Appendix H

Preliminary Landscape and Visual Assessment

Preliminary Landscape and Visual Impact Assessment

Hunter Transmission Project

Prepared for Energy Corporation of NSW

May 2024

Preliminary Landscape and Visual Impact Assessment

Hunter Transmission Project

Energy Corporation of NSW

E220595 RP#12

May 2024

Version	Date	Prepared by	Approved by	Comments
1	15 December 2023	Tadd Andersen Stephen Bertram	Tadd Andersen	Draft
2	15 March 2024	Tadd Andersen Stephen Bertram	Tadd Andersen Rachael Thelwell	Draft
3	17 April 2024	Tadd Andersen Stephen Bertram	Tadd Andersen Rachael Thelwell	Draft
4	1 May 2024	Tadd Andersen Stephen Bertram	Tadd Andersen Rachael Thelwell	Final
5	8 May 2024	Tadd Andersen Stephen Bertram	Tadd Andersen Rachael Thelwell	Final

Approved by

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8 May 2024

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1 Introduction

Energy Corporation of NSW (EnergyCo) is proposing to build the Hunter Transmission Project (HTP), which involves the construction and operation of a new overhead 500 kilovolt (kV) double circuit transmission line between new substations at Bayswater and in the Olney State Forest.

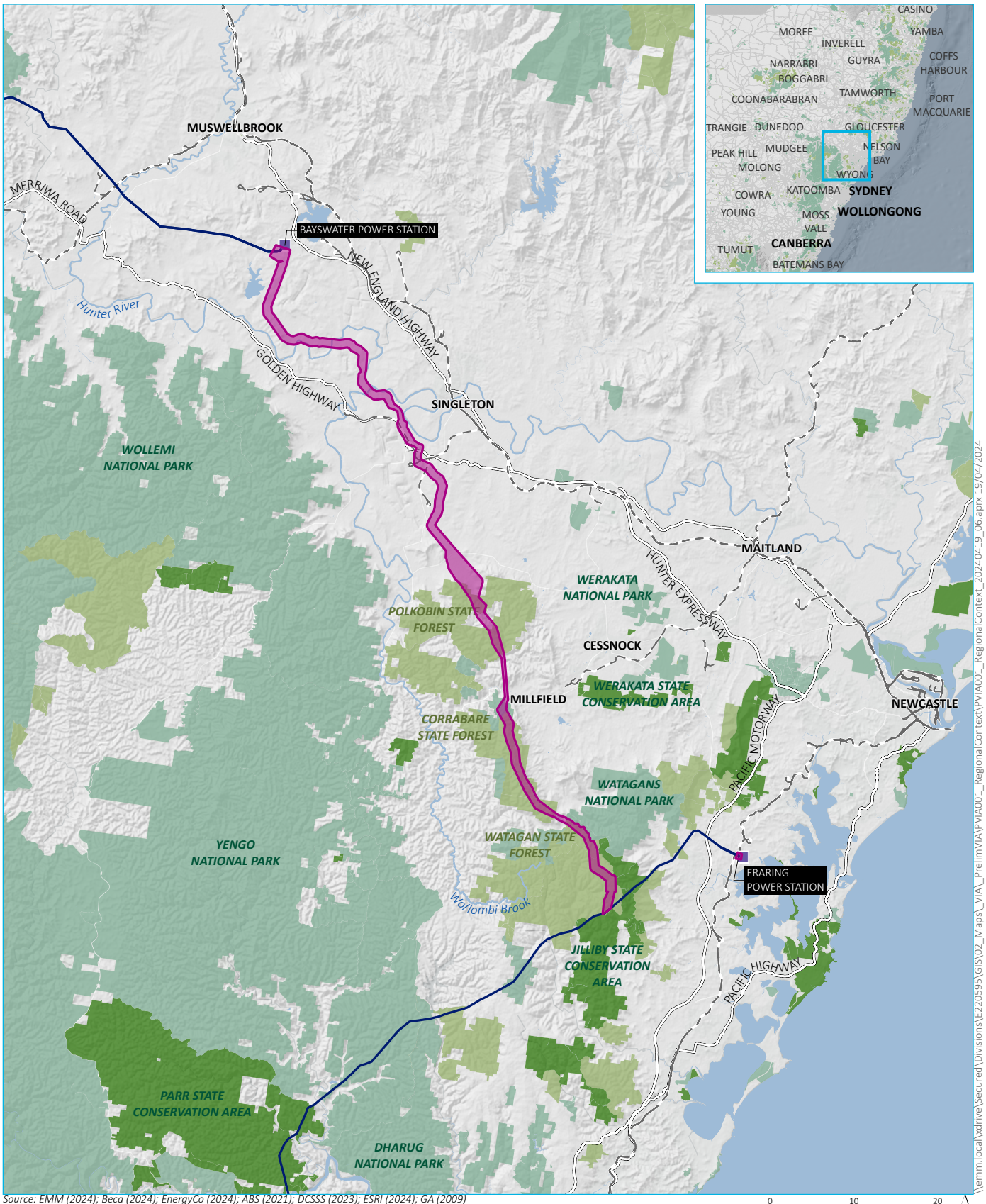
The HTP is critical for energy security by providing a crucial link in the state's energy network. Due to its strategic importance, the HTP has been declared Critical State Significant Infrastructure (CSSI) under the *Environmental Planning and Assessment Act 1979* and requires the approval of the Minister for Planning and Public Spaces before it can proceed.

EnergyCo is now proposing to start the environmental approvals process for the project and seek the environmental assessment requirements (SEARs) for the Environmental Impact Statement (EIS) that must accompany the CSSI application. The EIS will include a detailed assessment of the landscape and visual impacts of the project in accordance with the *Draft Transmission Guideline: Technical Supplement – Landscape and Visual Impact Assessment* (DPE 2023) (Draft Guideline).

After extensive investigations, EnergyCo has selected a corridor for the HTP. These investigations have sought to minimise impacts of the HTP on people and the landscape character of the Hunter region. This corridor will be refined during detailed design to further reduce the impacts of the HTP.

The nominal distance of the new transmission line is about 100 kilometres (km).

This Preliminary Landscape and Visual Impact Assessment (PLVIA) identifies locations around the HTP that have the potential for visual impacts. Visual impacts are changes to the existing landscape that can be seen by people. These potential impacts must be assessed and assigned a rating of high, moderate, low, or negligible. The PLVIA evaluates the surrounding residences, roads, and other publicly accessible places to identify locations that could be visually impacted by the HTP. These locations become viewpoints that will be assessed in detail in the Landscape and Visual Impact Assessment (LVIA) in the EIS.



Source: EMM (2024); Beca (2024); EnergyCo (2024); ABS (2021); DCSSS (2023); ESRI (2024); GA (2009)

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KEY

- HTP corridor
- Power station
- 500 kV transmission line
- Rail line
- Major road
- Named watercourse
- Named waterbody
- NPWS reserve
- State conservation area
- State forest

INSET KEY

- Major road
- NPWS reserve
- State forest

Regional context

Hunter Transmission Project
Preliminary visual impact assessment
Figure 1.1

EMM
creating opportunities

1.1 Project overview

The HTP includes:

- a new overhead 500 kV double circuit transmission line of around 100 km connecting the existing 500 kV transmission line at Bayswater to the existing 500 kV transmission line in the Olney State Forest near Eraring
- two new substations (Bayswater and Olney)
- associated works including upgrades to the existing Bayswater and Eraring substations, adjustments to existing transmission lines, road upgrades, access tracks, temporary construction facilities such as laydown areas, stringing sites, construction support sites and workers accommodation.

The key elements are summarised in Table 1.1 and depicted in Figure 1.2.

EnergyCo has chosen a corridor for the HTP. The HTP corridor is around one kilometre wide and seeks to minimise impacts on people and the environment.

