

Memo

DATE	22 January 2025
AUTHOR	Cogency
TOPIC	Syncline Community Cable – Design Evolution Memo
TO	Those it concerns

Our Project Reference: 2326

Purpose

The purpose of this memo is to provide an overview of the design development process that has and will continue to occur for the Syncline Community Cable project (the Project).

Problem Identification

Syncline Community Cable is proposing to solve the problem of connecting Melbourne to VNI West and to renewable energy projects in Victoria's north-west, in addition to improving electricity flows to NSW, via an underground 500 kV High Voltage Direct Current (HVDC) cable.

Methodology

The route refinement process involved three broad stages:

1. Initial route investigations and high-level constraints assessment
2. Multi criterion constraints assessment and preferred route alignment
3. Micro siting from landowner and technical input (ongoing)

Within each stage, multiple route options were investigated and assessed, and a preferred route was determined. The refinement process is ongoing with minor adjustments to the preferred route expected to further reduce impacts of the project on the existing environment and agricultural practices of the landowners.

The following sections provide an overview of each of the stages outlined above.

1. Initial route investigations and high-level constraints assessment

Following the problem identification, initial route investigations began to set the start and end points, and a number of broad preferred corridors for the Project.

The Melbourne connection point was determined as the Melbourne Renewable Energy Hub (MREH), in Plumpton. MREH was selected due to the benefits of co-locating the converter station with the battery energy storage system (BESS), substation and adjacent existing Sydenham Terminal Station, along with the additional flexibility to the grid of having a major BESS at the end of a major transmission line. It was also selected because of the compatibility of the uses, land suitability, and presence of large buffers.

The VNI West connection point was determined as a broad area farming land near Charlton. This location was selected due to the low population density, agricultural land use, low ecological value and the benefits for the broader electricity system. The exact location of the connection point was determined during the second stage of the route refinement process, following detailed assessment.

Several exiting linear corridors (Figure 1) were assessed to link MREH to the broad acre farming land west of Melbourne, where the VNI West transmission corridor is proposed. This was to avoid disruption to the highly populated peri-urban ring surrounding Melbourne as well as the significant natural environmental values in this region.



Figure 1 – Identification of initial route options



The options included:

- Western Renewables Link (collocating)
- 220kV Transmission Easement Corridor via Moorabool Terminal Station
- Western Freeway median
- Ballarat Rail Line
- Bendigo Rail Line
- Calder Freeway median

These options were considered from a planning, social, environmental, constructability and grid connection perspective. From this assessment it was determined that the Calder Freeway median was the most appropriate option (refer Figure 2). The freeway median has the advantage of being direct, already disturbed, having relatively few biodiversity values, and offering an established corridor with good buffers from residential land. Further traffic engineering work concluded that sufficient land within the central median exists for an underground cable, and can be constructed in a way that maintains traffic function and allows for future transport upgrades.

The Calder Freeway median was determined as the preferred route from MREH to near Bendigo. The next stage involved determining the preferred route alignment between the Calder Freeway median and the VNI West transmission corridor near Charlton.

2. Multi criterion constraints assessment and preferred route alignment

A multi criterion constraints assessment was undertaken for the section from Bendigo to Charlton. The multi criterion analysis utilised GIS software and publicly available planning and environmental data to determine the least impactful route. The constraints were graded to highlight the different importance of each matter, having regard to broad social and environmental goals. Table 1 sets out the criteria.

Figure 2, Figure 3 and Figure 4 provide examples of the multi criterion constraints assessment.

