


Figure 5 Overview of assessment method

5.2 Study area

A conservative approach has been taken in identifying the visual catchment within which the Project may be seen. This has been determined through a desktop study examining aerial photographs and topographic maps where landform and land cover (screening) were considered in tandem. Also taking into consideration was the potential maximum visibility for this type of development. For LVIA, this becomes the study area.

The proposed gas pipeline, once completed, will be buried and does not have any visually obvious elements apart from the marker signs along the easement, which under AS2885 would be up to 500m apart depending on the location class of the area.

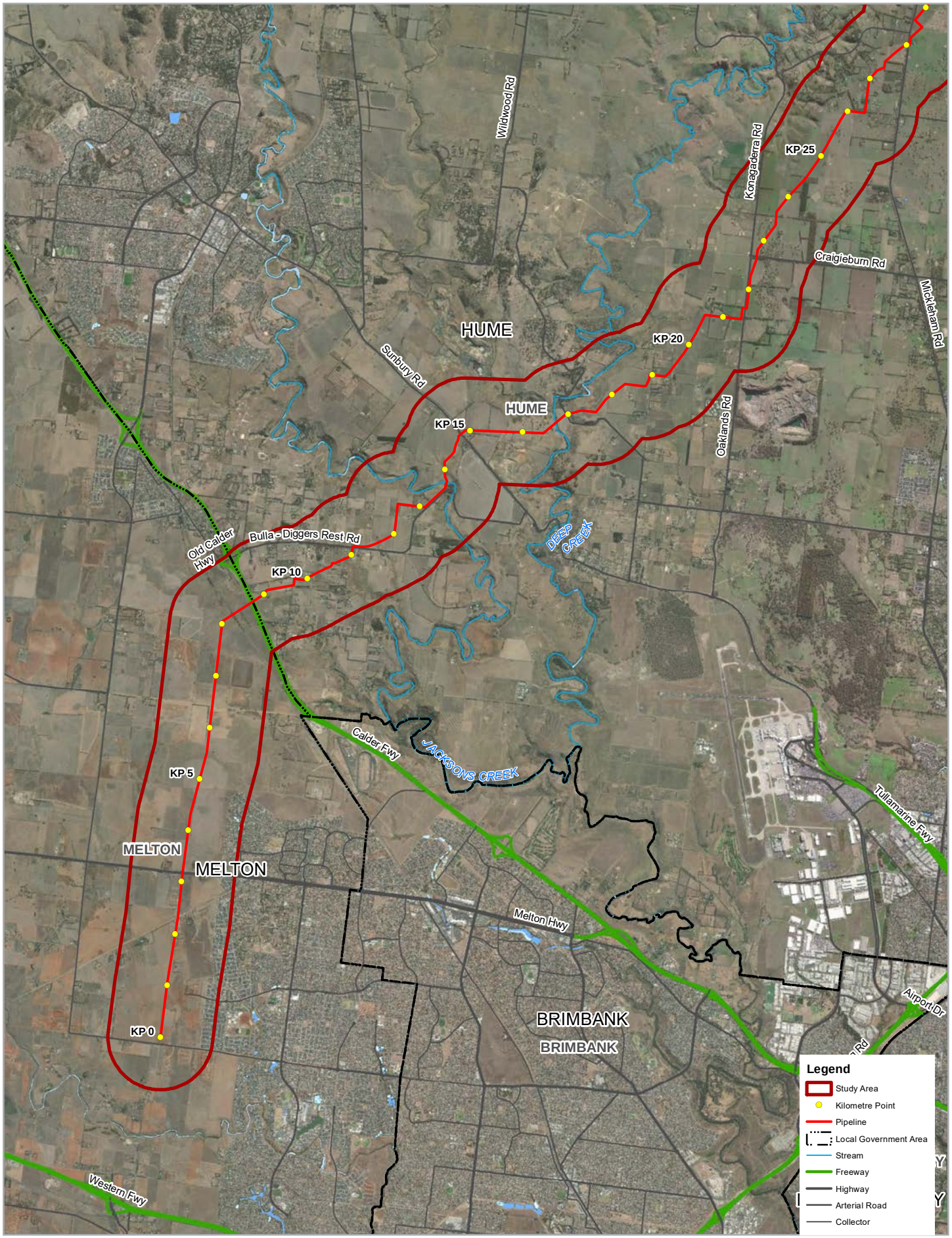
The mainline valves are not expected to be visually apparent from distances greater than 500 metres.

There will be an additional compressor unit and pressure regulating station at the existing APA Wollert Compressor Station. However, this will not be visually apparent from distances greater than 500 m and will be co-located with existing infrastructure.

For this reason, the study area has been set at one kilometre on either side of the Project alignment. This also takes into consideration previous studies of a similar nature and relevant guidelines.

The study area is then used to identify sensitive receptors with potential views of the Project. Figure 6 illustrates the study area that was adopted for this assessment.

An access road running adjacent to the railway line in Beveridge is a possible access option for use by the Project. The access road is an existing access track recently constructed by Yarra Valley Water and no physical construction works is proposed by the Project. As such this access track has not been considered further with regards to the assessment for landscape and visual amenity impacts. A second informal access track option may be used by machinery and equipment to access the construction footprint from the north. This track follows the existing APA easement. No physical construction is expected to be required to establish this access and therefore this access track has not been considered further with regards to the assessment for landscape and visual amenity impacts.



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Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55

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Date 30/11/2020

Study area

Figure 6

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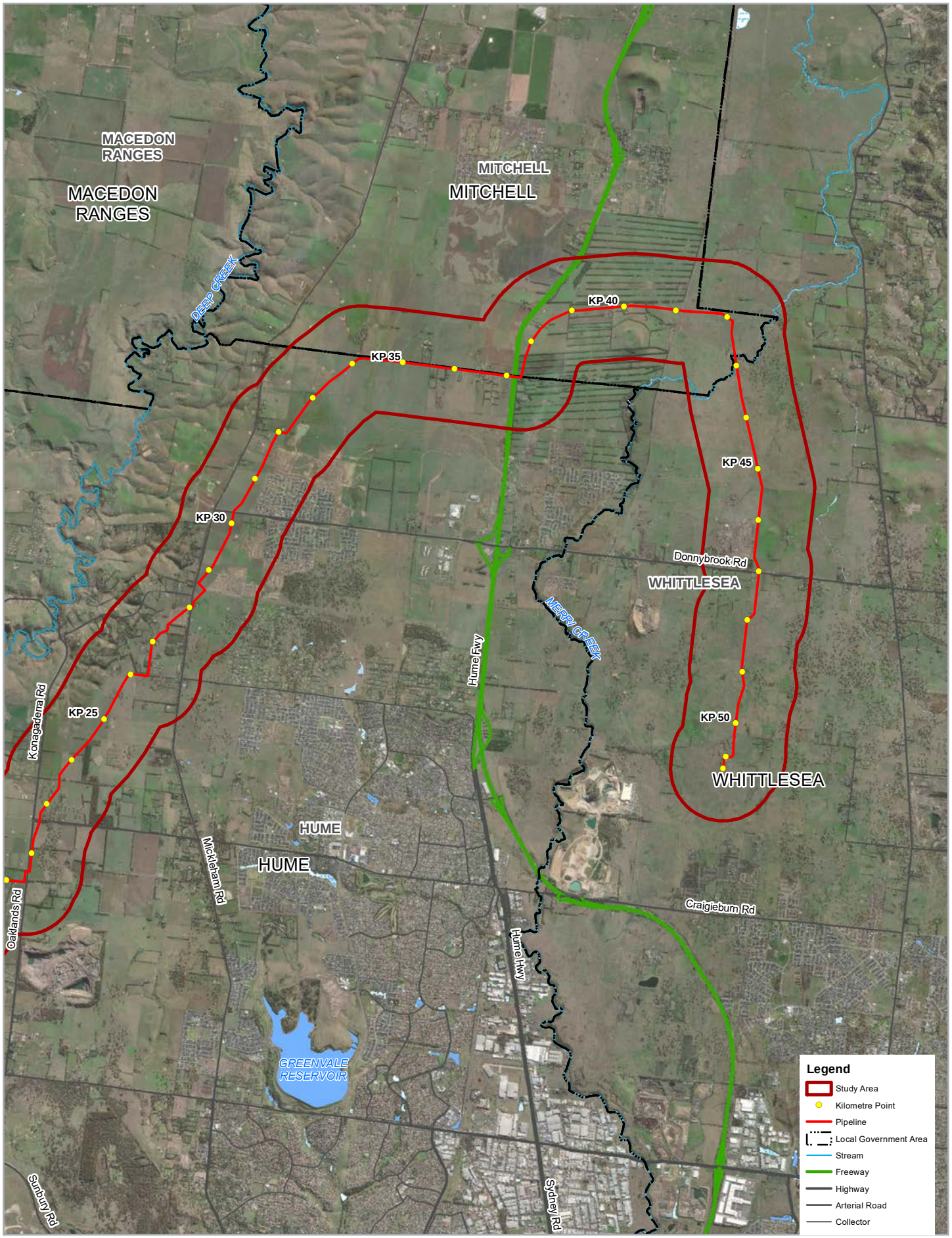

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Figure 6.1

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5.3 Existing landscape and visual environment

The following sections describe the process for assessing the existing landscape and visual environment.

5.3.1 Desktop analysis of the Project

Existing data was gathered and reviewed, including:

- Project design information
- Relevant legislation and policies
- Topography, land use, and vegetation information. Data sources:
  - DELWP, VicMap, 2020
  - Geoscience Australia, 2012
  - Vicmap basemap imagery, 2020
- Google Earth and Google Street View
- Publically available information of other similar developments within Victoria
- Review of other similar developments within the region
- Using this data, a preliminary assessment of the landscape and visual environment was undertaken to inform the site inspection

5.3.2 Site inspection

A site inspection was undertaken by two Landscape Architects on the 17th and 18th June, 2020. Weather conditions on the day of the site visit were clear with good visibility. During the site inspection, the landscape architects drove and walked the study area to gain representative views of the Project from publicly accessible viewpoints. The purpose of the inspection was to:

- Inspect the study area and appreciate views to/from the Project site
- Inspect publicly accessible locations identified in the desktop analysis as likely to provide views of the Project
- Identify sensitive visual receptor locations
- Assess the landscape character of the study area and identify landscape sensitivities
- Undertake site photography suitable for photomontage preparation

The coordinates of each viewpoint were recorded during the site inspection. At each location a photographic record of landscape features, key views and receptors was obtained along with field notes and sketches.

5.3.3 Description of existing landscape and visual environment

The description of the existing landscape and visual environment established a baseline against which the Project was assessed. A landscape existing conditions assessment was undertaken to determine the existing natural and cultural features within the study area. This includes determination of key landscape and spatial elements, features and values. Aspects considered include:

- Land use and built form
- Landform, topography and hydrology
- Vegetation
- Views
- Historical features
- A visual analysis was also undertaken to establish:
  - The key views
  - Project viewsheds
  - Other visual features within the study area.
- Section 6 provides a description of the existing landscape and visual environment

5.4 Risk assessment

A risk assessment for the Project was carried out using an approach that is consistent with Australian/New Zealand Standard *AS/NZS ISO 31000:2018 Risk Management Process*.

This risk assessment was used to identify the issues for assessment and apply a structured approach to the level of assessment and analysis undertaken of potential environment effects within each technical study. Applying the risk framework facilitated an approach for the EES to identify and then investigate issues with a focus proportionate to the risk, and to consider management measures focused on reducing identified risks.

The risk assessment methodology included:

- Defining the context for the risk assessment based on the existing assets, values and uses (baseline) assessments of each technical area and the proposed Project activities which interact with those existing conditions
- Identifying the risk pathways based on a specific cause and effect
- Identifying standard management/mitigation measures (including those in guidelines and standards) and initial mitigation measures that are part of the Project description
- Analysing the consequence and likelihood of the identified risk based on a consequence guide developed for each technical area and a likelihood guide
- Defining the risk level based on the risk matrix

The impact assessment then focused on those key risks with a or higher rating and/or where additional management/mitigation measures to treat risks could be considered.

The identification, analysis and evaluation of risks was conducted within each technical area and across technical areas where there was input or connection across disciplines.

The consequences of a landscape and visual risk occurring were assigned using consequence categories from insignificant to severe developed for landscape and visual based on the existing conditions and values in the study area. The consequence levels and descriptors are provided in Appendix B.

A likelihood rating for each identified risk was assigned ranging from 'almost certain' where the event is expected to occur to 'rare', where the event may occur only in exceptional circumstances. The likelihood levels and descriptors are provided in Appendix B.

The risk matrix used to define each risk level is also provided in Appendix B.

The risk ratings were revisited during the impact assessment where additional environmental management measures were applied to identify the residual impacts and risks.

The list of descriptors used for landscape and visual impact, as well as the results are included in section 9 and 10.

5.5 Landscape impact assessment

The following sections describe the process adopted for landscape impact assessment.

5.5.1 Landscape Character Areas

Landscape character considers common landscape types defined by typical features and characteristics identified during the desktop assessment and site inspection. Defining landscape character types identifies areas sharing the same homogenous environmental or cultural qualities or pattern such as topography, vegetation, hydrology, land use and settlement, built form scale and character, cultural and recreational characteristics.

This approach has been used to establish the existing landscape character around the Project site and to provide a framework for measuring the impact of the Project on the landscape. This assists in:

- Defining landscape elements that contribute to defining character
- Defining landscape character attributes
- Identifying landscape value

The assessment of the existing environment also considers factors which have influenced landscape change in the past and those that are likely to do so in the future. The landscape character areas are defined in section 9.

Landscape value

As part of the existing conditions the value of the landscape is defined for each Landscape Character Area (LCA).

Landscape value looks at designated and undesignated landscapes and holistically at all the elements such as the environmental, cultural, historical and visual/sensory elements that form the landscape. The value of the landscape from an international, national, local and community level is considered when applying a landscape value. The following factors are taken into consideration when defining landscape value (Land Use Consultants and Swanwick, C. 2011):

- Landscape quality (physical state of the landscape)
- Scenic quality (appeal of the landscape to the senses)
- Rarity (presence of rare elements)
- Representativeness (distinct character or features of landscape)

- Conservation value
- Recreation value
- Perceptual aspects/qualities
- Associations (with particular people, artists, events in history)
- The landscape values for each LCA are described in section 9

Landscape value ratings are outlined in Table 7.

Table 7 Landscape value

Landscape Value	Definition
High	Landscape character elements in good or above average condition and/or that make a strong positive contribution to landscape character. May include nationally important features.
Medium	Landscape character elements in reasonably good condition and/or that make an average contribution to the local character, which may include locally important landscape features.
Low	Landscape character elements in below average condition and/or that are not particularly distinctive local features.

5.5.2 Landscape effects

Landscape character refers to a distinct and recognisable pattern of elements that occur consistently in a particular type of landscape. Particular combinations of geology, landform, soils, vegetation, land use and human settlement create character, which makes each part of the landscape distinct and gives each its particular sense of place.

Assessment of landscape effects deals with the effect of change and development on landscape as a resource. The concern is with how the Project will affect the elements that make up the landscape, the aesthetic and perceptual aspects of the landscape and its distinctive character. The consideration of potential impacts on landscape character is determined based on the sensitivity of the existing landscape and the magnitude of change that is likely to occur.

The sensitivity of a landscape is judged on the landscape value (refer Table 7) and the landscape's susceptibility to change (refer Table 8) from a particular type of development. A judgement on the level of sensitivity is made and a rating of high, moderate or low applied.

The magnitude of change to landscape character depends on the nature, scale and duration (refer Table 12) of the change expected to occur. The magnitude of change also depends on the loss, change or addition of any feature to the existing landscape. It is based on that part of the landscape character area which is likely to be impacted to the greatest extent by the Project.

The sensitivity and magnitude of landscape effects address the following specific criteria:

- Sensitivity of landscape to proposed change, based on the value of landscape and the susceptibility to change (refer Table 7 and Table 8 respectively)

Magnitude of landscape effect, based on the size or scale of change, the geographical extent of effects, and the duration and reversibility of effects (refer Table 9)

- A judgement is made on the overall level of significance of the landscape effect in relation to the existing conditions

The assessment criteria have been derived from the *Guidelines for Landscape and Visual Impact Assessment, 3rd Edition* (Landscape Institute and Institute of Environmental Management & Assessment, 2013).

Table 8 Landscape susceptibility to change

Landscape susceptibility	Definition
High susceptibility to change	The type of development proposed could have a detrimental effect on the landscape character, condition or value. Mitigation measures are unlikely to reduce the impacts of the change.
Moderate susceptibility to change	Any change caused by the type of development would be unlikely to have a significant adverse effect on the landscape character, condition or value that could not be mitigated.
Low susceptibility to change	Development of this type is unlikely to have an adverse effect on the landscape character, condition or value. Mitigation measures would be effective in neutralising adverse effects.

Table 9 Magnitude of change criteria (landscape)

Rating	Criteria
High	A substantial/obvious change to the landscape character due to total loss of, or change to, elements, features or characteristics of the landscape. Would cause a landscape to be permanently changed and its quality diminished.
Moderate	Discernible changes in the landscape character due to partial loss of, or change to elements, features or characteristics of the landscape, however has potential to be partly mitigated. The change would be out of scale with the landscape character, and at odds with the local pattern and landform and would leave an adverse impact on the landscape character.
Low	Minor loss or alteration to one or more key landscape character elements, features or characteristics, or the introduction of components that may be new but may not be uncharacteristic within the existing landscape character.
Negligible	Almost imperceptible or no change in the landscape character as there is little or no loss of/or change to the elements, features or characteristics of the landscape.

5.6 Visual impact assessment

The following sections describe the process for visual impact assessment.

5.6.1 Viewpoint selection

Assessment of visual impacts deals with the effects of change and development on the views available to people and their visual amenity. It assesses how the surroundings of individuals or groups of people may be specifically affected by changes in the context and character of views as a result of the change or loss of existing elements of the landscape and/or the introduction of new elements.

Visual receptors have been considered in terms of the views they are likely to obtain from within the study area including consideration of any key vantage points, such as lookouts, where there is particular interest in the view. Visual receptors are identified based on:

- Proximity of the receptors to the Project, as the most affected visual receptors are anticipated to be located closest to the Project, unless located at an elevated vantage point
- Type of receptor, as different viewer types would have different perceptions of the change

Based on the analysis of the existing landscape and visual environment, sensitive visual receptors were identified and viewpoint locations selected as representative locations for assessment. Viewpoints are selected in order to:

- Represent views of particular landscape and /or visual features of importance
- Represent fixed or transient views
- Represent views from public viewpoints (including open land, buildings, public footpaths)
- Represent views from transport routes from private vehicles and public transport
- Represent views from where people work and spend extended amounts of time
- Represent views from recreational receptors such as (parks, tourist areas)
- Represent views from residential receptors

The views available from each viewpoint were photographed and the existing conditions were described using the following information in order to establish the visual existing conditions:

- Location
- Landform/significant features
- Vegetation
- Water
- Land use, infrastructure, built form
- Visual context

Refer to section 10.3 for the viewpoint locations and existing conditions.

5.6.2 Visual effects

The evaluation of potential impacts on the visual environment was based on the sensitivity of the viewpoint (and the visual receptor it represents) to change, and the magnitude of change that is likely to occur.

The sensitivity of each viewpoint was considered dependent on the:

- Importance of the view, its existing scenic qualities and the presence of other existing man-made elements in the view
- Type of visual receptor and their likely interest in the view
- The visual receptors viewing duration and opportunity (i.e. prolonged and regular viewing opportunities versus short-term and transient viewing opportunities)

The magnitude of change to views and the visual environment depends on the nature, scale and duration of the change that is expected to occur. The magnitude of a change also depends on the loss, change or addition of any feature in the field of view of the receptor including an assessment of the level to which the change contrasts with the existing view or expected view of the landscape. This includes the degree of any change to the backdrop to, or outlook from a viewpoint.

The assessment considered the likely impacts of the Project. The level of effects on a view depends on factors such as the extent of visibility, degree of obstruction of existing features, degree of contrast with the existing view, angle of view, duration of view and distance from the Project.

Steps undertaken to assess visual effects include:

- Identify and map viewpoint locations
- Undertake assessment of visual effects, comprising:
  - Sensitivity of visual receptor to proposed change, based on: susceptibility of visual receptors to change, and value attached to views (refer Table 10)
  - Magnitude of visual effect, based on: size or scale of change; geographical extent of effects, and duration and reversibility of effects (refer Table 11)

An assessment was undertaken of the overall level of significance of the visual effects in relation to the existing view.

Table 10 Sensitivity to change criteria (visual)

Rating	Criteria
High	Occupiers of residential properties, at home or going to or from, with long viewing periods, within proximity to the proposed development; Communities that place value upon the landscape and enjoyment of views of their setting.
Moderate	Outdoor workers who have a key focus on their work who may also have intermittent views of the study area; Viewers at schools, or similar, when outdoor play and recreation areas are located within close proximity but viewing periods are limited; Occupiers of residential properties with long viewing periods, at a distance from or screened from the study area.
Low	Road users in motor vehicles, trains or on transport routes that are passing through or adjacent to the study area and therefore have short term views; Viewers indoor at their place of work, schools or similar.