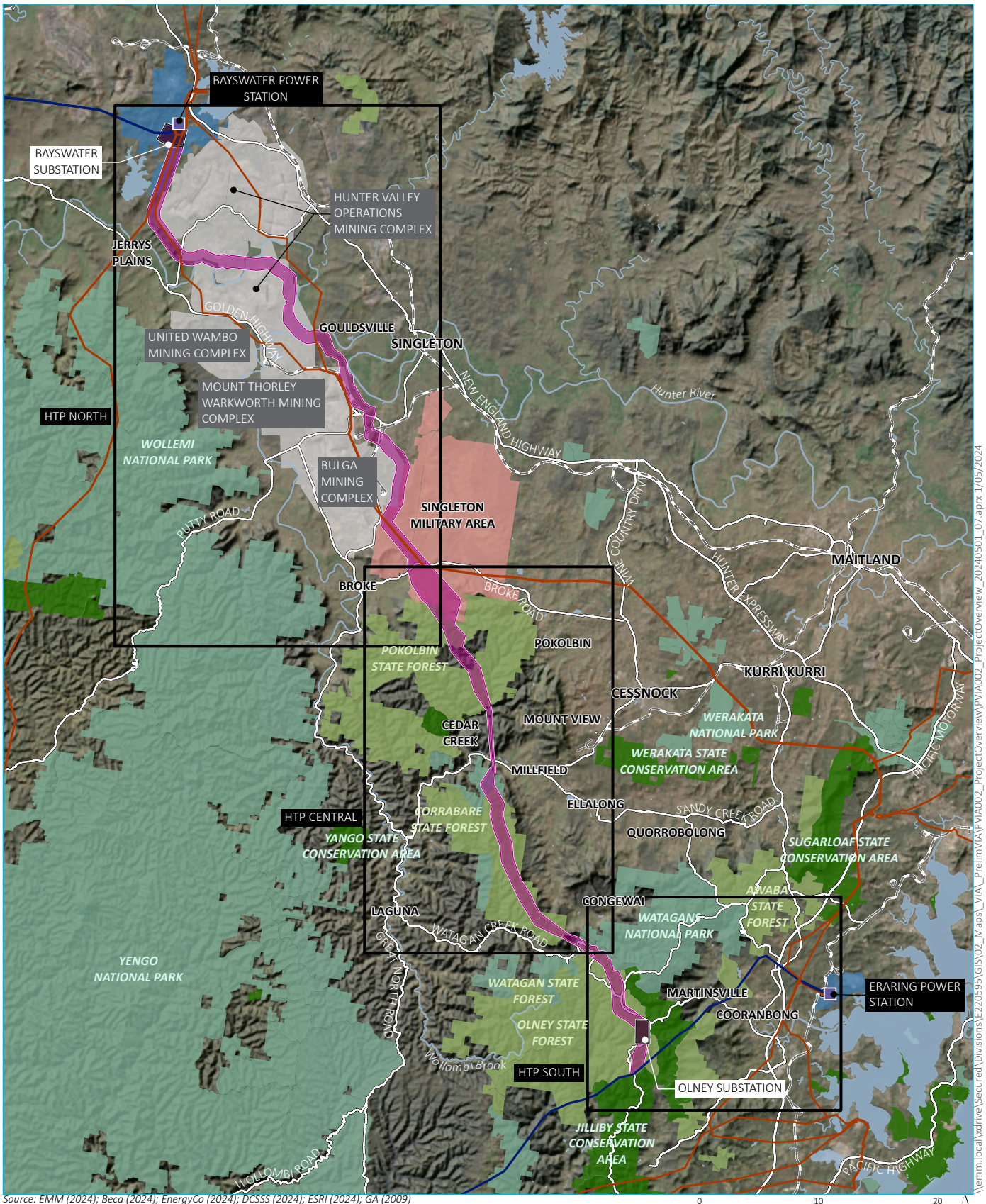
During the preparation of the EIS, EnergyCo will refine the width of the HTP corridor to less than 250 metres (m) and develop an indicative layout of both substations, the 500 kV transmission line, the adjustments to existing transmission lines and all ancillary infrastructure within the refined HTP corridor.

EnergyCo has divided the HTP corridor into three distinct sections (see Figure 1.2):

- HTP North – Bayswater to Broke, including the Bayswater Power Station, major coal mining complexes in the Upper Hunter Valley, Mount Thorley Industrial Estate, Singleton Military Area and several rural properties generally on the alluvial floodplains of the Hunter River
- HTP Central – Pokolbin to Corrabare, including the Pokolbin and Corrabare State forests and the rural residential areas between these forests at Cedar Creek, Millfield and Laguna
- HTP South – Olney to Eraring, including the Watagan and Olney State forests, Watagans National Park, Jilliby State Conservation Area, the residential areas in Martinsville and Cooranbong, and Eraring Power Station.

Table 1.1 Project overview

Summary	The HTP involves building a new overhead 500 kV double circuit transmission line of around 100 km and ancillary infrastructure. The existing 500 kV transmission line at Bayswater will connect to the existing 500 kV transmission line in the Olney State Forest near Eraring. The project will protect energy security in NSW by closing the northern gap in the 500 kV Ring and strengthening the core electricity grid in NSW for generations to come. The HTP will unlock electricity supply from the Central-West Orana and New England REZs. This will enable a clean and reliable electricity supply for consumers particularly in the Hunter, Sydney and Illawarra where 80% of the State's electricity is used.
Project area	The CSSI application for the HTP covers 5 local government areas. Most development to be concentrated in and around the HTP corridor but some ancillary development (such as construction support sites, road upgrades and laydown areas) outside the corridor. Current HTP project area: around 10,713 ha. Indicative construction footprint: around 1,785 ha. Indicative operational footprint: around 810 ha.
New transmission line	Overhead 500 kV double circuit transmission line of around 100 km. Steel lattice towers up to 75 m high that are typically spaced about 300 m to 600 m apart – but could extend to over 1 kilometre in some cases. 500 kV transmission lines with a minimum ground clearance of 13.5 m. Ancillary infrastructure such as earthwire and communications systems. Construction easement generally around 140 m wide. Operational easement generally around 70 m wide.
Adjustments to existing transmission lines	Line 5A3: Bayswater – Mt Piper 500 kV. Line 5A4: Bayswater – Wollar 500 kV. Line 31: Bayswater – Regentville 330 kV. Line 32: Bayswater – Sydney West 330 kV. Line 81: 330 kV: Newcastle – Liddell 330 kV. Line 82: 330 kV: Tomago – Liddell 300 kV. Line 5A1 and 5A2: Eraring – Kemps Creek 500 kV. Other lower voltage lines. Upgrades to existing earthwire and communications systems.
Substation works	New Bayswater 500 kV substation. Upgrades at the existing Bayswater substation. New Olney 500 kV substation. Upgrades at the Eraring substation, including installation of two new 1,500 MVA transformers.
Road works	Modifications to the existing public road network. New and upgraded access tracks for construction and operation.
Ancillary works	4 x construction support facilities, including workers accommodation. Laydown areas. Stringing sites. Third party utility and property adjustments.
Timing	Construction to start in 2026. Operation to start by the end of 2028.



Source: EMM (2024); Beca (2024); EnergyCo (2024); DCSSS (2024); ESRI (2024); GA (2009)

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KEY

- HTP corridor
- Power station
- 500 kV transmission line
- 330 kV transmission line
- Rail line
- Major road
- Named watercourse
- Named waterbody
- NPWS reserve
- State conservation area
- State forest
- Energy
- Mining
- Singleton Military Area

Project overview

Hunter Transmission Project
Preliminary Visual Impact Assessment
Figure 1.2

EMM
creating opportunities

2 Landscape character

The landscape of the wider Hunter region can be characterised by rolling coastal plains and rugged terrain associated with exposed Hawkesbury Sandstone rock outcrops. Much of the topography was formed through interactions with major river and catchment systems as well as fluctuating ocean levels.

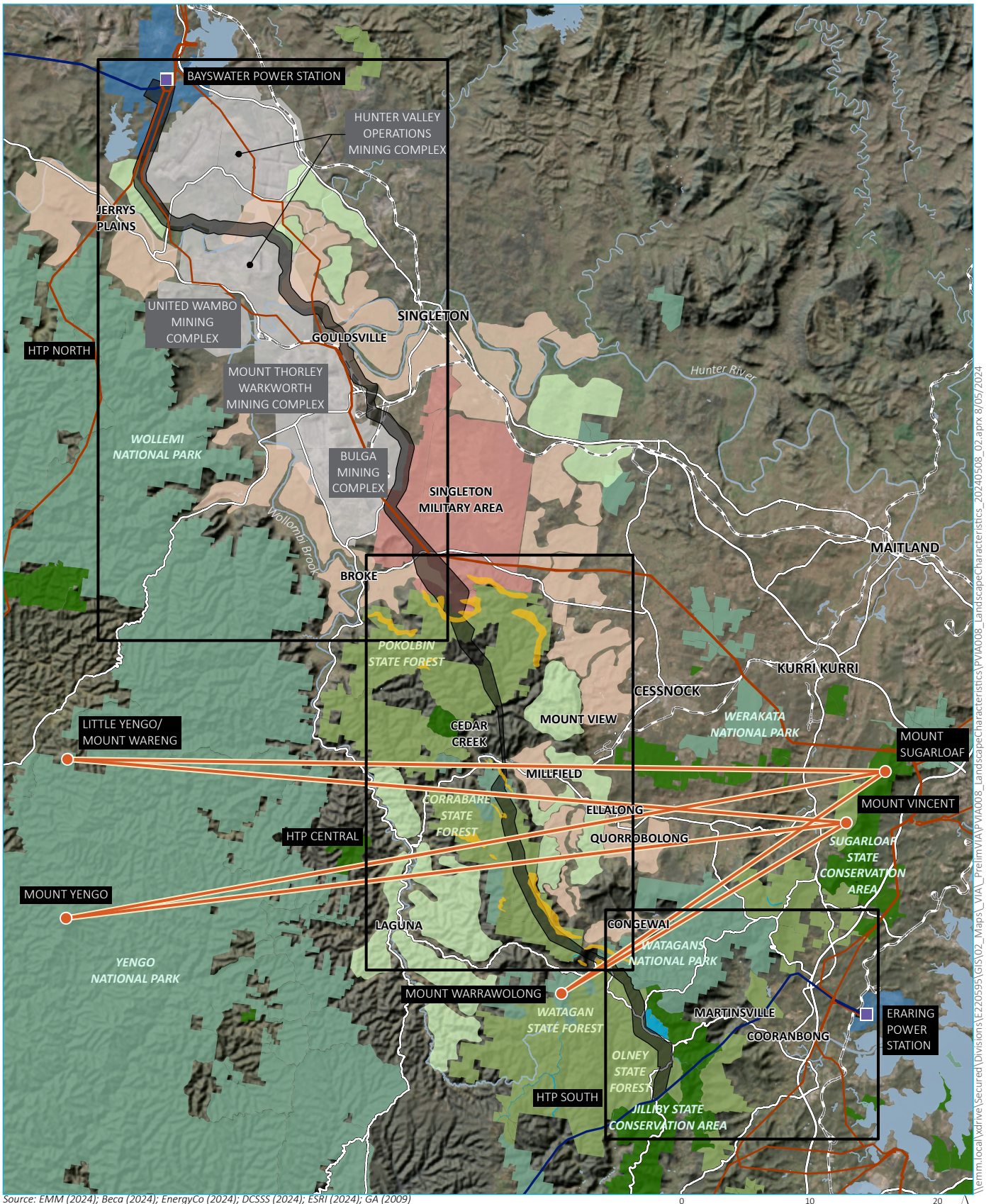
The Hunter Valley was formed as a wide valley with rolling hills carved by waterways, including the Hunter River. These areas would have historically been dominated by open woodland and are now subject to pastoralism and coal mining activities that have resulted in modified landscapes.