Table 1 – Constraint Criteria

Very High	High	Medium
▪ Conservation areas ▪ Ramsar wetlands ▪ National Parks ▪ State Parks ▪ Built Up Areas ▪ Towns/Cities ▪ Rural living type zoning ▪ Non-residential built-up areas	▪ Public Land ▪ Forestry Areas ▪ Managed resource areas ▪ Biodiversity (strategic biodiversity value)	▪ Small lot farming ▪ Intensive agriculture ▪ Rural dwellings ▪ Rivers and Waterways ▪ Other Public land ▪ Mining

From Bendigo to Newbridge the preferred route was determined early as a result of a clear corridor of minimal constraints along the route (see Figure 3). From Newbridge to Charlton a number of route options were explored and assessed based on their level of constraint as well as other key project elements such as constructability and length of route (see Figure 4). Broadly, the route options included:

- Option A: Travelling north to the east of Bridgewater, west to the north of Inglewood Nature Conservation Reserve, south of Wedderburn and north-west to Charlton
- Option B: Crossing the Loddon River at the same location as Option A, travelling north of Wedderburn and south-west to a connection with VNI West south of Charlton.
- Option C: Follows Option B to north of Wedderburn and travels west to a connection with VNI West north of Charlton
- Option D: Follows Option C to Buckrabanyule then travels north-west to a connection with VNI West at Glenloth.