Rating	Criteria
Negligible	Viewers from locations where there is screening by vegetation or structures where only occasional screened views are available and viewing times are short; Road users in motor vehicles, trains or on transport routes that are passing through/adjacent to the study area and have partially screened views and short viewing times.

Table 11 Magnitude of change criteria (visual)

Rating	Criteria
High	A substantial/obvious change to the existing view due to total loss of, or change to, elements, features or characteristics of the view. Would cause a view to be permanently changed and its quality diminished.
Moderate	Discernible changes in the existing view due to partial loss of, or change to elements, features or characteristics of the view, however has potential to be partly mitigated. The change would be out of scale with the existing view, and would leave an adverse impact on the view.
Low	Minor loss or alteration to one or more key view elements, features or characteristics, or the introduction of components that may be visible but may not be uncharacteristic within the existing view.
Negligible	Almost imperceptible or no change in the view as there is little or no loss of/or change to the elements, features or characteristics of the view.

Lighting impacts from night-time construction activities was also assessed in relation to potential visual impact through review of HDD locations and HDD duration at these locations, review of aerial imagery and distance to sensitive visual receptors, consideration of background lighting from existing activities, and qualitative assessment of impact to sensitive visual receptors (refer also 8.3).

5.6.3 Duration of impact

The duration of impact as used in this assessment is outlined in Table 12. This was used to qualitatively assess the landscape and visual impacts associated with the construction phase of the Project (temporary duration) and operation phase (other durations as relevant). Impacts due to construction are described in further detail in section 8

Table 12 Duration of impact

Temporary	Impacts lasting 1 year or less
Short term	Impacts lasting 1 to 5 years
Medium term	Impacts lasting 5 to 10 years
Long term	Impacts lasting 10 to 25 years
Permanent	Impacts lasting over 25 years

5.7 Significance of impact

The combination of sensitivity and magnitude determines the significance of the impact on the landscape character or representative viewpoint. Refer Table 13 for the matrix used to determine the significance of impact.

Table 13 Significance of impact matrix (landscape and visual)

Sensitivity to change	Magnitude of change				
	High	Moderate	Low	Negligible
High	High Impact	High-Moderate	Moderate	Negligible
Moderate	High-Moderate	Moderate	Moderate-Low	Negligible
Low	Moderate	Moderate-Low	Low	Negligible
Negligible	Negligible	Negligible	Negligible	Negligible

5.8 Cumulative impacts

A study area shown in Figure 6 was used to consider cumulative impacts of existing, planned and approved infrastructure and utility projects within the area surrounding the Project. The other projects identified as relevant to the EES are outlined in EES Chapter 5 *Evaluation and assessment framework.*

The following sections describe the criteria used to assess the cumulative landscape and visual impacts of the Project against each individual development identified.

5.8.1 Similarity to the Project in scale and form

The similarity of the Project to other projects identified in terms of scale and form would affect the overall cumulative impact.

5.8.2 Timing of the development

The effect of many projects being implemented within a similar timescale or concurrently would have a cumulative impact. This would create a sense of the landscape undergoing a process of rapid development. The inverse would be a scenario where development takes place one project at a time over an extended period, such that the change in landscape character would virtually go unnoticeable and not beyond what would be normally expected.

5.8.3 Combined visibility

The ability to view two or more developments from the same viewing location would result in a greater cumulative impact than where only one development is visible from a given location.

5.8.4 Sequential visibility

Sequential visibility refers to the ability to view two or more developments in succession whilst moving along a linear route such as a road, track or pathway.

The major projects considered relevant to potential cumulative landscape and visual impacts within the study area, include;

- OMR/E6 Transport Corridor (Approved, not commenced)
- Western Victorian Transmission Network Project (Currently not approved)
- Bald Hill to Yan Yean Pipeline Project (Approved, in progress)
- Sunbury Road Upgrade (Approved, in progress)

The cumulative impacts of these four projects is outlined in section 11.

5.9 Panorama and photomontages

All photographic images were captured using a 50 millimetre fixed focal length lens on a 35 millimetre full frame format camera at a camera height of 1.7 metres, as recommended in the IEMA guidelines (IEMA 2002). All photograph locations were recorded and mapped.

A series of 16 viewpoint locations were chosen and the existing views represented at these viewpoints using a panorama technique. This technique involves the stitching together of three adjoining images using the Adobe Photoshop software program. All images are represented with an 80 degree horizontal field of view and an 18 degree vertical field of view.

Of the 16 viewpoint locations, three viewpoints were selected for the production of photomontage images to represent proposed views following the completion of the Project. The software used to model and render the photomontages was Autodesk 3D Studio Max. In order to achieve an accurate photomontage of the Project and surrounding landscape, a digital terrain model with a one metre contour interval was used to model the surrounding landform.

Photomontages were chosen from publicly accessible and visual locations (such as road reserves) to demonstrate the areas which would experience the greatest impact as a result of the project infrastructure. The compressor station was rated as having a negligible impact due to existing site and distance from public places (approximately 500 m from Summerhill Road) and therefore was not represented in a photomontage. The Project would not remove any existing screening vegetation and would be constructed within the existing facility, with negligible changes to the existing landscape. The purpose of photomontages is to assist the reader in understanding the key impacts and photomontages are not prepared for every viewpoint.

Once the 3D model incorporating both the landscape and Project elements was created, a virtual camera was placed in the software at the same location the photographs were taken. The film, focal lens and height of the virtual camera matches the real camera utilised to take the photographs. The photographs of the site were used in 3D Studio Max as a background to accurately match the 3D model with the Project elements to the perspective of the photographs. From the camera view, rendered images of the Project were produced to match the daylight exposure of the photographs. The rendered images were imported into Adobe Photoshop for post-production editing and collation of the photomontages.

The final result is the 3D model of the Project shown in the correct 3D location in the photographs. The final images were produced to a high resolution, suitable for printing. Refer to Appendix A for photomontages of the Project.

Site photography, panorama and photomontage were prepared with reference to the following guidance:

- Visual Representation of Development Proposals, Technical Guidance Note 06/19 (Landscape Institute, 2019).

5.10 Environmental management measures

Environmental management measures were developed that respond to and reduce and minimise the impacts identified within the assessment. In developing the EMMs, the landscape and visual impact report adhered to the mitigation hierarchy that is, an obligation to first avoid, minimise, restore and only after exhausting those measures, offset the residual impacts that remain. For the landscape and visual impact assessment, the first step of the mitigation hierarchy 'avoidance' was preferred to manage environmental impacts that were identified. Where 'avoidance' cannot be achieved, due to the nature of the Project, the existing conditions and/or the type of impacts, 'minimisation', is the next level in the mitigation hierarchy proposed which aims to ensure the landscape and visual impacts are minimised as much as possible, where possible (refer section 12).

5.11 Rationale

The methodology for the LVIA has been set out to respond to specific Project requirements and constraints including scale and nature of the Project.

There is no general (legislated) guidance on the assessment of landscape and visual impact produced by an independent body specific to Australia. Therefore, the methodology for the LVIA, including impacts, was derived from the G*uidelines for Landscape and Visual Impact Assessment, Third Edition* (The Landscape Institute and the Institute for Environmental Management and Assessment, 2013).

Terminology, assessment methods and nomenclature have also been derived from the following:

- Australian Soil and Land Survey Field Handbook Third Edition, (CSIRO, 2009)
- EIA Practice Notes: Guidelines for landscape character and visual impact assessment (EIA-N04-02) (RMS 2013)
- Environmental Impact Assessment Practice Note: Guideline for Landscape Character and Visual Impact Assessment EIA-N04, Roads and Maritime Service 2018
- Guidelines for Landscape and Visual Impact Assessment, Landscape Institute and Institute of Environmental Assessment 3rd Edition 2013 (GLVIA3)
- Guidance Note for Landscape and Visual Impact Assessment, (Australian Institute of Landscape Architects, 2018)
- Guidance Note for Queensland Landscape and Visual Assessment, Australian Institute of Landscape Architect, 2018
- Landscapes of Cultural Heritage Significance: Assessment Guidelines, Heritage Council of Victoria 2015
- Visual Landscape Planning in Western Australia (Western Australian Planning Commission, 2007)
- Visual Representation of Development Proposals: Technical Guidance Note 06/19, Landscape Institute, 2019

5.12 Stakeholder engagement

Whilst stakeholder and community engagement was undertaken during the preparation of the EES, no community engagement was specifically required to inform this assessment.

EES Attachment III Community and Stakeholder Consultation Report provides details of the consultation activities undertaken for the Project more broadly and outcomes from those activities.

The feedback received from the community engagement relating to landscape and visual amenity impacts generally involved queries about post-construction landscape remediation and rehabilitation that were raised at the community information sessions. The participants wanted to understand what the easement would look like and how it would be maintained. Councils expressed similar interests about the post-construction visual amenity.

6. Existing landscape and visual environment

The following sections provide an overview of the existing landscape and visual environment in terms of land use and built form, topography and hydrology and vegetation. Section 9 provides further details on landscape character areas along the Project alignment. These include creek corridors, extractive industries, flat to gently undulating farmland, residential and urban growth, semi rural residential and land subject to change. Section 10 provides information and photographs of existing conditions at specific locations.

6.1 Land use and built form

Between KP5 and KP25 and KP 35 and KP40, existing land use within and adjacent to the study area is predominantly rural, characterised by pastoral or grazing properties for livestock production. There are a number of small rural townships such as Diggers Rest and Donnybrook. The Project alignment also traverses a number of growth areas within the urban growth boundaries that are experiencing rapid development such as the suburbs of Fraser Rise in Melton (KP0) and Merrifield in the City of Hume (KP30). Melbourne Airport is also located less than 10 km from the study area.

There are a number of reserves present within or adjacent to the study area such as The Mount Ridley Nature Conservation reserve and the Craigieburn Grassland Reserve.

Built form is generally characterised by single story rural residences with farm amenity buildings in rural residential areas. Within towns there are typical detached, suburban residential dwellings with some historical architecture in Donnybrook and historical dry stone walls in Melton and Hume. The Aboriginal and Cultural Heritage report identified that there was one stone wall within the construction corridor (near KP 3), but upon further inspection it was found to be in poor repair, did not have heritage value and it was not heritage listed. Refer to Technical Report I *Aboriginal and cultural heritage*. Major highways and freeways include the Hume Freeway at the northern end of the alignment Calder Highway at the southern section of the alignment. Western Freeway is located to the south of the study area. There are a number of rural roads that cut through the alignment such as Mickleham Road and Donnybrook Road. The Bendigo line and the North-Eastern line are the only exiting rail line within the study area.

6.2 Topography and Hydrology

The topography within the study area generally comprises open flat plains interspersed with small stony rises or knolls. Adjacent to the alignment there are a number of significant topographical features such as Mount Ridley which is just south of Donnybrook road, as well as Mount Kororoit in Melton. The lowest point within the vicinity of the Project alignment is to the south near Somerton Road in Melton.

The study area has multiple waterways and numerous smaller connecting tributaries. There are three main creeks that run adjacent to and through the Project alignment. These include Jacksons Creek, Deep Creek and Merri Creek as shown in Figure 7. All three creeks drain towards Port Phillip Bay.

Figure 7 illustrates the geology within and adjacent to the study area. Figure 8 illustrates the topography and hydrology within and adjacent to the study area.

6.3 Vegetation

The following bioregions, sub bioregions and vegetation types are present within the study area.

6.3.1 Bioregions and sub-regions

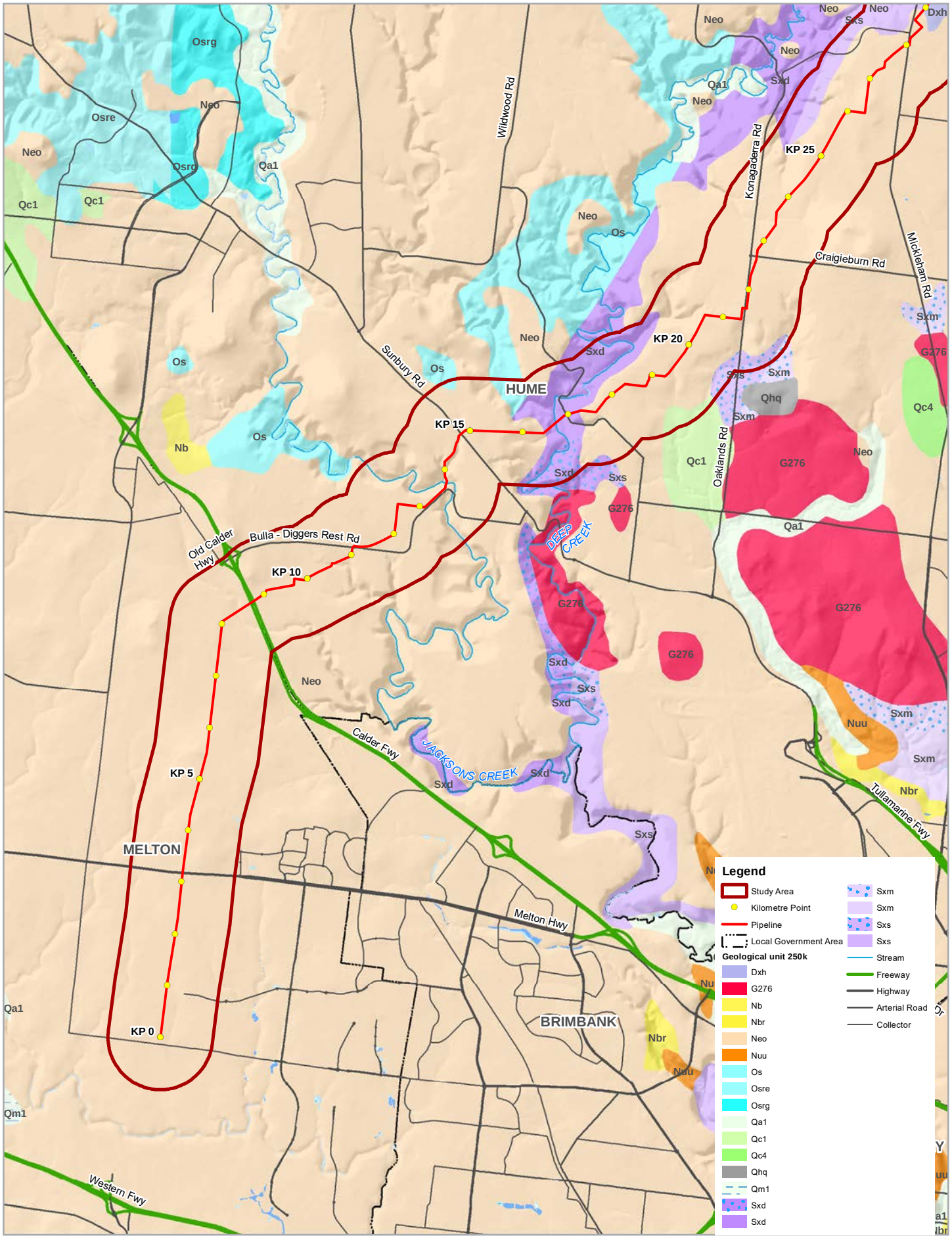
- Central Victorian uplands
  - EVC 175: Lower Slopes or Hills Woodlands, Grassy
- Victorian Volcanic Plain
  - EVC 132: Plain Grasslands, Chenopod Shrublands
  - EVC 55: Plains Woodlands or Forests, Freely-draining
  - EVC 125: Wetlands, Freshwater
  - EVC 937: Riparian Scrubs or Swampy Scrubs and Woodlands

Figure 9 shows the bioregions and sub-regions within and adjacent to the study area.

6.3.2 Vegetation

Vegetation within the study area mainly comprises:

- Dry grasslands and pasture with scattered groups of established native trees associated with grazing land. There are also scattered native trees such as River Red Gums occurring as isolated specimens within private property
- Established native trees along creek corridors
- Roadside vegetation in dense groups comprising mainly established native tree species in some areas
- Wind breaks along property boundaries and around paddocks. These mainly comprise established native and exotic tree species
- Scattered native trees
- Most of the Project alignment falls within the volcanic rock (KP0 to KP15 and KP20 to KP25)
- Between KP15 and KP20 and parts of KP30 where the Project alignment crosses existing waterways the surface geology is mostly sedimentary rocks and low-grade metamorphic rocks such as mudstone, siltstone or sandstone
- In the north sections of the alignment (KP35) the surface geology is mostly channel and flood plain alluvium; gravel sand silt and clay



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Kilometers

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Grid: GDA 1994 MGA Zone 55

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Geology

Figure 7

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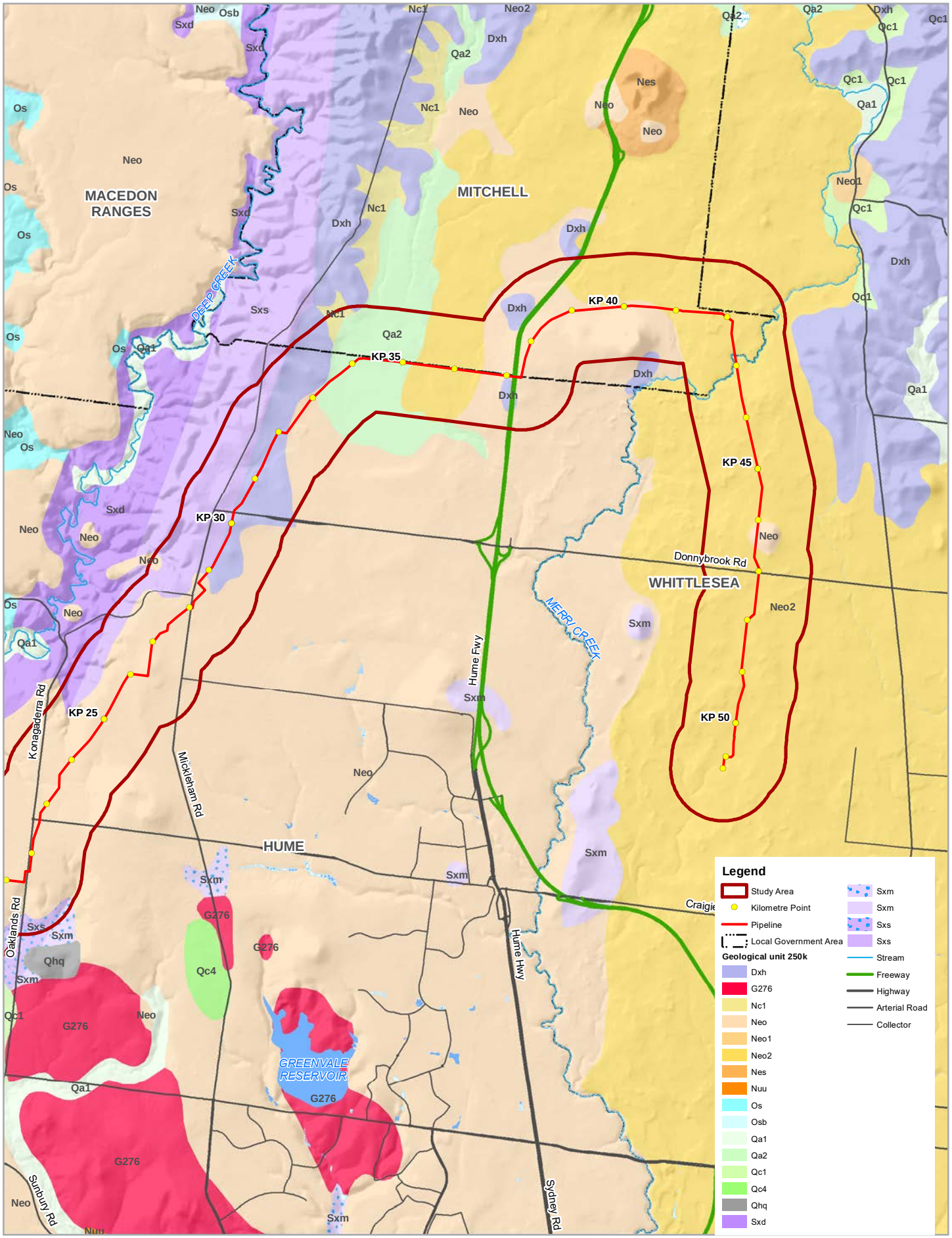