The southern edge of the Hunter Valley is defined by sandstone plateaus that are intersected with steep ravines and gorges. Most of these mountainous plateaus are contained within the State forests.

Landscape features were an important factor for the choice of camping, transitory and ceremonial areas used by Aboriginal people. In mountainous areas, the visual connection between mountains and/or important sites has cultural value. Feedback received during early engagement with traditional owners on HTP has included concerns about the interaction of the HTP crossing various 'connections' or 'linkages' between major promontories and mountains in the region, including Mount Yengo, Little Yengo, Mount Sugarloaf, Mount Vincent and Mount Warrawolong. There is also concern over the views from a significant rock shelter, located in Corrabare State Forest. EnergyCo will seek to avoid and minimise the project's impacts on these connections and sightlines during detailed design.

On a more local level, the existing landscape plays an important role in the visibility of infrastructure. Forested areas and mountainous topography can screen large objects like transmission towers from view, whereas flat agricultural plains with minimal vegetation can leave them exposed. Therefore, by placing towers behind visible ridgelines and at lower elevations in forested areas, the ridges may screen them from viewers on the valley floor or at lower elevations.

The landscape of the study area for HTP and its surrounds can be characterised into six broad categories. These are defined by the vegetation, landform, land use and presence of water. Figure 2.1 provides an overview of the landscape character and a brief description of each character area is provided in the sections following.



Source: EMM (2024); Beca (2024); EnergyCo (2024); DCSSS (2024); ESRI (2024); GA (2009)

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KEY

- HTP corridor
- Agricultural plain
- Bushland hill
- Sandstone outcrop
- Sight line
- Power station
- 500 kV transmission line
- 330 kV transmission line
- Rail line
- Major road
- Named watercourse
- Named waterbody
- NPWS reserve
- State conservation area
- State forest
- Recreation area
- Energy
- Mining
- Singleton Military Area

Landscape character

Hunter Transmission Project
Preliminary Visual Impact Assessment
Figure 2.1

EMM
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2.1 Agricultural plains

The agricultural plains are defined by a landscape that has been highly modified from its natural state. Agricultural lands surrounding the HTP corridor have been extensively cleared for agricultural and farming purposes of corn, hay, and lucerne cropping, beef and dairy cattle grazing and poultry raising. The agricultural plains are situated on flood plains adjacent to waterways, primarily the Hunter River and Wollombi Brook. They can be described as a mix of flat to low rolling hills with very sparse tree cover. The majority of remnant vegetation is located within the riparian / water course corridor which the agricultural land backs onto. There are occasional rows of tall narrow trees that serve as wind breaks, and visual screens, scattered amongst properties across the plains.

2.2 Water bodies and corridors

The HTP corridor intersects with two major NSW catchments, the Hunter River and Lake Macquarie / Tuggerah Lakes catchments. The transmission corridor spans several watercourses along its alignment including the Hunter River, Wollombi Brook, Congewai Creek, Watagan Creek, as well as many other permanent and ephemeral tributaries. Riparian corridors are typically vegetated and mark the landscape as they wind through valleys. A large proportion of the riparian corridor areas have been extensively modified due to historic and current mining activities and the insertion of associated water management infrastructure (e.g. diversion channels and water storage areas for power plant and mining purposes). Overcutting of timber has contributed to severe flooding, and control measures, such as Glenbawn Dam (est. 1958), have been installed.

2.2.1 The Hunter River

The serpentine Hunter River corridor is narrow with varying densities of vegetation along its banks. Alluvial sand deposits form sand banks within the watercourse which guide the flow of water into a narrow flowing channel that widens with rain or flooding events. Steep eroded vegetated banks form the edge of the river on one side while the other side is gentle sloping forming the sprawling flood plain.

The riparian corridor is intermittent and narrow due to clearing for agricultural lands both sides of the river. Vegetation is minimal with medium height native trees, shrubs, and grasses. The water is unseen from major roads with views only from crossing bridges.

2.2.2 Wollombi Brook

Wollombi Brook is a tributary of the Hunter River. The Brook winds across a valley floor between State Forests and National Parks. This meandering watercourse is narrow with a wide densely vegetated riparian corridor on both banks which creates natural screening for adjacent property owners throughout the valley. The water is unseen from major roads with views only from crossing bridges. Though the Brook is surrounded by agriculture and grazing land, the water corridor has remained heavily vegetated and creates a visual backdrop to semi-rural residential and farming activities.

2.2.3 Cedar Creek

Cedar Creek begins in Pokolbin State Forest about 2 km north of Mount View, west of Cessnock. It generally flows south, before reaching its confluence with the Congewai Creek adjacent to Wollombi Road. Cedar Creek is a very narrow water course which meanders through the Cedar Creek valley floor. This riparian corridor has high density native vegetation throughout the northern section of the valley where the valley bleeds into the surrounding forested hills. Embankments either side are steep and erosional, creating a deep channel. Further down the valley to the south the vegetation thins out and becomes partially segmented, with medium density vegetation and erosional deposits shaping the main channel. In sections, the water is visible from Cedar Creek Road and from water crossings to properties that intersect the creek.

2.2.4 Congewai Creek

Congewai Creek begins below Myall Range, about 3 km southeast of Quorrobolong trig station within the Watagan National Park. The creek generally flows northward and is joined by four tributaries including Cedar Creek, before joining with Wollombi Brook near the township of Wollombi. The creek descends 106 m over its 45 km course. As the creek emerges from the heavily vegetated Watagans National Park into the Congewai Valley the serpentine water course is shallow and narrow with gentile embankments both sides with segmented vegetation throughout its narrow riparian corridor, the water visible in sections where the adjacent Congewai Road comes within close proximity to the creek and from property entrance water crossings.

As the creek continues through the valley toward the township of Millfield the riparian corridor widens along its course, and the embankments become steep and heavily vegetated with undergrowth. The creek then enters a narrow, cleared valley near Cedar Creek and becomes very densely vegetated with a wide riparian corridor before joining Wollombi Brook. The creek creates a continuous vegetated backdrop to the various rural properties throughout the valleys and the water is only visible from bridge crossings and private properties.

2.2.5 Watagan Creek

The 27 km long, Watagan Creek begins near Crumps Retreat within the heavily vegetated Watagans National Park. It flows west adjacent to Watagan Creek Road and flows into Wollombi Brook near the village of Laguna. The creek forms a narrow valley which supports agricultural uses along its floor. The banks of the creek contain dense vegetation creating a continuous line of vegetation winding across the valley floor.

2.3 National and state forests

2.3.1 Watagans National Park

Watagans National Park located 20km south of Cessnock covers an area of around 7,800 hectares (ha), widespread within this coastal eucalypt rainforest are dense layers of ferns, dramatic moss-covered walls and boulders, giant Red Cedar trees and vibrant Illawarra Flame Trees all over the national park, Monkey Face lookout provides views over the Martinsville Valley and Narrow Place lookout provides 180 degree panoramic views toward Cessnock, the Hunter Valley and beyond to Barrington Ranges. The Watagan Mountains are of great importance to the Awabakal and Darkinjung People and has over 40 aboriginal sites displaying rock art and engraving techniques throughout the park. Historic timber industry log chutes and old sawmill sites from the 1820's can be found scatted throughout the forest.

2.3.2 Jilliby State Conservation Area

Jilliby SCA is located 25 km west of Swansea and covers an area of 12,159 ha. The conservation area was formerly part of Olney State Forest until 2003. Surrounding land use is predominantly forestry with grazing and a growing number of smaller rural residential in the foothills and valleys below.

