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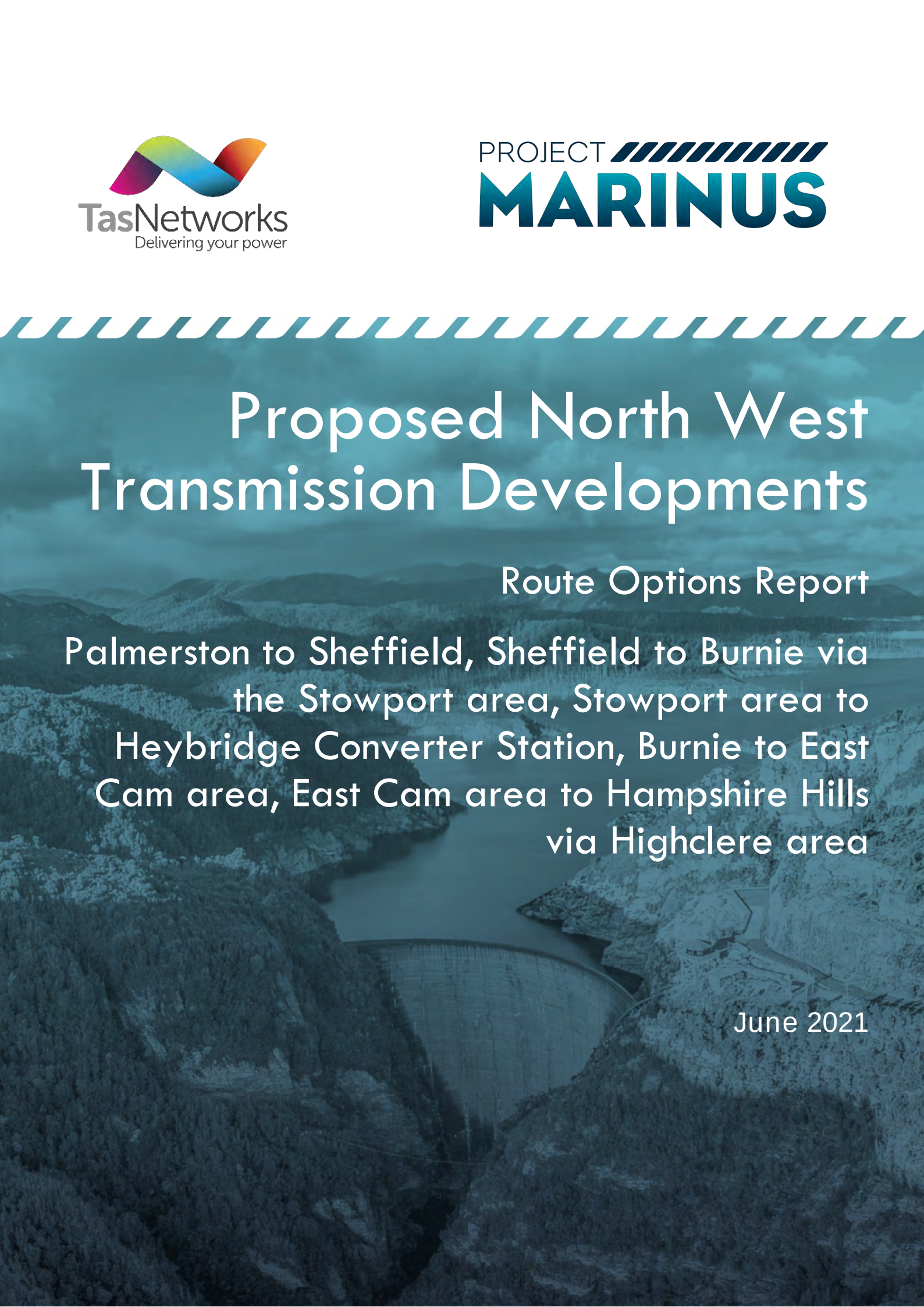
PROJECT MARINUS

Proposed North West Transmission Developments

Route Options Report

Palmerston to Sheffield, Sheffield to Burnie via the Stowport area, Stowport area to Heybridge Converter Station, Burnie to East Cam area, East Cam area to Hampshire Hills via Highclere area



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Responsibilities

This document is the responsibility of Tasmanian Networks Pty Ltd, ABN 24 167 357 299 (hereafter referred to as "TasNetworks").

You can contact us with any questions about the proposed developments to the North West Tasmania transmission network via our project email and phone line. If you would like to find out more you can also visit the TasNetworks website, email us on projectmarinus@tasnetworks.com.au, or call us on 1300 127 777.

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Overview of Route Selection Process

(numbers relate to section numbers in this report)

Table of Contents

Index of Figures

Index of Plates

Index of Tables

Executive Summary

Tasmanian Networks Pty Ltd (**TasNetworks**) owns, operates and maintains the electricity transmission and distribution networks in Tasmania. TasNetworks has responsibility for transmission system planning in Tasmania under the National Electricity Rules. The Australian Energy Market Operator (**AEMO**) is responsible for system security including transmission planning for the National Electricity Market (**NEM**). In Tasmania, TasNetworks is also responsible for system security including transmission planning.

In its capacity as jurisdictional planner, TasNetworks has prepared a strategic transmission plan for North West Tasmania. This plan sets out proposed transmission development for the region, to support energy flows to and from Marinus Link and efficiently unlock renewable energy and storage resources. As part of progressing the strategic transmission plan for North West Tasmania, TasNetworks is investigating the development of overhead transmission lines between Palmerston and Sheffield, and Sheffield and Burnie via Heybridge and from Burnie to Hampshire Hills via the Highclere area in North West Tasmania.

Project need

In its 2018 and 2020 Integrated System Plans (**ISPs**), AEMO has identified renewable energy zones and required transmission investment to efficiently unlock and transport energy in a rapidly transforming National Electricity Market. The *Integrated System Plan 2018* (AEMO 2018) and *Integrated System Plan 2020* (AEMO 2020) identify three renewable energy zones (**REZs**) in Tasmania – one in North East Tasmania, one in North West Tasmania and one in the Central Tasmania.

AEMO's 2018 ISP identified that Marinus Link, together with the supporting transmission developments in North West Tasmania, could play a key role in efficiently unlocking Tasmania's renewable energy and storage capacity, and that work should continue so that the project can be 'shovel ready' by 2023-24. The 2020 ISP also included Marinus Link as part of the future plan. The first 750 MW[1] of capacity including supporting transmission in North West Tasmania, should progress so it is able to be in service from 2028-29. The second 750 MW including supporting transmission in North West Tasmania, should be able to be in service from 2030-31.

The Tasmanian Government has legislated Tasmania's intention to reach 100 per cent self-sufficiency with renewable energy by 2022, and a doubling to 200 per cent renewable generation by 2040. The State Government has also released a Renewable Hydrogen Action Plan, aiming for Tasmania to be commercially exporting green hydrogen by 2030. Analysis undertaken by TasNetworks shows that the unlocking of

[1] This finding is based on the step change scenario outlined in the AEMO 2020 ISP. Link to AEMO 2020 ISP: https://aemo.com.au/energy-systems/major-publications/integrated-system-plan-isp/

Tasmania's renewable energy and storage resources supported by the Tasmanian Renewable Energy Target (**TRET**), a green hydrogen industry, and Marinus Link and supporting transmission developments, are complementary and provide significant benefits to electricity customers and to regional communities. The developments also support Australia's clean energy transition.

The Tasmanian electricity transmission network will require augmentation of existing transmission assets and development of new assets to enable proposed and anticipated renewable energy and storage projects to proceed.

Transmission network planning

TasNetworks developed conceptual plans for the North West region in response to identified connection enquiries and applications, forecast growth in renewable generation and storage projects in the region, the proposed connection of Marinus Link and system constraints. These were included in the 2019 Annual Planning Report (https://www.tasnetworks.com.au/Poles-and-wires/Planning-and-upgrades/Planning-our-network) published for consultation. TasNetworks also developed a strategic transmission plan for the North West Tasmania transmission network.

Strategic planning recommends strengthening the North West Tasmania transmission network by creating a 220 kV 'rectangle' connecting the existing Sheffield and Burnie substations with two new switching stations. One new switching station is proposed at Hampshire Hills to facilitate forecast North West and Far North West wind development and West Coast wind and pumped hydroelectric storage projects. Another is proposed at Staverton to enable re-purposing of existing transmission lines between Staverton and Sheffield, and to facilitate forecast Mersey-Forth pumped hydroelectric storage projects.

Connecting Staverton and Hampshire Hills switching stations to Sheffield and Burnie substations to create a 'rectangle' (Figure E-1) provides significant system benefits. These include transmission route diversity and redundancy, reduced transmission losses, while maximising power transfer capability and system resilience.

The proposed transmission line between Palmerston and Sheffield will reinforce the North West Tasmania transmission network by strengthening the connection between Palmerston and Sheffield. The proposed transmission lines from Sheffield to Burnie via Heybridge and from Burnie to Hampshire Hills via the Highclere area complete the 220 kV 'rectangle'. The transmission lines will facilitate connection of Marinus Link and support connection of future renewable energy projects in the North West Tasmania REZ and Central Tasmania REZ. New double circuit 220 kV overhead transmission lines (**OHTL**) are proposed, with new switching and converter stations at Heybridge to enable connection of Marinus Link.

The proposed OHTLs will be built, owned and operated by TasNetworks as part of the shared network.

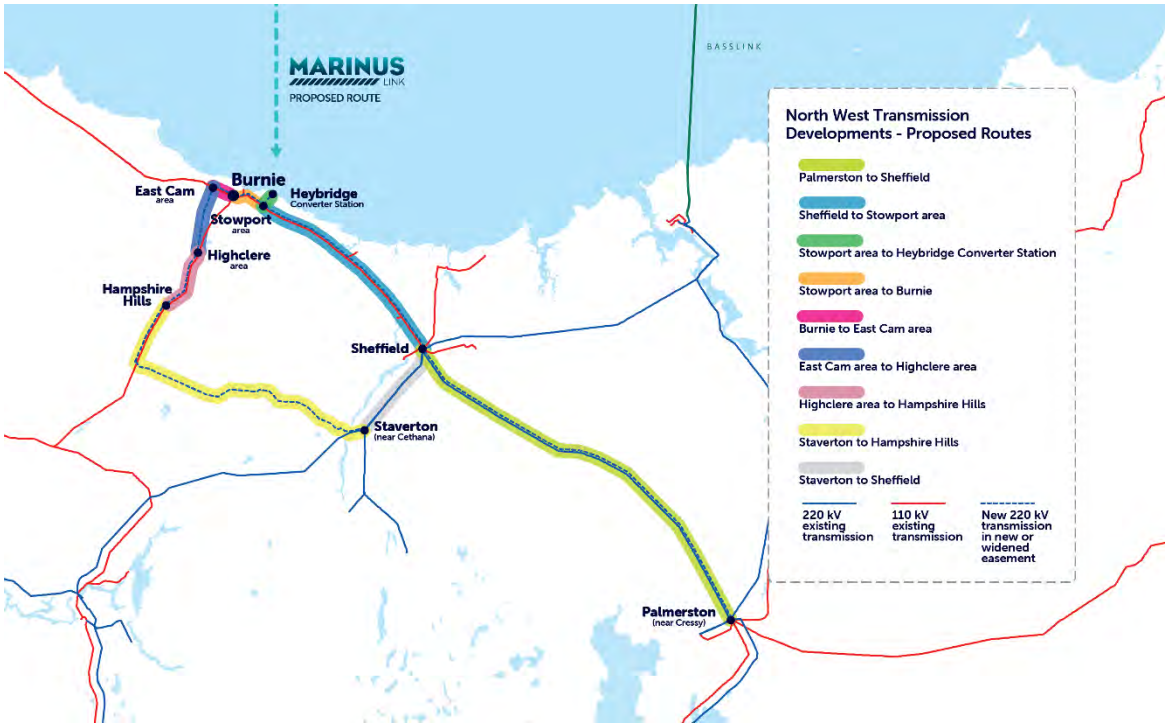


Figure E-1 North West Transmission Developments

Route selection

The proposed OHTLs comprise seven sections:

Palmerston–Sheffield 220 kV OHTL

Sheffield–Stowport area 220 kV OHTL

Stowport area-Heybridge Converter Station 2 x 220 kV OHTL

Stowport area-Burnie 220 kV OHTL

Burnie–East Cam area 220 kV OHTL

East Cam–Highclere area 220 kV OHTL, and

Highclere area–Hampshire Hills 220 kV OHTL.

The Staverton–Hampshire Hills and Staverton–Sheffield sections are the subject of related and separate projects that support the overall 'Project Marinus'. Information on the Staverton–Hampshire Hills section, including the Route Options Report can be found at https://talkwith.tasnetworks.com.au/north-west-transmission-upgrades.

The Staverton–Sheffield section consists of upgrading 18.6 kilometres of existing transmission lines to carry more electricity. This might include re-stringing the transmission lines with new conductors, increasing tower heights, modifying insulator strings, civil works and upgrading equipment in the Sheffield Substation. A new switching station will be built at Staverton under the existing transmission lines. In the section between

Staverton and Sheffield it is anticipated that no new transmission lines will need to be constructed and easements will stay the same size.Route selection for these proposed OHTLs involved collating all publicly available geospatial data and existing literature to identify constraints and guide the identification of potential OHTL routes.

Constraints to route selection are considered in both ‘strategic’ and ‘tactical’ contexts. Strategic constraints informed corridor identification and tactical constraints informed identification of prudent and feasible routes within those corridors.

The existing Palmerston–Sheffield, Sheffield–Burnie, Burnie–Smithton and Burnie–Waratah transmission line corridors provide opportunities for co-location, as there is, in most instances, sufficient space for the new OHTLs through using existing easements, together with minor widening required to maintain the required electrical safety clearances.

Prudent and feasible routes were identified in each of these corridors and evaluated against tactical technical, environmental and social route selection criteria. Options west and east of the existing Palmerston–Sheffield 220 kV OHTL, an option adjacent to the existing Sheffield–Burnie 220 kV OHTL, three options from the existing Sheffield–Burnie transmission line corridor to Heybridge, and two options from the existing Burnie Substation to the proposed Hampshire Hills Substation were identified and evaluated.

The route west of the existing Palmerston–Sheffield 220 kV OHTL was found to be more constrained than the route to the east of the OHTL. The route southwest of the existing Sheffield–Burnie 220 kV OHTL enables this OHTL to be removed and allows for orderly transmission network development. The western route for the Stowport area–Heybridge Converter Station section was found to be least constrained. The route along the Burnie–Waratah 110 kV OHTL was found to be highly constrained near Burnie Substation and by adjacent houses and buildings, which preclude potential future duplication of the proposed double circuit 220 kV OHTL. Sufficient space is available in the Burnie to East Cam corridor to accommodate a new double circuit 220 kV OHTL and when coupled with the routes from East Cam to Hampshire Hills was found to be a better option.

Proposed routes

The proposed routes (Figure E-2) are:

- **Palmerston–Sheffield**: thirty (30) metres east of and parallel to the existing Palmerston–Sheffield single circuit 220 kV OHTL with minor deviations at Donorlan and near Deloraine to address localised constraints. This will require widening the existing easement by approximately 20 metres with a potential for some new 60 metre easements at particular points of deviation. The new OHTL will be approximately 80 kilometres long and will involve approximately 180 new towers.
- **Sheffield–Stowport area**: ten (10) metres southwest and parallel to the existing Sheffield–Burnie single circuit 220 kV OHTL to Stowport. The new OHTL will replace the existing single circuit 220 kV

OHTL. The proposed development will require widening the easement where the route has been straightened. The new OHTL is approximately 44 kilometres long and will involve approximately 77 new towers, and removal of 121 existing towers

- **Stowport area–Heybridge Converter Station**: from Minna Road, Stowport via the valley between Minna Road and Devonshire Drive to the proposed Heybridge Converter (and Switching) Station, this 3.2 kilometre section will link the North West Tasmanian transmission aleternating current network to the Marinus Link high voltage direct current network. Two (2) new 220 kV double circuit transmission lines are proposed to be built in a new 90 metre wide easement.These lines will carry electricity to and from Sheffield and the Converter Station, and to and from Burnie and the Converter Station. The new OHTL is approximately 3.2 kilometre section and will involve approximately 18 towers, 9 towers for each double circuit transmission line.

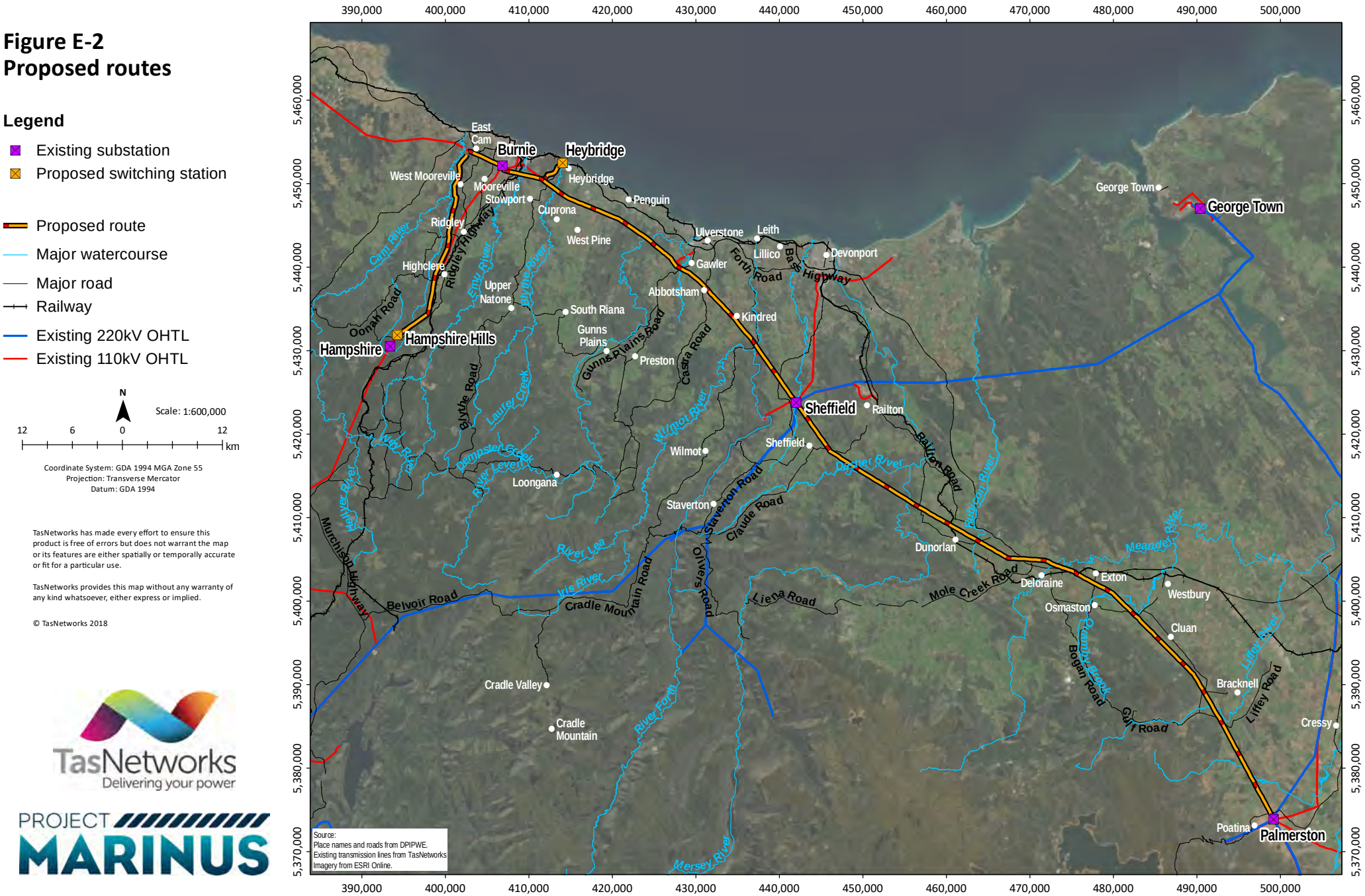
- **Stowport area–Burnie**: ten (10) metres southwest and parallel to the existing Sheffield–Burnie 220 kV OHTL to Maydena Road, then along the existing Sheffield–Burnie 220 kV OHTL alignment to Burnie Substation. The new OHTL is approximately 5 kilometres long, will involve approximately 14 new towers and replace the existing ‘single circuit’ 220 kV OHTL, with 17 existing towers removed

- **Burnie–East Cam area**: thirty (30) metres south and parallel to the existing Burnie–Smithton double circuit 110 kV OHTL. The new 220 kV OHTL will require widening the easement by up to 20 metres. The new OHTL is approximately 5 kilometres long and will involve approximately 14 new towers. The two 22 kV distribution power lines are to be undergrounded from Burnie Substation to West Mooreville Road.