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Geology

Figure 7.1

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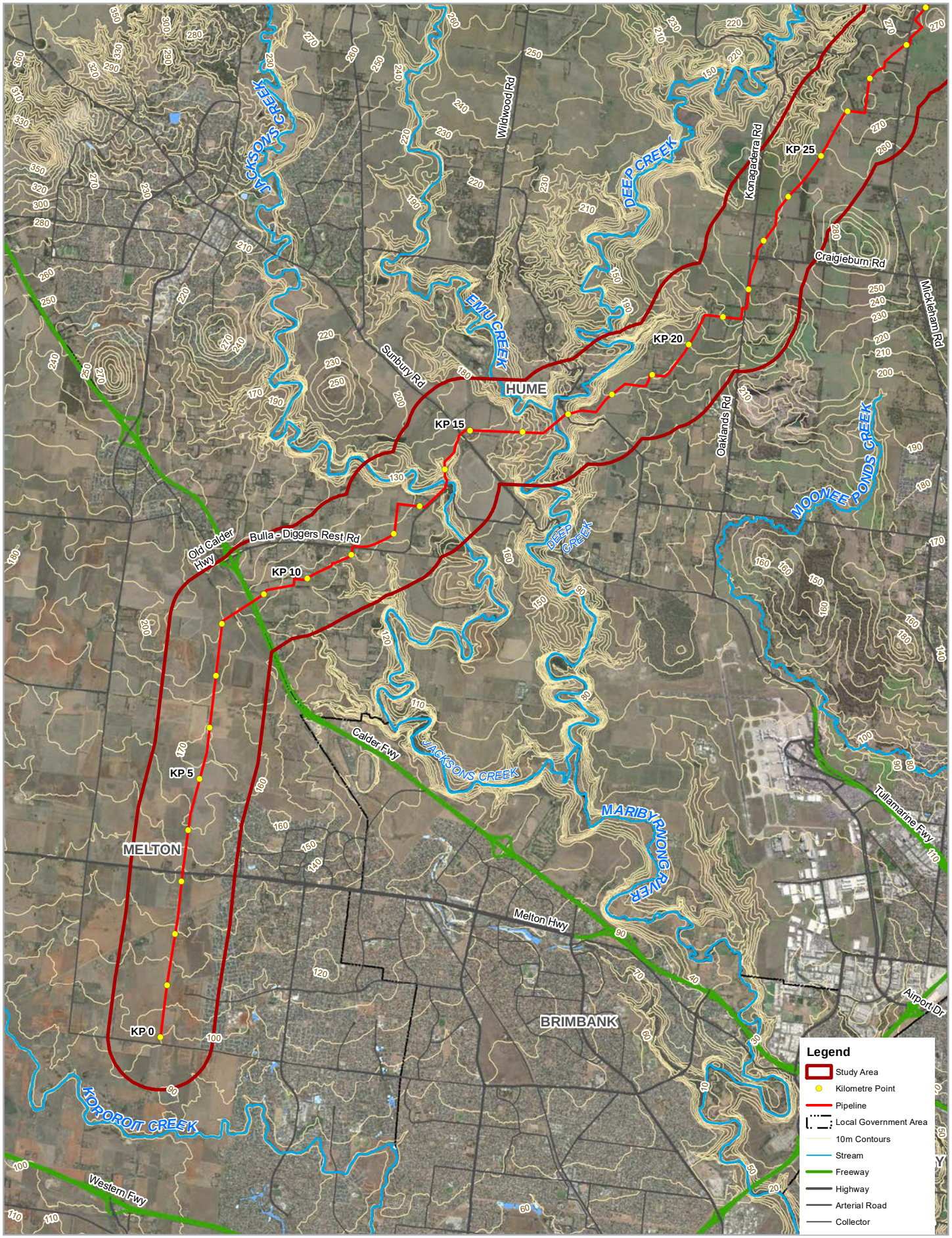

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Topography and waterways

Figure 8

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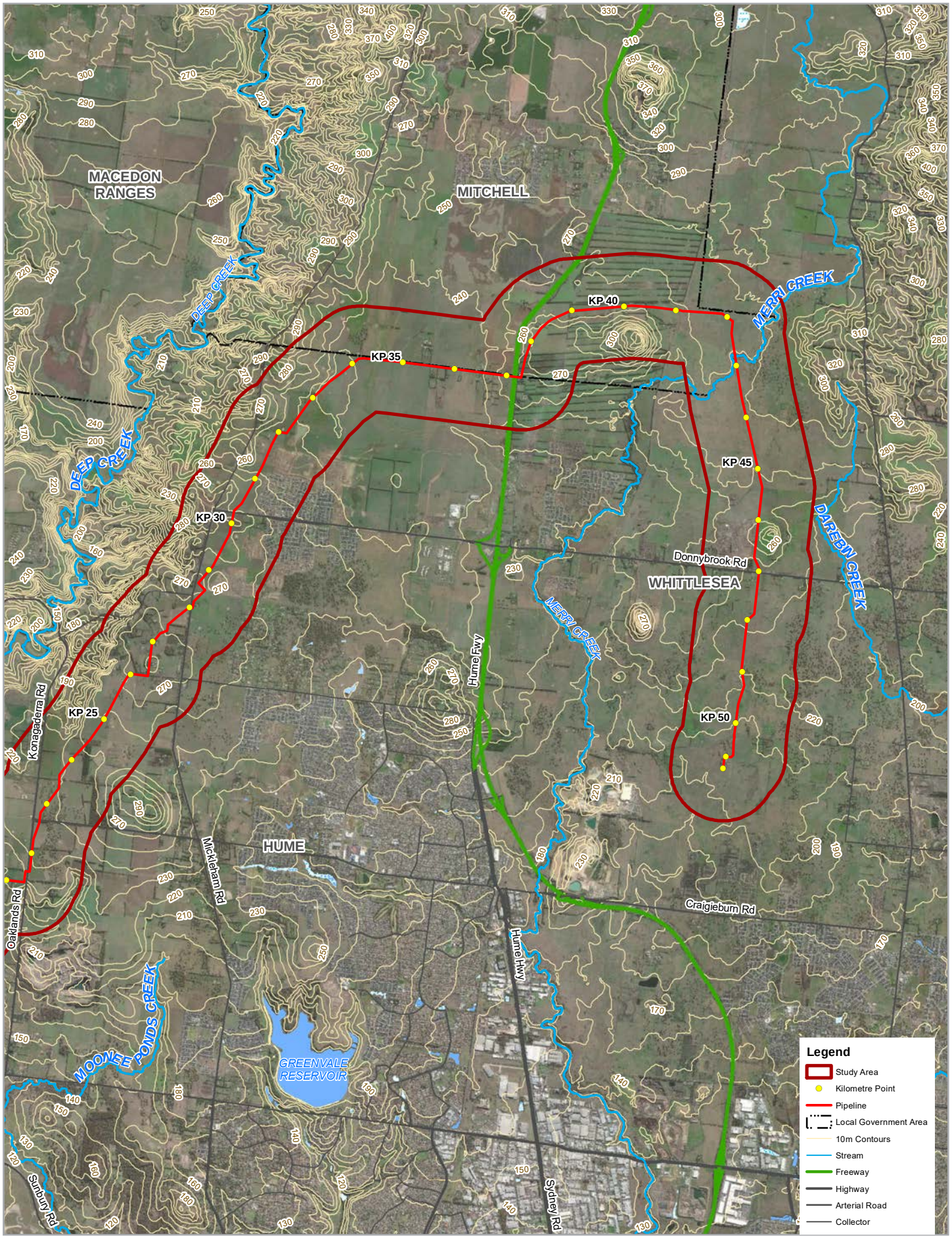

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Topography and waterways

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Figure 8.1

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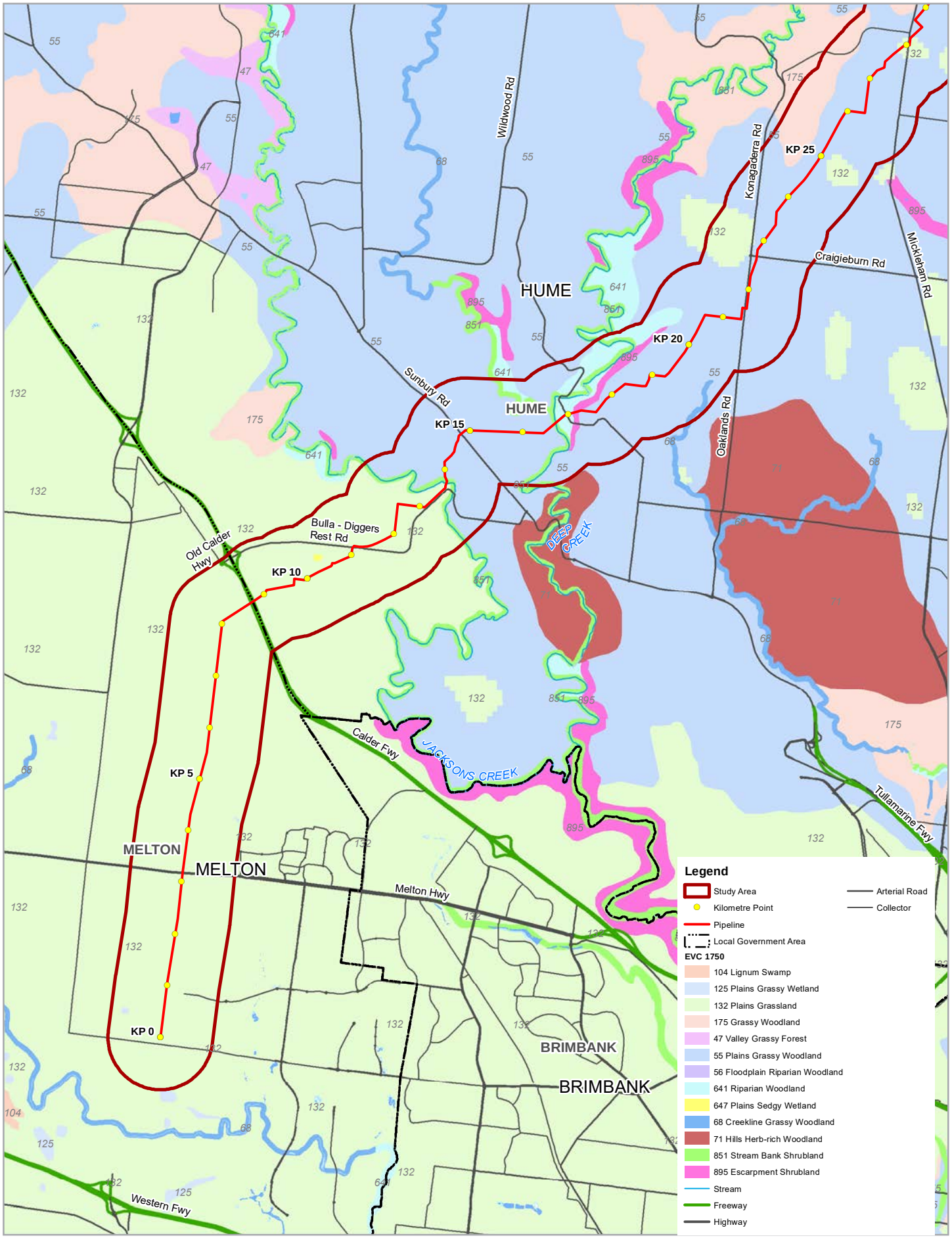

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Bioregions and sub regions

Figure 9

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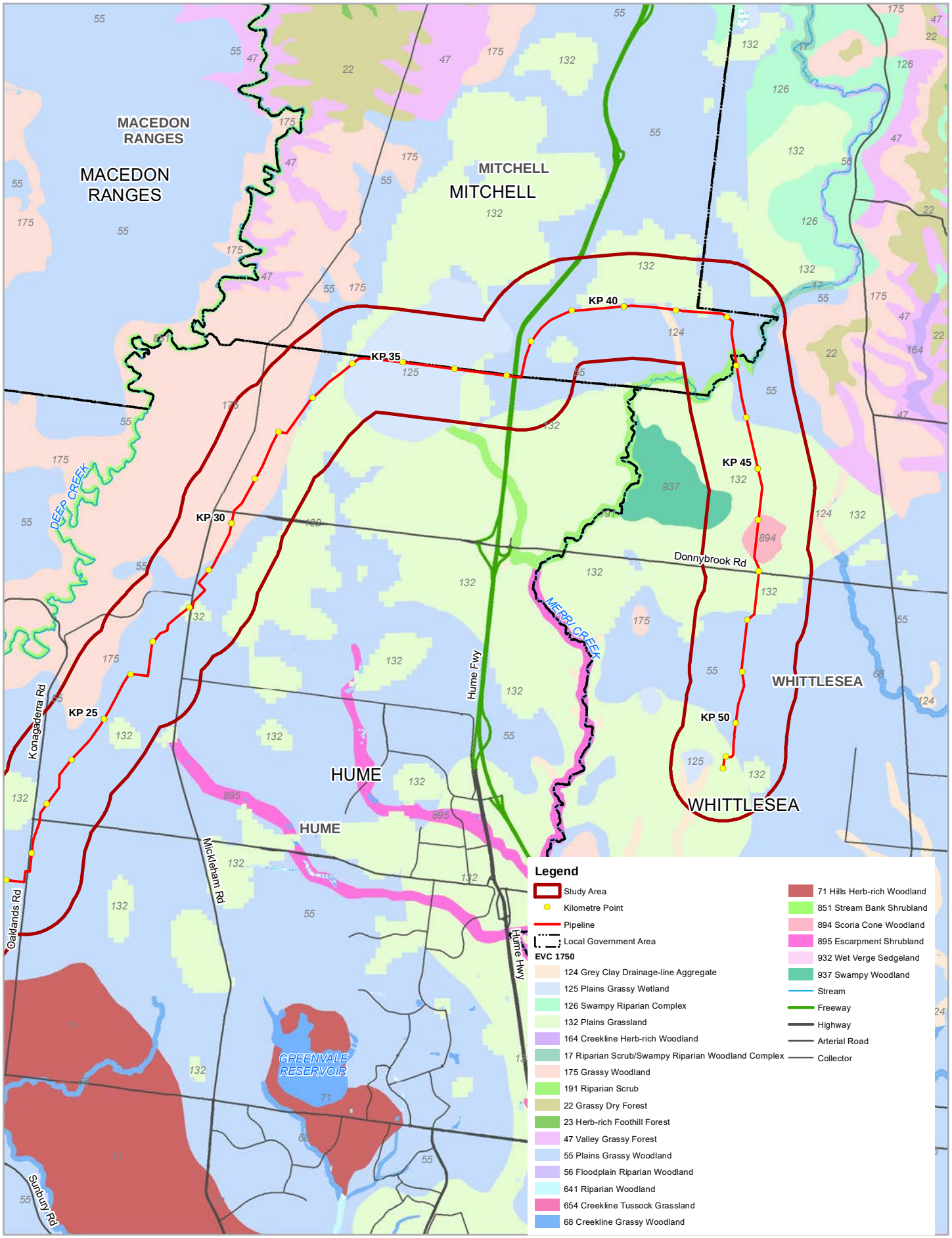

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Project No. 31-12529997
Revision No. B
Date 30/11/2020

Bioregions and sub regions

Figure 9.1

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Print date: 30 Nov 2020 - 13:22

Data source: DELWP, VicMap, 2020; Geoscience australia 2012, GHD, 2020,Vicmap basemap imagery Created by: sacevedo

7. Risk assessment

A risk assessment of Project activities was performed in accordance with the methodology described in section 5.

The initial risk ratings considered an initial set of mitigation measures which are based on compliance with legislation and standard requirements that are typically incorporated into the delivery of infrastructure projects of similar type, scale and complexity. Risk ratings were applied to each of the identified risk pathways assuming that these mitigation measures were in place.

Where the initial risk ratings were categorised as medium these risks were a focus of additional management measures as part of the impact assessment. All risks were considered in the impact assessment.

The assessment of the potential impacts associated with the identified risks during the construction and operation of the Project is presented in sections 8, 9 and 10.

The risk register showing the risk pathways and findings of the risk assessment for landscape and visual is attached in Appendix B.

Three construction risks were identified and assessed and two operation risks.

A summary of the risk assessment results is presented in Table 14.

Table 14 Risk results

Risk ID	Risk description	Construction/ operation	(Project Section applicable) Pipeline/ mainline valve/ compressor	Initial risk rating	Final risk rating
LV1	Tree removal. Removal or alterations to trees and vegetation buffers changing the landscape character and causing visual impacts.	Construction	All	Medium	Low
LV2	Construction activities. Construction activities including laydown areas, activity in construction corridor and plant/equipment use changing landscape character and causing private and public visual impacts.	Construction	All	Low	Low
LV3	Lighting. Lighting required during any night time works at major creeks, major roads or rail crossings during HDD activities causes visual amenity impact to nearby sensitive receptors.	Construction	Pipeline	Low	Low
LV4	Permanent infrastructure. Changes to the landscape character due to presence of the permanent infrastructure.	Operation	Mainline valve Wollert compressor station	Low	Low
LV5	Restrictions on land use in the pipeline easement. Restrictions on use of the easement area for tree planting and other landscape and visual enhancements impacting on landscape character.	Operation	Pipeline	Low	Low

The initial risk rating of medium for LV1 has assumed that the removal or alterations to trees / vegetation buffers during construction would be avoided where possible. Where trees are required to be retained, they would be clearly identified and demarcated prior to commencement of construction. Where there are loss of trees within the approved construction corridor (in areas affecting public places or screening of private residences), where practicable, these will be replaced where reasonably requested and in in consultation with the affected landholder and/or responsible authority resulting in a final risk rating of low.

Prior to construction, an arborist report would be undertaken on any trees to be retained within or immediately bordering the construction corridor (where required). The assessment considers any potential impacts on trees from proposed construction activities in accordance with *AS-4970 Protection of trees on development sites*.

Following these measures, it is expected that a low degree of visual change would likely occur along the Project alignment, therefore the initial risk rating would be low.

The initial risk rating for LV2 has assumed that existing vegetation or landscaping buffers between roads and construction and laydown areas would be maintained where possible, subject to consultation with APA and the responsible authority. Protection of trees during construction would be in accordance with *AS-4970 Protection of trees on development sites*. Machinery, materials and temporary infrastructure would be removed as soon as it is no longer required and construction laydown areas would be kept tidy and dust kept to a minimum. Following these measures, it is expected that a low degree of visual change would likely occur along the Project alignment, therefore the initial risk rating would be low.

The initial risk rating for LV3 has assumed that light generated during night time construction activities will be managed in general accordance with the requirements in *Australian Standard AS/NZS 4282:2019 Control of the obtrusive effects of outdoor lighting*. These night time construction activities may occur in areas where HDD is proposed at creek, road and rail crossings along the proposed alignment. Most areas are located away from sensitive locations and the lighting is expected to be required for short duration and will be localized to the immediate construction area. Generally, lighting would be designed to minimise off-site light spill. Following these measures, it is expected that a low degree of visual change would likely occur along the Project alignment, therefore the initial risk rating would be low.

The initial risk rating for LV4 has assumed that vegetation buffers between above ground infrastructure such as the mainline valves and adjacent roads around residential uses would be maintained. Where there is no existing vegetation, trees and shrubs will be introduced to screen the permanent infrastructure from roads and residences, if reasonably requested by affected landholders and with any necessary approvals granted, while also maintaining ongoing access to the mainline valves. The planting of trees and shrubs will be undertaken in consultation with the affected landholder and/or responsible authority. Screening vegetation would be undertaken in accordance of the relevant bushfire management overlays for the area. Following these measures, it is expected that a low degree of visual change would likely occur along the Project alignment, therefore the initial risk rating would be low.

The initial risk rating for LV5 has assumed that vegetation or landscaping buffers between residential areas and the pipeline easement would be maintained, subject to consultation with APA and the responsible authority. Following these measures, it is expected that a low degree of visual change would likely occur along the Project alignment, therefore the initial risk rating would be low.

8. Construction Phase impact assessment

The following sections provide a qualitative assessment of the landscape and visual impacts from the construction activities occurring during the Project. This includes elements associated with temporary work activity as it moves along the Project alignment. Permanent changes, such as vegetation clearance, has been assessed separately in sections 9 and 10.

8.1 Description

Construction activities would occur along the whole alignment, and may be visible to varying degrees by people living, working, and travelling through the surrounding rural and residential areas, particularly residents and workers within close proximity to the Project.

Landscape and visual impact is likely to be generated by the following:

- Work crews and construction plant/machinery would be seen moving along the alignment as they dig a trench, install the pipeline with a sideboom and backfill the trench. This would also include drilling activities at some creek and road crossings.
- Temporary construction compounds/site offices will be established for the Project at two locations, and where they are adjacent tor roads may result in a temporary and minor visual change to the landscape from construction activities occurring
- Primary visual effect arising from pipeline installation is the clearing of vegetation required within the construction corridor including any ancillary areas, temporary access tracks and other construction related activities. This may potentially be beyond what is required for operation.
- Potential views to temporary storage areas where pipe and materials are stockpiled within the construction corridor
- Potential views of delivery activities associated with construction equipment, pipe and materials. This is likely to include large scale machinery and materials associated with transportation of the pipeline components.
- Potential views of construction traffic and workers

8.2 Assessment

In the context of the rapid development of residential areas to the southern (KP 0−KP 3.15) and northern sections (KP 28.16 - KP 28.57 and KP 32.07 - KP 51.04) of the Project alignment, construction activity would be a common occurrence. In rural areas, machinery and construction is also sometimes observed in relation to farming activity. In addition, construction activity commonly occurs along major roads and highways as part of road upgrade and maintenance works.