Jilliby SCA protects important areas of remnant forest ecosystems at the head of major water catchments. Some areas have not been significantly logged and contain important biodiversity values and intact natural landscapes. Jilliby SCA contains a range of vegetation communities including tall moist eucalypt forest, warm temperate rainforest and drier tall eucalypt forests and woodlands. Jilliby SCA provides a scenic backdrop to the highly urbanised areas of Lake Macquarie, Wyong, and to a lesser extent, Gosford. Vantage points with scenic views are located along many of the ridgetop roads within the area and provide views northwest into the Hunter Valley and to the east along the coastline.

2.3.3 Pokolbin State Forest

Pokolbin State Forest located 18 km west of Cessnock covers an area of around 13,000 ha. This mountainous and heavily vegetated a dry sclerophyll hardwood forest is untouched bushland. The forest contains rugged rock formations and cliffs, sloping steeply towards the northeast from Broken Back Range.

There are a number of Aboriginal cultural heritage sites located within or within the surrounding area. The area is part of a cultural landscape, used for everyday and ceremonial activities including seasonal food and resource gathering and also as a travel route from the mountains to the coast. Tangible aspects of these activities are evident as walking tracks and scar trees, the remains of camp sites with stone tools (isolated stone artefact and artefact scatters) as well as sacred features and places created at the beginning of time.

2.3.4 Corrabare State Forest

Corrabare State Forest covers an area of about around 4,900 ha and is located between the villages of Millfield and Wollombi and is around 18 km south-west of Cessnock. The forest is steep to very steep, rugged, mountainous terrain with rocky outcrops, overhangs, and caves, as well as intermittent streams. The forest is a combination of dry and wet sclerophyll forest.

The forest creates a regional habitat corridor, connecting conservation lands on the escarpment with those on the coastal plain, from Yengo and Wollemi national parks in the west to Watagans and Werakata national parks in the east.

2.3.5 Watagan State Forest

Watagan State Forest covers an area of around 1,800 ha and is located 20 km south-west of Cessnock. The Forest borders Corrabare State Forest, Olney State Forest, Jilliby State Conservation Area and Watagans National Park. The forest is steep, rugged, mountainous terrain with a mixture of coastal Eucalypt rainforest within the south and eastern area of the forest and dry sclerophyll hardwood forest to the north and west. Flat Rock Lookout is a natural rock platform with a sheer 500 m drop off the escarpment, the lookout offers views across the Congewai Valley to the east and north.

2.3.6 Olney State Forest

Olney State Forest is located west of Lake Macquarie in the Watagan Mountains and is bordered by Wyong State Forest, Watagan State Forest and Watagans National Park. Olney State Forest covers an area of around 44,000 ha and is predominately undulating to steep terrain. Olney is a hardwood regrowth forest and has been harvested for timber for over a hundred years. Areas within the moist blue gum rainforest are part of a former Pine plantation.

Within the forest are sandstone cliffs dotted with small caves, waterfalls, valleys, gorges, carpets of maidenhair fern interlaced with lichen and bird's nest ferns hanging from trees.

Recreation areas are present with camping sites, BBQ facilities, picnic tables and walking tracks scatted throughout the forest for visitors. Indigenous rock art by the Darkinjung people can also be found in Olney State Forest.

2.4 Mining lands

There are around 20 open cut coal mines within the Singleton LGA, with many of these located in or adjacent to the Hunter River floodplains valley. Mining operations within the area have heavily altered the landscape.

The large extent of mining operations in the area are obscured from view with all operations set back from major roads and surrounded by large, vegetated embankments. Views to the mines are from lookout points with the occasional glimpses where roadside vegetation thins, and new plantings are being established. Previously mined areas are obvious with terraced hillsides that are being progressively rehabilitated.

2.5 Townships

2.5.1 Jerry's Plains

Jerry's Plains is located 33 km west of Singleton on the Golden Highway. It's a small rural town on the river flats by the Hunter River with a population of 385 (2016 census). Houses and businesses are mixed along the main road with the back streets leading to larger semi-rural properties. There is a public school, Anglican church, tourist information centre / post office in a 1881 historic building, and a hotel within the town. The area around the town has substantial horse-breeding properties as well as wine cultivation and production.

2.5.2 Warkworth

Warkworth, 22 km west of Singleton on the Golden Highway, is a small village with a church, picnic area with a playground and a cricket oval. St Philip's Anglican Church and the old Warkworth Public School (1859) are the only original buildings remaining in the village.

2.5.3 Mount Thorley

Mount Thorley is primarily an industrial estate, located east of the junction of Mitchells Line of Road and Putty Road, 6.5 km south of Singleton. Mount Thorley is one of Singleton's heavy industrial and engineering sectors. Associated with mining operations in the area, large warehouses, factories, storage yards, and businesses make up the park as well as coal refining plants, silos, and conveyor belts for coal transportation to the railway system. The Industrial Estate is set upon a hill and is obscured from view by vegetated embankments and the natural hill sides.

2.5.4 Broke

The village of Broke is situated at the base of the Brokenback and Hunter Ranges, on the Wollombi Brook, 26 km south-south-west of Singleton and hosts a population of approximately 292 people. Broke is a divided town with large block residential to the east of Wollombi Brook and rural properties cross the Brook to the west. The south side of Broke provides views across agricultural plains to the Brokenback Range and the sandstone formation known as Yellow Rock (Lizard Rock).

There are macadamia and olive tree plantations along Wollombi Brook in irrigated groves, and the town's surrounding area is dominated by boutique vineyards Broke's town centre contains a primary school, a Catholic church, an Anglican church, a service station with store and historical buildings, the original post office (1882), the village hall (1898) and the public school (1876).

2.5.5 Millfield

Millfield is located 12 km south-west of Cessnock and sits at the eastern foothills of the Yango State Conservation Area in a cleared agricultural and grazing valley, Millfield had a population of 1,006 as of the 2016 census. Millfield is zoned a combination of RU5 Village and R5 Large Lot Residential. Dwellings in this locality are of the federation era and the town has recently seen extensive change with the development of new large lot residential development, south of the original village with larger contemporary homes.

Much of the landscape around the village of Millfield has high to very high cultural heritage significance, particularly in areas around natural waterways. Millfield is within a relatively low–lying valley, surrounded by native forested mountains. Many areas of Millfield offer views to mountain ranges in the Corrabare, Watagan and Pokolbin State Forests. This includes views along Wollombi Road to the east and west.

Vegetation cover within the village area is minimal, with a canopy cover of approximately 10%. The largest concentration of contiguous vegetation is in the northern portion of Crawford Avenue, and in the far west, along the riparian corridor behind the school. Extensive vegetation located to the north and east of the Village is Lower Hunter Spotted Gum – Ironbark Threatened Ecological Community (TEC), and south and west of the village is open pasture grasslands. There are a number of heritage sites within Millfield, the former Rising Sun Inn (c1838), The Millfield Public School (1868), St Luke's Church Hall and Crawfordville Infants School (early 1920s).

2.6 Bushland hills

Within the HTP North corridor there are fragmented patches of bushland hills that gently rise from the edge of the floodplain, these undulating hills have medium density vegetation and are a combination of native grasslands and bushland comprising of native trees, shrubs, and grasses. These bushland hills visually break up the agricultural land by creating large areas of topographic and native vegetative screening.

2.7 HTP corridor

2.7.1 HTP North

The northern section contains a sequence of coal mines with highly modified landscapes. The mines also control vast tracts of land that are not accessible to the public, and often hidden from view. The northern section also contains existing power lines (330 kV) that originate at Bayswater Power Station. The HTP takes advantage of this by locating the transmission infrastructure alongside the mines, and along the existing power lines.

The HTP corridor does run near the western side of the Hunter River in the proximity of Maison Dieu to Hambledon Hill. The flood plains along the river are used for agriculture (crops and grazing) with residential properties located above the flood plains. Aside from vegetated riverbanks, there is little vegetation that can screen transmission towers from view.

South of Mount Thorley, the corridor enters land that is forested, and joins an existing 330 kV transmission line running through the Singleton Military Area. South of Cessnock Road, the transmission corridor traverses the Monkey Place Creek valley, which has been cleared.

Areas where the transmission corridor are expected to be visible include the agricultural plains along the Hunter River and Cessnock Road, near Broke.

2.7.2 HTP Central

The central section of the HTP is set primarily in State Forest lands. This landscape is mountainous and heavily forested. Access into the State Forests is limited to a few roads and tracks.

The routing of the HTP corridor takes advantage of the mountainous, forested lands and is located along ridges that are not easily seen from the surrounding populated valleys.

The corridor in HTP Central crosses the Wollombi Creek valley. The valley floor has been cleared and is used for agriculture, residential properties, and Wollombi Road. The township of Millfield is located along Wollombi Road, approximately 3.2 km east of the transmission corridor.

Locations where the transmission corridor are expected to be visible include the agricultural plains and waterways along Wollombi Road. There may be glimpses of the HTP infrastructure from agricultural plains along Congewai Road and from the valley along Watagan Creek. Within the forest areas, views of the corridor are expected to be limited by the terrain and existing vegetation.