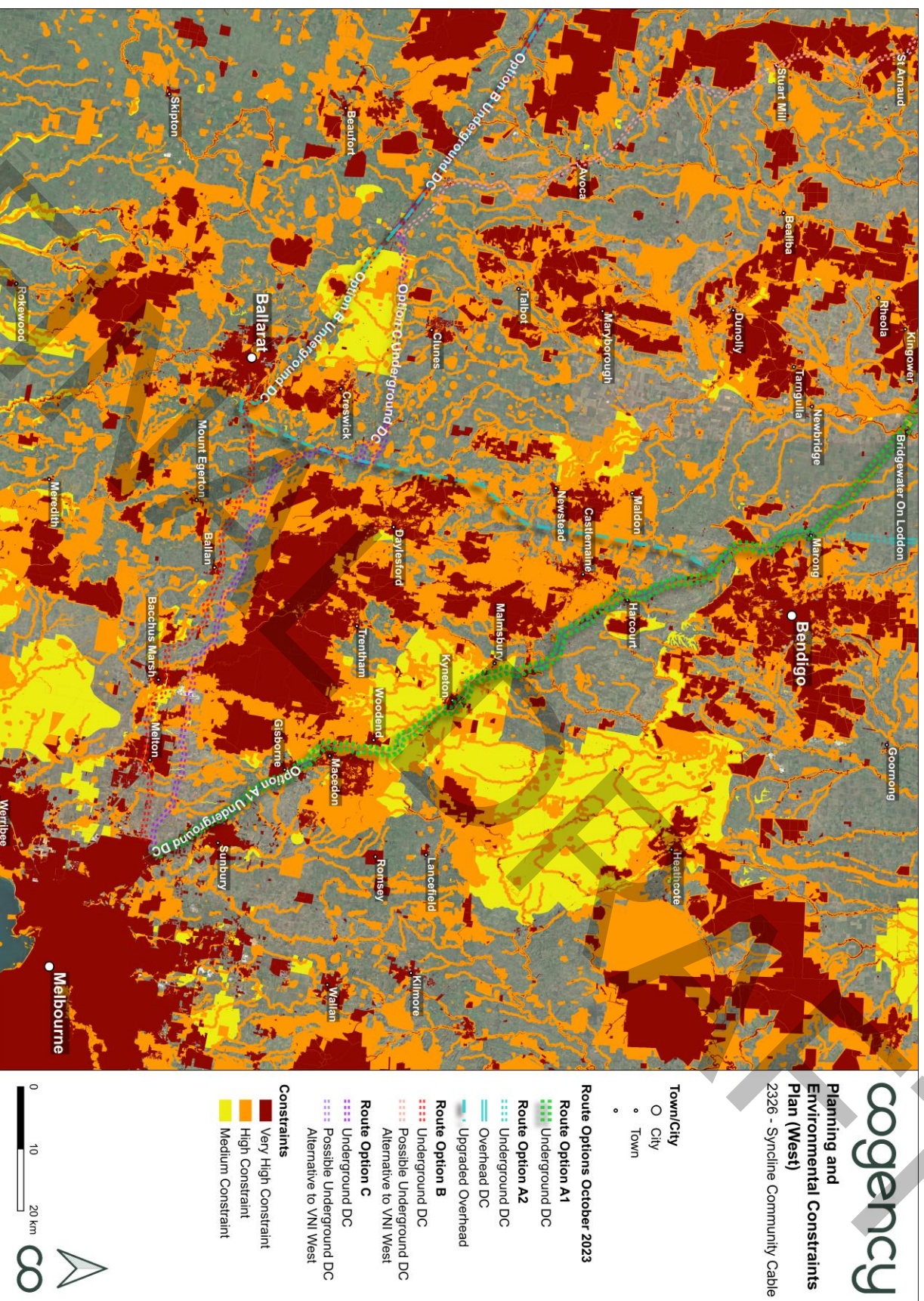


Figure 2 – Region wide multi criterion constraints assessment example

- Town
 - SCC Preferred Route
 - Existing Transmission Lines
- Planning and Environmental Constraints**
- Very High Constraint
 - High Constraint
 - Medium Constraint