Apart from vegetation clearance beyond what is required for the operation phase of the Project, all construction activity would be temporary in nature (less than one year). This is particularly the case as the construction work crews and construction activities move in current along the Project alignment. Views of construction activity from a specific location would not last the entire construction period of the Project for this reason. As vegetation clearance is a more permanent change, it has been assessed in sections 9 and 10.

The visual impact associated with construction activities may extend beyond the study area. This is due to the greater visibility of construction crews and machinery as compared to the completed easement and mainline valves. However, given it is temporary in nature, the magnitude of impact would be low.

Given the temporary nature of the construction activity and the common occurrence of construction activity in many sections of the study area, the landscape and visual impact of construction activity is assessed as low.

8.3 Lighting impacts from 24 hour construction

Lighting from 24 hour construction activities would occur at the HDD sites where the Project alignment crosses Calder Freeway, Sunbury Road, Deep Creek and Hume Freeway. These sites would be lit for approximately one and a half weeks during the construction phase. Light fixtures would be designed to illuminate machinery and the immediate working area to a level that is adequate for safe working conditions. For this reason, the extent of light spill to areas that it is not required is expected to be minimal. Lighting from night time construction activities would also occur at hydro testing sites. However this is expected to be limited in duration as compared to the HDD sites and only required if work is necessary outside of daylight hours.

Night time road works are a common occurrence along major roads and freeways, particularly in built up urban environments. In addition, street lighting also contributes substantially to background ambient lighting levels. For this reason, the night time lighting to be located at Calder Freeway, Sunbury Road and Hume Freeway is expected to have a negligible impact.

The background ambient lighting levels at Deep Creek would be lower than that of the major roads and freeways as it is a rural environment. From a review of aerial imagery, the closest residential dwelling to the HDD site at Deep Creek is estimated to be 350 metres away to the north-east. Given the distance and temporary nature of the night time lighting at Deep Creek, the impact is expected to be low to negligible. There would be no night time lighting from construction of the Project which is directly adjacent to residential areas elsewhere along the Project alignment.

8.4 APA's Site Planning and National Guidelines

Once constructed, where possible, it is APA's preferred position that the Project's pipeline easement is designed to be linear green spaces that ultimately become council public reserves and opens spaces. APA's *Site Planning and Landscape National Guidelines* (APA, 2020), outline the preferred urban design and landscape outcomes for APA's easements. In general, these guidelines are designed to enhance social outcomes and visual amenity by providing for landscaped active open space areas, that typically incorporate a mix of landscaping and shared use paths, examples of which are shown in Figure 10.

APA's guidelines provide for:

- Excavations considered within the 3 metre buffer area, like pedestrian and cycle paths and roads crossing perpendicular to the pipeline alignment
- Excavation works within the easement require APA approval and site supervision by an APA officer
- Landscape furniture like seats and picnic tables can be installed on the easement subject to approval by APA.
- Significant larger landscape structures such as small shelters or pergolas and fitness equipment could be installed on the easements, outside of the 3 m buffer area, subject to APA assessment on a case by case basis

As much of the land on which the pipeline is to be constructed is private land, it would ultimately be the decision of the owner of the property on which the pipeline is constructed to progress the establishment of linear green spaces within the easement, in-line with APA's *Site Planning and Landscape National Guidelines*.

Precedent image

Landscaped areas with sculptures

Precedent image

Potential for long view lines and long green corridors

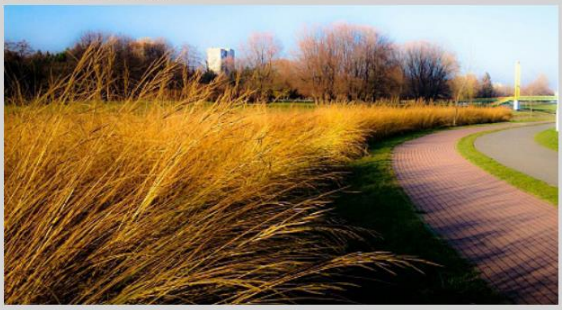
Precedent image

Easement corridors with landscape treatment combined with reserves

Precedent image

Potential to expand and connect shared path network

Precedent image



Expansive grass and low planting areas

Figure 10 Potential linear open space outcomes (Source: APA, 2020 - Site Planning and Landscape National Guidelines)

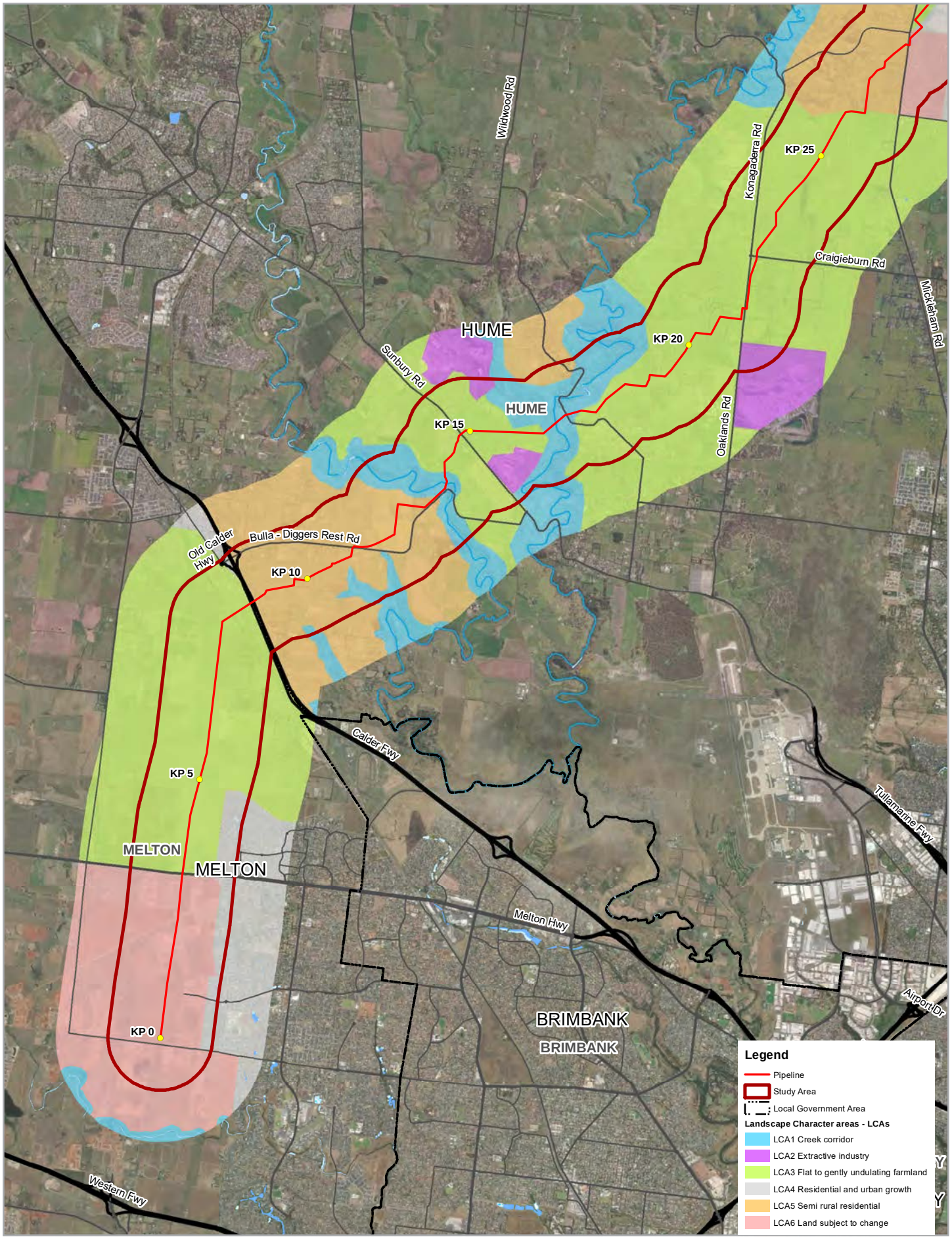
9. Landscape impact assessment

The following section adopts the landscape impact assessment methodology as described in detail in Section 5.5.2. The landscape impact assessment was undertaken based on an analysis of landscape character areas (LCAs). These LCAs were defined through a desktop review of the existing landscape context and typical characteristics identified during the site visit. Areas were identified which shared the same homogenous environmental or cultural qualities and pattern such as topography, vegetation, hydrology, land use and settlement, built form scale and character, cultural and recreational characteristics.

The following six LCAs were identified within the study area:

- LCA1 Creek corridor
- LCA2 Extractive industry
- LCA3 Flat to gently undulating farmland
- LCA4 Residential
- LCA5 Semi rural residential
- LCA6 Land subject to development

These LCAs have been discussed in further detail in the following sections. Figure 11 shows the LCAs within the study area.



Paper Size ISO A4

0 0.7 1.4 2.1 2.8

Kilometers

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55

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APA VTS (Operations) Pty Ltd
Western Outer Ring Main Gas Project

Project No. 31-12529997
Revision No. D
Date 04/06/2021

Landscape character areas

Figure 11

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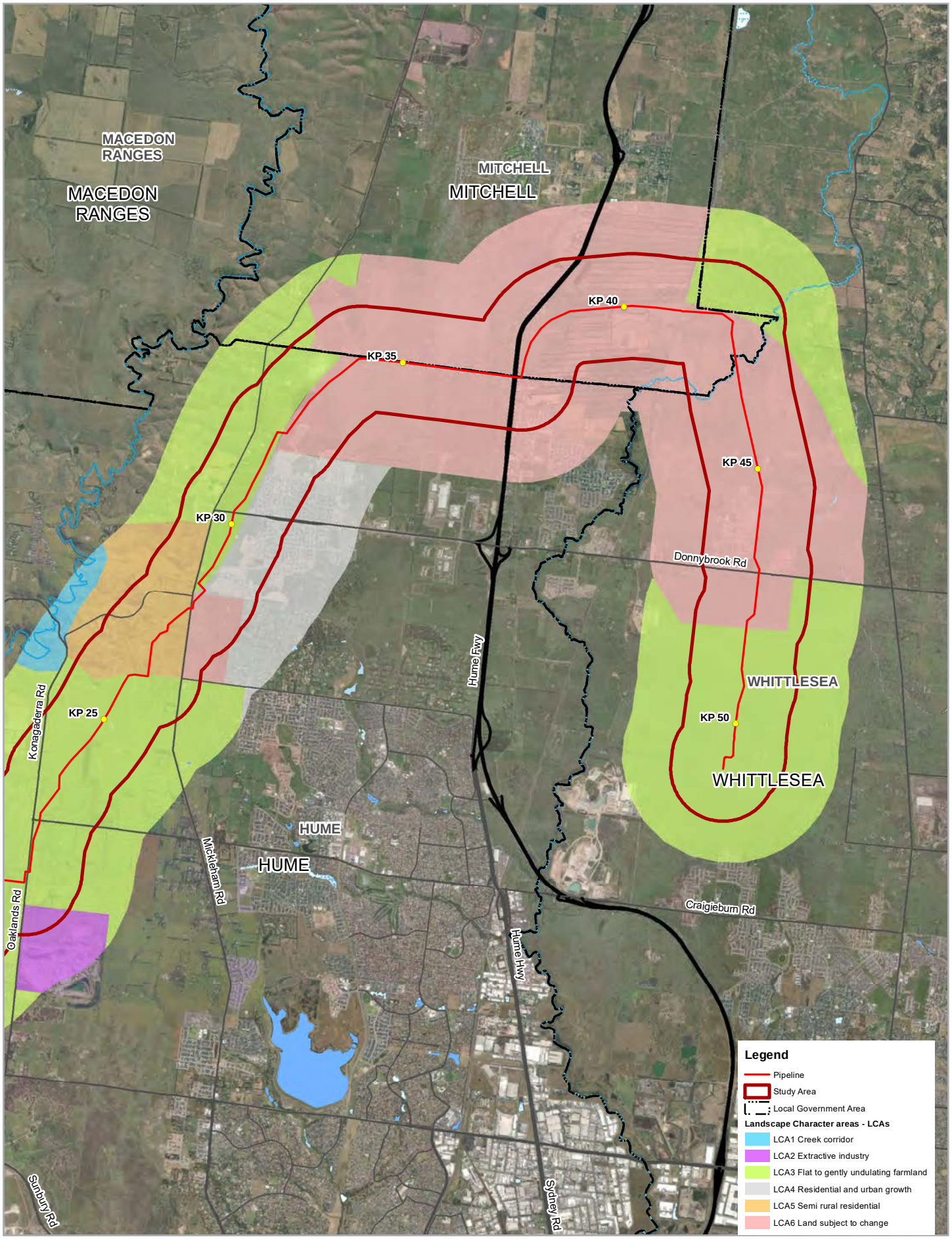
Data source: DELWP, VicMap, 2020; Geoscience australia 2012, GHD, 2020,Vicmap basemap imagery Created by: cjauniau



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Kilometers

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55

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APA VTS (Operations) Pty Ltd
Western Outer Ring Main Gas Project

Project No. 31-12529997
Revision No. D
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Landscape character areas

Figure 11.1

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Data source: DELWP, VicMap, 2020; Geoscience australia 2012, GHD, 2020,Vicmap basemap imagery Created by: cjauniau

9.1 LCA1: Creek corridor

9.1.1 Description

LCA1 Creek corridor is located primarily near the south-west sections of the Project alignment, between KP 13 and 17. This section lies approximately 2.5 km to the north-west of the township of Bulla. Jacksons Creek and Deep Creek are typically located within a deep gorge surrounded by steeply sloping hills. Deep Creek passes through a floodplain near KP 17. Land use typically includes agriculture and broad scale grazing. Merri Creek is located on private land between KP 42 and KP 43 where it intersects with the Project. LCA1 comprises Deep Creek, Jacksons Creek and Merri Creek and has been assessed as a whole unit. Visual impacts to specific creeks has been assessed in section 10.

Figure 12 shows a view south along Jacksons Creek from adjacent to Bulla-Diggers Rest Road. Table 15 describes the key characteristics of LCA1.

Figure 12 View south along Jacksons Creek from adjacent to Bulla-Diggers Rest Road

Table 15 Key characteristics of LCA1

Character element	Description
Nearest KP	Jacksons Creek (KP 14) , Deep Creek (KP 17), Merri Creek (KP 43)
Landform	Gorge and ridge lines with steep sloping hills and valleys
Vegetation	Typically contains woodland communities with understories of riparian scrubs, plain grasslands and chenopod shrubland
Waterways/ Reserves	Deep Creek and Jacksons Creek typically located within deeply incised gorge

Character element	Description
Land use	Rural residential, agricultural (broad scale grazing)
Infrastructure	Rural roads, gravel roads, bridges, transmissions towers
Cultural and characteristics	A quiet, dynamic landscape with a rural character. Typical features include open paddocks and widely distributed residential dwellings and farm buildings. Wooden and wire fences create are in keeping with a rural setting. The township of Bulla is a local cultural centre.
Spatial qualities	This LCA has a sense of enclosure with main access routes being surrounded by dense eucalypt forests and planted windbreaks adjacent to the gorge. Beyond the bridge along Bulla Digger Rest Road, there are more open views and glimpses of dry grazing land and transmission towers.

9.1.2 Landscape value

Landscape values associated with LCA1 include:

- An environmental overlay which recognises the high biodiversity and conservation value of the rural waterways and surrounding environment
- The townships of Bulla with small number of locally recognised heritage sites
- The creek landscapes which are valued for their visual and scenic amenity

LCA1 has a **moderate** landscape value as there are elements in reasonably good condition however it has no nationally recognised values.

9.1.3 Assessment

The susceptibility to change of LCA1 is assessed as **moderate**. Changes that would be brought about by the Project would be unlikely to have a significant adverse effect on the landscape character, condition or value that could not be mitigated.

The sensitivity to change of LCA1 is assessed as **moderate**. The area is valued for its scenic amenity and has a number of locally important features whilst having no state or nationally recognised values. The naturalistic environment and enclosed qualities of the creek corridor may be moderately impacted by the Project. The magnitude of change is assessed as **moderate.** The existing vegetation is well established and a key feature of the LCA1. The Project could result in a discernible change in the landscape character due to partial loss of, or change to elements, features or characteristics of the landscape, however has potential to be partly mitigated.

The overall significance of impact of the Project on LCA1 is therefore assessed as **moderate**.

Jacksons Creek and Merri Creek are proposed to be crossed using open trench construction methods. The width of the construction corridor at these crossings has been reduced from 30 m to 20 m at Jacksons Creek and 25 m at Merri Creek wide within the waterways. The habitat on one side of the bank at Jacksons Creek is pasture grasses, cattle grazed and pugged all the way to the water's edge. The other bank is very steep and has been fenced to exclude cattle. Very little habitat in the form of either emergent or bank aquatic vegetation is present. Figure 12.8 within Appendix HH of the Technical Report A *Biodiversity,* shows the trees that would be impacted by the Project along Jacksons Creek. One large native tree would be removed by the Project, however there are several large trees that would be retained in the area. There would be a minor loss of vegetation as a result of the Project, which would not be uncharacteristic of the creekline environment, whereby there are already numerous gaps in vegetation cover.

The possible use of trenchless construction techniques, such as HDD were considered for the Jacksons Creek crossing based on a number of contributing factors, to avoid construction disturbance within this sensitive area. The assessment outcome indicated that crossing Jacksons Creek using a trenchless construction technique was not feasible, the rationale for which is detailed within the Surface Water Technical Report (Technical report B) and EES Chapter 3 *Project Development*.

The riparian woodland vegetation of the banks and channel is dense along Merri Creek, with a healthy mix of deep-rooted trees and ground cover vegetation along the waterway, which provides protection of both sides of the waterway. The biodiversity assessment recorded native shrub and tree species (*Tea tree Leptospermum species* and *Eucalyptus species*) flanking Merri Creek in the vicinity of the proposed waterway crossing. Figure 12.23 within Appendix HH of the Technical Report A *Biodiversity,* shows the trees that would be impacted by the Project at the Merri Creek crossing. Up to two large native trees and one small native tree would be removed by the Project, however there are several large trees that would be retained in the area. There would be a minor loss of vegetation which would not be uncharacteristic of the creekline environment, whereby there are already numerous gaps in vegetation cover.

9.1.4 Mitigation measures

The following mitigation measure is recommended for reducing the impact of the Project on LCA1.

- If there is any loss of trees immediately bordering to the approved construction corridor at creek crossings, resulting from direct impacts associated from construction activities, these will be replaced with appropriately selected native trees and shrubs. Appropriate reinstatement of the construction corridor within directly impacted creek crossings will be undertaken in consultation with the affected landholder and/or responsible authority.

Following the successful implementation of this mitigation, the significance of impact of the Project on LCA1 would be **low**.

Post initial mitigation measures there is the possibility of residual impacts if appropriate reinstatement of the construction corridor has not occurred. In order to help mitigate against these residual impacts the following residual mitigation measure is recommended for reducing the impact of the Project on LCA1.

- A planting and remediation plan will be developed where planting of trees and shrubs are proposed following the initial mitigation measure. The plan will be reviewed by the responsible authority and/or affected landholders. This plan will outline a monitoring and defects period for planting and remediation to ensure significance of impact remains **low**.

9.2 LCA2 Extractive industry

9.2.1 Description

LCA2 Extractive industry is located in the vicinity of KP 15 and KP 16. These areas comprise Sunbury Eco Park, which is a waste management facility and Bulla Tip and quarry. Both are located on the northern side of Sunbury Road, Bulla. There is also an area of extractive industry to the south of KP 22, on the eastern side of Oaklands Road. From a review of aerial photography, it appears to be a quarry.

Extractive industry is characterised by a high degree of modification to the landscape, typically resulting in a degraded landscape character.

Figure 13 shows a view south-east towards Bulla Tip and Quarry from Batey Court, Bulla. Table 16 describes the key characteristics of LCA2.

Figure 13 View south-east towards Bulla Tip and Quarry from Batey Court

Table 16 Key characteristics of LCA2

Character element	Description
Nearest KP	KP 15, KP 16, KP 22
Landform	Highly modified and degraded landforms in a continuous state of change
Vegetation	Vegetation in this area is typically restricted to isolated groups of trees and road side vegetation
Waterways/ Reserves	Nil
Land use	Tip and Quarry and associated functions
Infrastructure	Rural main roads, gravel roads, transmission towers, quarry and associated infrastructure, tip and associated infrastructure
Cultural and characteristics	Highly utilitarian landscape and generally not open to public access
Spatial qualities	The Bulla tip and Quarry is the most visible feature in the landscape however there is some road side vegetation used to screen the tip

9.2.2 Landscape value

Landscape values associated with LCA2 include:

- A highly degraded landscape due to the presence of extractive industries
- Limited recreational and conservation value

For these reasons, LCA2 has a **low** landscape value.