2.7.3 HTP South

The southern section is also contained within the mountainous State Forest lands. Starting at Watagan Creek Road, it stretches south through the Watagan State Forest and Olney State Forest toward the intersection of Watagan Forest Road and Martinsville Hill Road. From this location, the corridor heads southeast to meet the existing transmission line.

This portion of the corridor (including the Olney Substation) is wholly contained within the Watagan and Olney State Forests. Views of the corridor are expected to be limited by the terrain and existing vegetation.

3 Visual assessment

3.1 Study area

The initial step in the PLVIA process is to define the visual study area, which is derived from the proposed transmission corridor. The study area defines the limits of the visual impact assessment and is specified by the Draft Guideline. Even though the transmission infrastructure may be visible beyond the study area, the visual impacts are not required to be assessed under the Draft Guideline.

Based on the maximum height of the proposed towers (75 m) and potential for the towers to be prominent in the view, the study area is required to be 1.5 km on either side of the HTP corridor (refer to Figure 3.1). This results in a study area of around 4 km for the PLVIA.

The HTP corridor is likely to be revised to around 250 m wide during the preparation of the EIS. The study area will be adjusted accordingly, which means some public and private viewpoints identified for detailed assessment in the PLVIA may not be included in the LVIA in the EIS.

3.2 Viewshed mapping

Viewshed mapping is a method of mapping the theoretical visibility of the project across the surrounding landscape. Using geographic information systems (GIS) technology, it uses the topography of the land and project modelling to analyse potential visibility of the project. The results are the zone of visual influence (ZVI).

The ZVI assists in determining where potential visual impacts would occur, and to what extent. This is important in selecting viewpoints to use in the LVIA. It can be used to eliminate the need to assess viewpoints that do not have line of sight to the transmission towers.

It is important to note that the Draft Guideline requires that vegetation (trees) and built structures not be included in the mapping. The resulting maps can therefore only show where landforms obstruct views. This can be important for viewpoints that are behind vegetation or buildings and have no, or obstructed, views of the proposed development, yet are assessed as having a potential impact in this PLVIA.

3.2.1 Zone of visual influence

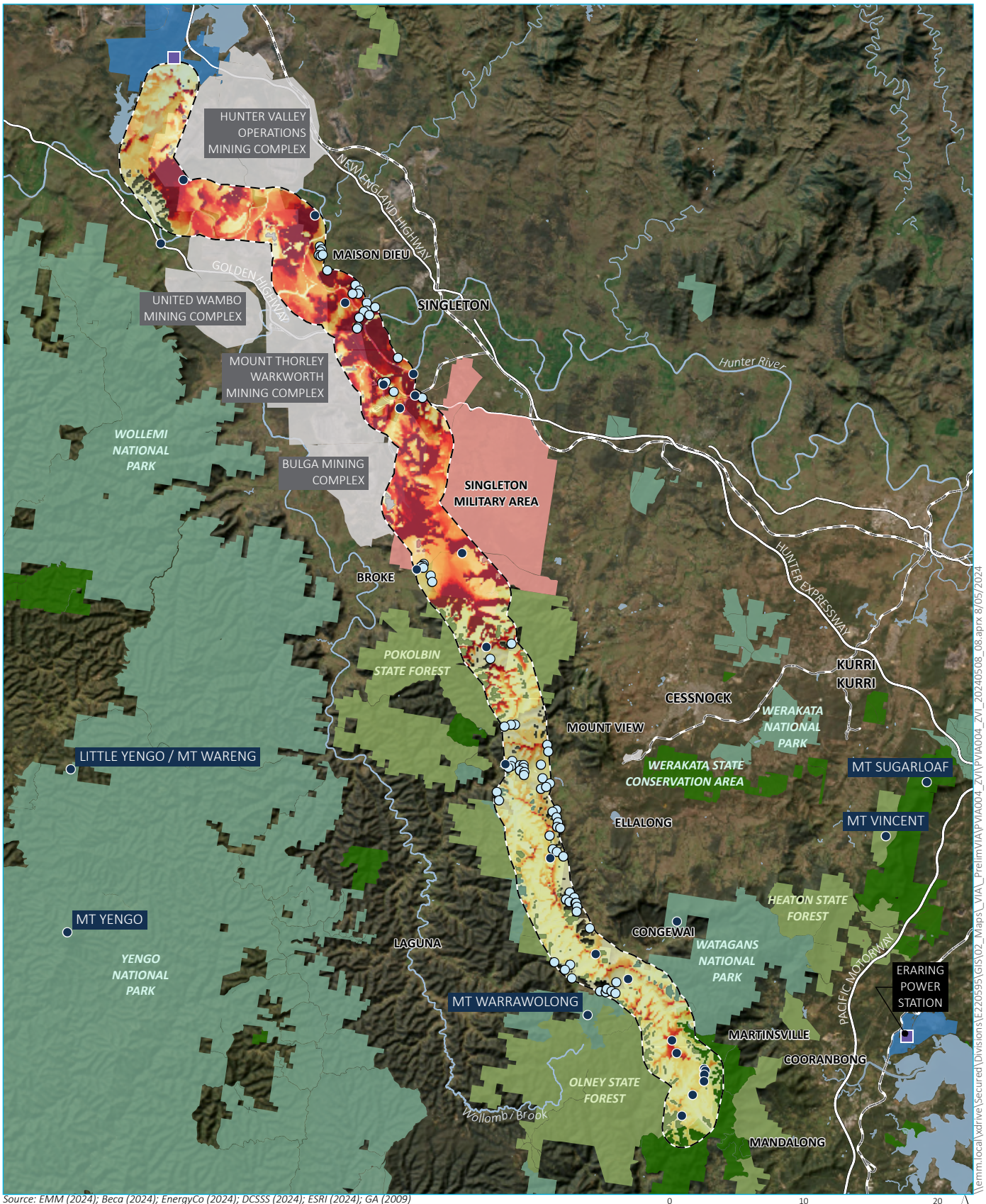
A ZVI diagram illustrates the theoretical visibility of the proposed project infrastructure, or the area over which a development can theoretically be seen. Refer to Figure 3.1 for the ZVI.

The ZVI is generated using a digital elevation model (DEM) which covers the development footprint and the immediate surrounds. The DEM was built using publicly available ELVIS spatial data from the Foundation Spatial Data Framework.

The DEM is representative of the bare earth surface and only takes into account the topography of the landscape. This does not account for any vegetation (trees), or structures (e.g. rural dwellings, farm sheds and agricultural infrastructure) that may screen views into the development footprint. It represents a worst-case scenario in terms of project visibility.

It is important to note that the ZVI does not take into account the diminishing size of the project elements as the viewer moves further away. It only indicates where the project elements would be visible, with no obstructions. To account for the diminishing effect of distance on the project elements, distance bands are marked on the ZVI. These provide a general guide to help visualise relative size based on personal experience.

Note the ZVI does not indicate specifically how many towers or which towers are visible from a particular location.



Source: EMM (2024); Beca (2024); EnergyCo (2024); DCSSS (2024); ESRI (2024); GA (2009)

0 10 20 km

GDA2020 MGA Zone 56

N

KEY

- Visual study area
- Private receiver
- Public viewpoint

Visibility of transmission project

- High visibility
- Low visibility

- Power station
- Rail line
- Major road
- Named watercourse
- Named waterbody
- NPWS reserve
- State conservation area

- State forest
- Defence
- Energy
- Mining

Zone of visual influence

Hunter Transmission Project
Preliminary Visual Impact Assessment
Figure 3.1

EMM
creating opportunities

3.2.2 ZVI summary

The ZVI indicates that the proposed project infrastructure has the most potential for the highest visibility from areas immediately surrounding the development footprint. Distances over 1 km have diminishing views of the project.

The ZVI illustrates the following:

- The topography and land use (mining) limits opportunities to see much of the transmission lines between Bayswater and Maison Dieu.
- The section between Bayswater and Broke has potential for consistent but low visibility up to 8 km – this only takes topography into consideration; forested areas would reduce this distance.
- South of Broke, visibility is variable and mainly low due to topography.
- The alignment crossing Wollombi Road has the potential to affect:
    - 19 residences
    - travellers along Wollombi Road.

The ZVI is a tool to help identify the project's visibility from the surrounding landscape. The extent of the project's visibility and the potential for impacts on visual amenity would be verified by field work and photographic evidence in the EIS.

3.3 Viewpoint identification

The final step in the PLVIA is to identify the public viewpoints and private receivers within the study area that would have line of sight to the project infrastructure. These are the viewpoints that would be assessed in detail during the EIS stage of the project.

Some ancillary infrastructure is likely to be located outside the study area and may result in impacts on additional viewpoint. If this happens, these impacts will be assessed in detail in the LVIA in the EIS.

For the purposes of the preliminary assessment, there are two types of viewpoints. These are:

- Public viewpoints – locations that are publicly accessible (roads, parks, trails, shopping areas) and offer views of the transmission corridor.
- Private receivers – locations that are not accessible to the public (mainly residences) and have views of the transmission corridor.

3.3.1 Public viewpoints

Public viewpoints include a number of various types of locations. They include public gathering areas like parks, sporting fields and walking trails in the surrounding community. They also include roads, trails, scenic viewpoints and campsites that are located within regional, state and national parks, reserves and forests. Tourist attractions, heritage sites and public buildings can also be included in this category.