- **East Cam area–Highclere area**: south along the eastern slopes of the Cam River and Guide River for 15.2 km, a new strategic 90 metre wide easement accommodating a new 220 kV OHTL. The new OHTL is approximately 15.2 kilometres in length and will involve around 20 towers.

- **Highclere area–Hampshire Hills**: thirty (30) metres west and parallel to the Burnie–Waratah 110 kV OHTL from Highclere to Hampshire Hills a new double circuit 220 kV transmission line is proposed. The existing easement in this section will be widened by up to 65 metres to accommodate a strategic 90 metre easement. The new OHTL line is approximately 9.3 kilometres in length and will involve around 28 towers.

Figure E-2
Proposed routes



Next steps

Identification of the proposed routes will enable:

- Engagement with landowners including land access negotations.
- Broader community engagement.
- Submission of an environmental referral under the the Commonwealth *Environment Protection Biodiversity Conservation Act* 1999.

As landowner and community engagement progresses, preferred routes are confirmed and this will enable:

- Detailed terrestrial ecology, cultural heritage and geomorphology field investigations.
- Landscape and visual impact assessment to understand how the proposed routes and new OHTL changes views from properties and key tourist viewpoints.
- Environmental, cultural heritage and socioeconomic technical studies to inform environmental, cultural and socioeconomic impact assessment. The outcomes of these studies may require refinement of OHTL design to address site-specific constraints and manage impacts.
- Preliminary geotechnical and constructability investigation (walk-through) to identify features and site conditions that require detailed investigation to inform detailed design.
- Detailed transmission line and supporting infrastructure design.
- Preparation and submission of environmental, land use planning and cultural heritage applications for approval.

1 Report purpose and structure

This technical report has been prepared to support TasNetworks' engagement with landowners, the community and other stakeholders on the route selection process used to identify proposed routes for overhead transmission lines from Palmerston to the Burnie via the proposed Heybridge Converter and Switching Station site, and from Burnie to the East Cam areas and south to Hampshire Hills in North West Tasmania.

The proposed routes complete the North West Tasmanian transmission network augmentation recommended in the North West Tasmania Strategic Transmission Plan and proposed in the North West Transmission Developments. This report and the Staverton–Hampshire Hills Route Options Report[2] document the route options studies for the North West Transmission Developments. Collectively, with Marinus Link, the proposed assets are part of Project Marinus, and part of the NEM's optimal development path.

The proposed routes will support submission of an environmental referral under the Commonwealth *Environment Protection and Biodiversity Conservation Act* 1999, progress of land access negotations, transmission line and supporting infrastructure design and field investigations with a view to finalising preferred routes for these segments of the North West Transmission Developments. The preferred routes will support environmental and social impact assessment and approvals, carried out under the Tasmanian *Major Infrastructure Development Approvals Act (MIDAA) 1999*.

National Electricity Rules (**NER**) require identification of routes that are a prudent and efficient. Environmental, planning and cultural heritage legislation and guidelines require prudent and feasible alternatives to be identified and assessed in identifying proposed routes.

The route selection process presented in this report is shown in Figure 1-1, which includes key milestones. Numbers in Figure 1-1 relate to the section numbers in this report.

[2] Proposed North West Transmission Developments Staverton–Hampshire Hills Route Options Report, TasNetworks, August 2020 https://talkwith.tasnetworks.com.au/59134/widgets/304463/documents/177863

Figure 1-1 Route selection process

2 What connection is required?

Tasmanian Networks Pty Ltd (**TasNetworks**) owns, operates and maintains the electricity transmission and distribution networks in Tasmania. TasNetworks has responsibility for transmission system planning in Tasmania under National Electricity Rules. The Australian Energy Market Operator (**AEMO**) is responsible for system security including transmission planning for the National Electricity Market (**NEM**). In Tasmania, TasNetworks is also responsible for system security including transmission planning.

In its capacity as jurisdictional planner, TasNetworks has prepared a strategic transmission plan for North West Tasmania. This plan sets out proposed transmission development for the region, to support energy flows to and from Marinus Link and efficiently unlock renewable energy and storage resources.

2.1 Background

Developed in collaboration with jurisdictional planners or transmission network service providers, AEMO publishes two reports – *Electricity Statement of Opportunities* annually and *Integrated System Plan* every two years – that inform electricity market participants and prospective participants of forecast demand, generation, constraints and opportunities. The *Integrated System Plan*, first published in 2018 and most recently in 2020, responds to the market transitioning from coal-fired generation to renewable generation and decentralised energy resources. The plan identifies renewable energy zones and required transmission investment to efficiently unlock and transport energy in a rapidly transforming NEM.

The *Integrated System Plan 2018* (AEMO 2018) and *Integrated System Plan 2020* (AEMO 2020) identify three renewable energy zones (**REZs**) in Tasmania – one in North East Tasmania, one in North West Tasmania and one in the Central Tasmania.

AEMO's 2018 Integrated System Plan (**ISP)** identified that Marinus Link, together with the supporting transmission developments in North West Tasmania, could play a key role in efficiently unlocking Tasmania's renewable energy and storage capacity, and that work should continue so that Project Marinus can be '**shovel ready**' by 2023-24. The 2020 ISP included Marinus Link as part of the future plan. The first 750 megawatt (**MW**) of capacity, including supporting transmission in North West Tasmania, should progress

so it is able to be in service from 2028-29[3]. The second 750 MW, including supporting transmission in North West Tasmania, should be able to be in service from 2030-31.

The Tasmanian Government's *Tasmanian Renewable Energy Action Plan 2020* (State of Tasmania December 2020)[4] proposes a Tasmanian Renewable Energy Target (**TRET**) of 200 per cent renewable generation by 2040, establishing Tasmania as a net exporter of clean energy. The Tasmanian Government has also released the *Tasmanian Renewable Hydrogen Action Plan* (State of Tasmania March 2020)[5] with a vision that Tasmania will be commercially exporting hydrogen by 2030. Analysis undertaken by TasNetworks shows that unlocking Tasmania's renewable energy and storage resources supported by the TRET, a green hydrogen industry, and Marinus Link and supporting transmission developments, are complementary and provide benefits to electricity customers and to regional communities. The developments also support Australia's clean energy transition.

Tasmania has world-class wind resources that are being developed. A number wind and solar projects are in various stages of development around Tasmania.

The Tasmanian electricity transmission network will require augmentation of existing transmission assets and development of new assets to enable proposed and anticipated renewable energy and storage projects across Tasmania to proceed.

2.2 North West Tasmania Strategic Transmission Plan

TasNetworks, in its capacity as Tasmanian jurisdictional planner, is required to plan and consult on proposed transmission network augmentation. The augmentation plans consider the configuration and performance of the existing network, respond to forecast changes in generation and customer load including as a result of connection enquiries and applications, and address anticipated constraints in the network. Transmission planners are also required to consider AEMO's ISP.

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[3] This finding is based on the step change scenario outlined in the AEMO 2020 ISP. Link to AEMO 2020 ISP: https://aemo.com.au/energy-systems/major-publications/integrated-system-plan-isp/

[4] Tasmanian Renewable Energy Action Plan 2020, Department of State Growth, Renewables Tasmania, December 2020 https://renewablestasmania.tas.gov.au/__data/assets/pdf_file/0008/275876/Tasmanian_Renewable_Energy_Action_Plan_December_2020.pdf

[5] Tasmanian Renewable Energy Action Plan, Department of State Growth, Renewables Tasmania, March 2020 https://renewablestasmania.tas.gov.au/__data/assets/pdf_file/0004/274693/Tasmanian_Renewable_Hydrogen_Action_Plan_web_27_March_2020.pdf

The regulatory framework for network planning requires TasNetworks to provide efficient solutions in the long-term interests of users and producers of electricity. The framework is intended to support planning, consultation and development of a shared transmission network (the transmission lines, substations, switching stations and associated infrastructure constructed and managed for the benefit of all customers) that efficiently transports energy from where it is being generated to where customers are using it. The approach adopts a low regrets approach (that is, development of the transmission network should not result in under-utilised or stranded assets) that sees development staged where practical.

TasNetworks has developed a strategic transmission plan for the North West Tasmanian transmission network which considers:

- Future load and generation connection requirements. This takes into account connection enquiries and applications received, and REZs identified in AEMO's ISP. Approximately 5000 MW of renewable generation and storage is forecast in the North West Tasmania by AEMO's ISP.
- A second Bass Strait interconnector (Marinus Link). In its role as Tasmanian jurisdictional planner, TasNetworks identified the Heybridge site to connect the proposed 1500 MW high voltage direct current (**HVDC**) interconnector to the Tasmanian alternating current (**AC**) transmission network.
- Existing and forecast transmission network constraints. Parts of the North West Tasmania transmission network, including the existing Palmerston–Sheffield 220 kilovolt (**kV**) circuit and Sheffield–Burnie 220 kV circuit, are constrained or will become constrained in the coming years.

The strategic plan recommends strengthening the North West Tasmania transmission network by creating a 220 kV 'rectangle' connecting the existing Sheffield and Burnie substations with two new switching stations. One new switching station is proposed at Hampshire Hills to facilitate forecast North West and Far North West wind development and West Coast wind and pumped hydroelectric storage projects. Another is proposed at Staverton to enable re-purposing of existing transmission lines between Staverton and Sheffield, and to facilitate forecast Mersey-Forth pumped hydroelectric storage projects.

The strategic plan is proposed to be implemented as staged development of the 'rectangle', together with a further transmission line alongside the existing Palmerston–Sheffield 220 kV overhead transmission line **(OHTL)** to address forecast network constraints. The projects collectively known as the North West Transmission Developments are shown in Figure 2-1.

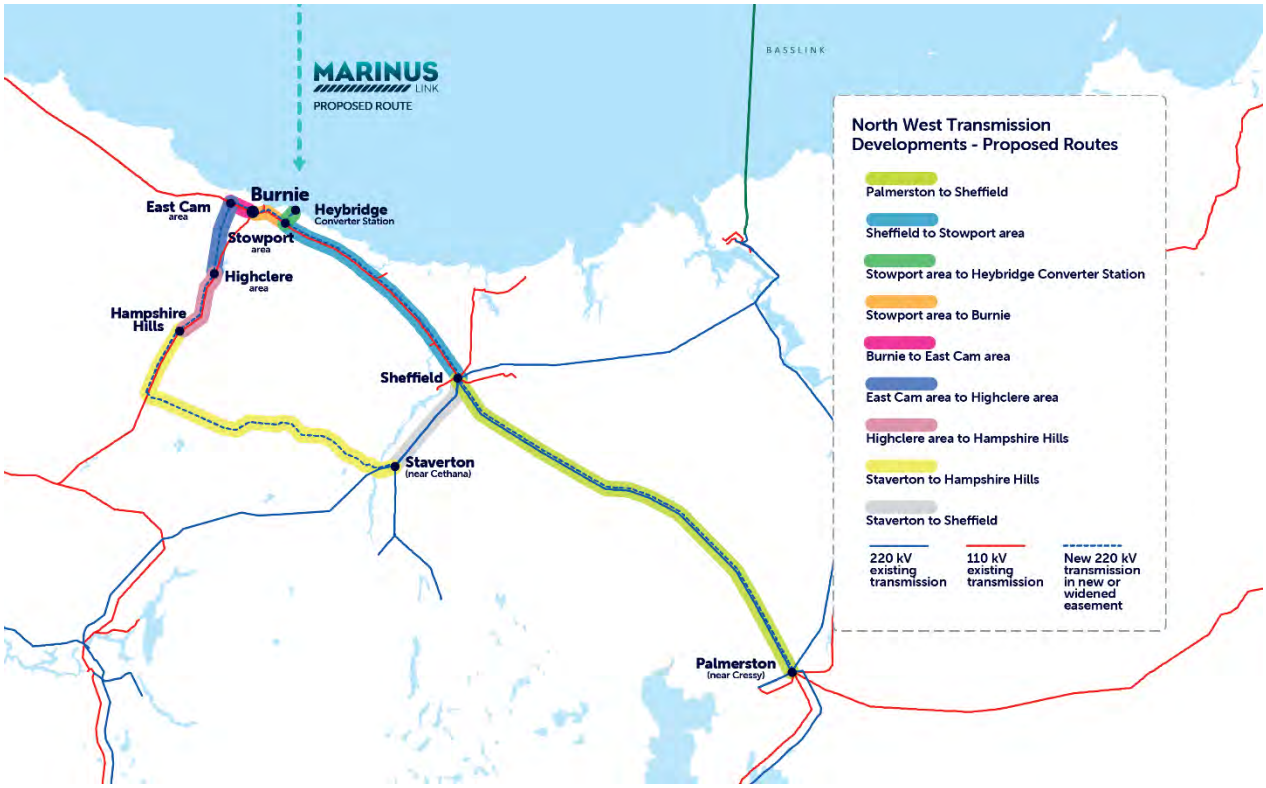


Figure 2-1 North West Transmission Developments

2.3 New transmission lines

Transmission lines proposed to complete augmentation of the North West Tasmania transmission network, as recommended in the strategic plan, are:

- A double circuit 220 kV OHTL between Palmerston and Sheffield to strengthen the connection between those substations.
- A double circuit 220 kV OHTL between Sheffield Substation and Burnie Substation replacing the existing single circuit 220 kV OHTL, with a spur to the proposed Heybridge Converter (and Switching) Station.
- A double circuit 220 kV OHTL from Burnie Substation to the proposed Hampshire Hills Switching Station.

- A double circuit 220 kV OHTL from the proposed Hampshire Hills Switching Station to the proposed Staverton Switching Station[6].

The proposed OHTLs will facilitate connection of Marinus Link (at the proposed Heybridge Converter and Switching Station site) and support connection of future renewable energy projects in the North West Tasmania REZ and Central Tasmania REZ. TasNetworks will build, own and operate the proposed OHTLs, as part of the **shared network**, together with new and modified substation and switching station assets along the route.

[6] This transmission line and the proposed Staverton Switching Station are being progressed separately and earlier than the network augmentations described in this route options report. The Route Options Report for Staverton to Hampshire Hills is available on TasNetworks' website: https://talkwith.tasnetworks.com.au/59134/widgets/304463/documents/177863

3 What is proposed to be built?

Route selection requires an understanding of what is proposed to be built, i.e. the technical specifications for the transmission infrastructure. The technical specifications adopted for the proposed OHTLs route selection are set out in Table 3-1.

Table 3-1 Technical specifications for proposed OHTLs

Component	Specification
Nominal voltage	220 kV
Nominal span length	400 m
Minimum design ground clearance	8.5 metre (**m**) (from lowest conductor to ground)
Proposed configuration	Double circuit steel lattice towers, twin sulphur phase conductors and dual optical ground wires
Proposed tower types	Strain towers at deviation points and to break up long sections; suspension towers in straight sections.
Nominal tower height	42 m with extensions up to 56 m; 37 m in some situations
Nominal tower footprint	10 m by 10 m
Nominal area required to construct tower	50 m by 50 m
Nominal easement width	60-m-wide easement for one 220 kV OHTL and 90-m-wide easement for two 220 kV OHTLs. The preference is to accommodate this within exisiting easements where practical.
Nominal switching station plot size	Hampshire Hills - 260 m by 120 m (assuming air-insulated switchgear and excluding associated infrastructure, e.g., sediment retention pond) Heybridge - 60 m by 20 m (assuming gas-insulated switchgear and excluding associated infrastructure, e.g., sediment retention pond)*
Augmentation of existing substations	Existing substations at Palmerston, Sheffield and Burnie will require augmentation on existing TasNetwork's land
Nominal access track width	6 m (excluding batters and cut-off drains)

* Gas insulted switchgear is contained in buildings and requires less area of land to establish than air insulated switchgear.

The proposed OHTLs will be implemented in three sections:

- **Palmerston–Sheffield** which requires a new double circuit 220 kV OHTL running parallel and 30 metres (m) northeast of the existing single circuit 220 kV OHTL.
- **Sheffield–Burnie via the proposed Heybridge Converter Station** which requires replacement of the existing single circuit 220 kV OHTL between Sheffield and Burnie with a new double circuit 220 kV OHTL and new double circuit 220 kV OHTLs between Minna Road, Stowport and the proposed Heybridge Converter Station.
- **Burnie–Hampshire Hills via East Cam and Highclere** which requires a new double circuit 220 kV OHTL adjacent and parallel to the existing single-circuit and double circuit 110 kV OHTLs where feasible and a new double circuit 220 kV OHTL elsewhere. Provision for a future double circuit 220 kV OHTL is required in this segment of the 'rectangle'.

The proposed OHTLs will be built and operated in accordance with the technical requirements set out in relevant Australian standards. TasNetworks applies a 60 metre wide easement for a 220 kV OHTL to protect the assets and meet electrical safety requirements. In some locations, a strategic 90 metre easement has been applied.