9.2.3 Assessment

The susceptibility to change of LCA2 is assessed as **low**. Activities associated with the Project is unlikely to have an adverse effect on the landscape character, condition or value. Mitigation measures would be effective in neutralising adverse effects.

The sensitivity to change of LCA2 is assessed as **low**. The easement required for the pipeline infrastructure may result in some loss of roadside vegetation along Sunbury Road, however the existing landscape character contains infrastructure elements such as overhead transmission lines and a Bulleen tip and quarry.

The magnitude of change is assessed as **low.** The anticipated change associated with the gas pipeline and easement would be minor, the introduction of pipeline marker signage or easement clearing is not uncharacteristic within the existing landscape due the existing transmission towers, easements and roadways through LCA2.

The overall significance of impact of the Project on LCA2 is therefore assessed as **low**.

9.3 LCA3 Flat to gently undulating farmland

9.3.1 Description

LCA3 Flat to gently undulating farmland is the most commonly occurring and widely distributed LCA within the study area. It is typically a highly modified landscape which has undergone a process of continuous change since European settlement. Vegetation coverage is generally limited to linear rows of trees along property boundaries or in isolated groups. Other features that characterise this LCA are fence lines, private access roads, some areas of gentle stony rises or knolls, and the occasional dwelling.

Figure 14 shows a view north across flat to gently undulating farmland from Taylors Road, Plumpton. Table 17 describes the key characteristics of LCA3.

Figure 14 View north across flat to gently undulating farmland

Table 17 Key characteristics of LCA3

Character element	Description
Nearest KP	KP 3 to KP 9, KP 14 to KP 16, KP 18 to KP 26, KP 28 to KP 34, KP 48 to KP 51
Landform	Flat low-lying plains to gently undulating land formations. Occasional small hills and stony rises / knolls.
Vegetation	Plains woodlands or forests
Waterways/ Reserves	Jacksons Creek and Deep creek
Land use	Rural residential, agriculture (broad scale grazing)
Infrastructure	Rural roads, gravel roads, transmission towers
Cultural and characteristics	The landscape has a rural character with open paddocks, small gentle hills with stony rises / knolls and wide distribution of residential dwellings and farm buildings. Gravel roads and wire fences are in keeping with the rural character. The townships of Bulla, Donnybrook, Mickleham are local cultural centres.
Spatial qualities	The spatial quality is characterised by the openness of paddocks with expansive views across the landscape. The main roads are characterised by established roadside vegetation and transmission towers can be seen along certain areas within LCA3.

9.3.2 Landscape value

Landscape values associated with LCA3 include:

- Modified landscape which has moderate visual and scenic amenity value
- Areas of high conservation value with endangered EVC vegetation communities
- Cultural value with townships of Bulla, Donnybrook and Mickleham with small number of locally recognised heritage sites
- Well established wind breaks and roadside vegetation a common feature

There are elements in reasonably good condition however it has no nationally recognised values. For these reasons, LCA3 has a **medium** landscape value.

9.3.3 Assessment

The susceptibility to change of LCA3 is assessed as **moderate**. This is due to the numerous modifications to the landscape that are similar to the Project. There is an existing gas easement and transmission lines across much of this LCA. Changes caused by the Project would be unlikely to have a significant adverse effect on the landscape character, condition or value that could not be mitigated.

The sensitivity to change of LCA3 is assessed as **moderate**. The area has locally important features and makes a generally positive contribution to the landscape character. However this LCA has undergone a long process of continual change since European settlement. The easement required for the pipeline infrastructure may result in some loss of roadside vegetation in certain areas of the LCA, however this is not expected to be significant.

The magnitude of change is assessed as **low.** The vegetation clearing needed may result in a loss of some isolated trees, however this change would not be uncharacteristic with other existing easements, roads and transmission lines that cut through LCA3. The landscape and visual amenity impacts associated with stony knolls and drystone walls has been considered in the broader landscape context from publicly accessible viewpoints.

The overall significance of impact of the Project on LCA3 is therefore assessed as **Moderate-low.**

9.3.4 Mitigation measures

The following mitigation measure is recommended for reducing the impact of the Project on LCA3.

- If there is any loss of trees originally marked for retention within the construction corridor (where applicable) or trees immediately bordering the approved construction corridor, these will be replaced with appropriately selected native trees in consultation and agreement with the affected landowners. The planting of trees or shrubs will be undertaken in consultation with the affected landholder and/or responsible authority.

Following the successful implementation of this mitigation, the significance of impact of the Project on LCA3 would be **low**.

Post initial mitigation measures there is the possibility of residual impacts if appropriate reinstatement of the construction corridor has not occurred. In order to help mitigate against these residual impacts the following residual mitigation measure is recommended for reducing the impact of the Project on LCA3.

- A planting and remediation plan will be developed where planting of trees and shrubs are proposed following the initial mitigation measure. The plan will be reviewed by the responsible authority and/or affected landholders. This plan will outline a monitoring and defects period for planting and remediation to ensure significance of impact remains **low**.

9.4 LCA4 Residential and urban growth

9.4.1 Description

LCA4 describes the current residential and urban growth either built or occurring is located primarily at the south-western sections of the alignment, within close proximity to KP 0 and the suburb of Taylors Hill and Hillside. Residential areas are also located at the northern sections of the alignment, between KP 30 and 47 where the suburbs of Mickleham and Donnybrook are located. Residential areas are expanding and transforming farmland into a built up urban environment at a rapid rate. Construction activity is commonplace throughout this LCA.

Dwellings within residential areas are typified by standard, detached single or multi storey homes and they are often built close to the property boundary. Figure 15 shows a view south-west of dwellings along Inkerman Crescent, Mickleham. Table 18 describes the key characteristics of LCA4.

Figure 15 View south-west of dwellings along Inkerman Crescent, Mickleham

Table 18 Key characteristics of LCA4

Character element	Description
Nearest KP	KP 0 to KP 5, KP 29 to KP 31
Landform	Flat low lying plains to gently undulating farmland surrounding the residential areas

Character element	Description
Vegetation	Plains and woodlands or forests, newly planted street trees and road side vegetation along the major roads and local streets within the development
Waterways/ Reserves	Minor drainage channels and constructed wetlands within residential areas.
Land use	Residential
Infrastructure	Low density residential growth, sealed roads, construction and associated infrastructure
Cultural and characteristics	Areas of the alignment fall within low density residential growth areas, with a suburban residential character. This area will see significant growth and change over time with large parcels of land either side of the alignment planned for residential growth. These houses are typically one story with limited private open space.
Spatial qualities	The area has a suburban residential character with agricultural and undulating typography as a backdrop which provides a sense of openness. The spatial qualities existing are likely to change rapidly with future development and become more enclosed.

9.4.2 Landscape value

Landscape values associated with LCA4 include:

- The gently undulating landscape and distant hills provides a scenic backdrop to some residential areas, particularly at the northern end of the alignment
- There is limited conservation or recreational value within this LCA. Existing vegetation is generally not well established and does not contribute substantially to landscape character
- Due to the developments being established recently there is limited cultural or historical value within this LCA

For these reasons, LCA4 has a **low** landscape value.

9.4.3 Assessment

The susceptibility to change of LCA4 is assessed as **moderate**. The Project would not have a detrimental effect on the residential landscape area of already developed suburbs or areas under construction that could not be mitigated. In some cases, there is already an existing gas pipeline adjacent to residential areas which are nearing completion. Effects on the landscape character may be mitigated through landscaping.

The sensitivity to change of LCA4 is assessed as **moderate**. The easement required for the pipeline infrastructure may result in some loss of vegetation and result in restrictions around development particularly in the north near the Merrifield Precinct Structure Plan. Completed residential areas those under construction will require proper planning around the pipeline easement to ensure access and safety requirements.

The magnitude of change is assessed as **low.** The anticipated change associated with the gas pipeline and easement would be consistent with the level of modification that is currently under way or has already been completed.

The overall significance of impact of the Project on LCA4 is therefore assessed as **moderate-low**.

9.4.4 Mitigation measures

The following mitigation measure is recommended for reducing the impact of the Project on LCA4.

- If there is any loss of trees originally marked for retention within the construction corridor (where applicable) or trees immediately bordering the approved construction corridor, these will be replaced with appropriately selected native trees in consultation and agreement with the affected landowners.
  The planting of trees or shrubs will be undertaken in consultation with the affected landholder and/or responsible authority.

Following the successful implementation of this mitigation, the significance of impact of the Project on LCA4 would be **low**.

Post initial mitigation measures there is the possibility of residual impacts if appropriate reinstatement of the construction corridor has not occurred. In order to help mitigate against these residual impacts the following residual mitigation measure is recommended for reducing the impact of the Project on LCA4.

- A planting and remediation plan will be developed where planting of trees and shrubs are proposed following the initial mitigation measure. The plan will be reviewed by the responsible authority and/or affected landholders. This plan will outline a monitoring and defects period for planting and remediation to ensure significance of impact remains **low**.

9.5 LCA5 Semi rural residential

9.5.1 Description

LCA5 describes current semi rural residential areas located towards the south-western section of the Project alignment, between KP 9 and KP 13. There is also a section between KP 26 and KP 28. This LCA is characterised by low density single detached dwellings within large lots.

Figure 16 shows a view east towards a dwelling on Duncans Lane, Diggers Rest. Table 19 describes the key characteristics of LCA5.

Figure 16 View east of a dwelling on Duncans Lane, Diggers Rest

Table 19 Key characteristics of LCA5

Character element	Description
Nearest KP	KP 9 and KP 13, KP 26 to KP 28
Landform	Flat low lying plains to gently undulating farmland with some areas of stony rises / knolls and some small sections of drystone walls
Vegetation	Plains and woodlands, street trees and road side vegetation
Waterways/ Reserves	Jacksons Creek and Deep Creek
Land use	Agricultural land (grazing), rural residential
Infrastructure	Calder Highway, rural residential housing and farm buildings, gravel and sealed roads, wire fences, overhead transmission line and easement
Cultural and characteristics	This LCA is characterised by a quiet, rural community with open plains surrounded by low hills, some areas with stony rises / knolls, small sections of drystone walls, established forests, low density residential houses, small community areas, farm buildings and unsealed dirt roads. The Calder Highway also runs through this LCA to the south between KP 8 and 9
Spatial qualities	Within the rural residential areas, diverse spatial qualities are evident as there are dense bushland and unsealed roads together with undulating terrain and open areas.

9.5.2 Landscape value

Landscape values associated with LCA5 include:

- The rural landscape is valued for its character and visual amenity
- There is cultural character and heritage value in the residential and associated farm buildings, sections of drystone walls and local townships such as Bulla and Diggers Rest
- High conservation value with existing vegetation and endangered EVC vegetation communities in some areas

LCA5 has landscape character elements in reasonably good condition that make an average contribution to the local character. For this reason it has a **medium** landscape value.

9.5.3 Assessment

The susceptibility to change of LCA5 is assessed as **moderate**. The type of development associated with the gas pipeline could have a negative impact on landscape character such as the removal of vegetation. However this may be mitigated through replacement of vegetation.

The sensitivity to change of LCA5 is assessed as **moderate**. The area is valued for scenic amenity, has a number of locally important features, and generally makes a positive contribution to landscape character. However, there are numerous examples of modifications to the landscape that are similar in character to the Project.

The magnitude of change is assessed as **moderate**. Due to the flat low lying plains elements of the Project would be visible from within LCA5, such as pipeline marker signage and a potential loss of vegetation. There is likely to be some vegetation clearance, however this LCA has numerous signs of modification. The landscape and visual amenity impacts associated with stony knolls and drystone walls has been considered in the broader landscape context from publicly accessible viewpoints.

The overall significance of impact of the Project on LCA5 is therefore assessed as **moderate**.

9.5.4 Mitigation measures

The following mitigation measure is recommended for reducing the impact of the Project on LCA5.

- If there is any loss of trees originally marked for retention within the construction corridor (where applicable) or trees immediately bordering the approved construction corridor, these will be replaced with appropriately selected native trees in consultation and agreement with the affected landowners.
  The planting of trees or shrubs will be undertaken in consultation with the affected landholder and/or responsible authority.

Following the successful implementation of this mitigation, the significance of impact of the Project on LCA5 would be **low**.

Post initial mitigation measures there is the possibility of residual impacts if appropriate reinstatement of the construction corridor has not occurred. In order to help mitigate against these residual impacts the following residual mitigation measure is recommended for reducing the impact of the Project on LCA5.

- A planting and remediation plan will be developed where planting of trees and shrubs are proposed following the initial mitigation measure. The plan will be reviewed by the responsible authority and/or affected landholders. This plan will outline a monitoring and defects period for planting and remediation to ensure significance of impact remains **low**.

9.6 LCA6 Land subject to change

9.6.1 Description

LCA6 describes areas identified in the PSP as future urban growth and is located primarily at the south-western and northern sections of the Project alignment. It is characterised by the presence of construction activity as farmland is gradually being transformed into residential subdivisions.

Figure 17 shows a view of a residential area undergoing development at Donnybrook Road. Table 20 describes the key characteristics of LCA6.

Figure 17 View west towards residential area undergoing construction from Donnybrook Road

Table 20 Key characteristics of LCA6

Character element	Description
Nearest KP	KP 0 to KP 3 and KP 34 to KP 48
Landform	Flat low lying plains to gently undulating farmland with some areas of stony rises / knolls and some small sections of drystone walls
Vegetation	Plains and woodlands or forests, street trees and road side vegetation
Waterways/ Reserves	Jacksons Creek and Deep Creek
Land use	Agricultural land (grazing), rural residential, future residential/development
Infrastructure	Construction hoarding and fencing, landfill and excavation trucks on site, road signage, construction warning signs, land sales advertisement, display homes, Hume Freeway.
Cultural and characteristics	This LCA is characterised by open rural plains surrounded by low hills and established forests, some small areas with stony rises / knolls and small sections of drystone walls. The Hume Freeway also cuts through the centre of this LCA. It is evident with the construction throughout the LCA that the current landscape characteristics are likely to change.
Spatial qualities	There are diverse spatial qualities as the landscape undergoes development. Currently there are open views over fields and paddocks towards distant hills creating an open and expansive spatial quality.

9.6.2 Landscape value

Landscape values associated with LCA6 include:

- The rural landscape is a valued landscape character with visual and scenic amenity
- There is some cultural character associated with the open rural plains, some sections of drystone walls and the few stony rises / knolls within the cleared land
- However the landscape character is likely to change due to the clearing for future development
- There is limited long term conservation and recreational value due to clearing for future development

For these reasons, LCA6 has a **low** landscape value.

9.6.3 Assessment

The susceptibility to change of LCA6 is assessed as **low**. The type of development associated with the gas pipeline is unlikely to have an adverse effect on the landscape character, condition or value that could not be mitigated.

The sensitivity to change of LCA6 is assessed as **low**. The area is changing rapidly at the moment with extensive construction happening for future residential properties and associated land uses.

The magnitude of change is assessed as **negligible**. Due to the extreme change of character of LCA6, the magnitude of change associated with the Project would be inconsequential. The landscape and visual amenity impacts associated with stony knolls and drystone walls has been considered in the broader landscape context from publicly accessible viewpoints.

The overall significance of impact of the Project on LCA6 is therefore assessed as **negligible.**

10. Visual impact assessment

The following sections provide a visual analysis which establishes the rationale for the selection of viewpoints for the visual impact assessment. This includes identification of potential sensitive visual receptors and a description of key visual features within the study area. The visual impact assessment focuses on key viewpoints from publicly accessible locations as described in section 5.6.

10.1 Sensitive visual receptors

The context analysis and site visit identified the following sensitive visual receptors.

10.1.1 Settlements

A number of settlements are present within the study area. These include established settlements such as the townships of Donnybrook, Bulla and Diggers Rest as well as newly developing settlements such as Merrifield and Taylors Hill.

Settlements include a variety of land uses but are predominantly residential. They are characterised by a cluster of visual receptors within close proximity. Aside from permanent residents, townships in rural areas generally attract visitors passing through and rural residents accessing amenities and services. There are also a number of future or proposed settlements within or near the study area. The Project is located within close proximity to residential growth areas at the south-western and northern sections of the alignment, viewpoints have been selected and assessed within these areas (VP02, VP11, VP12, VP14).

10.1.2 Rural residential dwellings

Rural residential dwellings are common within the study area, with residential dwellings occurring between towns and settlements. Residents with potential visibility of the Project are sensitive receptors with frequent and long viewing durations. For this reason, they typically value the landscape setting of their home environment. A number of viewpoints close to rural residential properties and farmland have been selected to best assess the potential visual impacts of these sensitive receptors (VP05, VP06, VP08, VP09, VP10, P16, VP18).

10.1.3 Main roads, highways and freeways

Main roads and highways within the study area include Calder Freeway, Donnybrook Road, Hume Freeway, Melton Highway, Mickleham Road, Oaklands Road and Sunbury Road. The primary purpose of these roads are for commuting within the greater Melbourne area and commuting between Melbourne and major cities such as Bendigo and Sydney. There were no tourist drives observed through the desktop studies or during the site visit.

10.2 Key visual features

Key defining visual features within the study area include the series of low connected hills or small ridges which create a visual backdrop to distant views from open lower-lying rural areas.

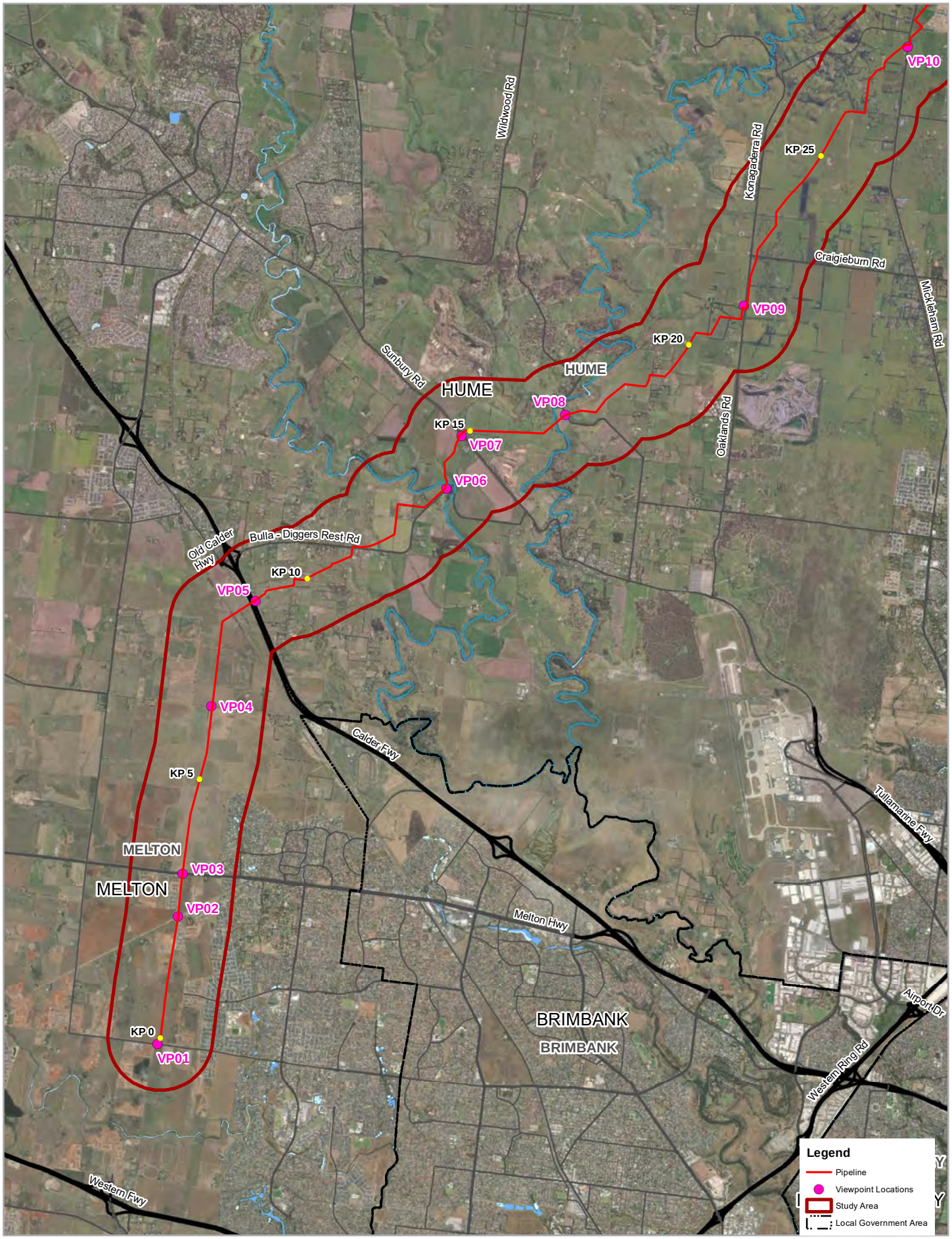
Other defining visual features are the short and enclosed views into the new and existing settlements adjacent to the Project alignment.