The public areas identified near the corridor include:

- Pokolbin State Forest
    - Lizard Rock, with Yellow Rock Lookout on top of the formation

- Yellow Rock Road
- Broken Back Road

- Mount Baker
- Millfield Cemetery
- Corrabare State Forest
- Watagan State Forest
  - Flat Rock Lookout
  - Walkers rest area
  - Watagan Creek Road Bridge
- Olney State Forest
  - Casuarina Camping area
  - Turpentine Camping area
  - The Pines Campground
  - Old Mill picnic area
  - The Pines picnic area
- Watagans National Park
  - 125r Lookout
- Jilliby State Conservation Area.

3.3.2 Private viewpoints

Private viewpoints are primarily residences and land held by private individuals. Access to these locations is typically restricted, limiting the number of people who are impacted by a project. However, these are locations where people spend most of their time, and the duration of a visual impact is substantial for those living there.

Private viewpoints are assessed individually as they are near the project that are likely to have significant visual impacts. These are likely to require detailed assessments in the LVIA. During the LVIA process, photographs would be taken from the residence, in a location that captures views from important rooms in the house.

3.3.3 Selected viewpoints

The selection of the viewpoints is based on the locations of residences, public areas and roads within the study area. This was overlaid with the ZVI mapping to determine which locations had the potential for visual impacts from the project. Viewpoints selected satisfy two criteria; falling within the affected ZVI and characterised as a private, public or road viewpoint.

Table 3.1 through Table 3.3 list the viewpoints selected for this assessment and the rational for the selection. Figure 3.2, Figure 3.3 and Figure 3.4 illustrate where the viewpoints are located.

The proposed viewpoints are grouped by location as follows:

- HTP North – Table 3.1
- HTP Central – Table 3.2
- HTP South – Table 3.3.

Table 3.1 Selected viewpoints for assessment – HTP North

Viewpoint reference	Viewpoint type	Location	Rationale for selection
PR-N01	Private	956b Maison Dieu Road, Maison Dieu	Residence within the study area
PR-N02	Private	9 Shearers Lane, Maison Dieu	Residence within the study area
PR-N03	Private	20 Shearers Lane, Maison Dieu	Residence within the study area
PR-N04	Private	50 Shearers Lane, Maison Dieu	Residence within the study area
PR-N05	Private	51 Shearers Lane, Maison Dieu	Residence within the study area
PR-N06	Private	41 Shearers Lane, Maison Dieu	Residence within the study area
PR-N07	Private	124 Knodlers Lane, Maison Dieu	Residence within the study area
PR-N08	Private	266B Dights Crossing Road, Maison Dieu	Residence within the study area
PR-N09	Private	290 Dights Crossing Road, Maison Dieu	Residence within the study area
PR-N10	Private	318 Dights Crossing Road, Maison Dieu	Residence within the study area
PR-N11	Private	318 Dights Crossing Road, Maison Dieu	Residence within the study area
PR-N12	Private	375 Dights Crossing Road, Maison Dieu	Residence within the study area
PR-N13	Private	163 Long Point Road, Longpoint	Residence within the study area
PR-N14	Private	99 Long Point Road, East Long Point	Residence within the study area
PR-N15	Private	83 Long Point Road, Gouldsville	Residence within the study area
PR-N16	Private	134 Long Point Road, East Long Point	Residence within the study area
PR-N17	Private	16 Long Point Road, Gouldsville	Residence within the study area
PR-N18	Private	90 Gouldsville Road, Gouldsville	Residence within the study area
PR-N19	Private	90 Gouldsville Road, Gouldsville	Residence within the study area
PR-N20	Private	609C Hambledon Hill Road, Hambledon Hill	Residence within the study area
PR-N21	Private	996 Putty Road, Mount Thorley	Residence within the study area
PR-N22	Private	984 Putty Road, Mount Thorley	Residence within the study area
PR-N23	Private	887 Putty Road, Mount Thorley	Residence within the study area
PR-N24	Private	920 Mitchell Line of Road, Mount Thorley	Residence within the study area

Table 3.1 Selected viewpoints for assessment – HTP North

Viewpoint reference	Viewpoint type	Location	Rationale for selection
PR-N25	Private	385 Cessnock Road, Broke	Residence within the study area
PR-N26	Private	367 Cessnock Road, Broke	Residence within the study area
PR-N27	Private	359 Cessnock Road, Broke	Residence within the study area
PR-N28	Private	368 Cessnock Road, Broke	Residence within the study area
PR-N29	Private	118 Oakley Lane, Broke	Residence within the study area
PR-N30	Private	36 Oakley Lane, Broke	Residence within the study area
PV-N01	Public	Lemington Road, Lemington	Road with potential views
PV-N02	Public	Golden Highway at Lemington Road	Major road with potential views
PV-N03	Private	Archerfield Road, Warkworth	Heritage item within the study area
PV-N04	Public	Longpoint Road W, Gouldsville	Heritage item within the study area
PV-N05	Public	Golden Highway, Mount Thorley	Major road with potential views
PV-N06	Public	Mitchell Line of Road at Putty Road	Major road with potential views
PV-N07	Public	Broke Road, Mount Thorley	Main road with potential views
PV-N08	Public	Cessnock Road, Broke	Main road with potential views
PV-N09	Public	Cessnock Road, Broke	Main road with potential views
PV-N10	Public	478 Putty Road, Mount Thorley	Heritage item within the study area

Table 3.2 Selected viewpoints for assessment – HTP Central

Viewpoint reference	Viewpoint type	Location	Rationale for selection
PR-C01	Private	Cedar Creek Road, Cedar Creek	Residence within the study area
PR-C02	Private	Cedar Creek Road, Cedar Creek	Residence within the study area
PR-C03	Private	518 Cedar Creek Road, Cedar Creek	Residence within the study area
PR-C04	Private	436 Cedar Creek Road, Cedar Creek	Residence within the study area
PR-C05	Private	436 Cedar Creek Road, Cedar Creek	Residence within the study area
PR-C06	Private	225 Mount Baker Road, Mount View	Residence within the study area
PR-C07	Private	58 Lewis Road, Millfield	Residence within the study area
PR-C08	Private	16 Cedar Creek Road, Cedar Creek	Residence within the study area
PR-C09	Private	1726 Wollombi Road, Cedar Creek	Residence and heritage item within the study area