TasNetworks locates and operates the electricity network to ensure electric and magnetic field (EMF)[7] levels comply with the recommendations of the Australian Radiation Protection and Nuclear Safety Agency[8] and the EMF limits of exposure recommended by the International Commission on Non-Ionizing Radiation Protection[9]. Energy Networks Australia[10] is working on behalf of the electricity supply industry to monitor and gauge responses to scientific developments. The typical arrangement of a 220 kV OHTL easement is shown in Figure 3-1. An example of a double circuit transmission tower is shown in Plate 3-1. The proposed towers are higher than existing towers due to the higher required power transfer capacity of the OHTL, which requires greater ground clearance.

[7] Proposed North West Transmission Developments Electric and Magnetic Fields, TasNetworks, May 2021 https://talkwith.tasnetworks.com.au/59134/widgets/304463/documents/177863

[8] Australian Radiation Protection and Nuclear Safety Agency - https://www.arpansa.gov.au/

[9] Non-Ionizing Radiation Protection - https://www.icnirp.org/

[10] Energy Networks Australia - https://www.energynetworks.com.au/electric-and-magnetic-fields/

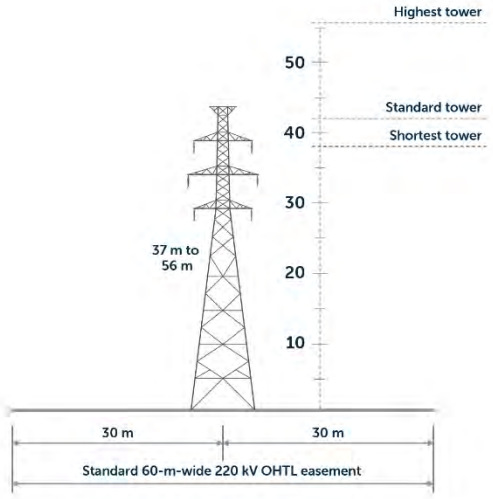


Figure 3-1 Typical arrangement of 220 kV OHTL easement

Plate 3-1 Typical double circuit 220 kV transmission tower adjacent to typical double circuit 110 kV transmission tower

4 What values exist in the area of interest?

The project is in North West Tasmania, with the area of interest extending along the existing Palmerston–Sheffield 220 kV OHTL, the Sheffield–Burnie 220 kV and 110 kV OHTLs, the Burnie–Smithton 110 kV OHTL and, in part, along the Burnie–Waratah 110 kV OHTL. The area of interest is described below with respect to the physical, biological and socioeconomic environments; the latter encompassing social, cultural and economic aspects including landscape and scenic values.

4.1 Physical environment

The area of interest is characterised by mountain ranges and undulating plateaus dissected by deeply incised rivers and creeks (Figure 4-1). Watercourses are east and north flowing, originating in the central highlands of Tasmania and discharging to Bass Strait. Major watercourses are Brumbys Creek, Liffey River, Quamby Brook, Meander River, Mersey River, Dasher River, Don River, River Forth, Gawler River, River Leven, Penguin Creek, Blythe River, Guide River, Cam River and Emu River.

The plateaus comprise weathered basalt overlying sedimentary rock, alluvial deposits, and karst limestone. The interface between the weathered basalt and sedimentary rock creates a zone of instability, particularly on the steep slopes of the watercourse valleys. Historic landslides are evidence of the risk this geological feature poses, with the risk increased by land clearing activities.

The prominent mountain range and mountain in the area of interest is the Dial Range and its peak Mount Montgomery.

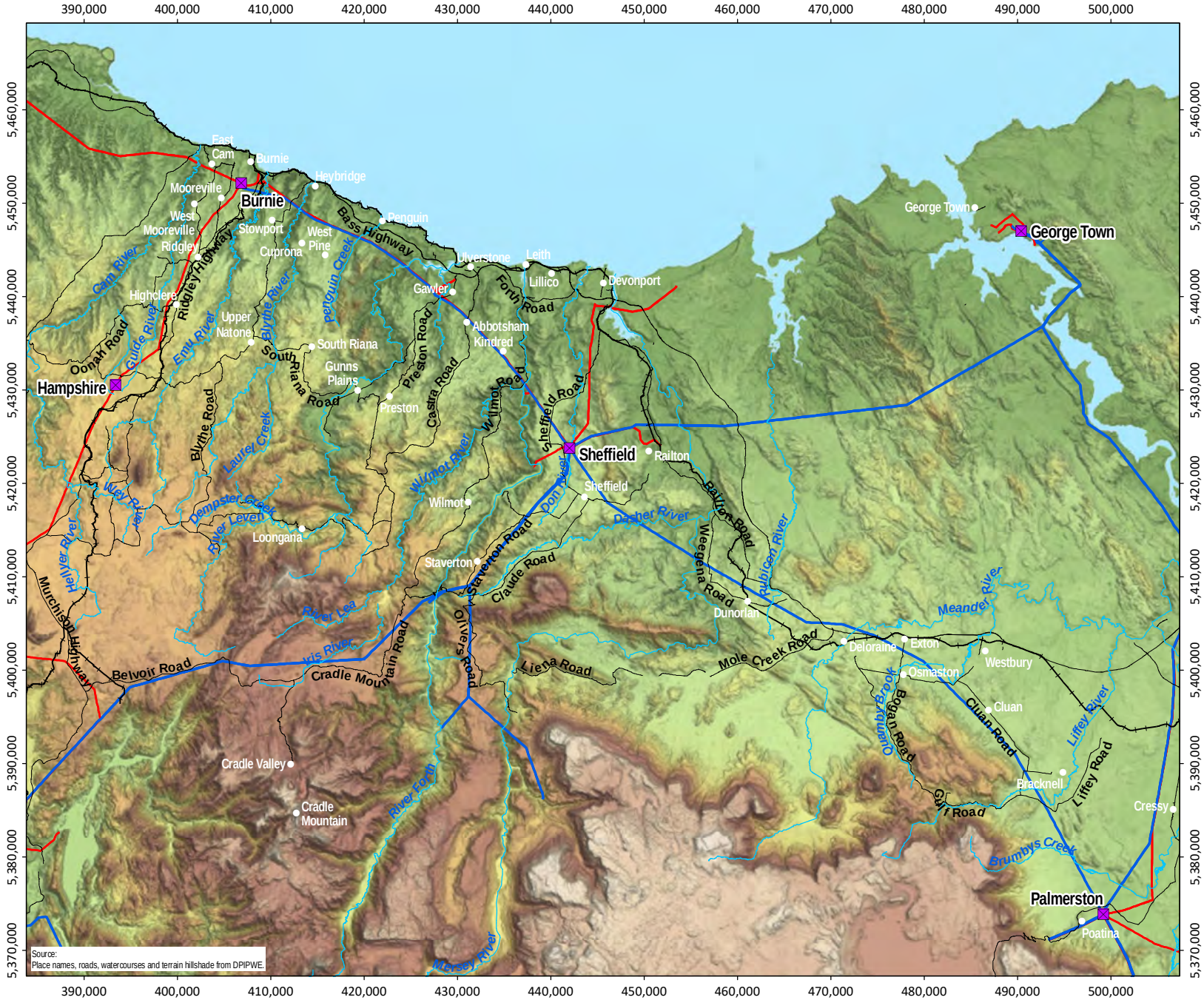
The weathered basalt supports deep, highly fertile soils. This has resulted in native vegetation being cleared for agriculture, plantation forestry and urban settlement in much of the area of interest.

Climate statistics for Bureau of Meteorology (**BOM**) weather stations in the area of interest are presented in Table 4-1. Prevailing winds are southwesterly, westerly, northwesterly and northerly inland with occasional southeasterly and northeasterly winds. Coastal sites experience northwesterly, westerly and southerly winds.

Table 4-1 Climate statistics for area of interest

BOM weather station	Elevation	Mean minimum temperature	Mean maximum temperate	Mean rainfall
091022 Cressy	148 m AHD	5.8°C	18.2°C	590 mm
091000 Deloraine	237 m AHD	4.4°C	16°C	946 mm
091091 Sheffield	280 m AHD	6.2°C	15.8°C	1179 mm
091111 Devonport	12 m AHD	8.0°C	16.8°C	946 mm
091009 Burnie	8 m AHD	9.3°C	16.9°C	958 mm
091099 Tewkesbury	410 m AHD	5.8°C	13.5°C	1,552 mm
097014 Waratah	609 m AHD	3.6°C	12.3°C	2,180 mm

Figure 4-1
Area of interest (terrain)



4.2 Biological environment

The rich volcanic soils of the area of interest have been extensively cleared for agriculture and plantation forestry.

Tracts and patches of native vegetation remain in the area of interest (Figure 4-2) with the most intact remnants along the base of Cluan Tiers southeast of Deloraine, at the base of the Great Western Tiers west of Cressy, along and adjacent to the Mersey River, Dasher River, River Forth, River Leven, Blythe River and Chasm Creek, and in the Dial Range.

Native vegetation comprises a mosaic of dry eucalypt forest and woodland and wet eucalypt forest and woodland.

Threatened ecological communities occur throughout the native vegetation including:

- *Eucalyptus viminalis* wet forest
- *Eucalyptus amygdalina* inland forest and woodland on Cainozoic deposits
- *Eucalyptus amygdalina* forest and woodland on sandstone
- *Eucalyptus ovata* forest and woodland.

Numerous threatened flora species associated with the above communities occur on and adjacent to the proposed OHTL corridors.

Threatened fauna species occurring throughout the area of interest include:

- Spotted-tail quoll (*Dasyurus maculatus subsp. maculatus*)
- Eastern quoll (*Dasyurus viverrinusl*)
- Eastern barred bandicoot (*Perameles gunnii*)
- Tasmanian devil (*Sarcophilus harrisii*)
- Tasmanian wedge-tailed eagle (*Aquila audax subsp. fleayi*)
- Masked owl (*Tyto novaehollandiae* subsp*. castanops*)
- Swift parrot (*Lathamus discolor*)
- Tasmanian azure kingfisher (*Ceyx azureus* subsp. *diemenensis)*
- Giant freshwater crayfish (*Astacopsis gouldi*)
- Grey goshawk (*Accipiter novaehollandiae*)

- White-bellied sea eagle (*Haliaeetus leucogaster*).

Threatened vegetation, flora and fauna are, in some places, protected by conservation reserves and conservation covenants (Figure 4-3), most notably:

- Mount Montgomery State Reserve.
- Blythe River Conservation Area.
- Informal reserves on other public land.
- Informal Reserve on Permanent Timber Production Zone Land or state or commercial forested land.
- Private reserves associated with plantation forestry.

4.3 Socioeconomic environment

Small rural communities and major towns exist throughout the area of interest including Poatina, Bracknell, Cluan, Osmaston, Exton, Deloraine, Dunorlan, Sheffield, Lower Barrington, Kindred, Abbotsham, Gawler, Stowport, Heybridge, Burnie, East Cam, West Mooreville, East Cam, Ridgley and Highclere. These communities derive their livelihoods mainly from agriculture, forestry and tourism with Burnie a regional service centre and trading port. Coastal development is expanding inland in the Gawler River and Penguin Creek valleys from Ulverstone and Penguin respectively. Rural residential subdivisions and small landholdings are key features of these valleys. Residential and rural residential subdivisions are expanding around Burnie and between Heybridge and Stowport.

The area of interest supports high quality agricultural land, which is intensively farmed in parts. Irrigation is used throughout the area of interest, particularly on the broad floodplains of the inland rivers and streams including Quamby Brook, Brumbys Creek and Liffey River.

A detailed desktop study identified a large number of registered Aboriginal heritage sites within the area of interest. The majority of these registered Aboriginal heritage sites are isolated artefacts or artefact scatters, with one modified tree heritage site located near the existing OHTLs. The majority of known artefact scatters are located near watercourses on relatively level and well-drained ground, where Aboriginal people would have camped, hunted and fished. Chert quarries are possible in places where rock outcrops occur, particularly in the area around Lake Nowhere Else and in and adjacent to the Dial Range. Aboriginal walking tracks connect coastal sites near Burnie with the Surrey Hills. This area is expected to be particularly sensitive given its historical use by the Palawa people.

The area of interest has a rich pioneering history dating back to the mid-1800s. A number of registered historical cultural heritage sites are located along the existing Palmerston–Sheffield 200 kV OHTL corridor, including Exton House in Westbury and the Bowerbanks Sheepfolds site near Deloraine. The Van Diemen's Land Company traded goods sourced inland along the north coast of Tasmania. Historic sites and material are possible in the Burnie area and in the Surrey Hills. The existing OHTLs do not intersect any listed historic places or areas included in relevant local government planning scheme overlays.

The area of interest is a gateway to tourism sites, and various local government initiatives are aimed at increasing regional economic spend and visitation to the area. Central Coast Council's *Coast to Canyon* initiative promotes the region's natural assets including its beaches, Gunns Plains' caves and Leven Canyon. The Penguin to Cradle Walking Trail runs along the River Leven from Penguin through the Dial Range, Gunns Plains, Leven Canyon and Black Bluff to Cradle Mountain. Sheffield and Deloraine are gateways to Cradle Mountain National Park and the Great Western Tiers. There are direct flights between Burnie and Melbourne, and Devonport and Melbourne, with Burnie providing access to the West Coast tourist sites via the Ridgley and Murchison highways. Key tourist sites and roads are shown in Figure 4-4.

4.4 Landscape and scenic values

Scenic landscapes, scenic corridors and roads and scenic management areas are included in overlays in local government planning schemes. These overlays protect landscapes and scenic tourist roads in Tasmania. These overlays were considered in route selection, particularly where existing OHTLs cross scenic corridors and roads including Meander Valley Road and Bass Highway and where proposed transmission lines may intersect scenic protection areas.

TasNetworks is undertaking a landscape and visual impact assessment that includes viewshed analysis and characterisation of the features that define the landscape, the viewing experience and values that people have in the existing landscape. This assessment process will be used to identify and evaluate how the landscape and views will change as a result of the development of the proposed OHTL, noting that existing OHTLs traverse the area of interest.

Figure 4-2
Area of interest (land use)

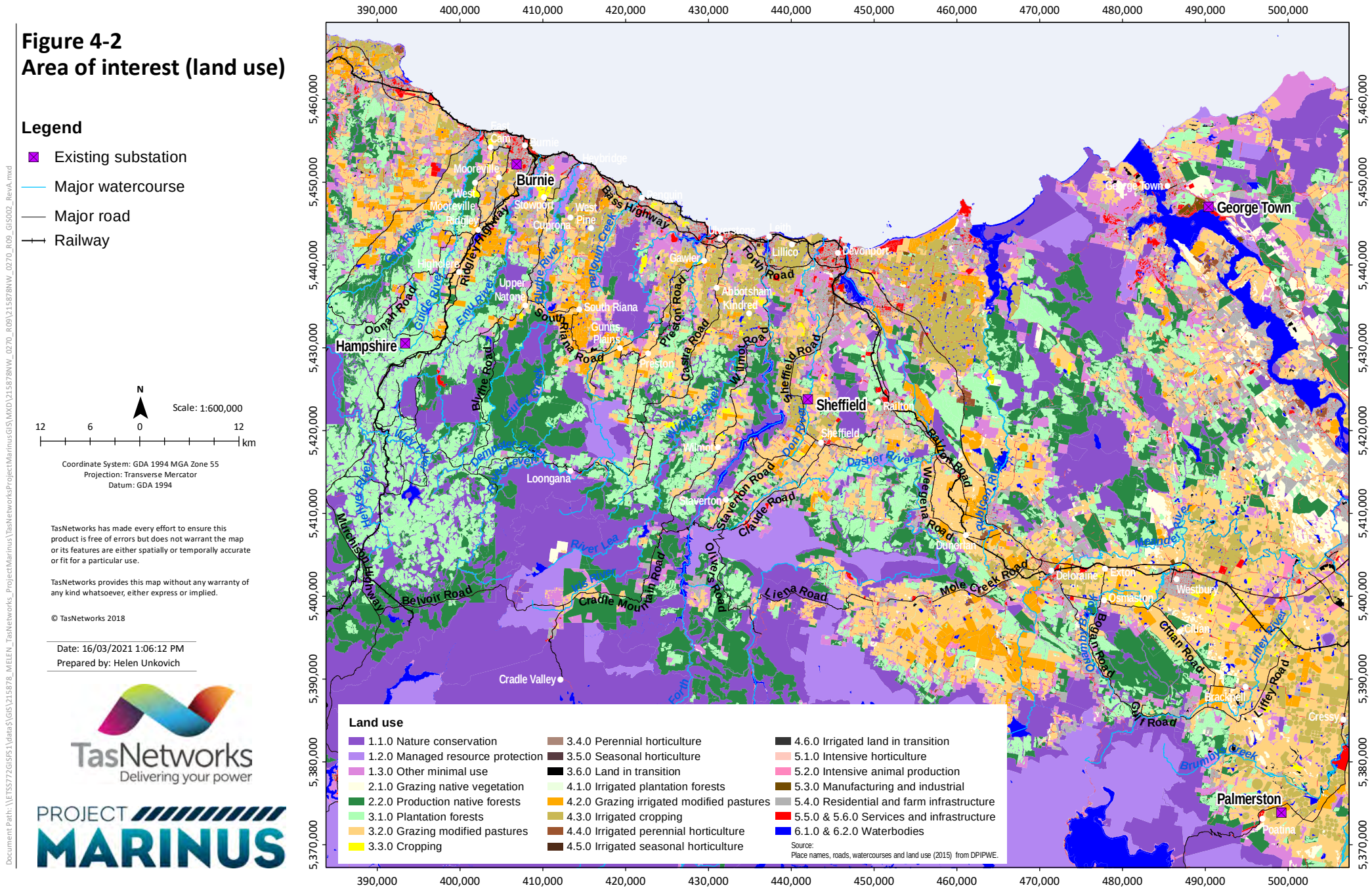


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Figure 4-3
Area of interest (reserves)