10.3 Viewpoint selection

Based on the visual analysis and site visit undertaken on publicly accessible land, the locations in Figure 18 were selected for visual assessment to focus on the following:

- Mainline valve locations
- Major road crossings
- Residential interfaces
- Creek crossings
- Areas of potential vegetation clearance
- Termination points of the Project corridor
- Areas with heritage sensitivity

Refer to Table 21 and Figure 18 for the location of viewpoints.



Paper Size ISO A4

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Kilometers

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55

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APA VTS (Operations) Pty Ltd
Western Outer Ring Main Gas Project

Project No. 31-12529997
Revision No. D
Date 04/06/2021

Viewpoint locations

Figure 18

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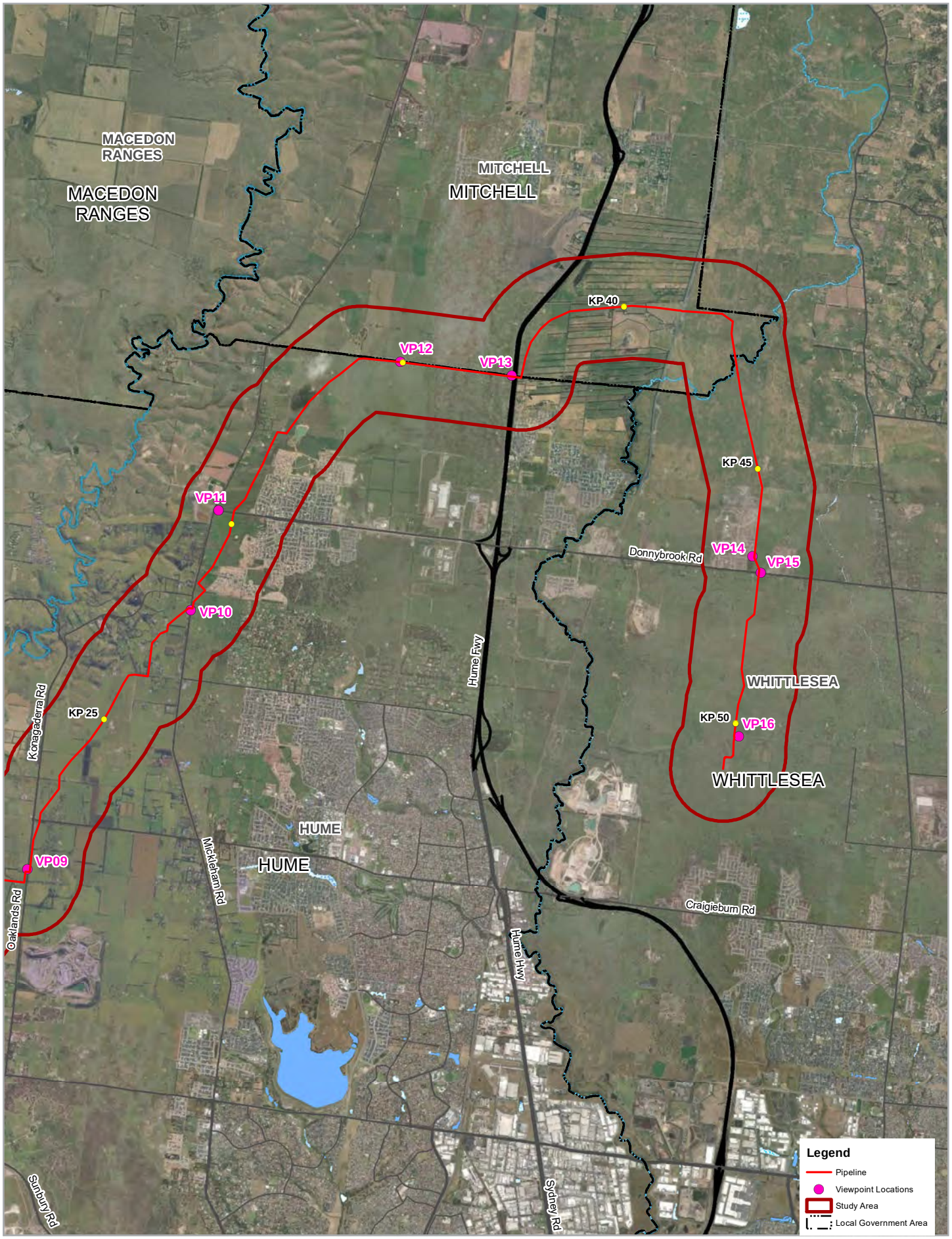
Print date: 04 Jun 2021 - 11:48

Data source: DELWP, VicMap, 2020; Geoscience australia 2012, GHD, 2020,Vicmap basemap imagery Created by: cjauniau



Paper Size ISO A4

0 0.7 1.4 2.1 2.8

Kilometers

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55

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APA VTS (Operations) Pty Ltd
Western Outer Ring Main Gas Project

Project No. 31-12529997
Revision No. D
Date 04/06/2021

Viewpoint locations

Figure 18.1

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Data source: DELWP, VicMap, 2020; Geoscience australia 2012, GHD, 2020,Vicmap basemap imagery Created by: cjauniau

Table 21 Viewpoint locations

Viewpoint	Location	Nearest KP	Sensitive Receptor
VP01	Plumpton Regulating Station at Taylors Road	0	Local road users
VP02	Beattys Road, within Westwood residential development	2	Nearby residents, future residents and local road users
VP03	Melton Hwy	3	Road users
VP04	Holden Road	6	Nearby residents, and local road users
VP05	Thompsons Road, facing Calder Fwy	9	Nearby residents and local road users
VP06	Bulla-Diggers Rest Road	14	Nearby residents and local road users
VP07	Sunbury Road	15	Road users
VP08	Wildwood Road	17	Nearby residents and local road users
VP09	Oaklands Road,	22	Nearby residents and local road users
VP10	Mickleham Road	28	Nearby residents and local road users
VP11	Donnybrook Road	30	Nearby residents and local road users
VP12	Gunns Gully Road	35	Nearby residents
VP13	Gunns Gully Road/Hume Freeway	37	Nearby residents,
VP14	Oriel Road	47	Nearby residents and local road users
VP15	Donnybrook Road	47	Nearby residents and local road users
VP16	Summerhill Road	50	Nearby residents and local road users

Three of these viewpoints were selected for the production of photomontages to represent proposed views following the completion of the Project (refer to Appendix A). These include VP04, VP09 and VP12.

10.4 Viewpoint location 01 (VP01): Plumpton Regulating Station, Taylors Road

Figure 19 View north-west-from Taylors Road towards the Plumpton Regulating Station

Table 22 Viewpoint assessment

Criteria	Assessment
Location and view direction	GPS location: 298 304, 5 822 919 (GDA 1994 MGA Zone 55) Elevation: 102 metres Nearest KP: 0 VP01 is located along Taylors Road, west of the Plumpton Regulating Station and the suburb of Taylors Hill. Figure 19 shows a view north-west from Taylors Road toward the Plumpton Regulating Station and the surrounding flat to gently undulating farmland beyond.
Description of existing view	Views of the surrounding private properties into the distant rural landscape are a key feature of this viewpoint as well as the existing Plumpton Regulating Station and its associated infrastructure, such as fencing and signage. The view also shows a number of native trees along the property boundary. There are also trees along the boundary adjacent to the road which partially screens the meter station form view. There is an existing pipeline easement extending north from the meter station.
Anticipated change to view	It is anticipated that there will be minimal change to the existing view, the Plumpton Regulating Station and easement will remain in place and any changes will be located underground.
Sensitivity to change	View sensitivity is assessed as **negligible** due to the following factors: • Viewers from locations where there is screening by vegetation or structures where only occasional screened views are available and viewing times are short. The visual receptors are primarily road users in motor vehicles.
Magnitude of change	The magnitude of change is assessed as **negligible** due to the following • Almost imperceptible or no change in the view as there is little or no loss of/or change to the elements, features or characteristics of the view. The pipeline would be located within an existing easement.
Significance of impact	The overall significance of impact of the Project on VP01 is assessed as **negligible**. There are no works proposed at the existing Plumpton Regulation Station. Connections to the existing pipeline will occur underground. There would be no change to the existing conditions after completion.

10.5 Viewpoint location 02 (VP02): Beattys Road, Westwood development

Figure 20 View south towards Beattys Road, Westwood development

Table 23 Viewpoint assessment

Criteria	Assessment
Location and view direction	GPS location: 298 704, 5 825 356 (GDA 1994 MGA Zone 55) Elevation: 132 metres Nearest KP: 2 VP02 is located within the new Westwood residential development. Figure 20 shows a view south toward Beattys Road from the proposed linear park within the estate.
Description of existing view	A key feature in this view is the construction of conventional detached residential dwellings to the left in the image. To the right is a view out to a vast expanse of vacant land which is subject of development. Directly opposite Beattys road is pipeline marker signs for the existing Deer Park – Sunbury pipeline currently running through the site. Landscaping and pedestrian paths have been built over the existing easement with marker signs indicating the presence of the easement.
Anticipated change to view	The view after construction of the Project would be similar to the existing view, as there is an existing pipeline easement currently in place.
Sensitivity to change	View sensitivity is assessed as **high** due to the following factors: • The Project would be located in a residential growth area running through the middle of a proposed development • Viewers would be occupiers of residential properties, at home or going to or from, with long viewing periods, within close proximity to the proposed development • Communities that place value upon the landscape and enjoyment of views of their setting.
Magnitude of change	The magnitude of change is assessed as **negligible** due to the following • There would be an almost imperceptible or no change in the view as there is little or no loss of/or change to the elements, features or characteristics of the view • Once construction is complete, the Project corridor would be reinstated to existing conditions, whereby there is already a pipeline easement.
Significance of impact	For these reasons, the overall significance of impact of the Project on VP02 is assessed as **negligible**.

10.6 Viewpoint location 03 (VP03): Melton Highway

Figure 21 View north-west along Melton Hwy

Table 24 Viewpoint assessment

Criteria	Assessment
Location and view direction	GPS location: 298 788, 5 826 175 (GDA 1994 MGA Zone 55) Elevation: 140 metres Nearest KP: 3 VP03 is located adjacent to Melton Highway approximately 10 metres east from the crossing point of the Project alignment. Figure 21 shows a view north-west from Melton highway towards the Project.
Description of existing view	Melton Highway is visible across the extent of the view, and has roadside vegetation comprised of shrubs and small to medium trees. The vegetation partially obstructs views toward a gas infrastructure compound. The existing Deer Park – Sunbury pipeline currently intersects Melton Highway in generally a north to south direction. Associated marker signage can be seen along the existing easement.
Anticipated change to view	It is expected that there will be minimal change to the existing view, as there is an existing pipeline easement. There may be some loss of roadside vegetation associated with the construction of the Project.
Sensitivity to change	View sensitivity is assessed as **low** due to the following factors: • The primarily visual receptors would be road users. They would be passing by at high speeds and have short term views of the Project. There is existing pipeline infrastructure in the view located within the Project alignment.
Magnitude of change	The magnitude of change is assessed as **low** due to the following • There is likely to be very minor to no change to this view • There would be a minor loss or alteration to one or more key view elements, features or characteristics, such as the roadside vegetation • Other than some potential vegetation loss there would be no other discernible change to the view
Significance of impact	The overall significance of impact of the Project on VP03 is therefore assessed as **low**.

10.7 Viewpoint location 04 (VP04): Holden Road

Figure 22 View north-east from Holden Road

Table 25 Viewpoint assessment

Criteria	Assessment
Location and view direction	GPS location: 299 334, 5 829 372 (GDA 1994 MGA Zone 55) Elevation: 168 metres Nearest KP: 6 VP04 is located along Holden Road, approximately 20 metres west of the Project alignment. Figure 22 shows a view north-east toward the Project.
Description of existing view	The existing view is of flat to gently undulating farmland with low hills on the horizon. Existing pipeline marker signs and wire fencing is visible in the foreground, as well as an existing gas pipeline infrastructure compound. Roadside vegetation consists of grasses and shrubs. There are no established trees within this view.
Anticipated change to view	This is the site of one of the proposed mainline valve locations. The existing infrastructure compound in the centre of the photo would be incorporated within a new compound housing the proposed mainline valve. Apart from this change, there would be minimal other modifications as there is an existing gas pipeline easement which the Project would be located within. There may be some loss of grass and buffer planting as a result of construction as well as an upgrade to the existing pipeline infrastructure compound. A photomontage has been prepared for this location and is provided in Appendix A.
Sensitivity to change	View sensitivity is assessed as **low** due to the following factors: • Motorists are passing by at high speeds and would have short term views of the Project. There is existing infrastructure and signage associated with the current pipeline
Magnitude of change	The magnitude of change is assessed as **low** due to the following • There would be the introduction of components that may be visible but not be uncharacteristic within the existing view as there is already an existing compound.
Significance of impact	The overall significance of impact of the Project on VP04 is therefore assessed as **low**.

10.8 Viewpoint location 05 (VP05): Thompsons Road, facing Calder Freeway

Figure 23 View from north-west towards Calder Freeway from Dillon Court

Table 26 Viewpoint assessment

Criteria	Assessment
Location and view direction	GPS location: 300 180, 5 831 385 (GDA 1994 MGA Zone 55) Elevation: 175 metres Nearest KP: 9 VP05 is located adjacent to Dillon Court, approximately 15 metres south-east of the Project alignment. Figure 23 shows a view north-west towards Calder Freeway at the crossing point of the Project alignment.
Description of existing view	The existing view is mainly of flat to gently undulating farmland. Calder Freeway can be seen in the middle distance with sparsely distributed roadside vegetation of medium height. There is a telephone pole and boundary fencing in the foreground along with a pipeline marker signs for the existing pipeline. The proposed pipeline will be crossing underneath the Calder Freeway and following the same path as the existing pipeline easement.
Anticipated change to view	After completion of the Project, it is expected that there will be minimal change to the existing view. There is an existing easement for the current Deer Park to Sunbury pipeline and associated pipeline marker signs.
Sensitivity to change	View sensitivity is assessed as **negligible** due to the following factors: • Motorists are passing by at high speeds and would have minimal value attached to the existing view, given the presence of numerous other infrastructure elements along the freeway.
Magnitude of change	The magnitude of change is assessed as **negligible** due to the following: • There would be an almost imperceptible or no change in the view as there is little or no loss of/or change to the elements, features or characteristics of the view
Significance of impact	The overall significance of impact of the Project on VP05 is therefore assessed as **negligible**.

10.9 Viewpoint location 06 (VP06): Bulla-Diggers Rest Road

Figure 24 View Private Property off Bulla Diggers Rest Road

Table 27 Viewpoint assessment

Criteria	Assessment
Location and view direction	GPS location: 303 832, 5 833 529 (GDA 1994 MGA Zone 55) Elevation: 132 metres Nearest KP: 14 VP06 is located adjacent to Bulla-Diggers Rest Road, approximately 30 metres east of the Project alignment. Figure 24 shows a view north towards the Project alignment where it crosses Jacksons Creek.
Description of existing view	The existing view is characterised by Jacksons Creek and its associated gorge with steeply sloping hills on either side of the waterway. Along the creekline, there are dense stands of established native trees. The surrounding areas are mainly comprised of cleared undulating farmland. There is also an orchard that is visible to the right in the image.
Anticipated change to view	It is anticipated that there may be some loss of vegetation at the creek where horizontal direction drilling (HDD) would occur. However this view is difficult to observe by motorists passing at high speed. This view represents one of a few gaps in the roadside vegetation where the creek is visible.
Sensitivity to change	View sensitivity is assessed as **negligible** due to the following factors: • It is off the main road and represents an occasional, short term view that cannot be obtained easily by passing cars. • It is within private property, however there is significant screening from roadside vegetation which prevents any long term views.
Magnitude of change	The magnitude of change is assessed as **low** due to the following • There would be a minor loss of vegetation which would not be uncharacteristic of the creekline environment, whereby there are already numerous gaps in vegetation cover • There would be the introduction of pipeline marker signs, however these would not be out of character with the fencelines and existing signage associated with the farmland landscape.
Significance of impact	The overall significance of impact of the Project on VP06 is therefore assessed as **negligible**.

10.10 Viewpoint location 07 (VP07): Sunbury Road

Figure 25 View north-west along Sunbury Road

Table 28 Viewpoint assessment

Criteria	Assessment
Location and view direction	GPS location: 304 116, 5 834 536 (GDA 1994 MGA Zone 55) Elevation: 181 metres Nearest KP: 15 VP07 is located along Sunbury Road, approximately 30 metres south-east of the Project alignment. Figure 25 shows a view north-west along Sunbury Road.
Description of existing view	The existing view along Sunbury Road shows established tall roadside vegetation comprised mainly of native trees. Transmission towers are visible in the background as well as views of the surrounding flat to gently undulating farmland.
Anticipated change to view	It is anticipated that there will be some minor changes to the existing view, as drilling will be required to cross underneath Sunbury Road and may result in the removal of some roadside vegetation. However there are gaps in the existing vegetation so any trees that are removed would not appear completely out of character.
Sensitivity to change	View sensitivity is assessed as **low** due to the following factors: • Motorists would be traveling at high speeds and any views of the Project and associated signage would be short term and would not be uncharacteristic of the area • For motorists travelling east, any changes would be screened by roadside vegetation
Magnitude of change	The magnitude of change is assessed as **low** due to the following • There may be minor loss of vegetation and the introduction of pipeline marker signs visible to those traveling along Sunbury Road. However would not be uncharacteristic of the area given the numerous existing signs along the road.
Significance of impact	The overall significance of impact of the Project on VP07 is therefore assessed as **low**.

10.11 Viewpoint location 08 (VP08): Wildwood Road

Figure 26 View south-west along the Project alignment from Wildwood Road

Table 29 Viewpoint assessment

Criteria	Assessment
Location and view direction	GPS location: 306 101, 5 834 939 (GDA 1994 MGA Zone 55) Elevation: 106 metres Nearest KP: 17 VP08 is located adjacent to Wildwood Road, approximately 10 metres north of the Project alignment. Figure 26 shows a view south-west along the Project alignment from Wildwood Road.
Description of existing view	The existing view is within the Deep Creek valley across private property which is characterised by flat low lying plains in the foreground and steep undulating hills in the background. The existing view looks out over private property towards Deep Creek and the dense vegetation that follows the creek corridor.
Anticipated change to view	The Project would undertake HDD to cross Deep Creek and would be unlikely to result in any loss of vegetation directly along the creek corridor. There would also be the introduction of pipeline marker signage along the Project alignment.
Sensitivity to change	View sensitivity is assessed as **moderate** due to the following factors: • Close to neighbouring residential properties who may have long viewing periods at a distance • However, potential views may be screened by private gardens and intervening trees
Magnitude of change	The magnitude of change is assessed as **low** due to the following: • The Project would undertake HDD to cross Deep Creek and would unlikely result in loss of vegetation directly along the creek corridor • The addition of pipeline markers however would be consistent with fencelines and other infrastructure associated with a rural landscape.
Significance of impact	The overall significance of impact of the Project on VP08 is therefore assessed as **moderate-low**.
Significance of impact with mitigation	Where there is any loss of trees and shrubs within the approved construction corridor, these will be replaced with appropriately selected trees where reasonably requested and in consultation with the affected landholder and/or responsible authority. Planting would be undertaken in accordance of the relevant bushfire management overlays for the area. If no vegetation loss occurs, or if there is successful implementation of this mitigation, the significance of impact of the Project on VP08 would be **low**.

Criteria	Assessment
Significance of impact post mitigation (residual)	To ensure significance of impact remains low a planting and remediation plan will be developed where planting of trees and shrubs are proposed following the initial mitigation measure. The plan will be reviewed by the responsible authority and/or affected landholders. This plan will outline a monitoring and defects period for planting and remediation to ensure significance of impact remains **low**.

10.12 Viewpoint location 09 (VP09): Oaklands Road

Figure 27 View north-west along Oaklands Road

Figure 28 View south-east along Oaklands Road

Table 30 Viewpoint assessment

Criteria	Assessment
Location and view direction	GPS location: 309 519, 5 837 017 (GDA 1994 MGA Zone 55) Elevation: 224 metres Nearest KP: 22 VP09 is located along Oaklands Road Figure 27 shows a view north-west along Oaklands Road. Figure 28 shows a view south-east along Oaklands Road. The Project alignment would cross Oaklands road approximately beyond the end of the guard rail in Figure 28.

