Powering Sydney's Future –

Potts Hill to Alexandria Transmission Cable Project

State Significant Infrastructure Assessment

SSI 8583

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Executive Summary

TransGrid is proposing to develop the Powering Sydney's Future project, to improve the security and reliability of inner Sydney's electricity network.

There has been a significant increase in the demand for electricity in the inner Sydney area over recent years, and in 2016 the *National Transmission Network Development Plan* (Australian Energy Market Operator, 2016) identified that augmentation of the network was required to address aging infrastructure, cater for forecast increases in energy demand, and provide additional security during periods of peak demand.

The project involves construction and operation of a new 330 kilovolt (kV) high voltage underground transmission cable circuit between the existing Rookwood Road substation in Potts Hill and the Beaconsfield West substation in Alexandria, as well as related substation upgrade works.

The transmission cable route is approximately 20 kilometres long, and would be laid predominantly in a trench up to 3 metres wide by 1.6 metres deep, in road reservations beneath the road carriageway. Three transmission cables in conduits would be installed, with another three conduits laid for a potential future upgrade of the network in around 10 years time (subject to separate approval).

The transmission cable route would involve seven 'special crossings' of infrastructure or watercourses, including crossings of heavy and light rail lines, the Cooks River and the wetlands in Sydney Park. Most of these special crossings would be constructed via underboring techniques, although two of the rail crossings would be constructed via overhead cable bridges.

Associated upgrade works would be undertaken at the Rookwood Road, Beaconsfield West and Sydney South substation at Picnic Point substations. Four temporary construction laydown areas would be established during the works at Chullora, Ashfield, St Peters and Alexandria.

The project would take approximately 24 months to construct, comprising 15 months of civil works and 9 months for cable pulling and jointing, testing and commissioning. Most of the civil works would be undertaken during standard day-time construction hours, but some works would need to be undertaken outside standard hours, including works on major roads and at signalised intersections, special crossings, cable pulling and jointing, and works at construction laydown areas.

The project has a capital investment value of $285 million, and would generate up to 140 jobs over the 24 month construction period.

The project is classified as State Significant Infrastructure (SSI) under Part 5 of the *Environmental Planning and Assessment Act 1979* (EP&A Act), and consequently requires approval from the Minister for Planning and Public Spaces, but can be determined by the Department under delegation.

The Department of Planning, Industry and Environment (the Department) exhibited the Environmental Impact Statement (EIS) for the project from 11 October 2019 to 22 November 2019 (43 days), and received 21 submissions, including 11 from government authorities, 3 from special interest groups and 7 from the general public.

None of the government authorities or special interest groups object to the project, although each provided comments. Five of the public submissions object to the project, while the remaining two provided comments.

The key issues raised in submissions and identified in the Department's assessment of the project include:

- *noise and vibration* – particularly for residents and other land users (including schools and religious establishments) along the transmission cable route and near other construction sites;
- *traffic and transport* – including in relation to traffic and access disruptions, and bus service interruptions during the construction works; and
- *vegetation and biodiversity* – particularly the potential loss of street trees and other vegetation along the transmission cable route.

A range of other issues were also raised, including soil and water impacts (including drainage and flooding changes), interactions with other existing and planned infrastructure, short term social impacts and electromagnetic fields (EMF).

TransGrid has prepared responses to the issues raised in submissions, and has made some minor amendments to the project to further avoid and/or mitigate the identified impacts. The amendments include redefining the Cooks River crossing to minimise impacts on riparian vegetation and fish habitat, removing a fifth construction laydown area in Belfield, and identifying additional potential underboring locations to minimise impacts to roads and other infrastructure.

The Department has assessed the project application, EIS, submissions on the project, TransGrid's responses these submissions and its amendment report, in accordance with the objects of the EP&A Act and the principles of ecologically sustainable development.

Based on this assessment, the Department is satisfied that TransGrid has designed the project in a manner that is consistent with relevant strategic plans and statutory planning instruments, and minimises the potential impacts on the surrounding community and the environment as far as practicable.

Notwithstanding, the Department acknowledges that the project is likely to result in some short term impacts on the amenity of the local community, particularly in relation to noise and traffic disruption during the construction works.

With regard to noise, the assessment indicates that the construction activities would affect a large number of residents and other receivers for relatively short periods. For trenching activities, noise would exceed management levels (i.e. >35-50 decibels) at approximately 21,500 residential receivers at some stage during the works, and exceed 'highly affected' noise levels (i.e. >75 decibels) at approximately 2,000 receivers. These highly affected noise levels would be experienced intermittently for approximately four days at each residence, as the trenching activities move past the receiver.

Temporary traffic disruptions would accompany these noisy operations, although TransGrid would maintain traffic flows, access and parking as far as possible. The assessment indicates that the works can be undertaken without significant impacts to the broader transport network.

With regard to vegetation and biodiversity, the EIS does not identify which street trees may need to be removed for the project, but TransGrid estimates that between 2 and 5 percent of the trees along the

route may need to be removed (i.e. up to about 120 trees in total). TransGrid has committed to avoiding tree removal as far as possible, particularly high value street trees, and avoiding any tree removal in sensitive sites such as in Sydney Park in Alexandria.

The Department has recommended a detailed suite of conditions to ensure that these and other residual impacts associated with the project are effectively minimised, mitigated and/or managed. These include requirements on TransGrid to actively engage with the community in relation to the works, to minimise and manage night works, provide respite for particularly noisy activities, avoid impacts on high retention value trees, provide replacement trees which supports the Premier's Priorities for *Greening Our City* to increase tree canopy across Greater Sydney, and to prepare and implement a number of comprehensive construction management plans in consultation with the relevant Councils, including a noise and vibration management plan, traffic management plan, landscape plans and community consultation strategy.

The Department considers that the conditions reflect current best practice for the regulation of infrastructure projects of this nature in NSW.

The Department also recognises that the project would provide major social and economic benefits for the Sydney CBD and inner Sydney, and to wider NSW, including:

- shoring up Sydney's critical high voltage electricity network in both the short and long term;
- contributing to a reliable, secure and affordable source of electricity for Sydney households and businesses;
- generating a direct capital investment of $285 million; and
- generating up to 140 jobs over the 24 month construction period.

The Department has carefully weighed the impacts of the project against the significance of the infrastructure and its socio-economic benefits. The Department accepts that the project is required to address existing issues in the electricity supply network for inner Sydney, and is critical to support the continued growth of Sydney. On balance, the Department is satisfied that the project's benefits outweigh its residual costs, and that it is in the public interest and should be approved, subject to strict conditions.

Contents

1 Introduction

TransGrid is proposing to construct and operate a new underground 330 kilovolt (kV) high voltage transmission cable circuit between the existing Rookwood Road substation in Potts Hill and the Beaconsfield West substation in Alexandria, to ensure reliable electricity supply to the Sydney central business district (CBD) and Inner Sydney.