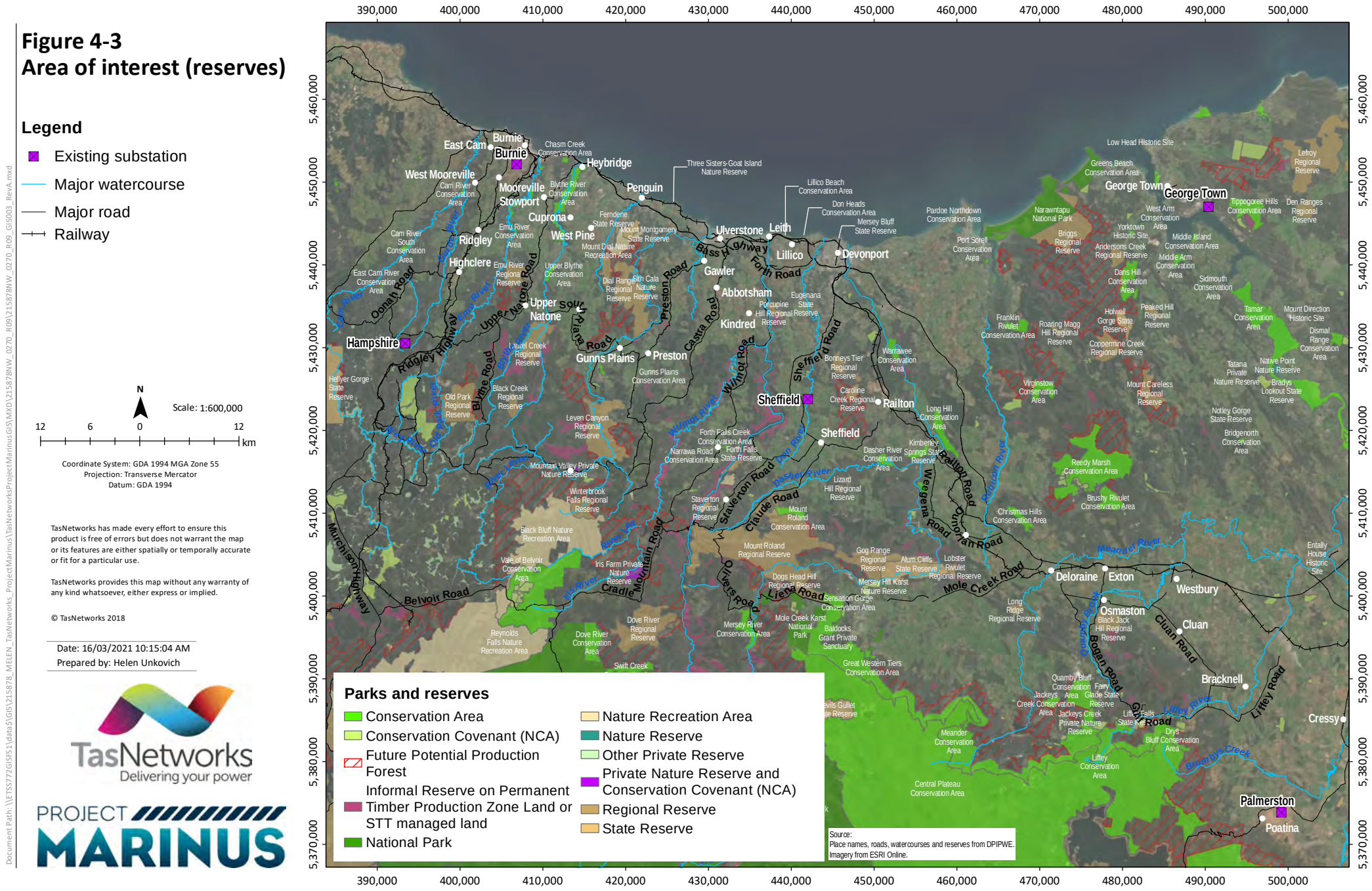

Figure 4-4
Area of interest (tourist sites and roads)

Legend

- Existing substation
- Coast to Canyon tourist route
- Other tourist route
- Penguin to Cradle Trail
- Major road
- Railway
- Existing 220kV OHTL
- Exsiting 110kV OHTL
- Tourist park/reserve

N

Scale: 1:600,000

10 5 0 10 km

Coordinate System: GDA 1994 MGA Zone 55
Projection: Transverse Mercator
Datum: GDA 1994

Date: 16/03/2021 10:38:45 AM
Prepared by: Helen Unkovich

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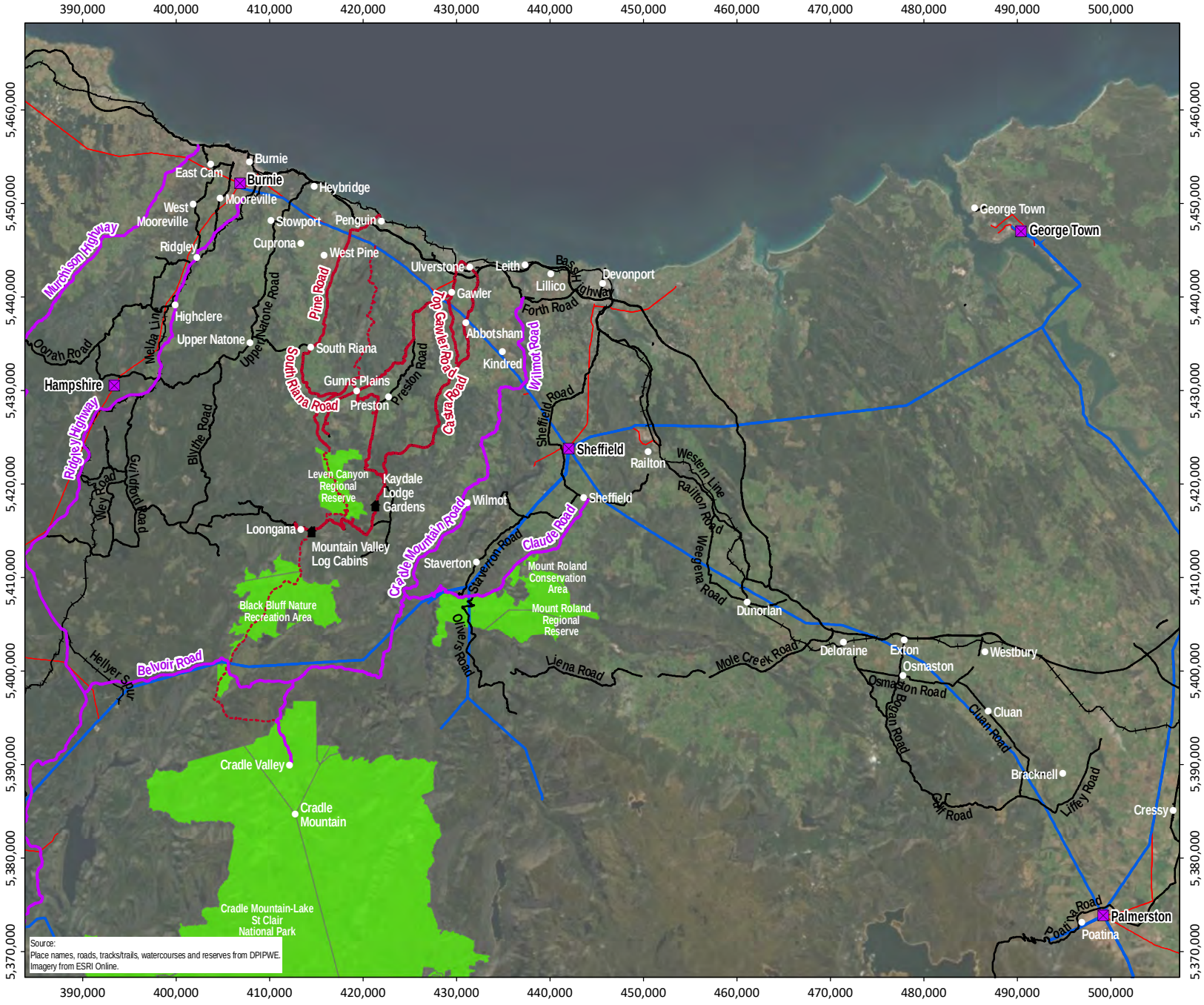


5 How do the existing values inform route selection?

The existing physical, biological and socioeconomic values constrain route options but also provide opportunities, particularly those created by existing linear infrastructure.

Constraints, opportunities and prudent and feasible corridors and routes are mapped and identified, respectively, by:

- Collating all relevant publicly available information including spatial data, reports and previous investigations into transmission line projects.
- Building a project geographic information system (**GIS**) to store and facilitate analysis of publicly available spatial data.
- Using the project GIS to understand constraints to route selection and to support the identification and evaluation of prudent and feasible alternatives.

Data sources used to identify constraints and opportunities, together with their limitations are listed in Appendix 1.

5.1 Constraints to route selection

Constraint identification and evaluation is used to guide route selection. It provides an indication of the areas of least constraint in which prudent and feasible routes might be identified.

Constraints to route selection are primarily based on statutory requirements, technical considerations and societal expectations. For example, legislation and planning controls detail what land uses are permissible in reserves and planning zones. Australian and Tasmanian Government legislation lists and protects threatened ecological communities and species and cultural heritage sites.

Constraints have been grouped as ‘very high’, ‘high’, ‘moderate’ and ‘low’. These groups are defined as follows:

- ‘Very high’ constraint areas are those areas or land uses where transmission infrastructure may have significant impacts that may be difficult to effectively manage, and avoidance is a key objective.
- ‘High’ constraint areas are those areas or land uses where avoidance is prudent, but transmission infrastructure could be sited and managed with careful route selection and design and/or specific management measures.

- ‘Moderate’ constraint areas are those areas or land uses where transmission infrastructure could be sited, and impacts can be managed with standard mitigation and site-specific measures that address the type and nature of constraint.
- ‘Low’ constraint areas are those areas or land uses where transmission infrastructure is compatible with existing land uses and/or the impacts can be effectively managed with standard mitigation.

The constraints defined for this route selection exercise are detailed in Table 5-1.

Table 5-1 Constraints (as defined by layers in the project GIS)

Category	Constraint
Very high	World Heritage Areas* * Existing transmission lines traverse these areas and reserves; re-use of existing easements and widening of existing corridors is not excluded.
	National, marine and coastal parks declared under the *National Parks and Reserves Management Act 2002* (Tas)* and conservation covenants registered under the *Nature Conservation Act 2002* (Tas) * Existing transmission lines traverse these areas and reserves; re-use of existing easements and widening of existing corridors is not excluded.
	Residential, township and village-zoned land** ** Existing electricity network assets traverse these areas; re-use of existing easements and widening of existing corridors is not excluded, nor is creation of a suitable corridor through these areas to connect new assets to existing transmission assets.
	Cemeteries and crematoriums*** *** Cemeteries can be overflown by overhead transmission lines. Underground cables are unlikely to be appropriate.
High	Conservation areas and reserves declared under the *Nature Conservation Act 2002* (Tas) and land managed for conservation purposes under the *Forest Management Act 2013* (Tas) and the *Forestry (Rebuilding the Forest Industry) Act 2014* (Tas)
	Threatened native vegetation communities listed under the *Nature Conservation Act 2002* (Tas) and ecological communities listed under the *Environment Protection and Biodiversity Conservation Act 1999* (Cwlth)
	Nationally important wetlands and Ramsar wetlands
	Registered historic cultural heritage properties and places
	Registered Aboriginal cultural heritage places and sensitivity areas

Category	Constraint
	Planning scheme zones, overlays and land use including: • landslide hazard areas • environmental management (contamination) • significant landscapes • scenic landscapes, roads and management areas • priority habitat • tree preservation and significant vegetation • commercial development • operational airspace and airport environments • significant agricultural land
	Airstrips and runways
	Intensive agriculture including animal husbandry, vineyards
	Mining leases
	Properties less than 0.4 ha
	Houses**** **** As defined by building point or house point in applicable datasets. Proximity to houses, schools and other sensitive occupancies was verified by interrogation of satellite imagery and ground-truthing.
	Defence training areas
	Igneous rock, karst limestone and alluvial/swamp deposits
Moderate	Unreserved Crown land
	Waterbodies
	Planning scheme zones, overlays and land use including: • cropping and irrigated grazing and plantations • manufacturing uses • special uses
	Community facilities
	Properties between 0.4 ha and 2 ha
	Metamorphic rock
Low	Native vegetation not listed for protection

Category	Constraint
	Planning scheme zones overlays and land use including: • industrial areas • electricity transmission infrastructure sites • farming land • roads
	Mineral and petroleum exploration licences and permits
	Sedimentary rock

Constraints to corridor and route selection for all route options are shown in Figure 5-1.

5.2 Opportunities for route selection (existing infrastructure corridors)

Existing infrastructure corridors are considered first when planning new transmission developments. Where there is an existing corridor in the geographic area requiring transmission development and where the uses are compatible, terrain and land use are not significant constraints and easement widening, or replacement of existing ageing transmission lines is possible, they can be prudent and feasible options.

For these new OHTLs, transmission corridors that provide opportunities for re-use or widening of existing easements include:

- Palmerston–Sheffield 220 kV OHTL which runs northwest from Palmerston through Deloraine to Sheffield.
- Sheffield–Burnie 220 kV and 110 kV OHTLs which run northwest from Sheffield to Burnie.
- Burnie–Smithton 110 kV OHTL which runs west-northwest from Burnie to Smithton.
- Burnie–Waratah 110 kV OHTL running from Burnie to Waratah via Hampshire Hills.

These transmission lines are shown in Figure 5-2.

Other existing infrastructure corridors such as existing pipelines and rail and road networks throughout the area of interest also provide opportunities, provided the new OHTLs will not pose a risk to the assets or create hazards or issues for the safe operation of the assets, railways or roads. Transmission lines require ongoing access to the assets for operation and maintenance. Requirements for new access tracks can have a significant impact where long tracks are required to access tower sites. Utilising existing roads and tracks reduces this impact.

Figure 5-1
Constraints

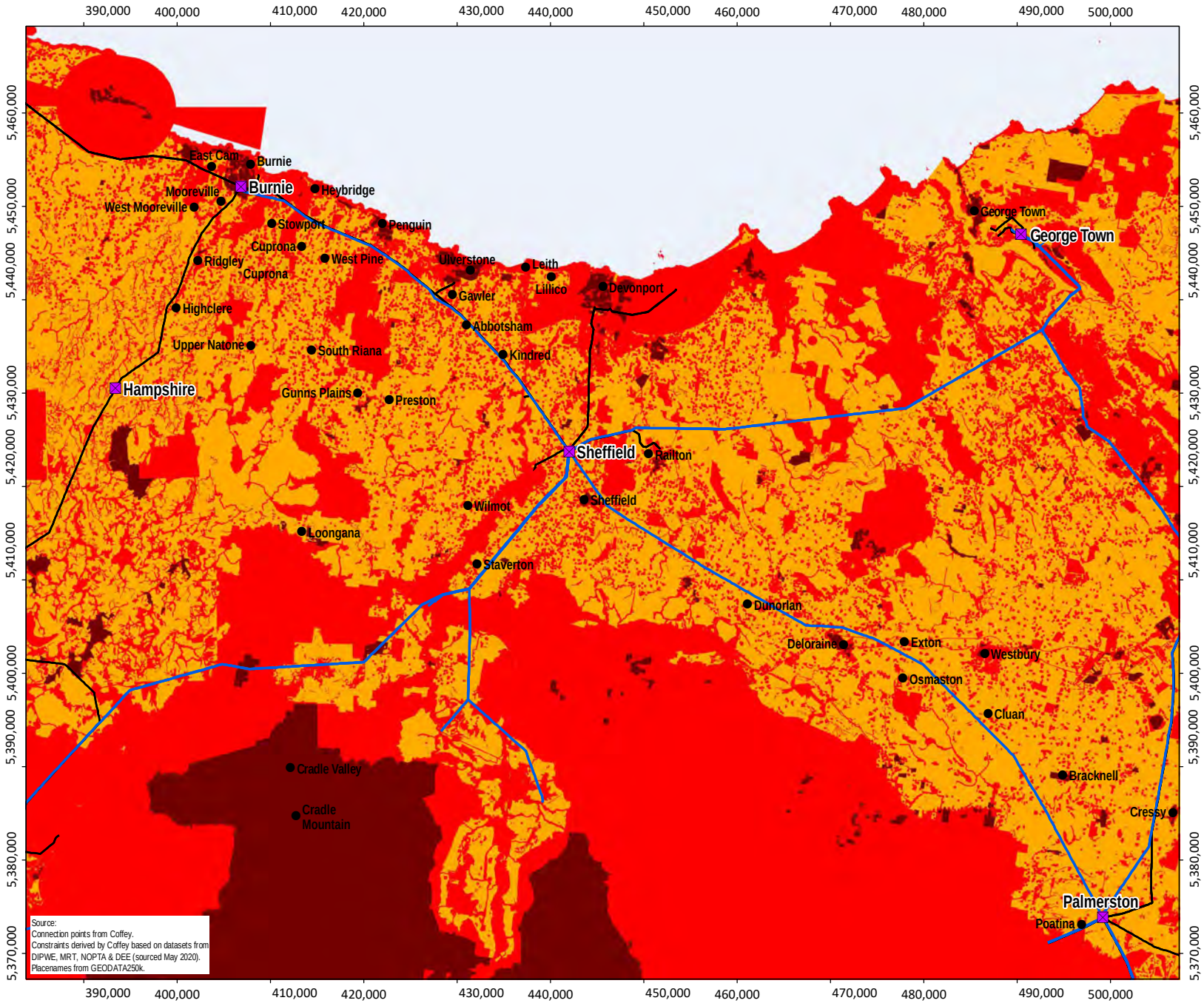
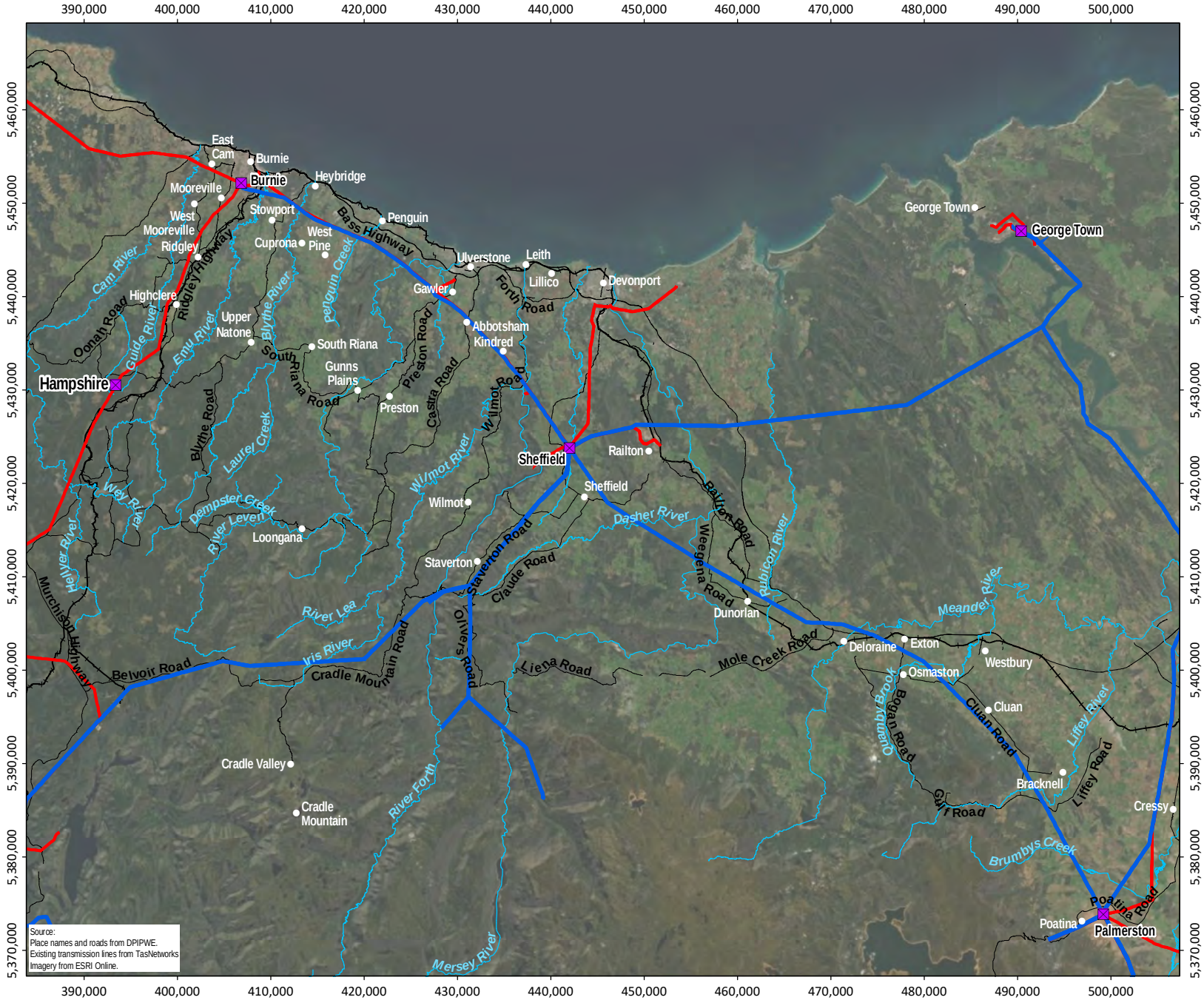


Figure 5-2
Existing corridors



6 Identify prudent and feasible corridors

Existing transmission line corridors are prudent and feasible corridors for the new double circuit 220 kV OHTLs.