Table 3.2 Selected viewpoints for assessment – HTP Central

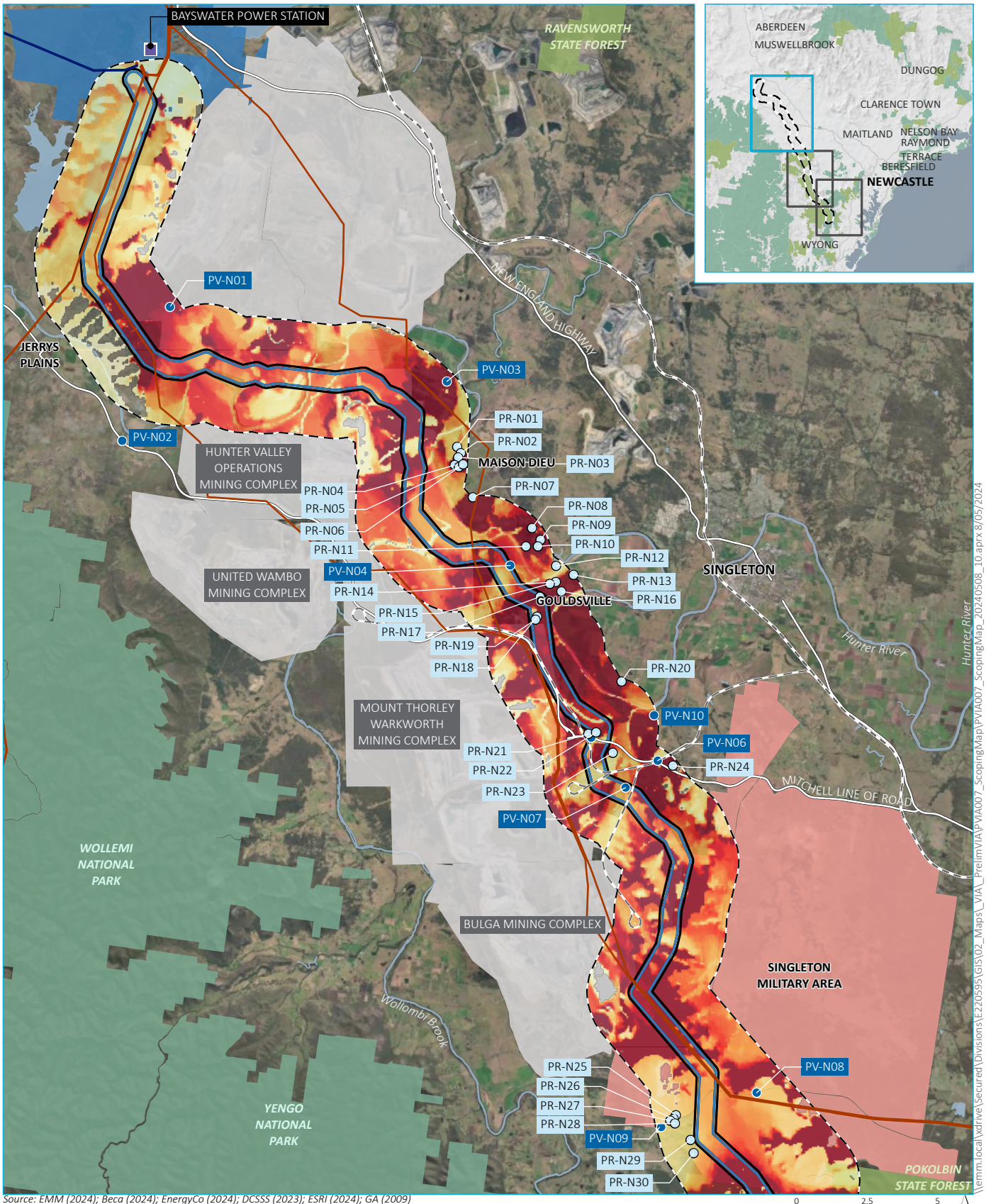
Viewpoint reference	Viewpoint type	Location	Rationale for selection
PR-C10	Private	1739 Wollombi Road, Sweetmans Creek	Residence within the study area
PR-C11	Private	1650 Wollombi Road, Millfield	Residence within the study area
PR-C12	Private	1648 Wollombi Road, Millfield	Residence within the study area
PR-C13	Private	1652 Wollombi Road, Millfield	Residence within the study area
PR-C14	Private	1646 Wollombi Road, Millfield	Residence within the study area
PR-C15	Private	1610 Wollombi Road, Millfield	Residence within the study area
PR-C16	Private	1611 Wollombi Road, Millfield	Residence within the study area
PR-C17	Private	83 Lewis Road, Millfield	Residence within the study area
PR-C18	Private	1460 Wollombi Road, Millfield	Residence within the study area
PR-C19	Private	340 Pokolbin Mountains Road, Pokolbin	Residence within the study area
PR-C20	Private	L 25 Wollombi Road, Millfield	Residence within the study area
PR-C21	Private	1469 Wollombi Road, Millfield	Residence within the study area
PR-C22	Private	84 Sweetmans Creek Road, Sweetmans Creek	Residence within the study area
PR-C23	Private	144 Sweetmans Creek Road, Sweetmans Creek	Residence within the study area
PR-C24	Private	210 Hayes Road, Millfield	Residence within the study area
PR-C25	Private	52 MF1 Road, Millfield	Residence within the study area
PR-C26	Private	72 MF1 Road, Millfield	Residence within the study area
PR-C27	Private	96 MF1 Road, Millfield	Residence within the study area
PR-C28	Private	192 MF1 Road, Millfield	Residence within the study area
PR-C29	Private	153 MF1 Road, Millfield	Residence within the study area
PR-C30	Private	232 MF1 Road, Corrabare	Residence within the study area
PR-C31	Private	147 Trig Road, Congewai	Residence within the study area
PR-C32	Private	284 Thursbys Road, Congewai	Residence within the study area
PR-C33	Private	278 Thursbys Road, Congewai	Residence within the study area
PR-C34	Private	168 Eglinford Lane, Congewai	Residence within the study area
PR-C35	Private	166 Eglinford Lane, Congewai	Residence within the study area
PR-C36	Private	191 Eglinford Lane, Congewai	Residence within the study area
PR-C37	Private	153 Eglinford Lane, Congewai	Residence within the study area
PR-C38	Private	125 Eglinford Lane, Congewai	Residence within the study area
PR-C39	Private	121 Eglinford Lane, Congewai	Residence within the study area

Table 3.2 Selected viewpoints for assessment – HTP Central

Viewpoint reference	Viewpoint type	Location	Rationale for selection
PR-C40	Private	89 Eglinford Lane, Congewai	Residence within the study area
PR-C41	Private	87 Eglinford Lane, Congewai	Residence within the study area
PR-C42	Private	940 Congewai Road, Congewai	Residence within the study area
PR-C43	Private	1295 Watagan Creek Road, Laguna	Residence within the study area
PR-C44	Private	1297 Watagan Creek Road, Watagan	Residence within the study area
PR-C45	Private	1299 Watagan Creek Road, Watagan	Residence within the study area
PR-C46	Private	1473 Watagan Creek Road, Watagan	Residence within the study area
PR-C47	Private	1753 Watagan Creek Road, Watagan	Residence within the study area
PR-C48	Private	1829 Watagan Creek Road, Watagan	Residence within the study area
PR-C49	Private	1831 Watagan Creek Road, Watagan	Residence within the study area
PR-C50	Private	1999 Watagan Creek Road, Watagan	Residence affected by the easement
PR-C51	Private	1861 Watagan Creek Road, Watagan	Residence within the study area
PR-C52	Private	2025 Watagan Creek Road, Watagan	Residence within the study area
PV-C01	Public	Broken Back Trail, Cedar Creek	Forest road with potential views
PV-C02	Public	Cedar Creek Road, Sweetmans Creek	Road with potential views
PV-C03	Public	Trig Road, Corrabare	Forest road with potential views
PV-C04	Public	Langans Road, Corrabare	Flat Rock Lookout
PV-C05	Public	Watagan Creek Road, Watagan	Forest road with potential views
PV-C06	Public	Mount Warrawolong	Cultural interest point
PV-C07	Public	Mount Vincent	Cultural interest point
PV-C08	Public	Mount Sugarloaf	Cultural interest point
PV-C09	Public	Mount Yengo	Cultural interest point
PV-C10	Public	Mount Wareng / Little Yengo	Cultural interest point
PV-C11	Public	125r Lookout Trail, Congewai	125r Lookout

Table 3.3 Selected viewpoints for assessment – HTP South

Viewpoint reference	Viewpoint type	Location	Rationale for selection
PV-S01	Public	Watagan Forest Road at Wollombi Forest Road	Recreation location with potential views Olney Headquarters campground
PV-S02	Public	Watagan Forest Road at Palmers Road	Forest road with potential views
PV-S03	Public	Watagan Forest Road at Martinsville Hill Road	Forest road with potential views
PV-S04	Public	Watagan Forest Road	Heritage item
PV-S05	Public	Watagan Forest Road at McKenzies Road	Forest road with potential views
PV-S06	Public	Watagan Forest Road at Prickly Ridge Road	Forest road with potential views
PV-S07	Public	Watagan Forest Road	Forest road with potential views
PV-S08	Public	Watagan Forest Road at Murrays Road	Forest road with potential views



Source: EMM (2024); Beca (2024); EnergyCo (2024); DCSSS (2023); ESRI (2024); GA (2009)

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GDA2020 MGA Zone 56

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KEY

- Urban setback
- Rural setback
- Study area extent
- Private receivers
- Public viewpoint

Visibility of transmission project

- High visibility
- Low visibility

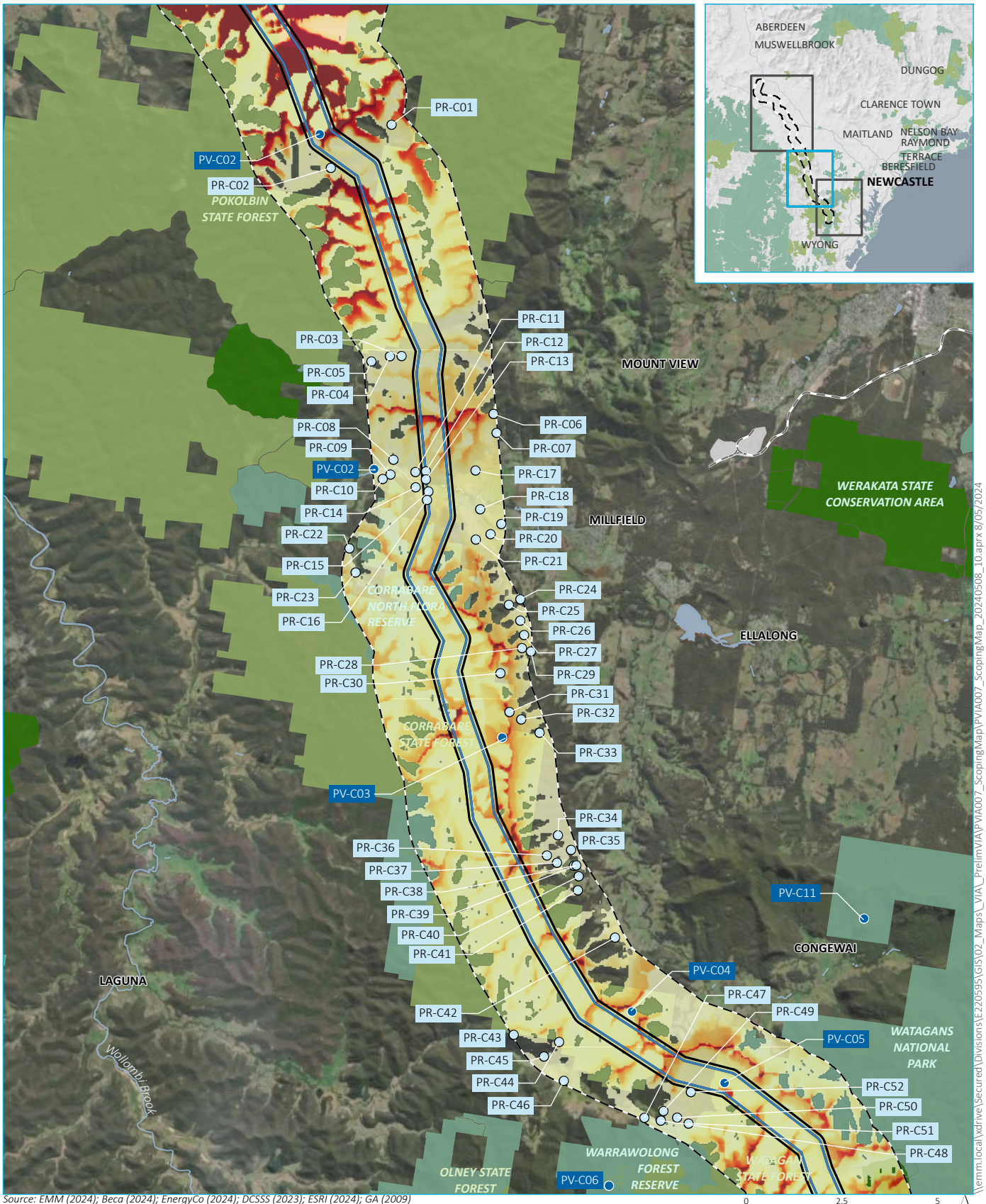
- Power station
- 500 kV transmission line
- 330 kV transmission line
- Rail line
- Major road
- Named watercourse
- Named waterbody