The project is located within the City of Canterbury Bankstown, Inner West and City of Sydney local government areas (LGAs)[1], with proposed development occurring in the suburbs of Potts Hill, Yagoona, Chullora, Greenacre, Lakemba, Belmore, Campsie, Croydon Park, Ashbury, Ashfield, Dulwich Hill, Marrickville, Newtown, St Peters, Alexandria and Picnic Point (see **Figure 1**).

The transmission cable circuit spans approximately 20 kilometres (km) and would predominantly be located in existing road reserves (beneath the road carriageway), with some development in existing substation sites, public open space and on previously disturbed areas. The main land use in the project area is residential, with some areas of industrial, commercial and public recreation.

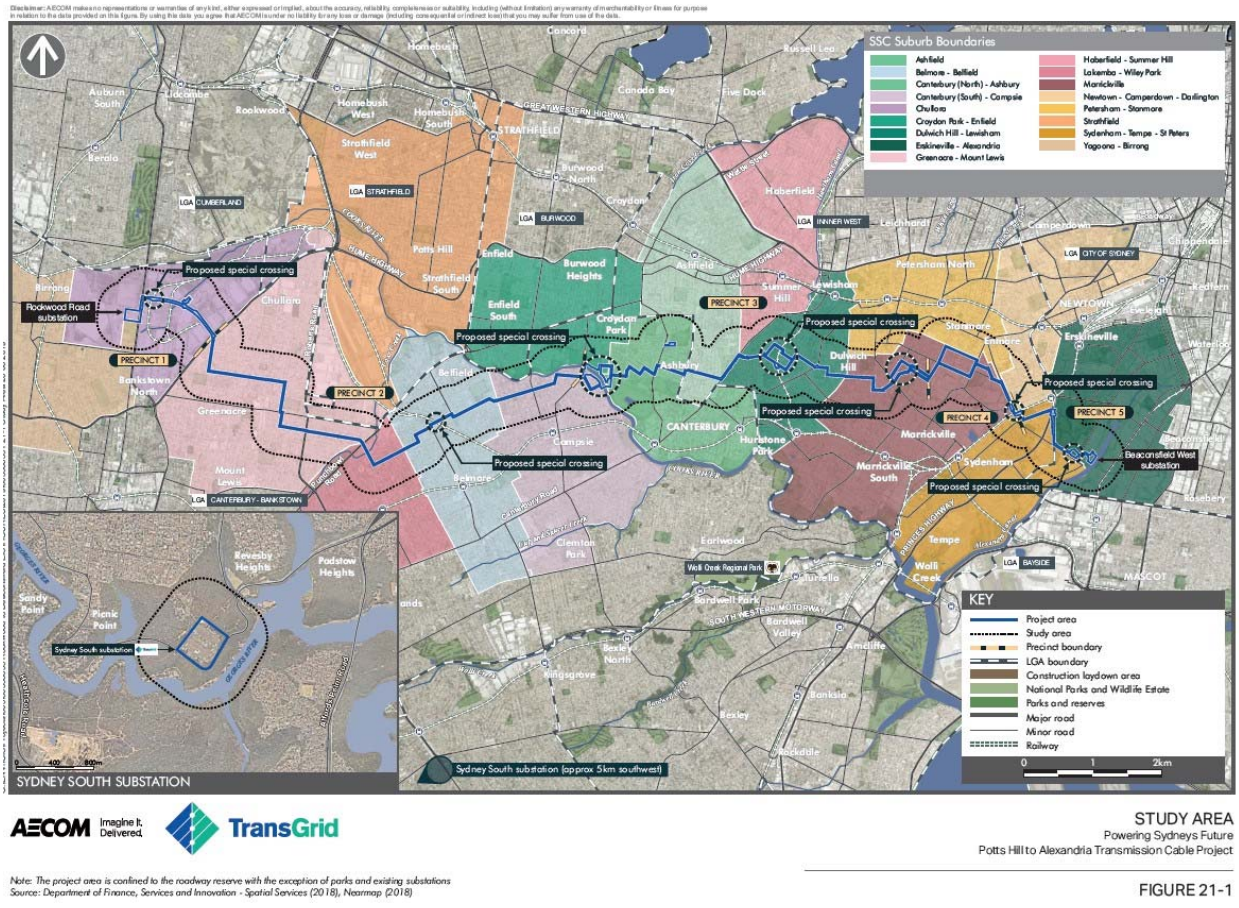


Figure 1 | Local Context

[1] The project originally also included a construction laydown area in the Strathfield LGA, however this laydown area has since been deleted from the proposal

2 Project

2.1 Project Overview

The key components of the project are summarised in **Table 1,** shown in **Figure 2** and described in the Environmental Impact Statement (EIS) (see **Appendix B**), Submissions Report (see **Appendix D**), Amendment Report (see **Appendix E**) and additional information (see **Appendix F**).

Table 1 | Main Components of the Project

Aspect	Description
Project summary	**Construction and operation of the Powering Sydney's Future project, involving:** • **a 330 kilovolt (kV) underground transmission cable circuit connecting the Rockwood Road substation in Potts Hill with the Beaconsfield West substation in Alexandria;** • **upgrade works at the Rookwood Road and Beaconsfield West substations, as well as the Sydney South substation in Picnic Point, to facilitate the project; and** • **four temporary construction laydown areas to facilitate construction**
Cable length	Approximately 20 km
Cable life	Minimum 40 years
Excavation method	Predominantly trenching (up to 3 metres (m) wide and 1.6 m deep) in road reservations/carriageways, with seven 'special crossings' of infrastructure or watercourses involving cable bridges or underboring (4 to 10 m below the ground surface). Underboring may also occur in other locations, including road and stormwater culvert crossings, with these locations to be determined during detailed design
Cable works	Connecting the Rookwood Road and Beaconsfield West substations, comprising: • 330 kV underground transmission cable circuit comprising three cables in three conduits; • another set of three conduits for a possible future 330 kV transmission cable circuit; • four smaller conduits for carrying optical fibres; • around 26-30 joint bays, per circuit, where sections of cable would be joined together, located approximately every 600-800 m along the transmission cable route; and • link boxes and sensor boxes associated with each joint bay to allow cable testing and maintenance
Special crossings	Seven special crossings of infrastructure or watercourses, including: • two rail lines (at Chullora and St Peters) (*cable bridge crossings)*; • one freight rail line (Enfield Intermodal rail line at Belfield) (*underbore crossing);* • one light rail line (at Dulwich Hill) *(underbore crossing)*; • the Cooks River (at Campsie) *(underbore crossing*); • a playground (at Marrickville) (*underbore crossing)*; and • the southern wetland at Sydney Park (at Alexandria) (*underbore crossing)*
Substation upgrades	Upgrade works at the Rookwood Road and Beaconsfield West substation to facilitate the new 330 kV transmission cable circuit. Conversion works at the Beaconsfield West and Sydney South substations to transition the existing cable from a 330 kV to 132 kV connection
Laydown areas	Temporary construction laydown areas would be established at: • 12 Muir Road, Chullora (0.48 ha) (City of Canterbury-Bankstown Council LGA); • Peace Park, Ashfield (0.45 ha) (Inner West Council LGA); • Camdenville Park, St Peters (0.18 ha) (Inner West Council LGA); and • Beaconsfield West substation, Alexandria (0.85 ha) (City of Sydney Council LGA)