Criteria	Assessment
Description of existing views	The existing views show Oaklands Road which is a main sealed road with established native roadside vegetation along the eastern side of the road. The vegetation partially inhibits views toward the east, however filtered views of the flat farmland can be seen behind the vegetation.
Anticipated change to view	There is likely to be the removal of some vegetation at the crossing point, however for the most part the Project alignment would be located to the east of the roadside vegetation. For this reason, most of the vegetation is likely to remain intact. Figure 27 shows the proposed location for a mainline valve. For the most part, the mainline valve is likely to be hidden from view given the roadside vegetation, however there would be filtered views of the chain wire fencing and structures associated with the proposed installation. A photomontage has been prepared for this location and is provided in Appendix A. Figure 28 shows the location of the Impressed Current Cathodic Protection (ICCP) system behind the mainline valve. The ICCP system would involve a row of PVC standpipes from each anode along the Project alignment. Due to the existing roadside vegetation there would be filtered views of the ICCP line.
Sensitivity to change	View sensitivity is assessed as **moderate** due to the following factors: • Neighbouring residential properties who may have long viewing periods at a distance across Oaklands road • Road users are passing at high speeds and experiencing this view with short term viewing duration and limited value associated with the views from the road
Magnitude of change	The magnitude of change is assessed as **moderate** due to the following • There would be a discernible change to the existing view however the mainline valve would be partially screened by established roadside vegetation. There would also be an opportunity to introduce screening vegetation around the mainline valve site to further reduce impacts. • There is likely to be some loss of vegetation at the crossing points of Oaklands Road • The pipeline marker signage would only be visible at specific locations such as the road crossing point. They would otherwise be relatively inconspicuous.
Significance of impact	The overall significance of impact of the Project on VP09 is therefore assessed as **moderate**.
Significance of impact with mitigation	Where there is any loss of trees and shrubs within the approved construction corridor, these will be replaced with appropriately selected trees where reasonably requested and in consultation with the affected landholder and/or responsible authority. Planting would be undertaken in accordance of the relevant bushfire management overlays for the area. If no vegetation loss occurs, or if there is successful implementation of this mitigation, the significance of impact of the Project on VP09 would be **low**.
Significance of impact post mitigation (residual)	To ensure significance of impact remains low a planting and remediation plan will be developed where planting of trees and shrubs are proposed following the initial mitigation measure. The plan will be reviewed by the responsible authority and/or affected landholders. This plan will outline a monitoring and defects period for planting and remediation to ensure significance of impact remains **low**.

10.13 Viewpoint location 10 (VP10): Mickleham Road

Figure 29 View north-east along Mickleham Road towards the Project crossing point

Table 31 Viewpoint assessment

Criteria	Assessment
Location and view direction	GPS location: 312 640, 5 841 965 (GDA 1994 MGA Zone 55) Elevation: 270 metres Nearest KP: 28 VP10 is located along Mickleham Road, approximately 40 metres south-west of the crossing point of the Project. Figure 29 shows a view north-east along Mickleham Road.
Description of existing view	The existing view shows Mickleham Road, a sealed road with established native roadside vegetation. The vegetation partially filters views to either side of the road, however intermittent views of the rural residential landscape can be seen behind the trees. The rural residential consists of large single story houses with agricultural buildings and sheds on large allotments.
Anticipated change to view	The Project will cross Mickleham road in the middle distance and would then turn away to the north to align parallel with the road on the right hand side. There is an established row of dense vegetation within a private allotment which is visible to the right in the image and the Project would be located behind these trees. There may be a requirement to remove some of the vegetation for the construction of the Project.
Sensitivity to change	View sensitivity is assessed as **moderate** due to the following factors: • Neighbouring residential properties who may have long viewing periods at a close distance • Road users are passing at high speeds and experiencing this view with short term viewing duration and limited value associated with the views from the road.
Magnitude of change	The magnitude of change is assessed as **moderate** due to the following: • There may be a loss of roadside vegetation as well as vegetation buffering views toward the road from the residential properties.
Significance of impact	The overall significance of impact of the Project on VP10 is therefore assessed as **moderate**.

Criteria	Assessment
Significance of impact with mitigation	Where there is any loss of trees and shrubs within the approved construction corridor, these will be replaced with appropriately selected trees where reasonably requested and in consultation with the affected landholder and/or responsible authority. Planting would be undertaken in accordance of the relevant bushfire management overlays for the area. If no vegetation loss occurs, or if there is successful implementation of this mitigation, the significance of impact of the Project on VP10 would be **low**.
Significance of impact post mitigation (residual)	To ensure significance of impact remains low a planting and remediation plan will be developed where planting of trees and shrubs are proposed following the initial mitigation measure. The plan will be reviewed by the responsible authority and/or affected landholders. This plan will outline a monitoring and defects period for planting and remediation to ensure significance of impact remains **low**.

10.14 Viewpoint location 11 (VP11): Donnybrook Road #1

Figure 30 View north-west along Donnybrook Road

Table 32 Viewpoint assessment

Criteria	Assessment
Location and view direction	GPS location: 313 171, 5 843 866 (GDA 1994 MGA Zone 55) Elevation: 277 metres Nearest KP: 30 VP011 is located along Donnybrook Road, approximately 700 metres west of the Project alignment. Figure 30 shows a view north-west along Donnybrook Road towards the Project.
Description of existing view	The existing view shows Donnybrook Road, a sealed road with some low growing roadside vegetation on the right had side of the road. There are open views to the left of the flat low lying landscape with undulating hills and mountain ranges on the horizon. The residential development associated with Merrifield is visible in the centre of the image in the far distance.
Anticipated change to view	The proposed alignment will cross Donnybrook Road in the far distance and will be aligned across the northern boundary (in front of) of the residential area. There would be no discernible change to the view from this location and the Project, once completed, is not likely to be easily visible.
Sensitivity to change	View sensitivity is assessed as **negligible** due to the following factors: • Any associated infrastructure will not be easily visible from this view • Road users are passing at high speeds and experiencing this view with short term viewing duration and limited value associated with the views from the road
Magnitude of change	The magnitude of change is assessed as **negligible** due to the following • Any associated infrastructure will not be easily visible from this view
Significance of impact	The overall significance of impact of the Project on VP11 is therefore assessed as **negligible.**

10.15 Viewpoint location 12 (VP12): Gunns Gully Road

Figure 31 View West along Gunns Gully Road (Note: Photo supplied by client after the initial site visit. A site visit to this location was not undertaken by the author)

Table 33 Viewpoint assessment

Criteria	Assessment
Location and view direction	GPS location: (GDA 1994 MGA Zone 55) Elevation: metres Nearest KP: 35 VP012 is located along Gunns Gully Road, approximately 2.2 kilometres north-west of the intersection of Hume Freeway. Figure 31 shows the view north-west along Gunns Gully Road. The Project would run parallel to the road, to the left of the fence.
Description of existing view	The view shows flat to gently undulating farmland and hills in the far distance.
Anticipated change to view	The proposed alignment will run parallel to the fence line on the left hand side. A mainline valve would be located in the middle distance to the left in the image. It would consist of gas pipeline infrastructure within a compound enclosed by a chain wire fence. There is currently no infrastructure in this area which is similar in character to the proposed mainline valve. A photomontage has been prepared for this location and is provided in Appendix A. (Note: Photomontage requires updating)
Sensitivity to change	View sensitivity is assessed as **moderate** due to the following reasons: • Residents may have a view to pipeline marker signage and mainline valve however there is existing screening from vegetation along the property boundary which prevents the signage being viewed • Road users are passing at high speeds and experiencing this view with short term viewing duration • There would be discernible changes in the existing view however it has potential to be mitigated.
Magnitude of change	The magnitude of change is assessed as **moderate** due to the following • The addition of the mainline valve would represent a discernible change to the existing view, however it has potential to be mitigated.

Criteria	Assessment
Significance of impact	The overall significance of impact of the Project on VP12 is therefore assessed as **moderate.**
Significance of impact with mitigation	Trees and shrubs will be introduced to screen the mainline valve from roads and residences, if reasonably requested by affected landholders and with any necessary approvals granted. The planting of trees and shrubs will be undertaken in consultation with the affected landholder and/or responsible authority. Planting would be undertaken in accordance of the relevant bushfire management overlays for the area. Following the successful implementation of this mitigation, the significance of impact of the Project on VP012 would be **low**.
Significance of impact post mitigation (residual)	To ensure significance of impact from the mainlline valve remains low a planting and remediation plan will be developed where planting of trees and shrubs are proposed following the initial mitigation measure. The plan will be reviewed by the responsible authority and/or affected landholders. This plan will outline a monitoring and defects period for planting and remediation to ensure significance of impact remains **low**.

10.16 Viewpoint location 13 (VP13): Gunns Gully Road/Hume Freeway

Figure 32 View from Gunns Gully Road, towards Hume Freeway

Table 34 Viewpoint assessment

Criteria	Assessment
Location and view direction	GPS location: 318 772, 5 846 448 (GDA 1994 MGA Zone 55) Elevation: 258 metres Nearest KP: 37 VP014 is located along Gunns Gully Road at the intersection of Hume Freeway. Figure 32 shows a view south-west along Hume Freeway.
Description of existing view	The existing view shows the intersection of the Hume Freeway and Gunns Gully Road. There is dense roadside vegetation along some sections of Hume Freeway and other elements such as shipping containers, road signs and light poles visible.
Anticipated change to view	The Project alignment would cross in front of this view and then continue across the Hume freeway to the opposite side. A drilling site would be established to facilitate the road crossing. There may be a loss of vegetation opposite the Hume Freeway, however other associated infrastructure such as pipeline maker signs will not be uncharacteristic of the area.
Sensitivity to change	View sensitivity is assessed as **low** due to the following factors: • Residents along Gunns Gully Rd may have a view to the pipeline marker signs, however the existing dense vegetation provides screening from potential views. • Road users are passing at high speeds and experiencing this view with short term viewing duration.
Magnitude of change	The magnitude of change is assessed as **low** due to the following • There is likely to be minor loss or alteration to the existing view • Due to the existing signage associated with the Hume Freeway there any additional signage will not be uncharacteristic of the area
Significance of impact	The overall significance of impact of the Project on VP13 is therefore assessed as **low.**

10.17 Viewpoint location 14 (VP14): Oriel road

Figure 33 View north-west along Oriel Road towards the Project

Table 35 Viewpoint assessment

Criteria	Assessment
Location and view direction	GPS location: 323 375, 5 842 995 (GDA 1994 MGA Zone 55) Elevation: 242 metres Nearest KP: 47 VP15 is located along Oriel Road, approximately 35 metres west of the Project alignment. Figure 33 shows a view north-west along Oriel Road towards the Project alignment.
Description of existing view	The existing view shows undulating farmland to the right and traditional, detached residential dwellings on the left. Street trees have been planted within the nature strip and along the property boundary, however these trees are not mature and currently provide minimal screening. There are gas pipeline markers and signage along the existing gas easement on the right of the fence.
Anticipated change to view	The Project will be aligned parallel to the road on the right hand side of the fence line. The Project, once completed, is not likely to appear noticeably different to the existing easement. When the street trees age it is expected that they will provide screening to any associated infrastructure within this view.
Sensitivity to change	View sensitivity is assessed as **moderate** due to the following factors: • Residents along this road may have a view to the pipeline marker signs, however the existing vegetation, when mature, will provide screening from potential views • Road users are passing are experiencing this view with short term viewing duration and limited value associated with the views from the road.
Magnitude of change	The magnitude of change is assessed as **negligible** due to the following • The Project, once completed, is not likely to appear noticeably different to the existing gas easement that is currently located along the Project alignment.
Significance of impact	The overall significance of impact of the Project on VP14 is therefore assessed as **negligible.**

10.18 Viewpoint location 15 (VP15): Donnybrook Road #3

Figure 34 View west along Donnybrook Road

Table 36 Viewpoint assessment

Criteria	Assessment
Location and view direction	GPS location: 323 534, 5 842 678 (GDA 1994 MGA Zone 55) Elevation: 240 metres Nearest KP: 47 VP16 is located along Donnybrook Road, approximately 40 metres east of the Project. Figure 34 shows a view south-west towards the Project.
Description of existing view	The existing view shows the extent of Donnybrook road, a sealed road with limited street vegetation. There is some dense vegetation in the background and within private property. An existing gas infrastructure compound associated with the Wollert-Wodonga gas pipeline can be seen to the left of this view.
Anticipated change to view	The proposed alignment will follow the Wollert-Wodonga line and cross at Donnybrook road in the middle distance in the view. It is anticipated that there will be minimal change to this existing view due to the existing infrastructure and gas pipeline easement.
Sensitivity to change	View sensitivity is assessed as **low** due to the following factors: • Residents have screened views to the existing infrastructure and road users in motor vehicles passing through would have short term views.
Magnitude of change	The magnitude of change is assessed as negligible due to the following • There is likely to be an almost imperceptible or no change in the view as there would be little or no loss of/or change to the elements, features or characteristics of the view.
Significance of impact	The overall significance of impact of the Project on VP15 is therefore assessed as **negligible.**

10.19 Viewpoint location 16 (VP16): Summerhill Road

Figure 35 View south-west along Summerhill Road towards the Wollert compressor station

Figure 36 View south along Summerhill Road

Table 37 Viewpoint assessment

Criteria	Assessment
Location and view direction	GPS location: 323 116, 5 839 552 (GDA 1994 MGA Zone 55) Elevation: 210 metres Nearest KP: 50 VP017 is located along Summerhill Road, approximately 700 metres north-east of the Wollert Compressor station. Figure 35 shows the view looking south-west towards the Wollert Compressor station. Figure 36 shows the view looking south along Summerhill Road where the alignment crosses the road and heads south towards the Wollert Compressor station.
Description of existing view	The existing view shows the vast flat low lying plains surrounding the proposed alignment. There is minimal existing vegetation in Figure 36, however the transmission lines can be seen in the background. Figure 35 shows the existing vegetation buffer around the Wollert Compressor station and its associated infrastructure.
Anticipated change to view	The proposed alignment will cross Summerhill road and follow the same alignment as the existing Wollert – Wodonga transmission line. It is anticipated that there will be minimal change to this view. Any changes to the Wollert compressor station are not likely to be obvious from this location. This is due to the changes being co-located with the existing infrastructure and its distance from the road.

Criteria	Assessment
Sensitivity to change	View sensitivity is assessed as **low** due to the following factors: • Residents have screened views to the existing infrastructure and there is likely to be no change to the existing view as the infrastructure already exists. • There may be the introduction of pipeline marker signs which is not uncharacteristic of the area
Magnitude of change	The magnitude of change is assessed as **negligible** due to the following: • There is likely to be an almost imperceptible or no change in the view as there would be little or no loss of/or change to the elements, features or characteristics of the view.
Significance of impact	The overall significance of impact of the Project on VP16 is therefore assessed as **negligible.**

11. Cumulative impacts assessment

11.1 OMR Road/E6 Transport Corridor

The OMR/E6 transport corridor is proposed to create new road and rail transport links through the Werribee, Melton, Tullamarine, Craigieburn/Mickleham and Epping/Thomastown areas. The proposed corridor for the OMR/E6 has been reserved through a Public Acquisition Overlay however work on this project has not commenced.

The Public Acquisition Overlay falls within the study area between KP07 and KP42. The scale of the OMR/E6 is significantly greater than the Project.

The Public Acquisition Overlay was approved in 2010 through local government processes. Further work will be required to prepare an Environmental Report by the Minister for Planning to obtain permits and approvals prior to any construction.

The combined and sequential visibility of the two projects would be unlikely to have an adverse cumulative impact due to the nature of the pipeline (i.e., located underground) and the significant difference in scale between the two projects.

11.2 Western Victorian Transmission Network project

The Western Victorian Transmission Network Project is proposing to construct 190km electricity transmission line starting at Bulgana in Victoria's west and connecting to Sydenham via a new terminal station north of Ballarat.

The project area of interest has been defined and a desktop analysis is being undertaken to identify and avoid areas of sensitive activities, high environmental value and high heritage value. The project area of interest falls within the Project study area between KP0 and KP08. Due to this project being above ground, this is of a much greater scale to that of the Project.

The project area of interest is undergoing significant change with recent residential developments such as Taylors lakes located in this area. The Project is within an existing APA easement in this location.

11.3 Bald Hill to Yan Yean Pipeline Project (Approved, in progress)

Melbourne Water is planning to build a new pipeline to meet growing demand for water in the northern and western suburbs of Greater Melbourne and to support development in the planned growth area. The project involves construction of a 20km pipeline from the Yan Yean Water Treatment Plant to the proposed Bald Hill, Kalkallo tank site.

The project area of interest has been defined and a desktop analyse, technical studies and investigations are being undertaken to identify and avoid areas of sensitive activities, high environmental value and heritage significance. The project area falls within the Project study area between KP43 and KP46. This project is below ground, so is of a similar scale to that of the Project. The WORM Project is within an existing APA easement in this location.

11.4 Sunbury Road Upgrade (Approved, in progress)

The Sunbury Road Upgrade involves the following:

- add an extra lane in each direction between Powlett Street and Bulla-Diggers Rest Road
- install traffic lights to replace the roundabouts at Francis Boulevard and Lancefield Road
- install traffic lights at 600 Sunbury Road
- upgrade the roundabout at Bulla-Diggers Rest Road
- upgrade the existing bridge and build a new bridge over the Jacksons Creek
- build new walking and cycling paths
- install safety barriers along the road

The project area of interest has been defined and desktop analysis has been undertaken to identify and avoid areas of significance and sensitive activities, high environmental value and high heritage value. The project area of interest falls within the study area between KP14 and KP15. Due to this project being above ground, this will have a greater scale of impact to that of the Project. The WORM Project is within an existing APA easement in this location.

The project area of interest is undergoing significant change to accommodate for future residential and commercial growth along Sunbury Road. VP07 is along Sunbury Road and was assessed as having low significance of impact.

The combined and sequential visibility of the projects would be unlikely to have adverse cumulative impact due to the nature of the pipeline (i.e., underground) and the significant difference in scale between three of the projects and the underground nature of the Yan Yean Pipeline. All four project areas of interest are undertaking individual technical assessments and desktop analysis to ensure they avoid areas of significance, sensitive activities and areas of high environmental and heritage value where appropriate.

12. Environmental management measures

Table 38 lists the recommended environmental management measures relevant to landscape and visual impact assessment. In developing the EMMs, the landscape and visual impact report adhered to the mitigation hierarchy that is, an obligation to first avoid, minimise, restore and only after exhausting those measures, offset the residual impacts that remain. For the landscape and visual impact assessment, the first step of the mitigation hierarchy 'avoidance' was preferred to manage environmental impacts that were identified. Where 'avoidance' cannot be achieved, due to the nature of the Project, the existing conditions and/or the type of impacts, 'minimisation', is the next level in the mitigation hierarchy proposed which aims to ensure the landscape and visual impacts are minimised as much as possible, where possible.

To manage and monitor performance, the planting and remediation plan (EMM LV7) would be developed where the planting of trees and shrubs are proposed. The plan would be reviewed by the responsible authority and/or affected landholders. This plan would outline a monitoring and defects period for planting and remediation to ensure the significance of impacts remain low.

Table 38 Recommended environmental management measures

EMM #	Environmental Management Measure	Stage	Mitigation hierarchy
LV1	Avoid tree removal as far as reasonably practicable. Through detailed design and selection of construction methods identify and demarcate trees to be retained (within the construction corridor) that provide screening to private property residences prior to commencement of construction. Protect trees in accordance with AS-4970 Protection of trees on development sites.	Design, construction	Avoidance
LV2	Prior to construction, undertake an arborist report on trees that screen private property residences from road reserves to be retained within or immediately bordering the construction corridor where trimming would be required. The arborist assessment must consider any potential impacts on trees from proposed construction activities in accordance with AS-4970 Protection of trees on development sites.	Construction	Avoidance
LV3	Remove machinery, materials and temporary infrastructure from site as soon as it is no longer required. Keep construction laydown areas tidy and minimise dust in accordance with EMM AQ1.	Construction	Minimisation
LV4	Manage light generated during night construction activities such as HDD, in general accordance with the requirements in Australian Standard AS/NZS 4282:2019 Control of the obtrusive effects of outdoor lighting. Design lighting to minimise off-site light spill as far as reasonably practicable.	Construction	Minimisation

EMM #	Environmental Management Measure	Stage	Mitigation hierarchy
LV5	Where trees and shrubs within the approved construction area are lost and affect public places or existing screening of private residences from road reserves, replace trees and shrubs where practicable, reasonably requested and in consultation with the affected landholder and/or responsible authority. Undertake planting in accordance with the relevant bushfire management overlays for the area.	Construction	Minimisation
LV6	Introduce trees and shrubs to screen the mainline valve from roads and residences, if reasonably requested by affected landholders and with any necessary approvals granted (while meeting requirements of the Asset Protection Zone (APZ)). The planting of trees and shrubs must be undertaken in consultation with the affected landholder and/or responsible authority. Undertake planting in accordance with the relevant bushfire management overlays for the area.	Construction	Avoidance
LV7	Develop and implement a planting and remediation plan (applicable to screening trees directly impacted) where planting of trees and shrubs are proposed, in consultation with any affected landowners where requested. Planting will be undertaken with consideration of APA requirements for restricted uses within an easement and other necessary approvals granted. The plan must be reviewed by the responsible authority and/or affected landholder. The plan must outline a monitoring and defects period for planting and remediation.	Construction, Operation	Avoidance

12.1 Monitoring

To manage and monitor performance, the planting and remediation plan (EMM LV7) would be developed where the planting of trees and shrubs are proposed following the initial mitigation measure. Planting would be undertaken 12 months after the reinstatement of the Project has occurred. The plan would consider any seasonal planting requirements and would be reviewed by the responsible authority and/or affected landholders. This plan would outline a monitoring and defects period for planting and remediation to ensure the significance of impacts remain low.