The existing Palmerston–Sheffield 220 kV OHTL corridor provides opportunities for co-location of the new OHTL with easement widening. The existing OHTL is centred in an 80-m-wide easement allowing for a new OHTL to be constructed on a 30 metre offset within the existing easement with widening of approximately 20 metres to meet TasNetworks' 220 kV OHTL easement requirements. Some deviations are required to address site-specific constraints. These deviations will require easement widening, in some places up to 60-m-wide .

Similarly, the Sheffield–Burnie transmission corridor provides opportunities for co-location. The existing OHTL easement varies between 110 m and 140 m wide and accommodates the existing Sheffield–Burnie 220 kV OHTL and Sheffield–Burnie 110 kV OHTL. The OHTLs are in 80-m-wide easements where they diverge in several sections. Sufficient space exists within the existing easements to accommodate the new OHTLs except where straightening would improve the alignment and reduce land use impacts. Where this occurs, the extent of easement expansion will be limited to support a 60-m-wide easement for the new OHTL.

Burnie–Waratah single circuit 110 kV OHTL is located in by a 50-m-wide easement. Insufficient space is available in the existing easement necessitating widening of the easement to accommodate the new double circuit OHTL which would be built on a 30 m offset to the existing OHTL. Near Burnie, the corridor is too constrained to allow widening so a new route via East Cam is proposed.

These corridors are shown in Figure 5-2.

7 Identify prudent and feasible routes within the corridors

Prudent and feasible routes within the existing transmission line corridors were identified having regard to the route selection criteria which incorporate the identified constraints and opportunities (see Section 5).

7.1 Route selection criteria

Route selection criteria, developed to guide identification and evaluation of prudent and feasible routes within the corridors, are based on the constraints identified in Section 5.1 and the technical requirements and engineering considerations for transmission infrastructure. Environmental and social criteria capture high and moderate constraints, which have been grouped into key differentiators. The criteria enable prudent and feasible alternatives to be compared to identify the option that is least constrained. Route selection criteria adopted for this project are detailed in Table 7-1.

Table 7-1 Route selection criteria

Route selection criterion	Considerations
Cost	• capital expenditure (construction costs) • operating expenditure (including maintenance and transmission energy loss costs)
Availability of land for switching stations	• sufficient area including potential for buffers • stable landforms • suitable terrain, geology and geotechnical conditions • good access
Constructability	• ease of access • disruption to existing access, services and businesses • potential for relocation of existing services • potential for contaminated land • ground conditions/ geotechnical considerations (e.g., exposure to hard and/or fractured strata)
Avoid co-location with incompatible linear infrastructure	• e.g. steel pipelines, fences, long buildings and other metallic structures parallel to the transmission line, which increase potential for induced current in steel infrastructure and fault current affecting the steel infrastructure

Route selection criterion	Considerations
Natural features	• topography • waterways/wetlands
Network security	• bushfire risk • hazard trees • geographic diversity to avoid single contingency events
Capacity to facilitate connection of renewable generation and storage	• for wind, solar and pumped hydroelectric storage projects
Expansion potential	• capacity to accommodate future transmission lines
Opportunity for third party benefit/ contribution/ synergies	• connection inquiries • renewable energy zones
Land reserved for conservation purposes	• e.g., World Heritage Areas, national parks, conservation covenants, nature reserves
Land tenure	• freehold, Crown land, reserves • captures tourist sites protected by reserves declared under *Nature Conservation Act 2002* (Tas) • land holdings (small private and commercial properties)
Occupation	• proximity to houses
Land use	• potentially incompatible land uses (e.g. airports, quarries, crop dusting operations, corrosive emissions) • impacts on agriculture, tourism • incompatible linear infrastructure
Registered historical cultural heritage properties and places	• under Commonwealth and state legislation
Registered Aboriginal cultural heritage places and sensitivity areas	• under Commonwealth and state legislation
Planning	• zones and overlays

Route selection criterion	Considerations
	• zones include major tourism • overlays include scenic landscapes (scenic protection areas and scenic road corridors), scenic roads and scenic management areas, landslip hazard and contaminated land
Native vegetation	• TASVEG (digital map of Tasmania's vegetation) • potential threatened species habitat
Threatened ecological communities	• native vegetation communities listed under federal and state legislation
Threatened species	• eagle nests within 1 km • records of threatened flora and fauna species listed under federal and state legislation

7.2 Prudent and feasible routes within the corridors

Two potential landfalls for Marinus Link were identified near Burnie – one at Blythe River mouth and the other at Cam River heads. The landfalls enable connection to proposed converter station sites at Heybridge and East Cam respectively. TasNetworks has identified Heybridge as the preferred converter station site for Marinus Link. Future interconnectors may connect at East Cam.

Prudent and feasible routes identified in the Palmerston–Sheffield, Sheffield–Burnie and Burnie–Hampshire Hills corridors having regard to Marinus Link are:

- **Palmerston–Sheffield**: routes east and west of the existing 220 kV OHTL.
- **Sheffield–Burnie via Heybridge**: a route southwest of the existing Sheffield–Burnie 220 kV OHTL and a route between the existing 220 kV and Sheffield–Burnie 110 kV OHTL. Three routes from Stowport on the Sheffield–Burnie 220 kV and 110 kV OHTLs to Heybridge.
- **Burnie–Hampshire Hills**: a route parallel to the Burnie–Waratah 110 kV OHTL and a route along part of the Burnie–Smithton 110 kV OHTL to East Cam and part of the Burnie–Waratah 110 kV OHTL.

8 Evaluate prudent and feasible routes

Identified routes were evaluated against the route selection criteria and inspected from the public road network to ground-truth geospatial data and publicly available information used to inform route selection. Detailed ecology, cultural heritage and geomorphology desktop studies were undertaken to inform route selection and verify existing data and information. The evaluation is presented for each section.

8.1 Palmerston–Sheffield

Existing land uses constrain options for widening the existing OHTL easement. A combination of constraints contribute to the eastern side of the existing 220 kV OHTL being less constrained than the western side of the OHTL. Constraints that contribute to this assessment are:

- Orientation of watercourses to the OHTL, particularly where watercourses are parallel to the alignment necessitating clearing of long sections of riparian vegetation, as would be required at Brumbys Creek.
- Proximity to houses is more manageable on the eastern side of the existing OHTL than on the western side of the OHTL.
- The gas transmission pipeline built adjacent to, and in some sections, in the existing OHTL easement constrains the western route option necessitating the new OHTL to be moved outside the easement in several sections.
- Threatened native vegetation communities about the existing OHTL easement. Widening of the easement will impact these communities. The eastern side of the existing OHTL has less impact on these communities, particularly patches that are parallel to the OHTL.
- TasNetworks permits centrepivot and boom irrigators under its OHTLs subject to specified design and operation requirements to ensure electrical safety is maintained. The arrangement of centrepivot irrigators west of and under the existing OHTL is more difficult to manage than on the eastern side of the OHTL.
- The Bass Highway is protected by a scenic corridor overlay in the Meander Valley Interim Planning Scheme 2013. The existing OHTL makes an ‘acute angle’ crossing of the highway. A route west of the existing OHTL would necessitate towers in the scenic corridor due to the constraints imposed by the adjacent Western Line [rail].

For these reasons, the route east of the existing OHTL is proposed. The proposed arrangement of the Palmerston–Sheffield easement is shown in Figure 8-1.

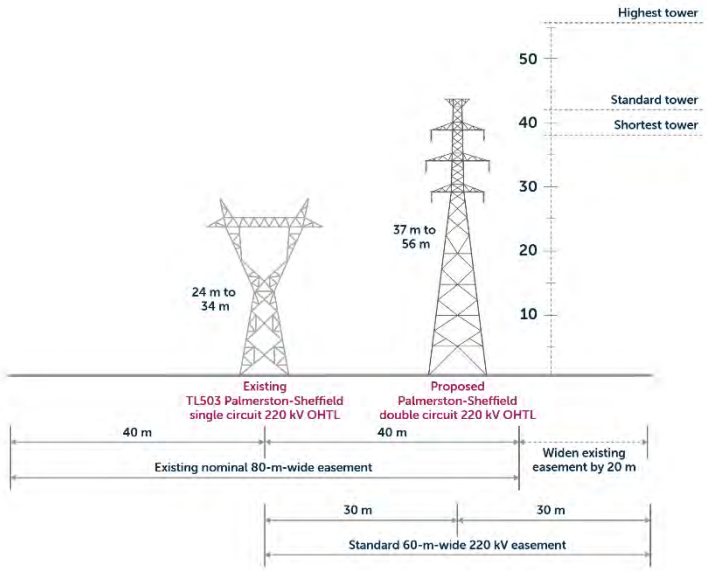


Figure 8-1 Proposed arrangement (looking northeast) of Palmerston–Sheffield easement

8.2 Sheffield–Burnie via the Stowport area

The Sheffield–Burnie transmission line corridor is highly constrained due to adjacent houses, agricultural enterprises, centrepivot irrigators, conservation reserves and other infrastructure including a gas transmission pipeline built adjacent to, and in some sections in, the existing easement. The proposed transmission line with its longer span length between adjacent towers creates an opportunity to reduce some land use impacts.

The intention to remove the existing Burnie–Sheffield 220 kV OHTL makes it prudent to locate the new double circuit 220 kV southwest of the existing 220 kV OHTL.

This will allow for orderly development of the transmission line corridor with the new double circuit 220 kV OHTL being built within the existing easement on a 30 m offset to the original OHTL.

The existing easement arrangement and the existing and proposed OHTLs between Sheffield and the Stowport area are shown in Figure 8-2.

The proposed double circuit 220 kV OHTL replaces the existing 220 kV OHTL in-situ between Stowport and Burnie due to the adjoining residential development.

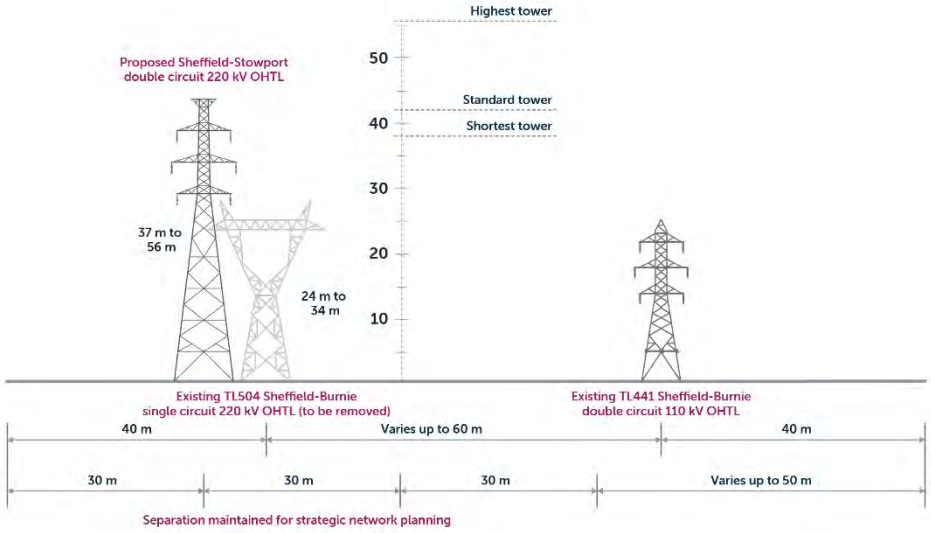


Figure 8-2 Arrangement of existing Sheffield–Burnie easement (looking northwest) showing existing and proposed OHTLs between Sheffield and Stowport

8.2.1 Stowport area–proposed Heybridge Converter Station

The proposed Heybridge Converter Station will be connected to the North West Tasmania transmission network via a loop from the existing transmission corridor, i.e., a route into Heybridge from Sheffield and a route out of Heybridge to Burnie.

Three routes were identified from the existing Sheffield–Burnie transmission line corridor to the proposed Heybridge Converter Station site at the former tioxide plant site at the corner of Minna Road and Bass Highway (Figure 8-3):

- A route along the ridge east of Minna Road crossing an asbestos disposal site and quarry. The quarry is in the Blythe River Conservation Area (eastern route).
- A route initially east, then west of Minna Road down the valley to the proposed switching station site (central route).
- A route from Chasm Creek along the valley to the proposed switching station site (western route).

The potential routes are evaluated in Table 8-1.

Table 8-1 Evaluation of Stowport area to Heybridge Converter Station route options

Route selection criteria	Eastern route	Central route	Western route
Length	3.3 km	3.6 km	3.3 km

Route selection criteria	Eastern route	Central route	Western route
Constructability	Good access to all tower sites (short access tracks off existing tracks); steep terrain; constraints working in and around asbestos landfill and quarry; existing tanks on ridge above former tioxide site constrain workspace	Good access to all tower sites (short access tracks off existing tracks); steep terrain; constraints working in and around asbestos landfill, general waste landfill and rehabilitated tailings ponds; existing tanks on ridge above former tioxide site constrain workspace	Good access to all tower sites (short access tracks off existing tracks); steep terrain; constraints working in and around general waste landfill and rehabilitated tailings ponds; existing tanks on ridge above former tioxide site constrain workspace
Land tenure	Traverses freehold and Blythe River Conservation Area; avoids conservation covenant (registered under *Nature Conservation Act 2002* (Tas)) west of Minna Road. Potential significant impact on freehold parcel at tee-off from Sheffield–Burnie transmission corridor	Traverses freehold; avoids Blythe River Conservation Area and conservation covenant (registered under *Nature Conservation Act 2002* (Tas)) west of Minna Road. Potential significant impact on freehold parcel at tee-off from Sheffield–Burnie transmission corridor	Traverses freehold; avoids Blythe River Conservation Area and conservation covenant (registered under *Nature Conservation Act 2002* (Tas)) west of Minna Road
Occupation	Nearest house to route is 200 m (Crown Circuit, Heybridge adjacent to former tioxide site); other closest houses are 430 m from the OHTL	Nearest house to route is 250 m (Crown Circuit, Heybridge adjacent to former tioxide site); other closest houses are 430 m from the OHTL	Nearest house to route is 250 m (Crown Circuit, Heybridge adjacent to former tioxide site); other closest houses are 330 m from the OHTL
Land use	Grazing land; native vegetation; asbestos landfill; quarry; rehabilitated tailings ponds	Grazing land; native vegetation; asbestos landfill; general waste landfill; rehabilitated tailings ponds	Native vegetation; general waste landfill; rehabilitated tailings ponds
Planning	26.0 Rural resource and 29.0 Environmental management zones Landslip hazard and tree protection overlays	26.0 Rural resource and 29.0 Environmental management zones Landslip hazard and tree protection overlays	26.0 Rural resource and 29.0 Environmental management zones Landslip hazard and tree protection overlays
Threatened native vegetation communities	No mapped communities traversed	No mapped communities traversed	No mapped communities traversed

Route selection criteria	Eastern route	Central route	Western route
Threatened species	Within 180 m, 300 m and 550 m of wedge-tailed eagle nests and 250 m of a grey goshawk nest; line of sight to OHTL	Within 180 m, 380 m and 550 m of wedge-tailed eagle nests and 250 m of a grey goshawk nest; line of sight to OHTL	Approximately 750 m from wedge-tailed eagle nest and 1,360 m from grey goshawk nest; not in line of sight to OHTL
Aboriginal cultural heritage	No registered sites	No registered sites	No registered sites
Historic cultural heritage	No registered sites	No registered sites	No registered sites
Landscape and visual	Highly visible from Minna Road and Heybridge as it traverses ridge west of Blythe River	Highly visible from Minna Road as it traverses ridge west of Blythe River	Visible where it crosses Devonshire Drive; largely screened in valley west of Minna Road