Aspect	Description
Construction period	Approximately 24 months (15 months for civil construction works and conduit installation and 9 months for cable pulling and jointing, testing and commissioning)
Construction hours	Standard construction hours would be adopted where reasonable and feasible, namely: • Monday to Friday: 7.00 am to 6.00 pm; • Saturdays: 8.00 am to 1.00 pm; and • No works on Sundays and public holidays. Works outside of standard construction hours (including night works and 24 hours) would be required on major roads, at signalised intersections and at special crossings, cable jointing locations, laydown areas and other locations where required or requested by relevant authorities.
Employment	Up to 140 construction jobs
Capital investment value	$285 million

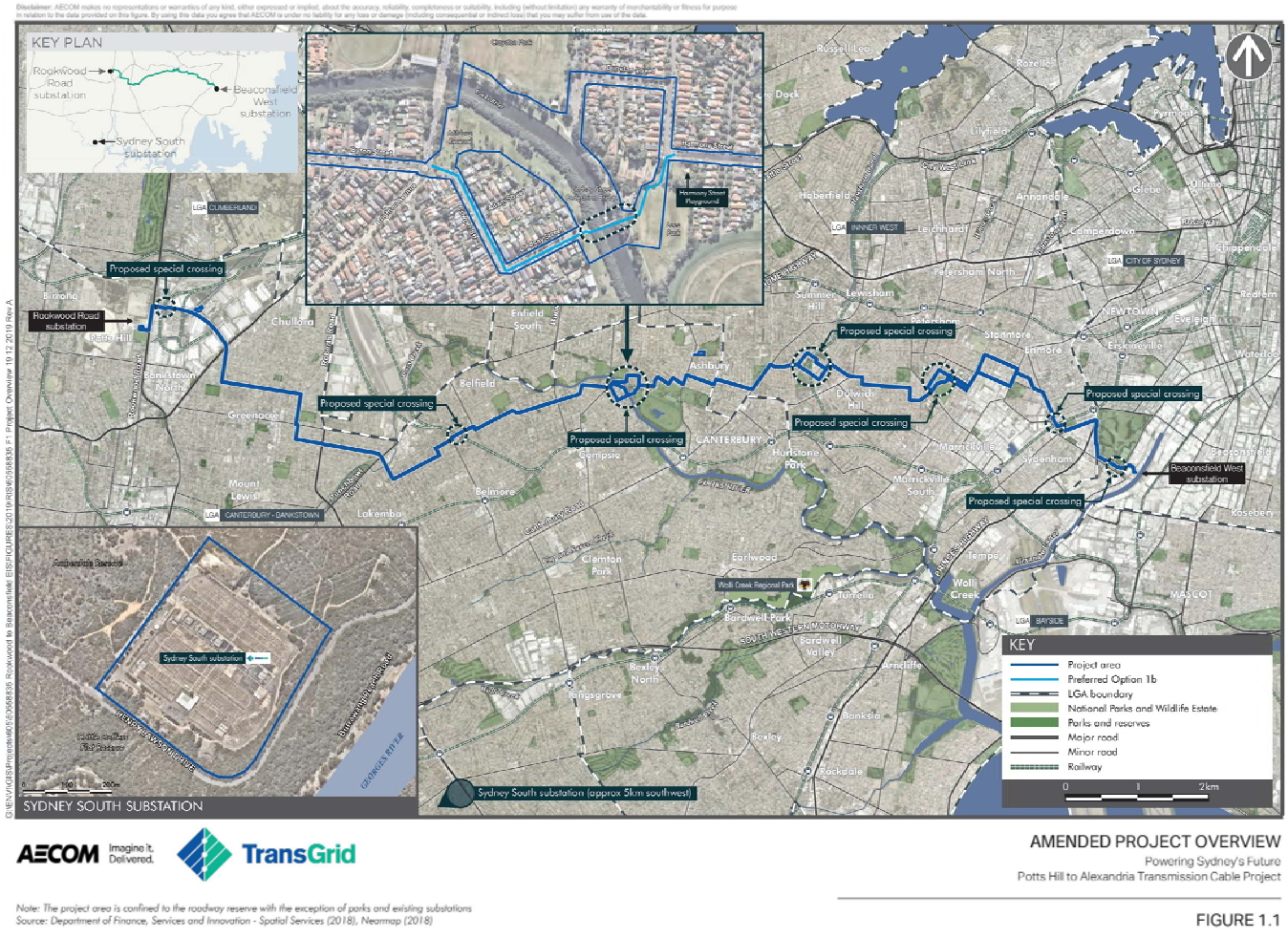


Figure 2 | Project Overview

2.2 Physical Layout and Design

The physical layout and key elements of the project are shown in **Figures 3 to 10.**

The project includes some localised route options and alternative construction methods in a number of locations along the transmission cable route, some of which were amended following the EIS. The options are shown on **Figure 7**, and include:

- two options for the special crossing under the Dulwich Hill Light Rail corridor in Dulwich Hill;
- two options for the cable route in the vicinity of Henson Park, Marrickville; and
- two options for the cable route in the vicinity of Addison Road, Marrickville.

The EIS also included three options for crossing the Cooks River, however TransGrid refined its design in the Amendment Report, confirming that the Cooks River crossing would be via underboring from the end of Lindsay Street (Option 1b in the EIS).