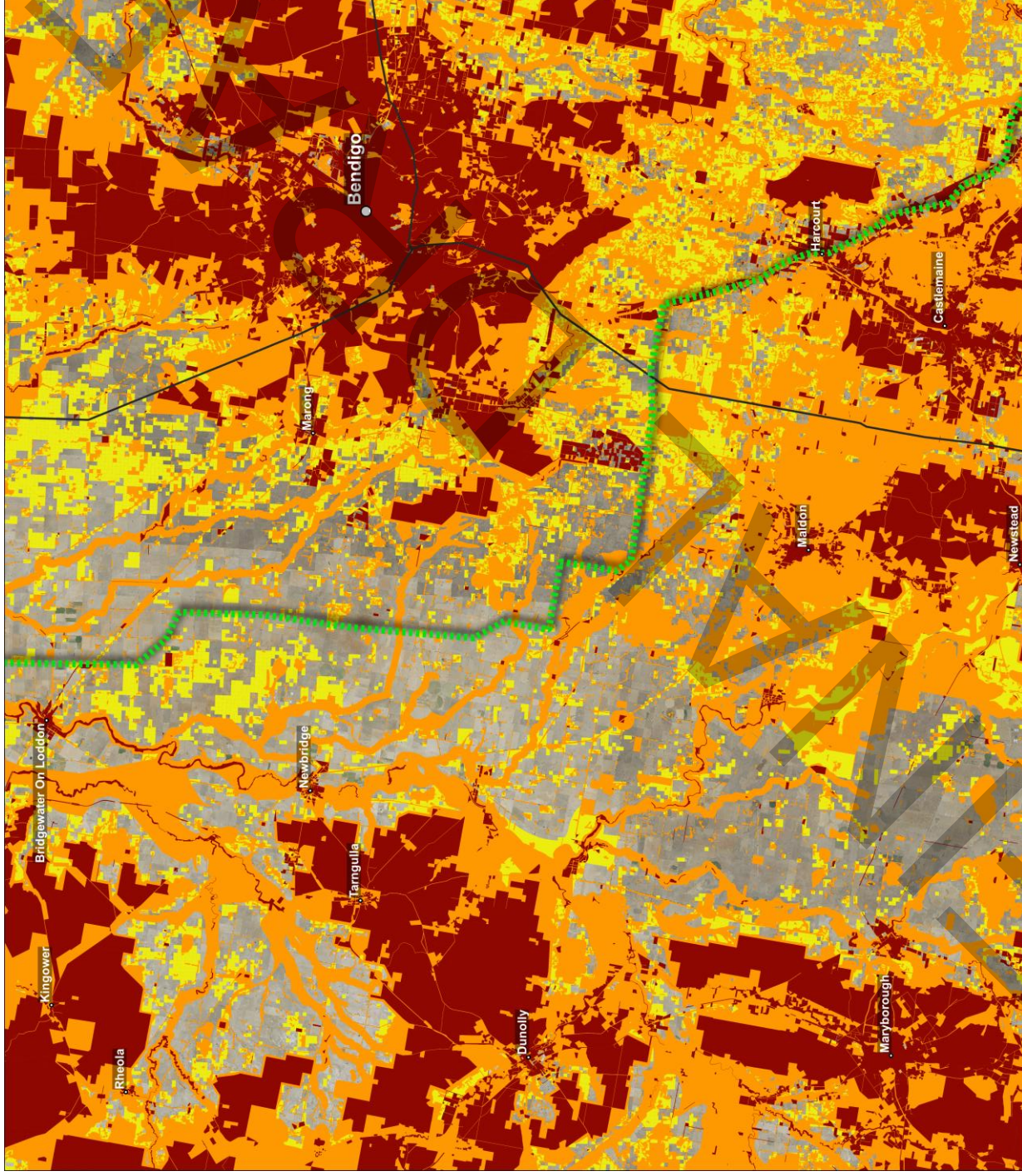


Figure 3 – Bendigo to Newbridge multi criterion constraints assessment example

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Newbridge to Charlton Options Plan

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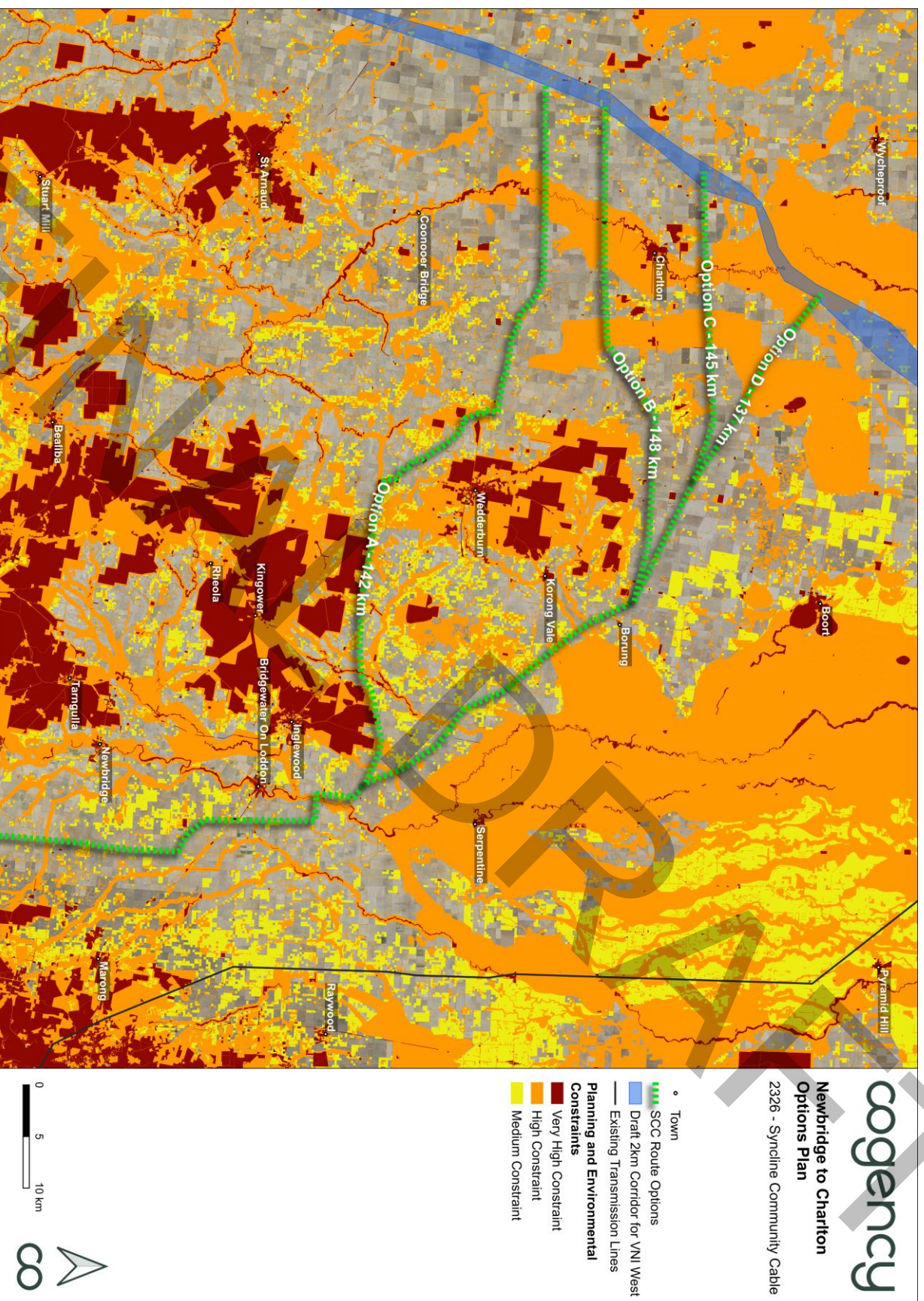