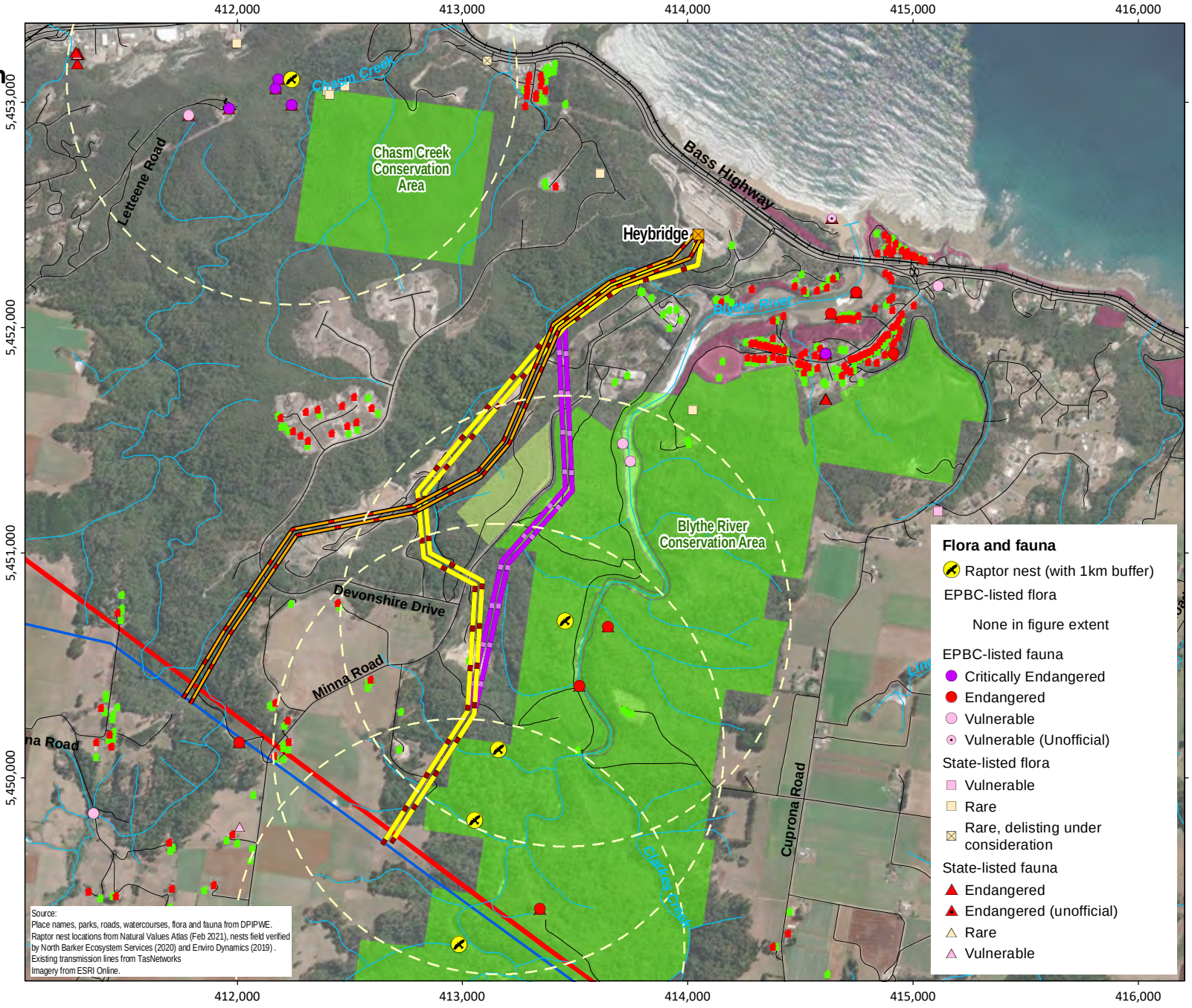
The western route is the least constrained route as it:

- Avoids impacts on Blythe River Conservation Area and conservation covenant west of Minna Road.
- Avoids the asbestos landfill and quarry east of Minna Road.
- Avoids potentially significant impacts on the parcel at the tee-off on the Sheffield–Burnie transmission line corridor (eastern and central routes).
- Increases separation to threatened wedge-tailed eagle nests and grey goshawk nest.
- Is less visible as it avoids traversing the ridge west of Blythe River. It runs in the valley west of Minna Road crossing Devonshire Drive in a saddle. The route joins the existing Sheffield–Burnie 220 kV OHTL in Chasm Creek which is less visible from surrounding properties.
- Reduces impacts on native vegetation and biodiversity by utilising disturbed and industrial areas for at least half its length.

The most efficient and secure way to connect Marinus Link to the North West Tasmania transmission network was investigated by TasNetworks. TasNetworks concluded that geographic diversity was not required for the Stowport area to Heybridge Converter Station route and that a gas insulated switching station adjacent to the converter stations was the most cost effective option. This arrangement does not preclude establishing a switching station at or near the tie-in to the proposed Sheffield–Burnie 220 kV OHTL or existing Sheffield–Burnie 110 kV OHTL if loads in the area require such augmentation in the future.

The arrangement of the easement from the existing Sheffield–Burnie 220 kV / 110 kV easement to the proposed Heybridge Converter Station is shown in Figure 8-4. The existing easement between Emu River and Burnie Substation is shown in Figure 8-5.

Figure 8-3 Stowport area to Heybridge Converter Station potential routes



Legend

- Proposed switching station
- Western route
- Central route
- Eastern route
- Residential building
- Other buildings and structures
- Conservation Area
- Conservation Covenant (NCA)
- Informal Reserve on other public land

N

Scale: 1:25,000

500 250 0 500 m

Coordinate System: GDA 1994 MGA Zone 55
Projection: Transverse Mercator
Datum: GDA 1994

Date: 16/03/2021 11:58:21 AM
Prepared by: Helen Unkovich

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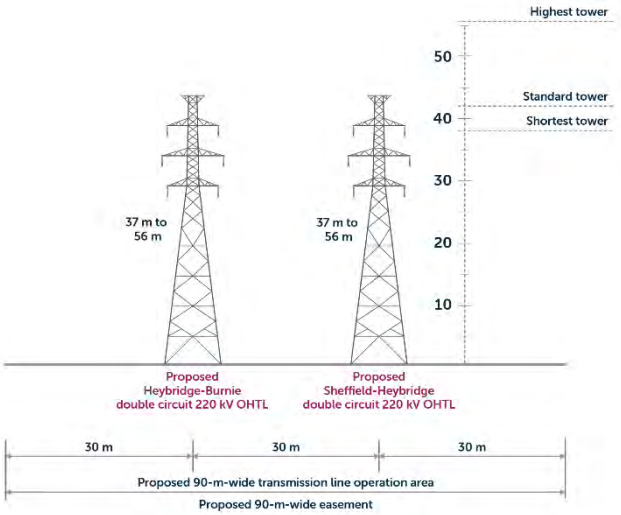


Figure 8-4 Proposed arrangement of Stowport area to Heybridge Converter Station easement looking north from Stowport to Heybridge

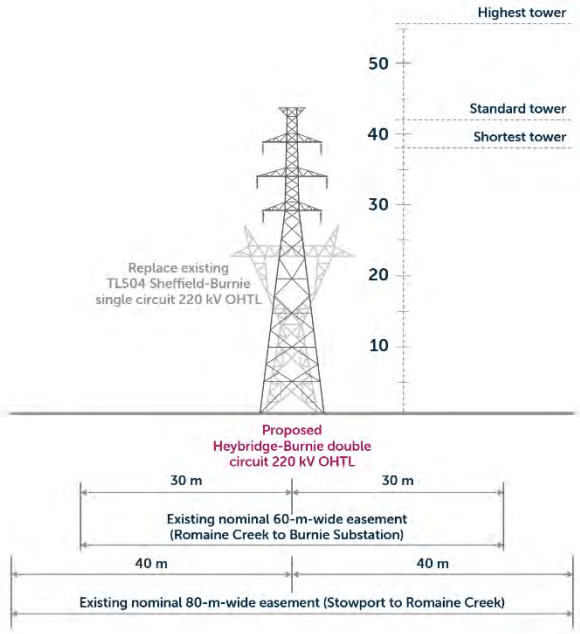


Figure 8-5 Proposed arrangement of Heybridge–Burnie 220 kV OHTL easement (looking northwest) between Chasm Creek/Maydena Drive and Burnie Substation. Proposed double circuit 220 kV OHTL will replace existing single circuit 220 kV OHTL in-situ.

8.3 Burnie–Hampshire Hills

Two potential routes (Figure 8-6) have been identified for connecting Burnie Substation to the proposed Hampshire Hills Substation – a route along the Burnie–Waratah single circuit 110 kV OHTL and a route via East Cam. The route via East Cam runs along sections of the Burnie–Smithton double circuit 110 kV OHTL and Burnie–Waratah single circuit 110 kV OHTL.

Burnie–Hampshire Hills route option

The route along the Burnie–Waratah 110 kV OHTL is constrained by houses, farm buildings and infrastructure and Burnie City Council's maintenance depot, which is adjacent to Burnie Substation. Avoiding or reducing impacts on these assets necessitates the route crossing from side-to-side of the existing OHTL. The route initially runs along the eastern side of the existing OHTL to Mooreville Road where it crosses to the western side of the existing OHTL to avoid houses along Mooreville Road. At Ridgley the route crosses onto the alignment of the existing 110 kV OHTL, which is relocated to the east to avoid houses adjacent to West Ridgley Road. North of Highclere, the route deviates from the existing 110 kV OHTL alignment to run parallel on a 30 m offset to Hampshire Hills. The Burnie–Waratah 110 kV OHTL deviation rejoins the original alignment at this location. The proposed arrangement of the easement through Shorewell Park, Burnie is shown in Figure 8-7.

Burnie–East Cam area, East Cam area–Hampshire Hills via Highclere route option

The Burnie–East Cam area transmission line corridor contains the Burnie–Smithton double-circuit 110 kV OHTL, two 22 kV distribution power lines and two 22 kV underground cables in an 80-m-wide easement. The underground cables are located between the double-circuit 110 kV OHTL and northern 22 kV distribution power line. The two existing overhead 22 kV distribution power lines are to be undergrounded in a westerly direction from Burnie Substation to West Mooreville Road.

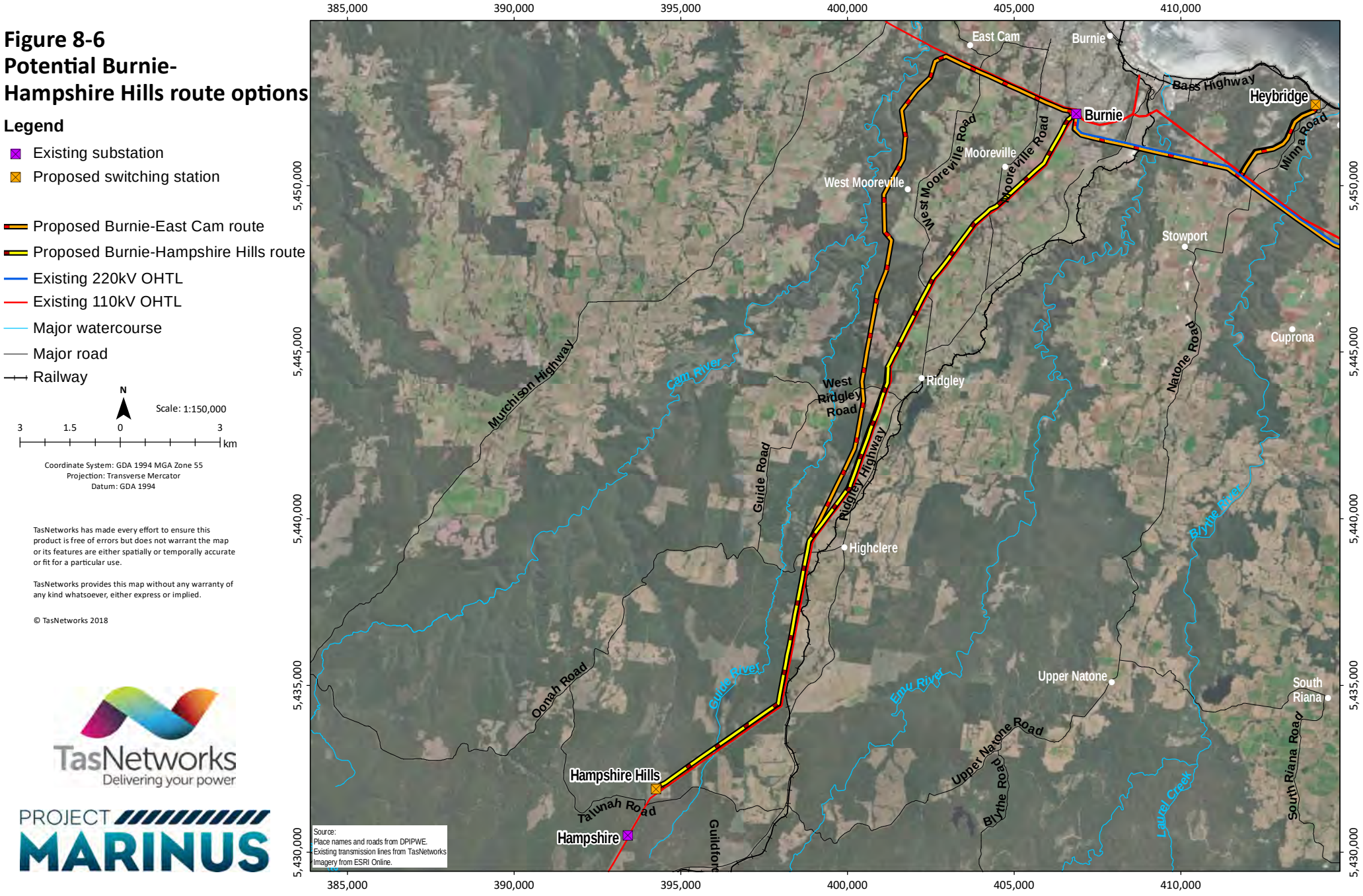
The existing easement abuts the Burnie City Council land parcel that extends from Burnie Substation to west to Mooreville Road. Sufficient space is available in the corridor to accommodate a double-circuit 220 kV OHTL.

The Burnie–East Cam route runs parallel on a 30 m offset to the south of the Burnie–Smithton double circuit 110 kV OHTL. A greater offset may be required at East Cam to avoid the gas transmission pipeline which is located in and adjacent to the 110 kV OHTL easement between West Mooreville Road to west of Laird Road, if transmission towers cannot be sited to avoid the pipeline easement. The proposed arrangement of the easement for this route is shown in Figure 8-8.

The route from East Cam to Hampshire Hills traverses the Cam River and Guide River valleys, running along the eastern slopes of the valleys just below the plateau that extends east from these rivers. The route traverses native vegetation managed as production native forest from East Cam to Ridgley. South of Ridgley, the route traverses plantations interspersed with agricultural land to Highclere where it joins and

follows the Burnie–Waratah 110 kV OHTL through plantations and agricultural land to the proposed Hampshire Hills switching station site on Talunah Road. The proposed arrangement of the easement between East Cam and Ridgley in shown in Figure 8-9 and between Ridgley and Hampshire Hills in Figure 8-10.

Figure 8-6
Potential Burnie-Hampshire Hills route options



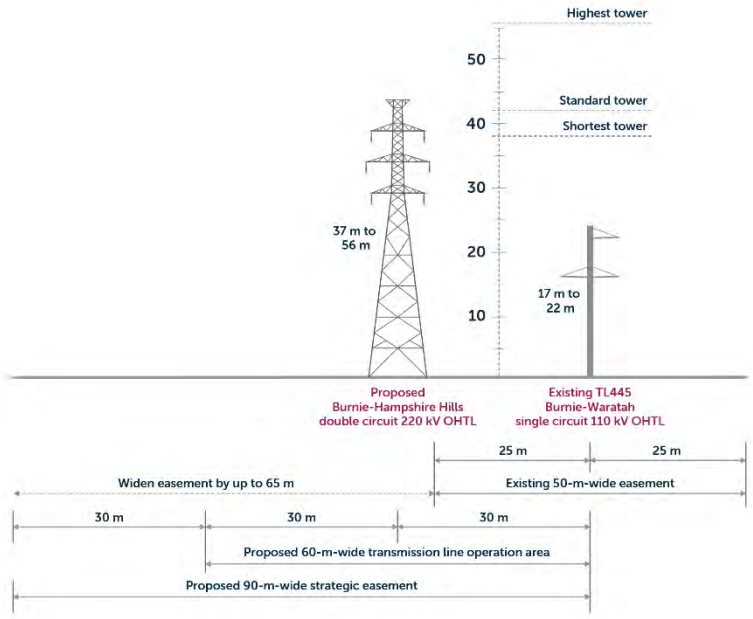


Figure 8-7 Proposed arrangement of East Cam–Hampshire Hills 220 kV easement (looking south) between Highclere and Hampshire Hills

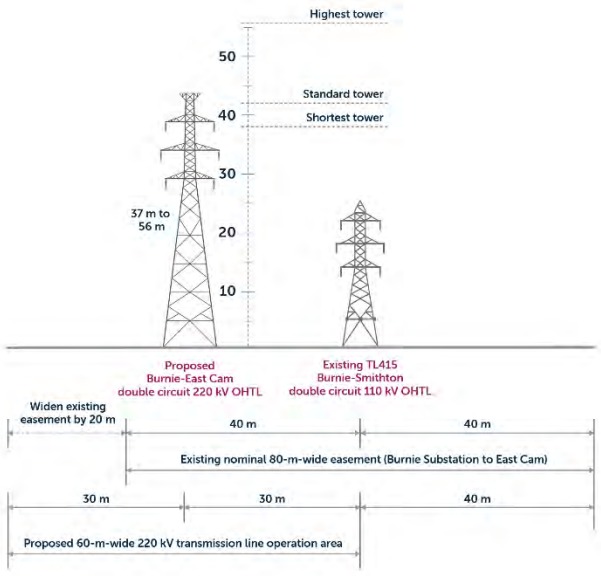


Figure 8-8 Proposed arrangement of Burnie–East Cam 220 kV easement (looking west) through Shorewell Park, Burnie

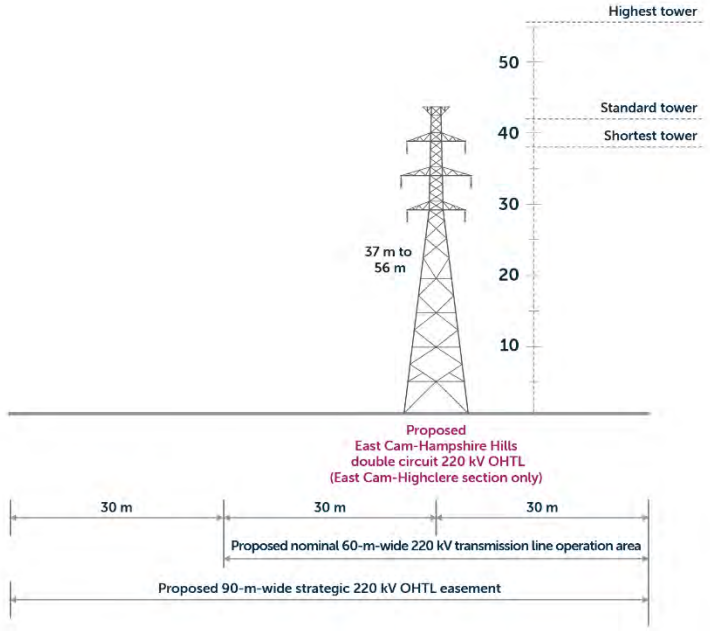


Figure 8-9 Proposed arrangement of East Cam–Hampshire Hills 220 kV easement (looking north) between Highclere and East Cam

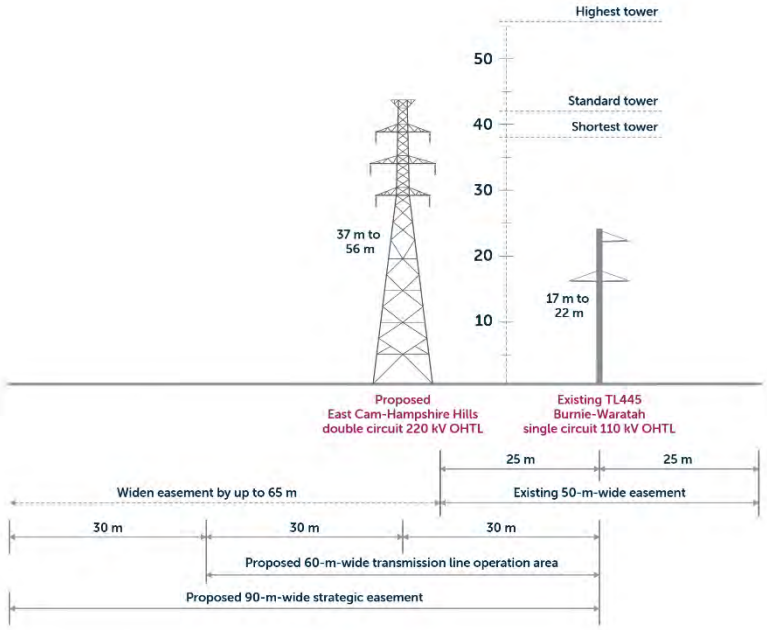


Figure 8-10 Proposed arrangement of East Cam–Hampshire Hills 220 kV easement (looking north) between Highclere and Hampshire Hills

Evaluation of route options

Appendix A presents key statistics for each route for each route selection criterion. The statistics inform the evaluation presented in Table 8-2.