Figure 3 | Project Area – Map 1

Figure 4 | Project Area – Map 2

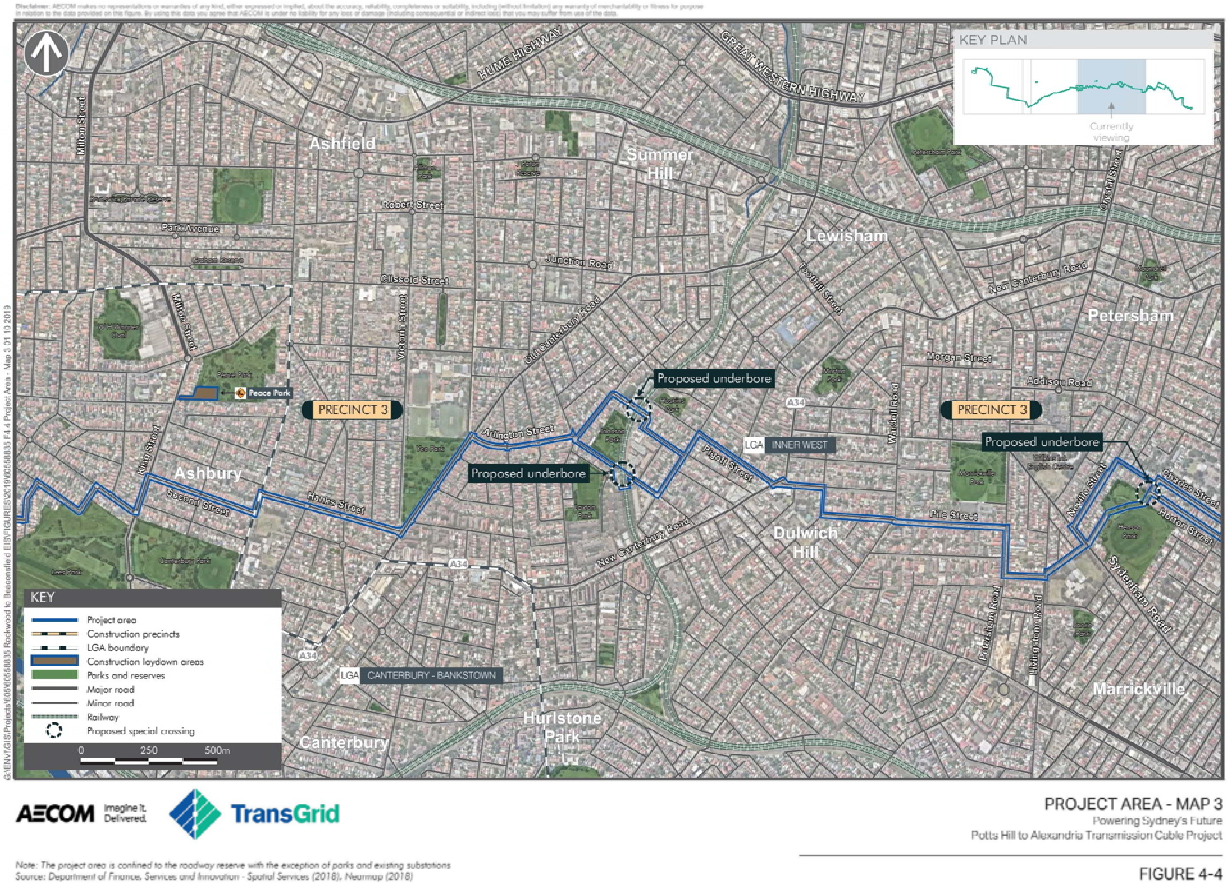


Figure 5 | Project Area – Map 3

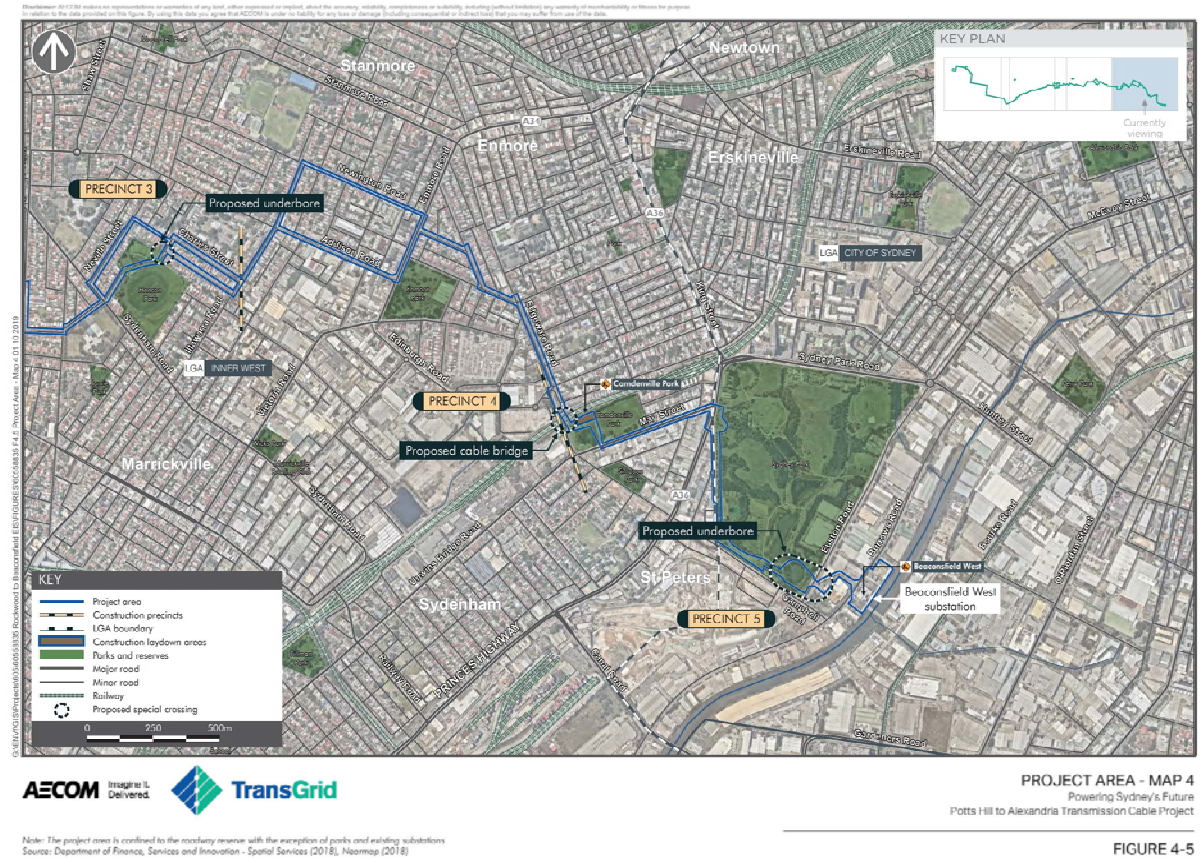


Figure 6 | Project Area – Map 4

Figure 7 | Project Area – Route Options

Figure 8 | Rookwood Road Substation Upgrade

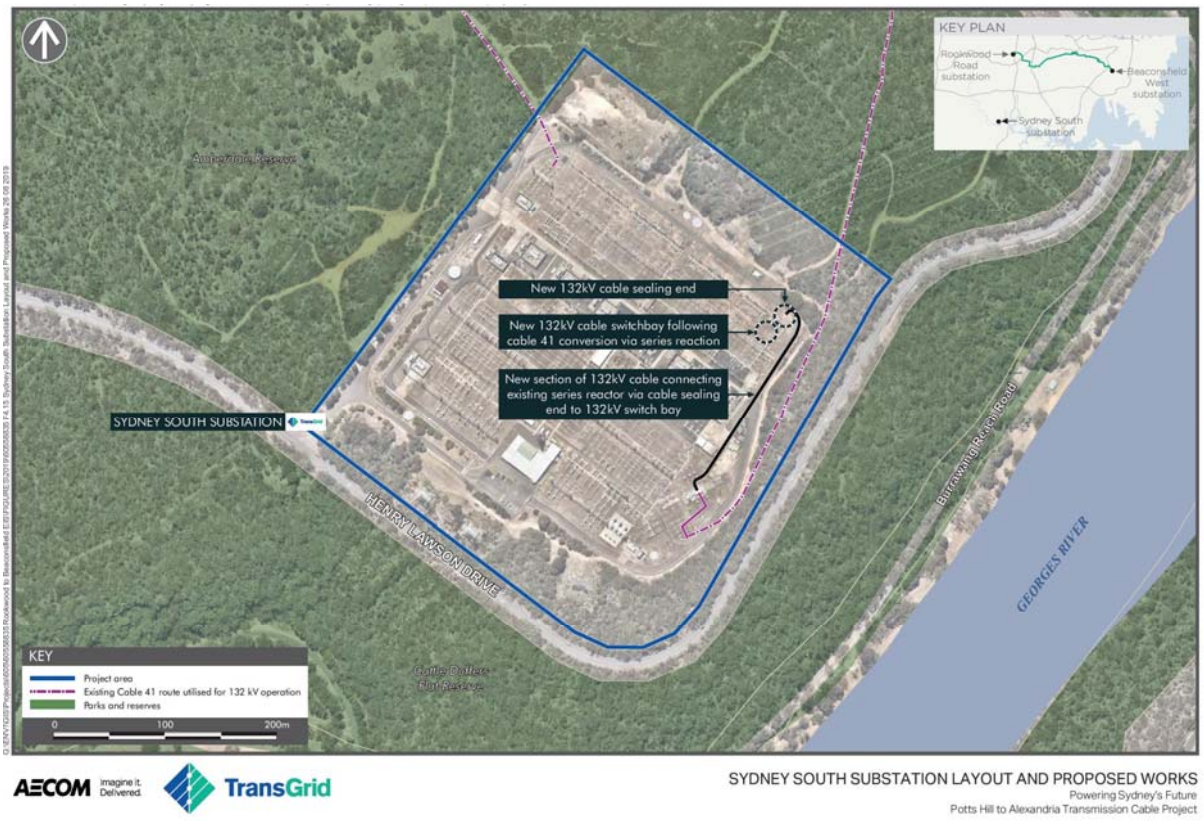


Figure 9 | Sydney South Substation Upgrade