Figure 4 – Newbridge to Charlton Multi criterion constraints assessment example



Following the multi criterion constraints assessment, the preferred route was determined as Option A which travels from Newbridge, north of Bridgewater on Loddon and Inglewood then west to Charlton south of Wedderburn. This Option was sited primarily within land subject to cropping, owing to reduced potential for ecological values and determined to have minimal constraints. The Option also avoided the nature conservation reserves and state parks in proximity to Inglewood and Wedderburn. The route avoids towns and settlements and remains within the area of broad acre agriculture land use.

An approximately 2 km study area was determined around the proposed route for the purpose of the next stage (micro siting).

3. Micro siting from landowner and technical input

Following selection of the preferred route within a 2 km study area, landowner engagement and technical assessments were commenced to further refine the route, including preliminary ecological, and cultural heritage studies. Along the preferred route, following engineering advice, it was determined that the Project will involve:

- Construction of a 1.4 m wide trench for the HVDC cable, to be protected by a 12 – 20 m wide easement during operation
- Use of a 30 m wide construction corridor to facilitate construction

Key considerations for micro siting of the preferred trench alignment and associated construction corridor include avoidance of ecological and cultural heritage values and consideration of landowner agricultural requirements. Therefore, the following changes were made to reflect the above priorities:

- Re-alignment of the route around significant ecological or cultural heritage values
- Reduction in the construction corridor to 20 m where ecological or cultural heritage values are known to occur
- Use of horizontal boring or other trenchless construction methods (in these locations the construction corridor stops and starts at the entrance and exit of the boring location with no ground disturbance proposed in between)
- Shifting of the construction corridor to an edge of a paddock, along a fence line, or to a location requested by a landowner to support farming practices
- Utilisation of a 'thread the needle' approach between significant trees and patches of native vegetation to avoid impacts

Figure 5 and Figure 6 provide examples of the above described micro siting.