Table 8-2 Evaluation of Burnie–Hampshire Hills route options

Route selection criteria	Burnie–Hampshire Hills	Burnie–East Cam East Cam–Hampshire Hills via Highclere area
Length	25 km	5 km / 25 km
Constructability	Good access to all tower sites from existing OHTL access routes and tracks; undulating terrain; route exposed to landslip hazard in vicinity, and south of Ridgley	Reasonable access from existing forest and plantation access tracks; good access where adjacent to existing OHTLs; steep terrain in places; route exposed to landslip hazard in vicinity, and south of Ridgley
Land tenure	Traverses freehold held privately and by authorities (TasWater) and local government (Burnie City Council) Traverses private reserves set aside in plantations	Traverses freehold held privately and by authorities (TasWater and TasTAFE) and local government (Burnie City Council) Traverses private reserves set aside in plantations
Occupation	Nearest house to route is 50 m from the proposed OHTL; 111 houses are located within 300 m of the proposed OHTL	Nearest house to route in the Burnie–East Cam route about the existing easement, i.e., 40 m separation. The nearest house to the East Cam–Hampshire Hills route is 220 m from the proposed OHTL. The Burnie–East Cam route has 468 houses within 300 m, the majority in Shorewell Park. There are six houses within 300 m of the East Cam–Hampshire Hills route.
Land use	Municipal depot; high quality agricultural land; plantations	Native vegetation; grazing land and pockets of high quality agricultural land; plantations
Planning	10.0 General residential, 26.0 Rural resource and 28.0 Utilities zones Landslip hazard overlay	10.0 General residential, 26.0 Rural resource and 28.0 Utilities zones Landslip hazard and tree protection overlays
Threatened native vegetation communities	No mapped communities traversed	No mapped communities traversed

Route selection criteria	Burnie–Hampshire Hills	Burnie–East Cam East Cam–Hampshire Hills via Highclere area
Threatened species	One active wedge-tailed eagle nest within 850 m of the proposed OHTL	Ten wedge-tailed eagle nests within 1,000 m; with the closest active nest 410 m from the proposed OHTL
Aboriginal cultural heritage	No registered sites	Not assessed
Historic cultural heritage	No registered sites	No registered sites
Landscape and visual	Highly visible in places from West Mooreville Road and Ridgley Highway and farm houses and residences scattered along the existing OHTL	Highly visible from properties west of Cam River; less visible from properties east of Cam River as mostly below plateau edge; highly visible at West Ridgley Road crossing

Each route option is constrained in different ways:

- Burnie–Hampshire Hills has a disproportionate impact on high quality agricultural land compared to the Burnie–East Cam and East Cam–Hampshire Hills route which have a high impact on native vegetation. The East Cam–Hampshire Hills route traverses native vegetation managed as production native forest. The route traverses areas recently harvested, noting that pockets of native vegetation remain along watercourses and as patches on the steeper slopes.
- East Cam–Hampshire Hills via the Highclere area has a high impact on threatened species, specifically wedge-tailed eagle nests, with 10 within 1,000 m of the proposed route. In comparison, the Burnie–Hampshire Hills route is in proximity to just one wedge-tailed eagle nest.
- Both routes are exposed to landslip hazard, particularly in the area west and south of Ridgley. The East Cam–Hampshire Hills via Highclere route has been selected to site towers on ridges to avoid unstable side slopes along the Guide River valley. Less opportunity is available on the Burnie–Hampshire Hills route which traverses the headwaters of watercourses draining the western edge of the plateau to Guide River.
- The Burnie–Hampshire Hills route is close to over 100 houses, where the East Cam–Hampshire Hills route has only 6 houses within 300 m. The Burnie–East Cam route has a significant number of houses close to the proposed OHTL due to it occupying the existing easement through Shorewell Park, a suburb of Burnie. The route is in an established transmission line corridor that will be rationalised by undergrounding existing 22 kV feeders to reduce electric and magnetic fields and visual impact from multiple transmission and power lines.

- While visible from properties west of Cam River, the East Cam–Hampshire Hills via Highclere route is less visible from adjacent properties than the Burnie–Hampshire Hills route.
- Constructing the Burnie–Hampshire Hills route would necessitate relocation of some or all buildings in the Burnie City Council maintenance depot.

TasNetworks undertook a study to understand the system constraints of augmenting the existing transmission infrastructure in the Burnie area). The study, which built on the work done in developing the North West Tasmania Strategic Transmission Plan, considered the implications of replacing the Burnie–Waratah single circuit 110 kV OHTL with the proposed double circuit 220 kV OHTL. The study concluded that the existing 110 kV OHTL could not be taken out of service without exposing the North West Tasmania network to increased risk of loss of power to the region.

The Burnie–East Cam area, and East Cam–Hampshire Hills via Highclere routes are least constrained overall and provide the most flexibility due to:

- least impacts on high quality agricultural land
- least impacts on rural residential properties and farm houses
- least impacts on Burnie City Council infrastructure including maintenance depot.
- most flexibility for future augmentation of the North West Tasmania transmission network
- reduced risk of loss of power to North West Tasmania by keeping Burnie–Waratah 110 kV in service.

9 Proposed routes

The proposed routes for the Palmerston–Sheffield and Sheffield–Burnie via Heybridge and Burnie–Hampshire Hills legs of the rectangle are described below and shown in figures 9-1, 9-2, 9-3, 9-4 and 9-5.

9.1 Palmerston–Sheffield

The proposed route is 30 m east of the existing Palmerston–Sheffield single circuit 220 kV OHTL (Figure 9-1). Two deviations are necessary to avoid site specific constraints. At Dunorlan, the proposed route deviates from the existing OHTL at Dunorlan Road to run on an offset to the existing OHTL for approximately 1.5 km to avoid the gas transmission pipeline that had been built in the existing easement in that section. East of Meander Valley Road, the proposed route deviates from the existing OHTL to cross over Bass Highway at the existing overpass. This increases the angle of the crossing and avoids towers in the scenic corridor on the Bass Highway. The new OHTL will be approximately 80 kilometres long and will involve approximately 180 new towers.

9.2 Sheffield–Burnie via the Stowport area

This route is described in two sections – firstly Sheffield–Stowport area and Stowport area–Heybridge Converter Station, and secondly Stowport area–Burnie.

9.2.1 Sheffield–Stowport area and Stowport area–Heybridge Converter Station

The proposed route (Figure 9-2) is 10 m offset southwest of the existing Sheffield–Burnie single circuit 220 kV OHTL (which will be removed between Sheffield and Burnie) between Sheffield Substation and Kindred. At Kindred, the route will be straightened between Riggs Road and Kindred Road to remove the deviation caused by the historic arrangement of transmission lines in that area. The proposed route continues on a 10 m offset to the existing 220 kV OHTL from Kindred to Abbotsham where it crosses the existing 220 kV OHTL to run between that OHTL and the existing 110 kV OHTL from Castra Road to Top Gawler Road to avoid houses and sheds close to the existing 220 kV OHTL.

At Isandula Road, Gawler the proposed route returns to a 10 m offset southwest of the existing 220 kV OHTL and continues on that offset to Dial Road, Penguin where it adopts the existing 220 kV OHTL alignment. The proposed route follows the existing 220 kV OHTL alignment across Ironcliffe Road, Penguin to Hughes Road where it returns to a 10 m offset to the southwest of the existing 220 kV OHTL.

The proposed route briefly adopts the existing 220 kV OHTL alignment west of West Pine Road, Penguin to avoid farm sheds and infrastructure. From Penguin to Stowport, the proposed route runs on a 10 m offset southwest of the existing 220 kV OHTL.

At Chasm Creek, the proposed route leaves the existing 220 kV OHTL to run north-northeast across the existing 110 kV OHTL and Devonshire Drive before descending the valley between that road and Minna Road to the proposed Heybridge switching station at the former tioxide plant site.

The new OHTL is approximately 47 kilometres long and will involve approximately 95 new towers.

9.2.2 Stowport area–Burnie

The proposed route (Figure 9-3) runs parallel to the Sheffield–Burnie route on a 30 m offset from Heybridge Converter Station back to the existing 220 kV OHTL in the Stowport area.

From Stowport to Maydena Road, the proposed route runs on a 10 m offset parallel and southwest of the existing 220 kV OHTL. At Maydena Road, the proposed route adopts the alignment of the existing 220 kV OHTL to Burnie Substation.

The new OHTL is approximately 9 kilometres long and will involve approximately 23 new towers.

9.3 Burnie–East Cam

The proposed Burnie–East Cam route (Figure 9-4) is a 30 m offset south of the existing 110 kV OHTL from Burnie Substation to south of Mawson Road, East Cam where it turns southwest. The proposed route straddles the gas transmission pipeline from West Mooreville Road to Laird Road, East Cam. The new OHTL is approximately 5 km long and will involve approximately 14 new towers.

9.4 East Cam–Hampshire Hills via Highclere area

The proposed East Cam–Hampshire Hills route (Figure 9-5) commences at East Cam. Initially, the route runs southwest before turning southerly to run along the face of the slopes of the Cam River valley to Highclere where it joins and follows the Burnie–Waratah 110 kV OHTL to the proposed Hampshire Hills Switching Station. The new OHTL is approximately 25 km long and will involve approximately 48 new towers.

Figure 9-1
Proposed Palmerston-Sheffield route

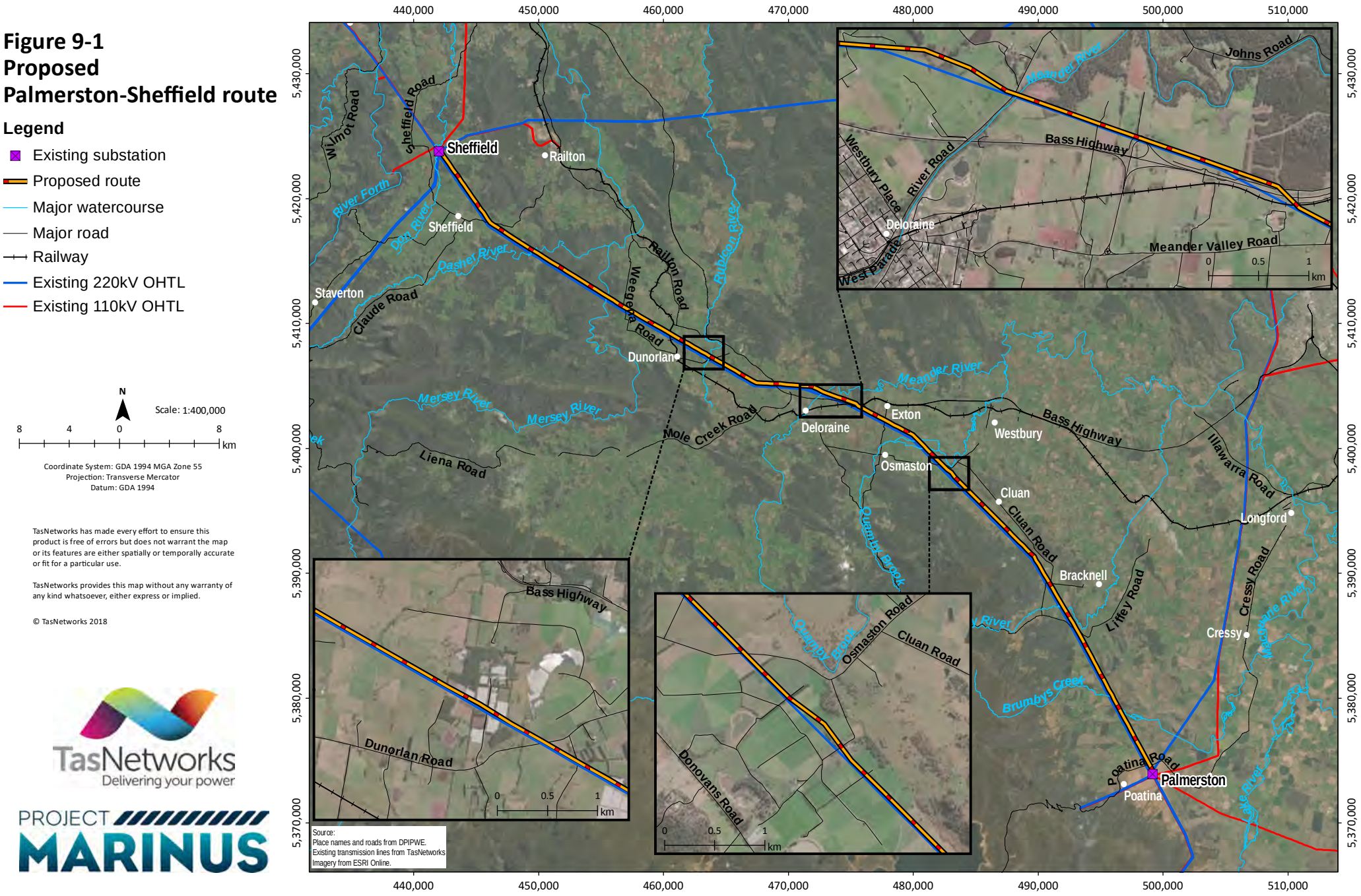


Figure 9-2

Proposed Sheffield–Stowport area and Stowport area–Heybridge Converter Station route

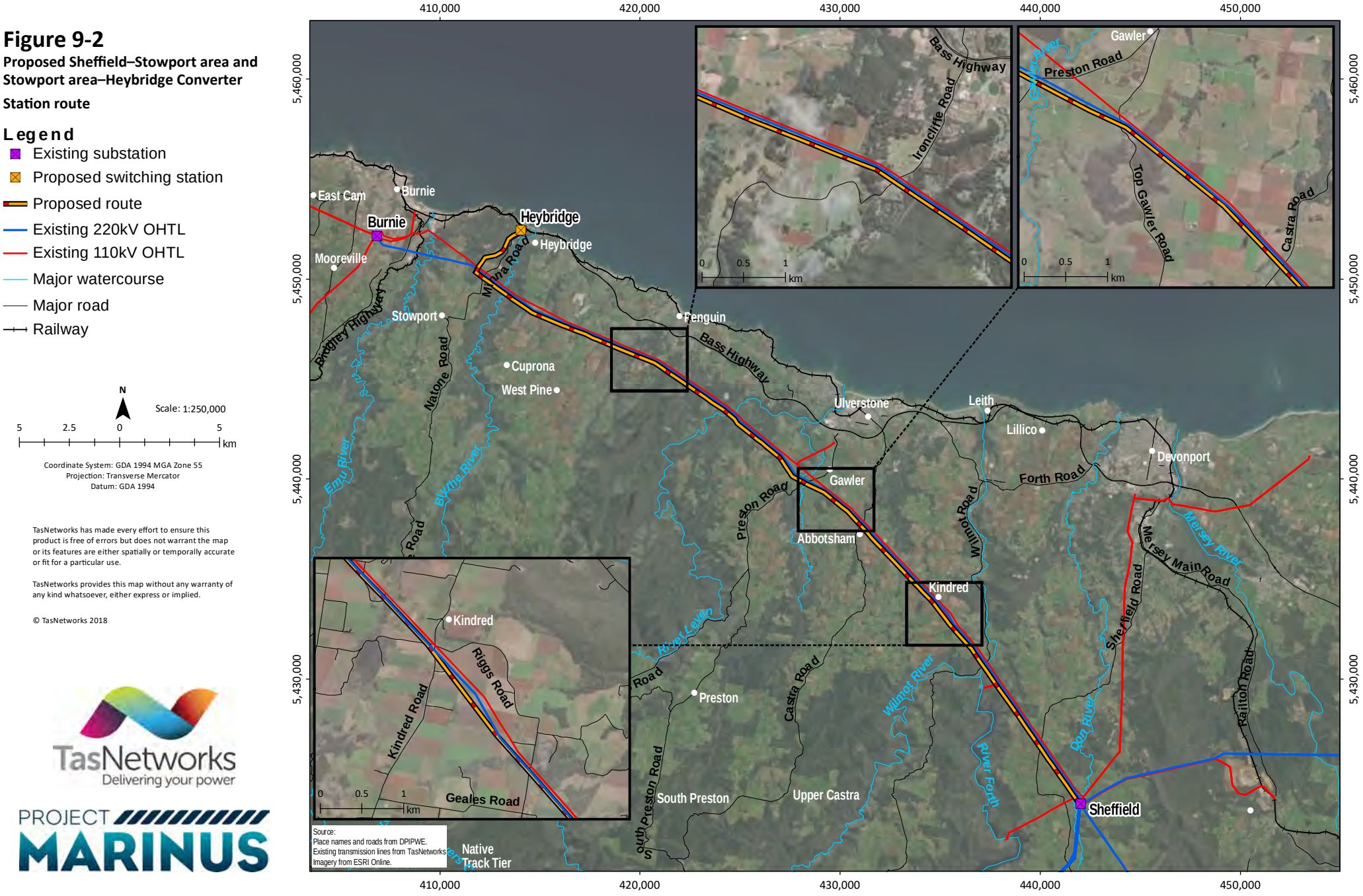


Figure 9-3
Proposed Stowport area-Burnie route

Legend

- Existing substation
- Proposed route
- Existing 220kV OHTL
- Existing 110kV OHTL
- Major watercourse
- Major road
- Railway

N

Scale: 1:50,000

1 0.5 0 1 km

Coordinate System: GDA 1994 MGA Zone 55
Projection: Transverse Mercator
Datum: GDA 1994