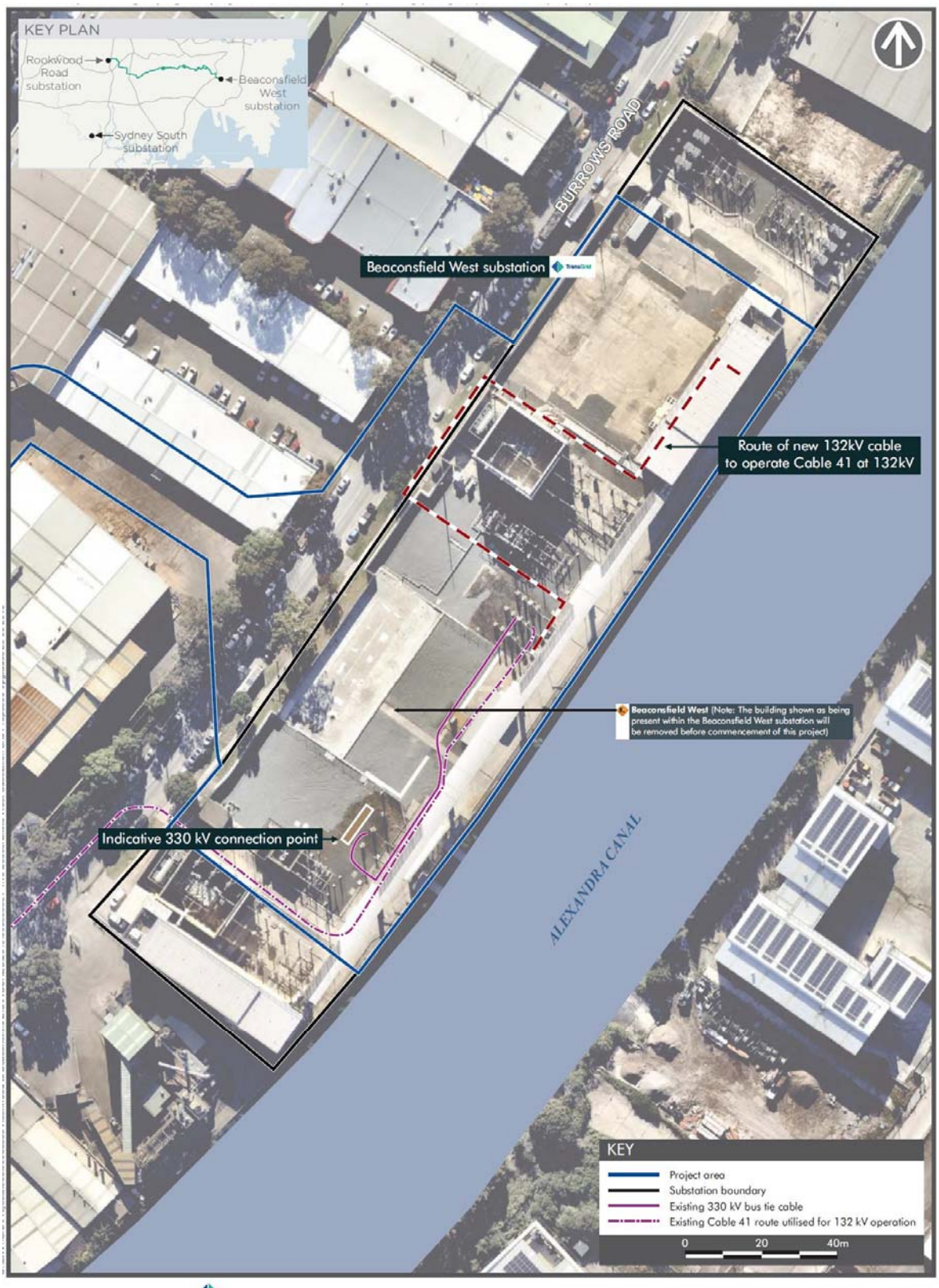


Figure 10 | Beaconsfield West Substation Upgrade

2.3 Construction Works

The key construction works are summarised in **Table 2**. An illustration showing the typical works is shown in **Figure 11**, and schematics showing the trenching and excavation construction methodology (kerbside and non-kerbside) are shown in **Figures 12** and **13**.