- NPWS reserve
- State forest
- Defence
- Energy
- Mining

Scoping map
HTP North

Hunter Transmission Project
Preliminary Visual Impact Assessment
Figure 3.2

EMM
creating opportunities



Source: EMM (2024); Beca (2024); EnergyCo (2024); DCSSS (2023); ESRI (2024); GA (2009)

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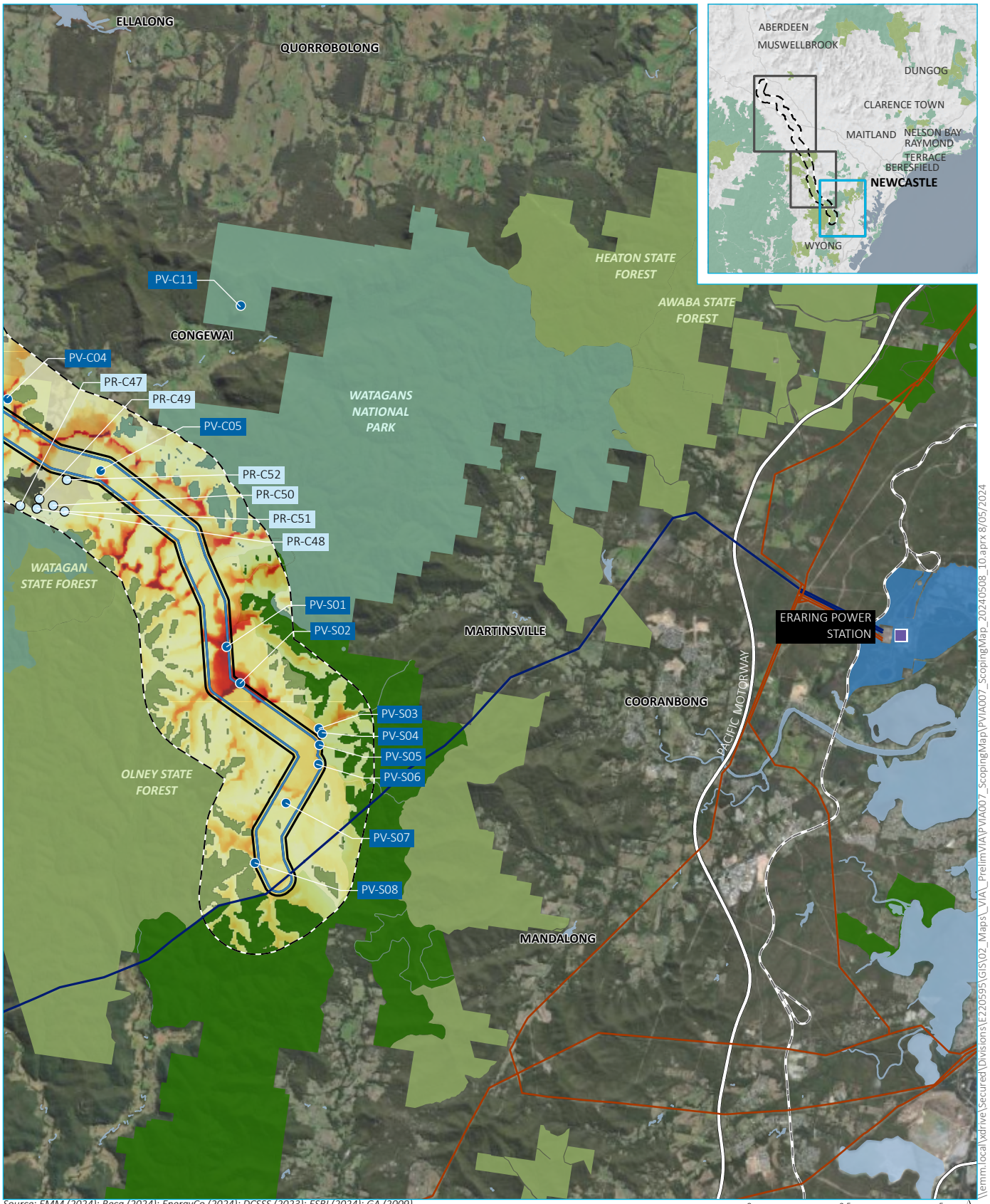
KEY

- Urban setback
- Rural setback
- Study area extent
- Private receivers
- Public viewpoint
- Rail line
- Named watercourse
- Named waterbody
- NPWS reserve
- State conservation area
- State forest
- Defence
- Mining

Scoping map
HTP Central

Hunter Transmission Project
Preliminary Visual Impact Assessment
Figure 3.3

EMM
creating opportunities



Source: EMM (2024); Beca (2024); EnergyCo (2024); DCSSS (2023); ESRI (2024); GA (2009)

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KEY

- Urban setback
- Rural setback
- Study area extent
- Private receivers
- Public viewpoint
- Power station
- 500 kV transmission line
- 330 kV transmission line
- Rail line
- Major road
- Named waterbody
- NPWS reserve
- State conservation area
- State forest
- Energy

Scoping map
HTP South

Hunter Transmission Project
Preliminary Visual Impact Assessment
Figure 3.4

EMM
creating opportunities

4 Preliminary assessment summary

4.1 Visual assessment

The preliminary assessment is a tool to help identify viewpoints with potential visual impacts from the transmission project. These viewpoints would be further evaluated and assessed in the detailed LVIA during the EIS stage of the project.

This preliminary assessment identified 82 private viewpoints and 28 public viewpoints in the community and landscape surrounding the project. Table 4.1 summarises the viewpoints and receivers that would be further assessed in the EIS.

Table 4.1 Viewpoint summary

Location	Private viewpoints	Public viewpoints
HTP North	30	10
HTP Central	52	10
HTP South	0	8
Totals	**82**	**28**

4.1.1 Potential high impact locations

There are areas along the transmission alignment that have potential for visual impacts. Moving from north to south, these locations include those listed below:

- Maison Dieu area along Knodlers Lane, Maison Dieu Road and Archerfield Road
  - this area is within 2 km of the transmission corridor with little screening from landscape elements.
- Long Point to Hambledon Hill and Mount Thorley
  - this area is within 4 km of the transmission corridor with little screening from landscape elements
  - the area is sparsely populated, so the number of receptors should remain low.
- Golden Highway from Gouldsville to Mount Thorley
  - the highway parallels the transmission corridor
  - mitigating factors include two existing transmission lines and rail infrastructure adjacent to the highway.
- Broke Road, north of Broke
  - the transmission lines are located adjacent to the road. This would only affect travellers along Broke Road.
- Broke area
  - the transmission corridor crosses Cessnock Road.

- Millfield and Wollombi Road
    - potential for a large number of receptors in the Millfield township. This is an elevated area with panoramic views of the mountains in Corrabare State Forest
    - travellers along Wollombi Road and Mount View Road have potential views of the transmission lines.

4.2 Suggested SEARs

The suggested SEARs for the landscape and visual amenity impacts are as follows:

- avoid and minimise the project's landscape and visual impacts
- assess the project's landscape and visual impacts in accordance with the draft *Technical Supplement for Landscape and Visual Impact Assessment* (DPE, 2023) for transmission projects
- describe the measures that will be implemented to mitigate moderate to high visual impacts on people, including providing suitable vegetation screening or at-source treatments at affected public viewpoints and private dwellings.

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