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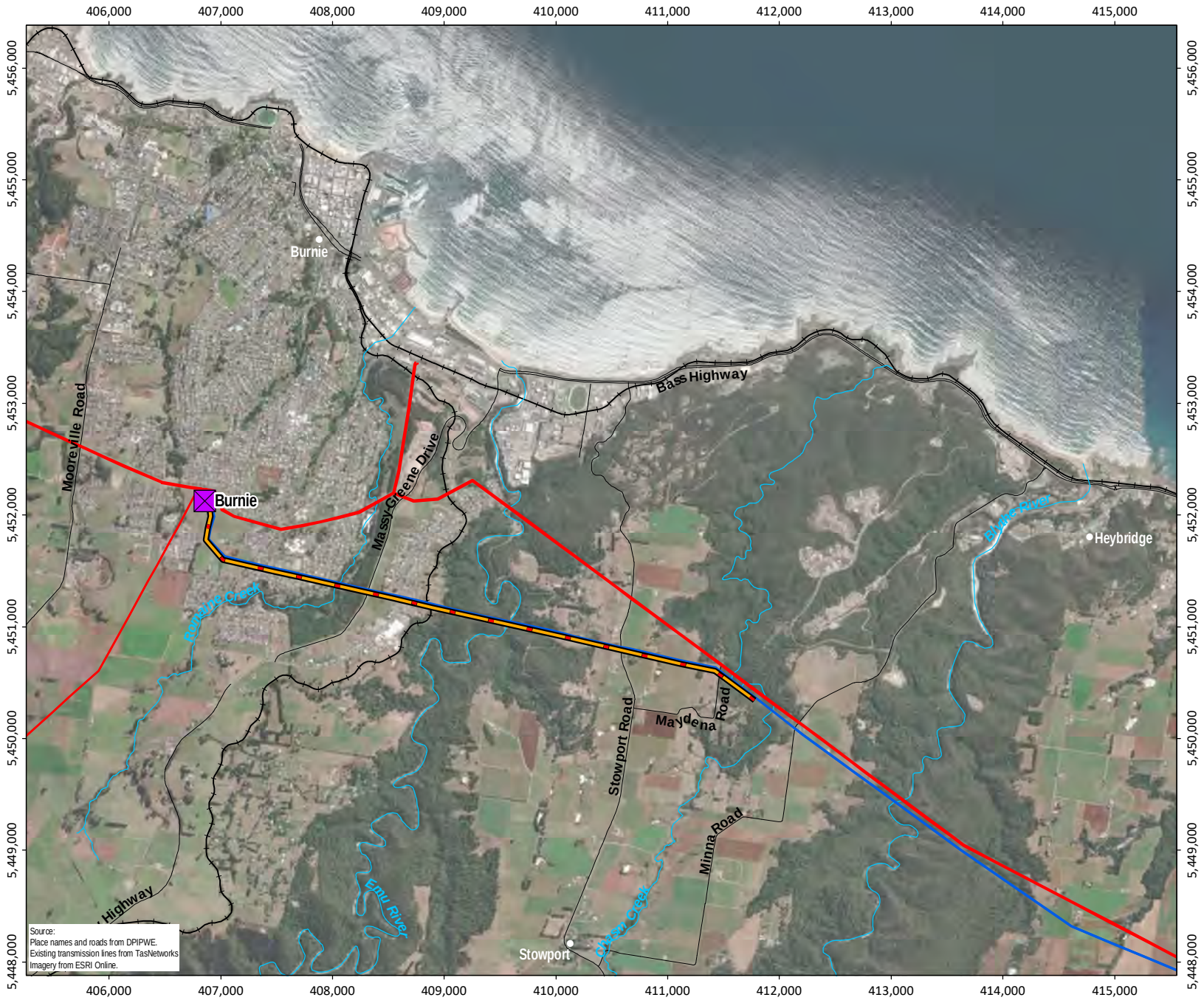
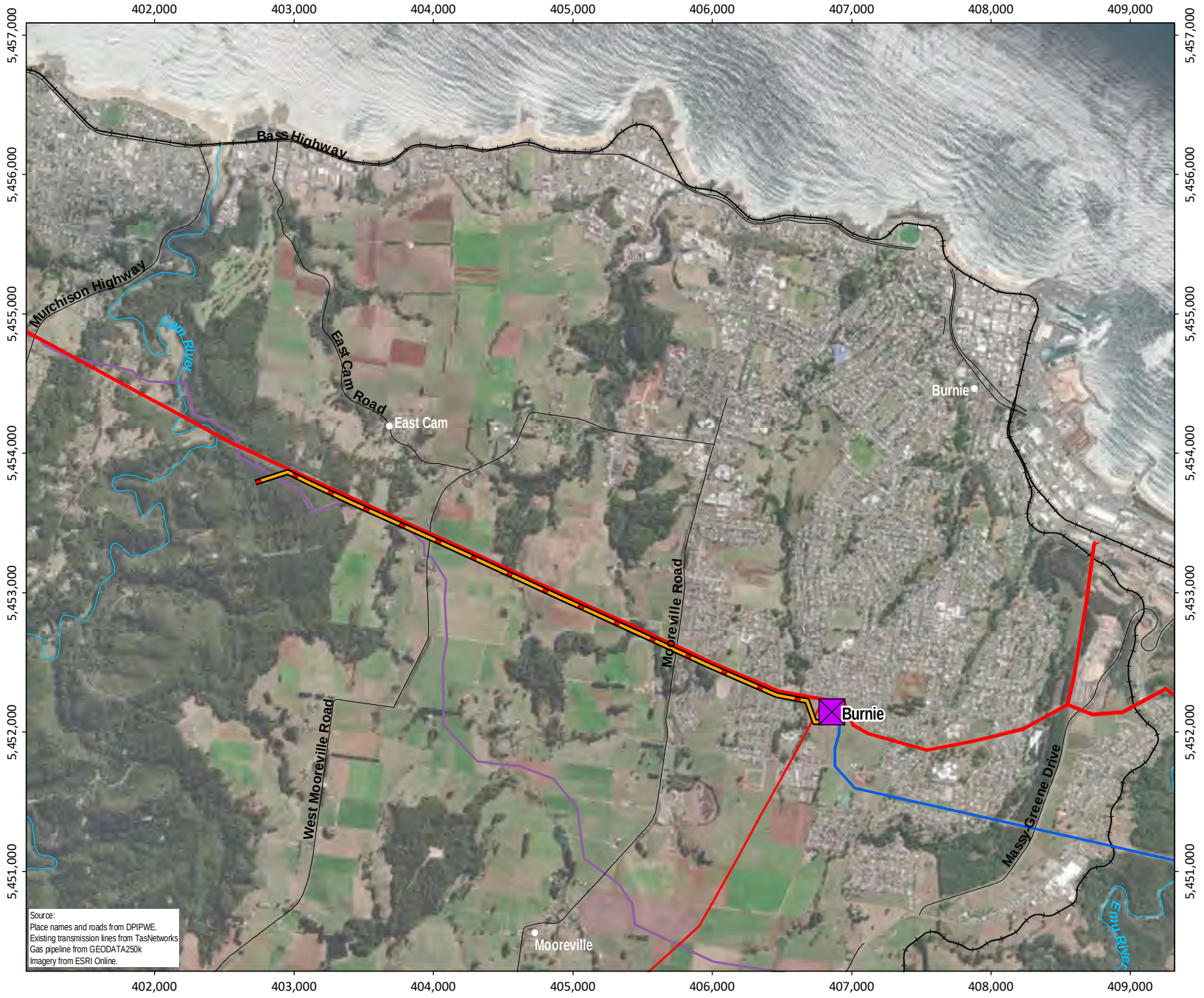


Figure 9-4
Proposed
Burnie-East Cam route



Legend

- Existing substation
- Proposed route
- Existing 220kV OHTL
- Existing 110kV OHTL
- Major watercourse
- Major road
- Railway
- Gas pipeline

N

Scale: 1:40,000

800 400 0 800 m

Coordinate System: GDA 1994 MGA Zone 55
Projection: Transverse Mercator
Datum: GDA 1994

Source:
Place names and roads from DPIPWE.
Existing transmission lines from TasNetworks
Gas pipeline from GEODATA250k
Imagery from ESRI Online.

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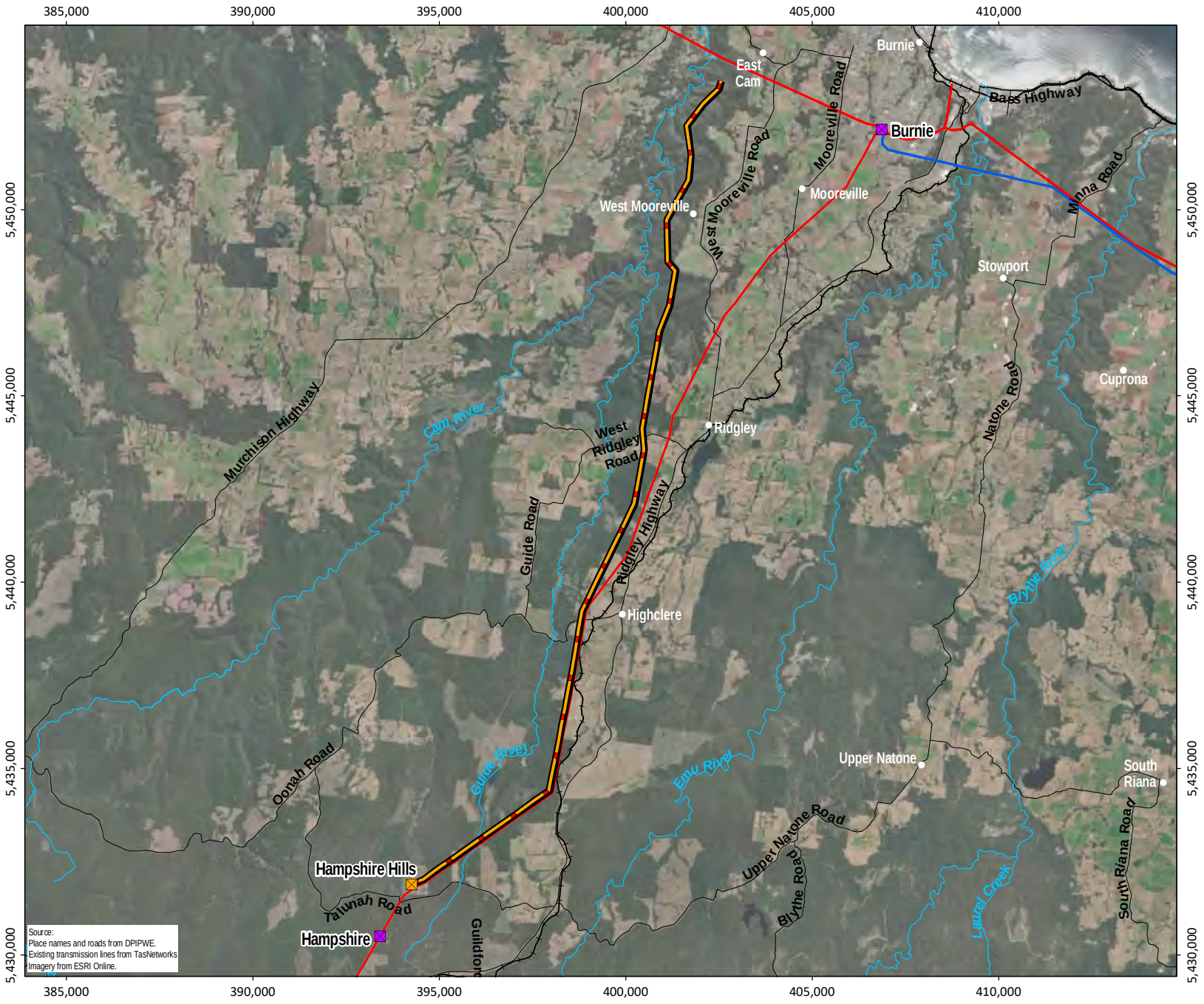
Figure 9-5

Proposed East Cam-Hampshire Hills via Highclere route

Legend

- Existing substation
- Proposed switching station
- Proposed route
- Existing 220kV OHTL
- Existing 110kV OHTL
- Major watercourse
- Major road
- Railway



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Scale: 1:150,000

3 1.5 0 3 km

Coordinate System: GDA 1994 MGA Zone 55
Projection: Transverse Mercator
Datum: GDA 1994

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10 Next steps

Identification of the proposed routes will enable:

- Engagement with landowners including land access negotations.
- Broader community engagement.
- Submission of an environmental referral under the the Commonwealth *Environment Protection Biodiversity Conservation Act* 1999.

As landowner and community engagement progresses preferred routes are confirmed and this will enable:

- Detailed terrestrial ecology, cultural heritage and geomorphology field investigations.
- Landscape and visual impact assessment to understand how the proposed routes and new OHTL changes views from properties and key tourist viewpoints.
- Environmental, cultural heritage and socioeconomic technical studies to inform environmental, cultural and socioeconomic impact assessment. The outcomes of these studies may require refinement of OHTL design to address site-specific constraints and manage impacts.
- Preliminary geotechnical and constructability investigation (walk-through) to identify features and site conditions that require detailed investigation to inform detailed design.
- Detailed transmission line and supporting infrastructure design.
- Preparation and submission of environmental, land use planning and cultural heritage applications for approval.

11 Glossary and references

Glossary of abbreviations and terms

Abbreviation/term	Description
AEMO	Australian Energy Market Operator
BOM	Bureau of Meteorology
circuit	an electrical circuit configured as alternating or direct current
Cwlth	Commonwealth (in reference to the government)
double circuit	parallel electrical circuits supported on either side of transmission towers or as sets of underground cables; each circuit comprises three phases
EPBC Act	*Environment Protection Biodiversity Conservation Act 1999* (Cwlth)
GIS	geographic information system
ground-truthing	checking the accuracy of data bases and remotely sensed data by means of in-situ observations
ha	hectare; SI unit of measurement
ISP	Integrated System Plan
km	kilometre; SI unit of measurement
kV	kilovolt or 1,000 volts; SI unit of measurement
LIST	Land Information System Tasmania
m	metre; SI unit of measurement
MW	megawatt or 1,000,000 watts; SI unit of measurement; a measure of energy transfer capacity
NC Act	*Nature Conservation Act 2002* (Tas)
NEM	National Electricity Market
NER	National Electricity Rules
OHTL	overhead transmission line
pinch point	a location where constraints preclude other route options

Abbreviation/term	Description
REZ	renewable energy zone, as defined in AEMO's Integrated System Plan 2018
shovel ready	the stage of a project when construction can commence
single circuit	single electrical circuit supported on transmission towers or as a set of underground cables; a single circuit comprises three phases
Tas	Tasmania
TASVEG	Comprehensive digital map of Tasmania's vegetation (DPIPWE)
TRET	Tasmanian Renewable Energy Target
TSP Act	*Threatened Species Protection Act 1995* (Tas)

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Appendix A
Key statistics for Burnie–Hampshire Hills route options

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Table A-1 Key statistics for identified prudent and feasible routes

Key statistic	Burnie to East Cam	East Cam to Hampshire Hills via Highclere	Burnie to Hampshire Hills
Length	5	25	25
Tenure			
Number of parcels intersected	16	37	78
Number of reserves intersected (by type)			
State reserve	-	--	-
Regional reserve	-	-	-
Conservation area	-	-	-
Conservation covenant	-	-	-
Management agreement	-	-	-
Other private reserve	-	17	9
Informal reserve on other public land	-	-	-
Informal reserve on permanent timber production	-	-	-
Resource tenure			
Number of mining leases intersected	-	1	-
Number of petroleum leases intersected	-	-	-
Occupation			

Key statistic	Burnie to East Cam	East Cam to Hampshire Hills via Highclere	Burnie to Hampshire Hills
Number of houses within nominal 60-m-wide easement	-	-	-
Number of houses within 300 m of OHTL	468	6	111
Land use			
Length in agricultural land (km)	3.7	4.5	12.5
Length in high quality agricultural land (km)*	1.1	2.0	6.9
Length in plantations (km)	-	16.6	6.8
Length in native vegetation (km)	0.5	1.9	1.7
Vegetation cover (TasVeg 3.0)			
Length in agricultural, urban and exotic vegetation (km)	4.1	15.9	22.6
Length in native vegetation and other natural environments (km)	0.9	8.6	2.1
Planning scheme zones			
Length in 10.0 General Residential (km)	0.6	-	0.4
Length in 12.0 Low Density Residential (km)	-	-	-
Length in 13.0 Rural Living (km)	-	-	-
Length in 17.0 Community Purpose (km)	-	-	-
Length in 18.0 Recreation (km)	-	-	-
Length in 19.0 Open Space (km)	1.3	-	-

Key statistic	Burnie to East Cam	East Cam to Hampshire Hills via Highclere	Burnie to Hampshire Hills
Length in 26.0 Rural Resource (km)	2.7	25	23.8
Length in 28.0 Utilities (km)	0.3	-	0.5
Length in 29.0 Environmental Management (km)	-	-	-
Interim planning scheme overlays			
Length in Flood Prone Areas (km)	-	-	-
Length in Landslip Hazard (km)	0.9	4.4	4.2
Length in Priority Habitat (km)	-	-	-
Length in Scenic Corridor (km)	-	-	-
Length in Tree Preservation (km)	1.5	3.8	-
Historical landslides			
Length in historical landslides (km)	0.5	2.0	2.0
Threatened native vegetation communities			
Area of wetlands intersected by nominal easement (ha)	0.9	-	1.0
Area of *Eucalyptus amygdalina* inland forest and woodland on cainzoic deposits intersected by nominal easement (ha)	-	-	-
Area of *Eucalyptus ovata* forest and woodland intersected by nominal easement (ha)	-	-	-
Area of *Eucalyptus viminalis* wet forest intersected by nominal easement (ha)	-	-	-

Key statistic	Burnie to East Cam	East Cam to Hampshire Hills via Highclere	Burnie to Hampshire Hills
Area of Highland *poa* grassland intersected by nominal easement (ha)	-	-	-
Area of Riparian scrub intersected by nominal easement (ha)	-	-	-
Threatened EPBC Act listed species and raptors			
Number of EPBC Act-listed species within nominal easement	-	-	-
Number of State-listed species within nominal easement	-	-	-
Number of raptor nests within 300 m of OHTL	-	-	-
Cultural heritage			
Registered Aboriginal heritage sites within survey corridor**	-	na	-
Historical heritage sites within survey area**	-	-	-

* Defined by land capability classes 1, 2 and 3

** Survey areas are defined as Palmerston to Sheffield (80 m wide), Sheffield to Burnie via Heybridge (465 m wide), Burnie to East Cam (80 m wide) and East Cam to Hampshire Hills (230 m wide).

na Not assessed