Table 2 | Construction Works Description

Aspect	Description
Site establishment	• Implementation of traffic management changes, installation of environmental control measures and clearing works. • Establishment of construction laydown areas and ancillary facilities including temporary offices and worker amenities, site fencing and provision of power / services.
Trenching and excavation of the transmission cable route	• Short sections of trench (3 m wide by 1.6 m deep) would be opened at a time (20 m long) within a work site (55 to 95 m long depending on the speed of the road). • Backfilling would occur after each section of the conduits have been installed and road plates installed until temporary road surface restoration, typically the following day, and next section of trench is excavated. • Trenching and excavation would occur concurrently at up to four work sites along the transmission cable route. • Trenching would be using an excavator and spoil would be placed directly into trucks for transport to either the construction laydown areas for temporary storage or to an off-site licensed waste facility for disposal.
Location	• The transmission cable route would vary from a kerbside lane to a non-kerbside lane arrangement depending on subsurface infrastructure. • Excavation of trenches in roadways would generally occupy up to two traffic lanes and may require lane or road closures during excavation. • Minor relocations service / utilities, if required, would occur within the road reserve and would be subject to consultation with asset owners.
Restoration and rehabilitation	• Restored road surface would be for the area that was excavated (not entire lanes or roadways) and match existing or as otherwise agreed with the relevant roads authority. • Restoration may include initial restoration of the road surfaces for a period of up to 6 months, followed by permanent restoration of the road surfaces.
Joint bays, cable pulling and jointing	• Exact location of joint bays would be determined during detailed design. • Joint bays would be excavated via open trenching and if vehicle access adjacent to properties trenches would be temporarily covered with trafficable steel plates. • Jointing works could include work at night and could take up to three weeks to complete but is not considered a high noise generating activity.
Underboring	• A trenchless method for installing conduits around 4 to 10 m below the ground surface by either thrust boring and horizontal directional drilling (HDD) methods confirmed during detailed design.
Substation upgrades	• Installation of new infrastructure, removal of redundant infrastructure and installation and connection of new cables.