13. Conclusion

The purpose of this report is to provide a landscape and visual impact assessment to inform the preparation of the EES required for the Project.

A summary of the key assets, values or uses potentially affected by the Project, and the associated impact assessment are summarised below.

13.1 Existing conditions

The landscape context within the study area is predominantly rural with areas of scattered vegetation on private property and areas of established roadside vegetation. At the northern and southern sections of the Project alignment, the landscape is undergoing a process of continuous change within the Urban Growth Boundaries. Residential subdivisions are rapidly transforming the character of the landscape from rural to a highly modified, built up urban environment.

Higher value landscapes within the study area include the creek corridors of Jacksons Creek, Merri Creek, and Deep Creek. Topography comprises of a series of low rolling hills or small ridges, with the highest point to the south towards Mount Koroit and the lowest to the west towards Deep Creek along Oakland's and Mickleham Road. This creates a visual environment where lower-lying rural grazing areas are often visually defined by open views with a backdrop of continuous low rolling hills typically with some intervening scattered native vegetation.

13.2 Impact assessment

Given the short duration of the construction activities along the Project alignment, the residual landscape and visual impact of construction activity has been assessed as low to negligible. In the context of the rapid development of residential areas within the study area, construction activity would be a common occurrence in these areas. In rural areas, machinery and construction is also sometimes observed in relation to farming activity. In addition, construction activity commonly occurs along major roads and highways as part of road upgrade and maintenance works.

Lighting from 24 hour construction activities would occur at the HDD sites and locations where horizontal bores are required. HDD will occur where the Project alignment crosses Calder Freeway, Sunbury Road, Deep Creek and Hume Freeway. HDD sites would be lit at night time for approximately one and a half weeks during the construction phase. There would be low level lighting sufficient to illuminate machinery and the immediate work area. Night time works are a common occurrence along major roads and freeways, particularly in built up urban environments. In addition, street lighting also contributes substantially to background ambient lighting levels. For this reason, the night time lighting to be located at Calder Freeway, Sunbury Road and Hume Freeway for HDD works is expected to have a negligible impact.

From a review of aerial imagery, the closest residential dwelling to the HDD site at Deep Creek is estimated to be 350 metres away to the north-east. Given the distance and temporary nature of the night time lighting at Deep Creek, the impact is expected to be low to negligible.

There would be no night time lighting from construction of the Project which is directly adjacent to residential areas elsewhere along the Project alignment. For these reasons, the landscape and visual impact due to construction activity has been assessed as low to negligible.

Six LCAs were defined within the study area to assist in the assessment of landscape character impacts. Table 39 provides a summary of landscape character impact.

Table 39 Summary of landscape character impact

Landscape Character Area	Name	Sensitivity to change	Magnitude of change	Significance of impact (pre mitigation)	Significance of impact (post mitigation)
LCA1	Creek corridor	Moderate	Moderate	**Moderate**	**Low**
LCA2	Extractive industry	Low	Low	**Low**	**Low**
LCA3	Flat to gently undulating farmland	Moderate	Low	**Moderate-low**	**Low**
LCA4	Residential and urban growth	Moderate	Low	**Moderate-low**	**Low**
LCA5	Semi rural residential	Moderate	Moderate	**Moderate**	**Low**
LCA6	Land subject to development	Low	Negligible	**Negligible**	**Negligible**

The highest landscape character impacts were found to occur on LCA1 Creek corridor and LCA5 Semi rural residential, where a moderate rating was assigned. This is due to the potential for vegetation clearance altering the character of the landscape in some areas during the construction phase as a result of the Project. One large native tree would be removed by the Project at the Jacksons Creek crossing and up to two large native trees and one small native tree at the Merri Creek crossing (refer to Figure 12.8 and 12.23 within Appendix HH of the Technical Report A Biodiversity). However, there are several large trees that would be retained in both of these locations and there would be a minor loss of vegetation which would not be uncharacteristic of the creekline environment, whereby there are already numerous gaps in vegetation cover.

It is recommended that if there is any loss of screening trees between a residence and a road reserve resulting from direct impacts associated from construction activities in these two character areas, these will be replaced and appropriately selected. This mitigation measure (EMM LV5) will result in the significance of impact post-mitigation rating to be assigned as low for these character areas.

Vegetation clearance may also alter the character of LCA3 Flat to gently undulating farmland and LCA4 Residential and urban growth, however this would be to a lesser extent. This is due to existing development which has already modified the landscape. For this reason, a rating of moderate-low was assigned to these LCAs. A rating of low to negligible was assigned to LCA2 Extractive industry and LCA6 Land subject to development as these landscapes are either highly degraded or experiencing a process of rapid change. Any changes to the landscape character brought about by the Project would therefore not be significant.

A variety of sensitive visual receptors were identified within the study area, including rural areas, residential areas and land which is undergoing development. Sixteen representative viewpoint locations were selected to assess the visual impact of the Project. Photographs looking toward the Project were obtained from public roads and publicly accessible areas.

Table 40 provides a summary of visual impact.

Table 40 Summary of visual impact

View Point	Name	Sensitivity to change	Magnitude of change	Significance of impact (pre mitigation)	Significance of impact (post mitigation)
VP01	Plumpton Regulating Station at Taylors Road	Negligible	Negligible	**Negligible**	**Negligible**
VP02	Beattys Road, within Westwood residential development	High	Negligible	**Negligible**	**Negligible**
VP03	Melton Hwy	Low	Low	**Low**	**Low**
VP04	Holden Road	Low	Low	**Low**	**Low**
VP05	Thompsons Road, facing Calder Fwy	Negligible	Negligible	**Negligible**	**Negligible**
VP06	Bulla-Diggers Rest Road	Negligible	Low	**Negligible**	**Negligible**
VP07	Sunbury Road	Low	Low	**Low**	**Low**
VP08	Wildwood Road	Moderate	Low	**Moderate-low**	**Low**
VP09	Oaklands Road,	Moderate	Moderate	**Moderate**	**Low**
VP10	Mickleham Road	Moderate	Moderate	**Moderate**	**Low**
VP11	Donnybrook Road	Negligible	Negligible	**Negligible**	**Negligible**
VP12	Gunns Gully Road	Moderate	Moderate	**Moderate**	**Low**
VP13	Gunns Gully Road / Hume Freeway	Low	Low	**Low**	**Low**
VP14	Oriel Road	Moderate	Negligible	**Negligible**	**Negligible**
VP15	Donnybrook Road	Low	Negligible	**Negligible**	**Negligible**
VP16	Summerhill Road	Low	Negligible	**Negligible**	**Negligible**

The assessment found that the visual impact of the Project would be low to negligible for 12 of the 16 viewpoints assessed. In many cases, the Project would be located within an existing easement and the visual change to the landscape would be difficult to discern once the Project is complete. The highest rating for visual impact was moderate. This rating was assigned to VP09 Oaklands Road, VP10 Mickleham Road and VP12 Gunns Gully Road. At these locations, there is potential for vegetation removal or alterations which may result in a visual change to the landscape. Where there is any loss of screening trees and shrubs between a residence and a road reserve within the approved construction corridor, these will be replaced with appropriately selected trees where reasonably requested and in consultation with the affected landholder and/or responsible authority (EMM LV5). If no vegetation loss occurs, or if there is successful implementation of this mitigation, the significance of impact of the Project on these VP locations would be **low**.

With the successful implementation of the environmental management measures as outlined in section 12, the landscape and visual impact of the Project as a whole would be low to negligible and consistent with the relevant evaluation objective.

13.3 Cumulative impacts

The cumulative impacts of existing, planned and approved infrastructure, and utility projects within the area surrounding the Project have been considered. The key major projects relevant are:

- OMR/E6 Transport Corridor (Approved, not commenced)
- Western Victorian Transmission Network Project (Currently not approved)
- Bald Hill to Yan Yean Pipeline Project (Approved, in progress)
- Sunbury Road Upgrade (Approved, in progress)

The assessment considered the similarity to the Project in scale and form, the timing of the development, the combined visibility and the sequential visibility. For these projects the cumulative impacts have been assessed as minimal and unlikely to have any adverse visual impacts, considering the significant growth and change occurring in this region, the nature of the pipeline (i.e., located underground) and the difference in scale between the projects.

14. References

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Roads and Maritime Services, Australia (2018), *Environmental impact assessment practice note EIA-N04 - Guideline for landscape character and visual impact assessment, Version 2.1*

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Scottish Natural Heritage (2006), *Topic Paper 6: Techniques and Criteria for Judging Capacity and Sensitivity.*

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Western Australian Planning Commission (2007), *Visual Landscape Planning in Western Australia*

Appendices

Appendix A – Photomontages

EXISTING VIEW

PROPOSED DESIGN

KEY PLAN

View Direction:	350° - 70°
Horizontal Field Of View:	80°
Camera Height:	1.7 m
Camera Type:	Cannon EOS 6D
Lens Type:	50 mm
Photograph Time & Date:	12:06, 17th June 2020

Location:	Holden Road, Diggers Rest, Victoria
Coordinates:	299336, 5829368 (GDA 1994 MGA Zone 55)
Viewpoint Elevation:	184 m
Date of Photomontage:	10th July 2020
Issue:	v01

Western Outer Ring Main Gas Pipeline
APA Group

Viewpoint 04 : Holden Road

GHD Pty Ltd
Level 8, 180 Lonsdale Street
Melbourne VIC 3000
T 61 3 8687 8000 **E** melmail@ghd.com.au **W** www.ghd.com

EXISTING VIEW

PROPOSED DESIGN

KEY PLAN

View Direction:	4° - 84°
Horizontal Field Of View:	80°
Camera Height:	1.7 m
Camera Type:	Cannon EOS 6D
Lens Type:	50 mm
Photograph Time & Date:	15:35, 17th June 2020

Location:	Oaklands Road, Oaklands Junction, Victoria
Coordinates:	309519, 5837017 (GDA 1994 MGA Zone 55)
Viewpoint Elevation:	240 m
Date of Photomontage:	10th July 2020
Issue:	v01

Western Outer Ring Main Gas Pipeline
APA Group

Viewpoint 09 : Oaklands Road

GHD Pty Ltd
Level 8, 180 Lonsdale Street
Melbourne VIC 3000
T 61 3 8687 8000 **E** melmail@ghd.com.au **W** www.ghd.com

EXISTING VIEW

PROPOSED DESIGN

KEY PLAN

View Direction:	78° - 158°
Horizontal Field Of View:	80°
Camera Height:	1.7 m
Camera Type:	Cannon EOS 6D
Lens Type:	50 mm
Photograph Time & Date:	15:46, 17th June 2020

Location:	Oaklands Road, Oaklands Junction, Victoria
Coordinates:	309542, 5837226 (GDA 1994 MGA Zone 55)
Viewpoint Elevation:	236 m
Date of Photomontage:	10th July 2020
Issue:	v01

Western Outer Ring Main Gas Pipeline
APA Group

Viewpoint 09A : Oaklands Road

GHD Pty Ltd
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EXISTING VIEW

PROPOSED DESIGN

The photos that were used in viewpoint 13 were supplied by the client due to travel restrictions in place because of COVID-19.

The photographs were taken with an Ipad 6th generation. It does not conform to standard photomontage methodology.

KEY PLAN

View Direction:	211° - 291°
Horizontal Field Of View:	80°
Camera Height:	1.7 m
Camera Type:	Ipad 6th Generation
Lens Type:	31 mm
Photograph Time & Date:	10:36, 13th August 2020

Location:	Gunns Gully Road, Mickleham, Victoria
Coordinates:	31664, 5846708 (GDA 1994 MGA Zone 55)
Viewpoint Elevation:	235 m
Date of Photomontage:	11th September 2020
Issue:	v01

Western Outer Ring Main Gas Pipeline
APA Group

Viewpoint 13 : Gunns Gully Road

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ZOOMED IN VIEW TO HIGHLIGHT DESIGN

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KEY PLAN

View Direction:	211° - 291°
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Appendix B – Risk assessment

Table B-1 shows the draft consequence criteria for landscape and visual. Table B-2 shows the likelihood criteria and Table B-3 shows the Project risk matrix. Table B-4 shows the assessment for landscape and visual.

Table B 1 Consequence criteria – landscape and visual

Aspect	Insignificant	Minor	Moderate	Major	Severe
Landscape and visual	Indiscernible effect on views and will not affect the composition, appreciation of the landscape character, or the ability to take in or enjoy the view.	Low degree of visual change, but would not materially affect the composition, the appreciation of landscape character or the ability to take in or enjoy the view.	Temporary change or clearly noticeable permanent change to the view that would affect the composition, the appreciation of landscape character or the ability to take in or enjoy the view.	Permanent change to the composition of the view, the appreciation of landscape character, or the ability to take in or enjoy the view	Substantial permanent alteration to a view of recognised national importance and the appreciation of landscape character, the ability to take in or enjoy the view

Table B 2 Likelihood approach

Level		Description
1	Rare	The event is conceivable and may occur only in exceptional circumstances
2	Remote	The event could occur but is not anticipated and may occur if certain abnormal circumstances prevail
3	Unlikely	The event is unlikely but could occur if certain circumstances prevail
4	Likely	The event will probably occur in most circumstances
5	Almost certain	The event is expected to occur in most circumstances or is planned to occur

Table B Risk rating approach

		Consequence rating				
		Insignificant	Minor	Moderate	Major	Severe
Likelihood rating	Almost certain	Low	Medium	High	Very high	Very high
	Likely	Low	Low	Medium	High	Very high
	Unlikely	Negligible	Low	Medium	High	High
	Remote	Negligible	Negligible	Low	Medium	High
	Rare	Negligible	Negligible	Negligible	Low	Medium

Table B 4 Risk register – landscape and visual

Study	Risk No.	Works Area	Staging		Risk Pathway	Initial Environment Management Measures	Initial Risk			Additional Mitigation and Management Measures	Residual Risk		
Landscape and visual	LV1	All	C		**Tree removal:** Removal or alterations to trees and vegetation buffers changing the landscape character and causing visual impacts.	EMM LV1: Tree removal during construction would be avoided where possible. Trees to be retained would be clearly identified and demarcated prior to commencement of construction. Vegetation buffers between roads and construction and laydown areas would be maintained where possible. Protection of trees during construction would be in accordance with *AS-4970 Protection of trees on development sites*. EMM LV2: Prior to construction, an arborist report would be undertaken on any trees to be retained within or immediately bordering the construction corridor (where required). The assessment considers any potential impacts on trees from proposed construction activities in accordance with *AS-4970 Protection of trees on development sites.* EMM LV5: For loss of trees and shrubs within the approved construction area affecting public places or existing screening of private residences from road reserves, where practicable, trees and shrubs will replaced where reasonably requested and in consultation with the affected landholder and/or responsible authority. Planting would be undertaken in accordance of the relevant bushfire management overlays for the area.	Moderate	Likely	Medium	EMM LV7: A planting and remediation plan, will be developed where planting of trees and shrubs are proposed (in consultation with any affected landowners and consistent with APA guidelines on restricted uses within an easement and other necessary approvals granted.) This plan will incorporate the mitigation measures applied as per the relevant EMMs. The plan will be reviewed by the responsible authority and/or affected landholder. The plan will outline a monitoring and defects period for planting and remediation.	Minor	Likely	Low
Landscape and visual	LV2	All	C		**Construction activities:** Construction activities including laydown areas, activity in construction corridor and plant/equipment use changing landscape character and causing private and public visual impacts.	EMM LV3: Machinery, materials and temporary infrastructure would be removed as soon as it is no longer required and construction laydown areas would be kept tidy and dust kept to a minimum. Maintaining vegetation buffers between roads and construction and laydown areas where possible. Protection of trees to be in accordance with *AS 4970 Protection of trees on development site*. Removal of machinery and materials as soon as it is no longer required. Construction laydown areas to be kept tidy and dust kept to a minimum	Minor	Likely	Low	No additional measure identified.	Minor	Likely	Low
Landscape and visual	LV3	All	C		**Lighting:** Lighting required during any night time works at major creeks, major roads or rail crossings during HDD activities, causing visual amenity impact to nearby sensitive receptors.	EMM LV4: Light generated during night construction activities such as HDD, will be managed in general accordance with the requirements in *Australian Standard AS/NZS 4282:2019 Control of the obtrusive effects of outdoor lighting*. Generally, lighting would be designed to minimise off-site light spill.	Minor	Likely	Low	No additional measure identified.	Minor	Likely	Low
Landscape and visual	LV4	All		O	**Permanent infrastructure:** Changes to the landscape character due to presence of the permanent infrastructure.	EMM LV6: Trees and shrubs will be introduced to screen the mainline valve from roads and residences, if reasonably requested by affected landholders and with any necessary approvals granted. The planting of trees and shrubs will be undertaken in consultation with the affected landholder and/or responsible authority. Planting would be undertaken in accordance of the relevant bushfire management overlays for the area (while meeting requirements of the Asset Protection Zone (APZ)).	Minor	Likely	Low	EMM LV7: A planting and remediation plan, will be developed where planting of trees and shrubs are proposed (in consultation with any affected landowners and consistent with APA guidelines on restricted uses within an easement and other necessary approvals granted.) This plan will incorporate the mitigation measures applied as per the relevant EMMs. The plan will be reviewed by the responsible authority and/or affected landholder. The plan will outline a monitoring and defects period for planting and remediation.	Minor	Likely	Low

Study	Risk No.	Works Area	Staging		Risk Pathway	Initial Environment Management Measures	Initial Risk			Additional Mitigation and Management Measures	Residual Risk		
Landscape and visual	LV5	All		O	**Restrictions on land use in the pipeline easement:** Restrictions on use of the easement area for tree planting and other landscape and visual enhancements impacting on landscape character.	EMM LV5: For loss of trees and shrubs within the approved construction area affecting public places or existing screening of private residences from road reserves, where practicable, trees and shrubs will replaced where reasonably requested and in consultation with the affected landholder and/or responsible authority. Planting would be undertaken in accordance of the relevant bushfire management overlays for the area. accordance of relevant bushfire management overlays.	Minor	Likely	Low	EMM LV7: A planting and remediation plan, will be developed where planting of trees and shrubs are proposed (in consultation with any affected landowners and consistent with APA guidelines on restricted uses within an easement and other necessary approvals granted.) This plan will incorporate the mitigation measures applied as per the relevant EMMs. The plan will be reviewed by the responsible authority and/or affected landholder. The plan will outline a monitoring and defects period for planting and remediation.	Minor	Likely	Low

Appendix C – Heritage Overlays

Table C-3 List of Heritage Overlays within 1km of alignment

Reference No.	
HO55	Dry Stone walls and cypress trees
HO33	Olrig 5-15 Windrock Avenue, Craigieburn – External paint controls, tree controls apply
HO30	Duncan's Lane Bridge (over tributary of Jacksons Creek)
H029	Holden Ford & Bridge (over Jacksons Creek) Bulla-Diggers Rest Road, Diggers Rest
HO22	Lochton and Lochton Steam Mill, 145 Green Street, Bulla
HO24	Wildwood Road Bridge (over Deep Creek) Wildwood Road, Bulla
HO390	Willow Bank (former Craig Bank) 400 Wildwood Road, Wildwood
HO272	Oaklands Quarry 380 Oaklands Road, Oaklands Junction
HO271	Oaklands 380 Oaklands Road, Oaklands Junction
HO268	Brookville 65 Konagaderra Road, Oaklands Junction
HO394	Belmont 830 Craigieburn Road, Yuroke
HO392	Harpsdale 860 Craigieburn Road, Yuroke
HO261	Tulloch Outbuilding (former Cheese Factory, ruin) 30 Farleigh Court, Mickleham
HO36	Former Post Office
HO305	Springvale Winery (ruins) Harker Street (Springvale Treatment Plant), Sunbury
HO263	Mickleham Uniting Church (former Methodist) 1881 Mickleham Road, Mickleham
HO37	War Memorial Adjacent to 1880 Mickleham Road, Mickleham
HO 264	Marnong 155 Old Sydney Road, Mickleham
HO 262	Bleak House (ruin) 155 Gunns Gully Road, Mickleham
HO238	House (former Little), 25 McLeods Road, Diggers Rest
HO233	Oakbank (barn, dairy, tank), 185 Bulla-Diggers Rest Road, Diggers Rest

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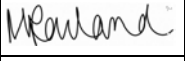
Document Status

Revision	Author	Reviewer		Approved for Issue		
		Name	Signature	Name	Signature	Date
1	D.Dharmaraj E.Gannon	M.Rowland		S.Brattle		11.05.2021

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