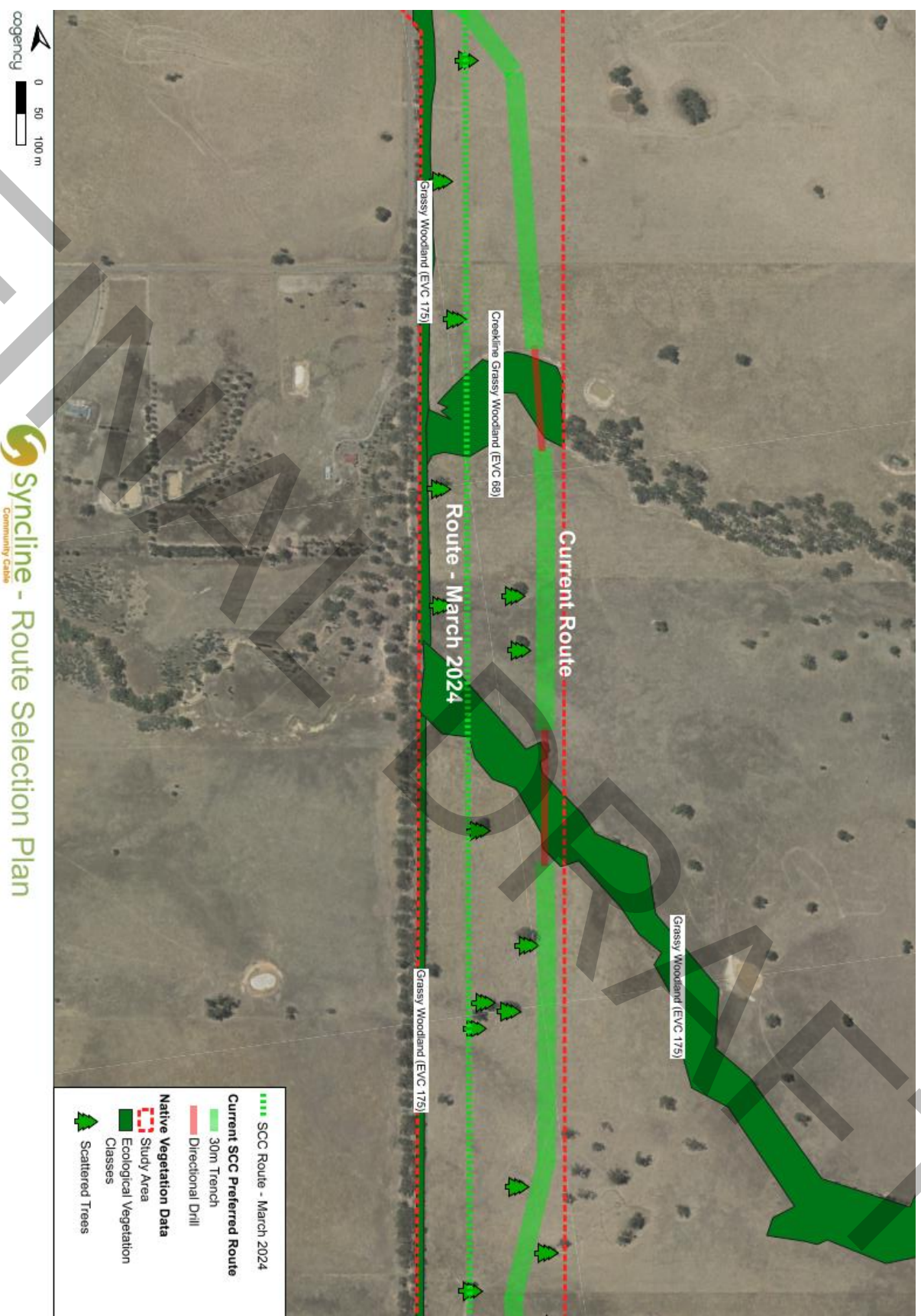


Figure 5 – Micro siting route selection example



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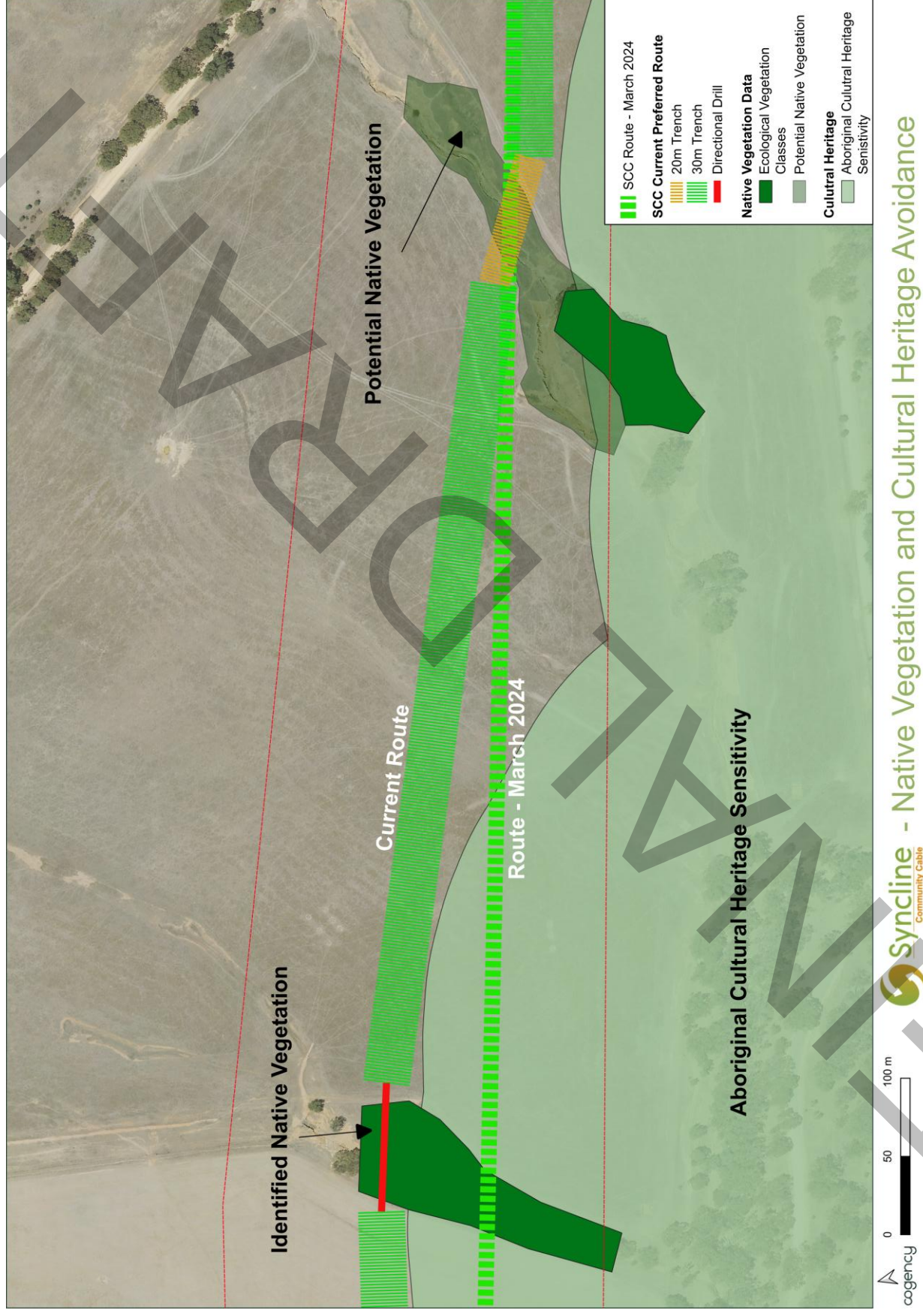


Figure 6 – Example native vegetation and cultural heritage micro siting

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In addition, avoidance, minimisation and offset measures implemented to reduce impacts include:

- Using cleared sites with no significant environmental values for laydown areas
- Sourcing quarry material, concrete and other construction materials from existing licensed facilities avoiding the need to construct new facilities.
- Narrowing the indicative construction area of disturbance in some areas to avoid impacting vegetation and to provide sufficient clearance to avoid tree protection zones.
- Locating the converter stations on cleared land in proximity to existing electricity infrastructure to avoid ecological disturbance and the introduction of additional aboveground electricity infrastructure.
- Reduction of impacts to vegetation through the proposed use of horizontal boring or other trenchless construction methods at targeted crossing sites (e.g. at waterways, sealed roads, areas of roadside vegetation, etc.).
- Micro siting joint bays and other infrastructure to avoid ecological values
- Once final ecological impacts are known, offsets will be implemented in accordance with the requirements of Victorian and Commonwealth guidelines.
- Reinstatement and rehabilitation of the construction corridor, temporary access and laydown areas to pre-construction uses, or as agreed with the landowner/s.
- Design of the converter stations to reduce landscape impacts e.g. orientation/placement away from sensitive viewpoints, colour of materials used.

The preferred route (refer to Figure 7) is being presented to landowners, and opportunities are being provided for feedback in relation to the effect of the Project on their agricultural operations. Examples of this landowner micro siting included avoiding irrigation infrastructure, avoiding more productive paddocks, and avoiding important access roads. Landowner micro siting is a key part of the Project and will continue through detailed design.

Next Steps

Following the route selection process as described, the preferred route was selected for the EES referral and is presented as Figure 7. The proposed route will continue to be micro sited through the planning and environmental approvals process, in response to environmental, land and topographical constraints, landholder negotiations and technical and operational requirements.

[map to be inserted]

Figure 7 – Preferred route



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