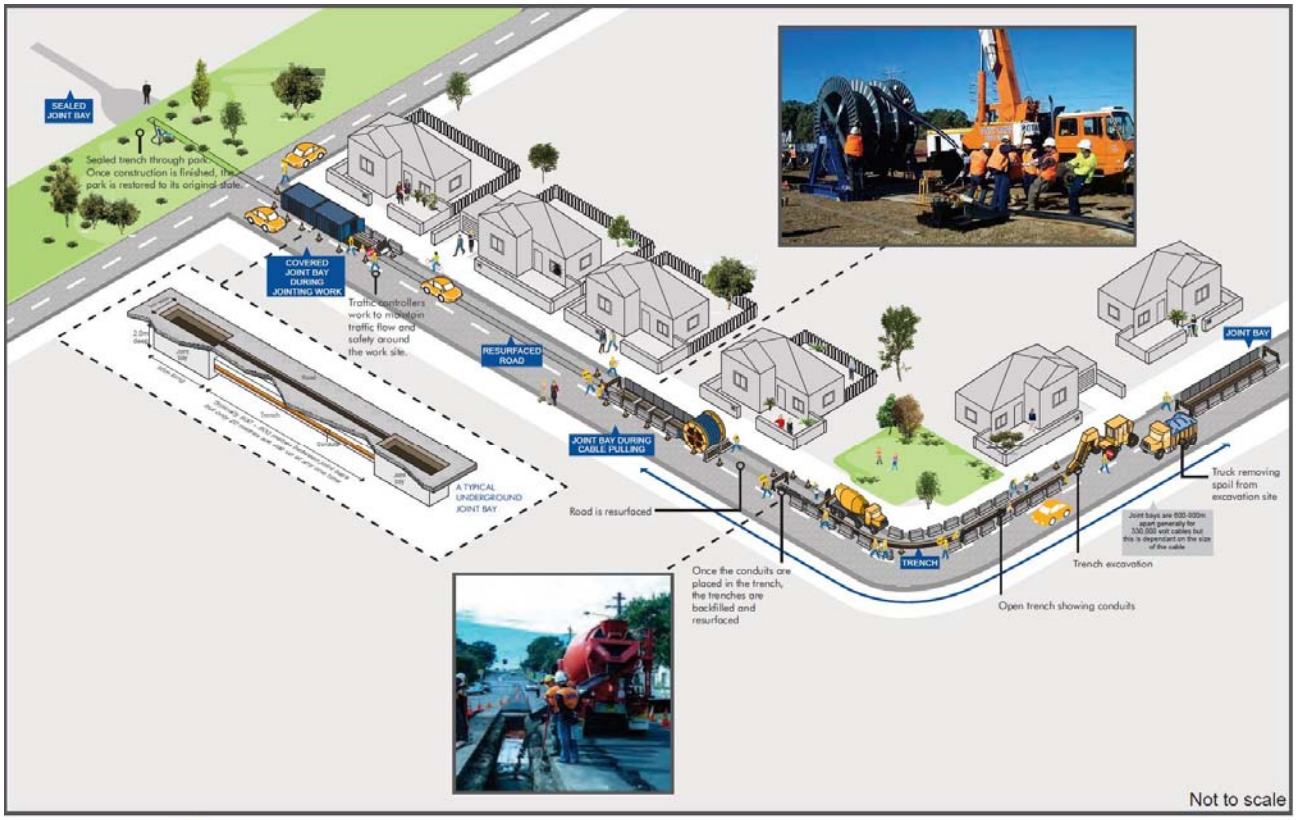


Figure 11 | Overview of Construction Activities

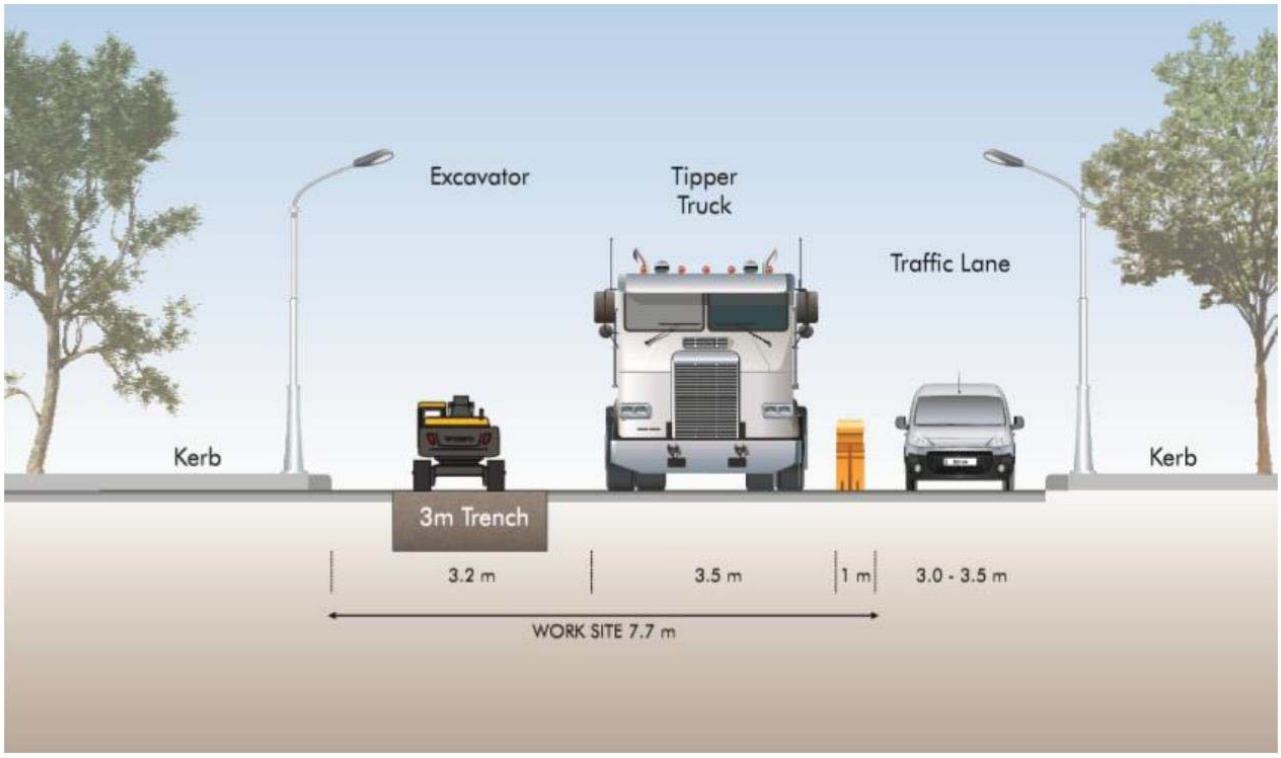


Figure 12 | Construction and Traffic Management for Kerbside Trenching

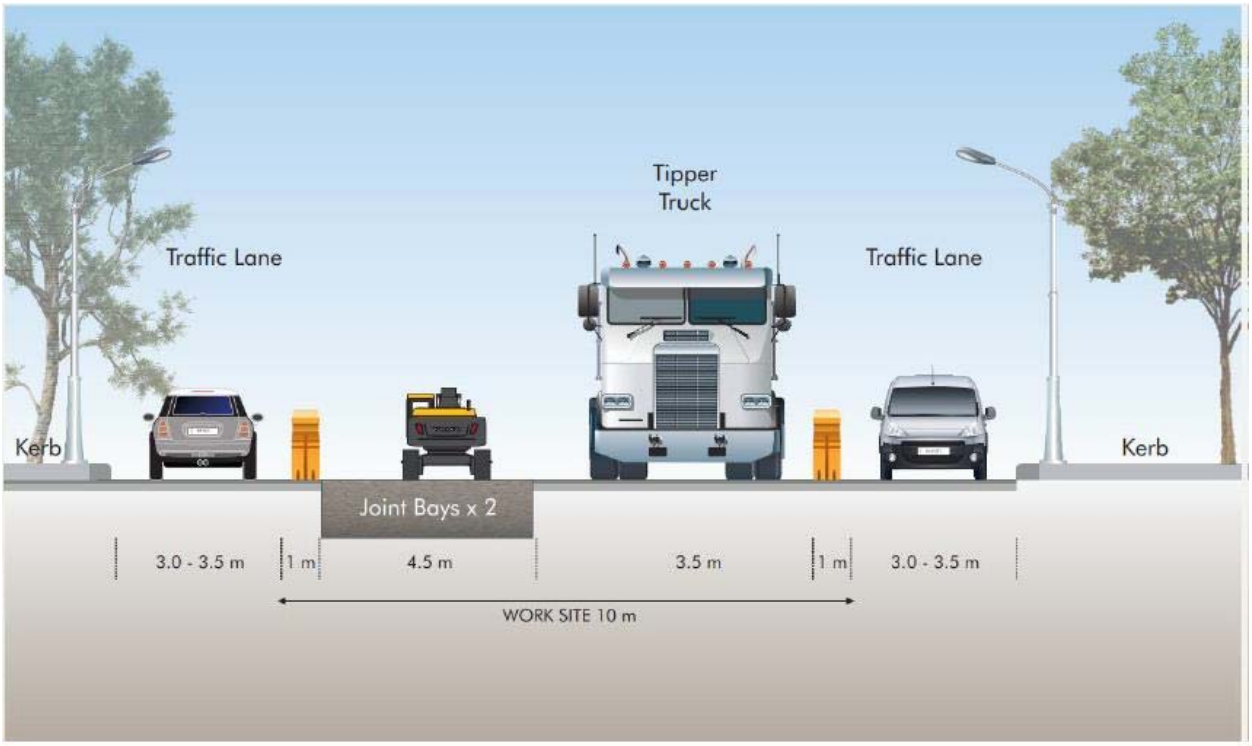


Figure 13 | Construction and Traffic Management for Non-Kerbside Trenching

2.4 Timing

Construction of the project is expected to take approximately 24 months to complete, incorporating around 15 months for civil construction works and conduit installation, and nine months for cable pulling and jointing, testing and commissioning. The expected completion and commissioning timeframe for the proposed 330 kV transmission cable circuit is 2022 / 23.

3 Strategic Context

3.1 Project Justification

The project is needed to address existing issues with the electricity supply network in the Sydney CBD and inner Sydney area. Parts of the transmission and distribution networks which supply electricity to the inner Sydney area are ageing and approaching the end of their serviceable lives and these assets are unable to operate at full capacity.

The inner Sydney area has also experienced rapid urban development, which has led to an increase in the demand for energy. TransGrid's analysis indicates that this demand is set to increase further in coming years.

Critically, electricity consumers in the inner Sydney area are becoming increasingly vulnerable in terms of expected level of disruption to their electricity supply.

The *National Transmission Network Development Plan* (NTDP) (Australian Energy Market Operator, 2016) identified projected limitation to reliability within inner Sydney, and that without a network solution, TransGrid would not be able to provide reliable energy supply.

The project is also consistent with relevant strategic NSW planning and policy documents including the *Greater Sydney Region Plan – A Metropolis of Three Cities* and the *Eastern City District Plan*.

The project has the following objectives:

- provide additional capacity to cater for future forecast increased energy demand in the inner Sydney area;
- meet TransGrid's operational requirements for the provision of a safe, reliable and secure transmission supply to the inner Sydney area;
- be consistent with the principles in TransGrid's *Environmental Policy*; and
- take into account and address key stakeholder and community needs and expectations with respect to the protection of the environment and local amenity.

Importantly, TransGrid has outlined several key project benefits, which include to:

- provide continuity and reliability benefits to electricity consumers within the inner Sydney area including the Sydney CBD;
- provide additional security for periods of peak demand and therefore reduce the risk of network failure;
- have a manageable short-term construction impact on the environment and surrounding residences and businesses; and
- have a manageable impact on the environment and community during construction and operation.

The Department accepts that the project is required to address existing issues in the electricity supply network for inner Sydney, and is critical to support the continued growth of Sydney.

The project would directly generate around $285 million in capital investment to the State, and is expected to generate up to 140 construction jobs.

3.2 Project Development and Alternatives

TransGrid has considered the merits of the project in the context of several alternative project options.

The Department accepts that doing nothing or providing non-network solutions would adversely impact on the security and continuity of supply to meet the forecast increase in consumer demand expected by the early 2020s. Non-network solutions would only defer (not replace) the need for a new cable for a short period (i.e. by one year).

In developing the network solution, TransGrid has undertaken a detailed route selection study with consideration given to environmental, land use and engineering constraints, infrastructure mode options (e.g. underground, overhead, tunnels or a combination of these), cost, sensitive areas, community impact, and feedback from key stakeholders.

The preferred macro route option was selected between Potts Hill and Alexandria and subsequently refined to comprise a 20 km, 330 kV transmission cable circuit between Rookwood Road and Beaconsfield West substations.

The Department accepts that the preferred option is a logical and reasonable solution for the transmission cable network, given that it:

- was assessed as the most feasible option in terms of relative benefit to the environment, community and cost;
- provides the shortest connection option between existing substations that could support a new 330 kV transmission cable circuit;
- avoids connections (from the east and north) through the heavily constrained Sydney CBD area; and
- utilises previously upgraded / constructed sections of transmission cables, connections and infrastructure, providing a secure long-term solution.

4 Statutory Context

4.1 State Significant Infrastructure

The project is State significant infrastructure (SSI) under section 5.12 of the *Environmental Planning and Assessment Act 1979* (EP&A Act), as it is infrastructure that is specified as SSI under schedule 3 of *State Environmental Planning Policy (State and Regional Development) 2011*. This is because TransGrid, as a determining authority for this type of development, has formed the opinion that an Environmental Impact Statement (EIS) is required for the project.

Consequently, the Minister for Planning and Public Spaces (the Minister) is the approval authority.

However, under the Minister's delegation of 11 October 2017, the SSI can be determined by the Executive Director, Energy, Resources and Compliance, as the relevant councils have not objected, and there were less than 25 public objections to the project.

4.2 Permissibility

The project is for the purpose of an 'electricity transmission or distribution network' and is characterised as development that is permissible without consent, in accordance with clause 41 of the *State Environmental Planning Policy (Infrastructure) 2007* (the Infrastructure SEPP), as TransGrid is an electricity supply authority.

Whilst it is permissible without consent, the infrastructure and environmental assessment requirements of Part 5 of the EP&A Act apply. Under section 5.14 of the Act, the Minister's approval is required for development that is SSI.

Consequently, the Minister's delegate may determine the project under section 5.19 of the EP&A Act.

4.3 Environmental Planning Instruments

Other than the *State Environmental Planning Policy (State and Regional Development) 2011* identifying the project as SSI, no environmental planning instruments substantially govern the carrying out of the project by virtue of the project being SSI. Notwithstanding, consideration was given to Environmental Planning Instruments (EPIs) that would have applied:

- *SEPP 19 – Bushland in Urban Areas:* which aims to protect and preserve bushland in urban areas. The Department is satisfied that the project has been designed, and can be managed, to avoid and / or minimise impacts to bushland (see Section 6.3)*;*
- *SEPP 33 – Hazardous and Offensive Development*: which regulates certain development that is hazardous or offensive. The Department is satisfied that the project can be carried out in a manner that is not potentially hazardous or offensive;
- *SEPP 55 – Remediation of Land*: which regulates remediation of contaminated land for the purpose of minimising the risk to human health and the environment. The EIS includes a

contamination assessment which identified areas of potential contamination. The Department has recommended conditions to manage this contamination risk (see Section 6.4); and

- *SEPP (Vegetation in Non-Rural Areas) 2017*: which aims to protect the biodiversity value of trees in non-rural areas, and requires authority to clear certain vegetation. The project does not meet the thresholds requiring authority under the SEPP to clear vegetation. The Department is satisfied that the project has been designed, and can be managed, to avoid and / or minimise impacts to bushland (see **section 6.3**).

4.1 Other Approvals

Under section 5.23 of the EP&A Act, a number of other approvals are integrated into the SSI approval process, and consequently are not required to be separately obtained for the project. These include:

- approvals and permits relating to heritage under the EP&A Act, *Heritage Act 1977* and *National Parks and Wildlife Act 1974*; and
- certain water approvals under the *Water Management Act 2000*.

Under section 5.24 of the EP&A Act, a number of further approvals are required, but must be substantially consistent with any planning approval for the project. These include:

- approvals for works in public roads under the *Roads Act 1993* (Roads Act). It is noted that this only applies to classified roads and Crown roads for this project, as TransGrid is an Authorised Network Operator under the *Electricity Supply Act 1995*. Consequently, TransGrid will generally not require consent from the relevant Councils for works in unclassified (local) roads for the project; and
- an environment protection licence (EPL) under the *Protection of the Environment Operations Act 1997* (POEO Act). It is noted that an EPL is not required for the project, as it does not constitute an applicable premises-based or non-premises based scheduled activity.

The Department has consulted with the agencies responsible for these approvals in its assessment of the project.

4.2 Objects of the EP&A Act

The Minister's delegate must have regard to the objects of the EP&A Act when making decisions under the Act. The objects of most relevance to the decision on whether or not to approve the project are found in section 1.3(a), (b), (c), (e) and (f). They are:

(a) *to promote the social and economic welfare of the community and a better environment by the proper management, development and conservation of the State's natural and other resources*

(b) *to facilitate ecologically sustainable development by integrating relevant economic, environmental and social considerations in decision-making about environmental planning and assessment*

(c) *to promote the orderly and economic use and development of land*

(e) *to protect the environment, including the conservation of threatened and other species of native animals and plants, ecological communities and their habitats*

(f) to promote the sustainable management of built and cultural heritage (including Aboriginal cultural heritage)

The Department is satisfied that the project would promote social and economic welfare through the proper development of the State's resources (Object 1.3(a)), and the orderly and economic use of land (Object 1.3(c)), as it would improve the capacity and reliability of Sydney's electricity supply network which is fundamental to the social and economic welfare of the city.

The Department has considered the principles of ecologically sustainable development (ESD) (Object 1.3(b)) in its assessment of the project, including:

- the precautionary principle;
- inter-generational equity;
- conservation of biological diversity and ecological integrity; and
- improved valuation, pricing and incentive mechanisms.

Based on its assessment of the project, the Department is satisfied that the project can be carried out in a sustainable manner, and would not result in any significant ecological (Object 1.3(e)) or heritage (Object 1.3(f)) impacts. As outlined in this report, the project is not expected to present any serious or irreversible risks of environmental harm, would not disadvantage future generations, would not result in any significant biodiversity or heritage impacts, and would not result in any significant adverse economic impacts.

5 Engagement

5.1 Department's Engagement

During the assessment of the project, the Department has consulted widely with the community and government agencies, including relevant Councils and relevant public infrastructure and utility service providers.

This engagement has included:

- making all the information associated with the project publicly available on the Department's website;
- exhibiting the EIS from 11 October 2019 until 22 November 2019 (43 days);
- publishing copies of all the submissions received online;
- requiring TransGrid to provide a formal response to the issues raised in submissions;
- inspecting the site and surrounding area; and
- working closely with government agencies on the assessment of key issues.

In undertaking these processes, the Department has satisfied the notification requirements of section 5.28 of the EP&A Act and the Infrastructure SEPP.

5.2 Summary of Submissions

The Department received 21 submissions on the project in response to the exhibition of the EIS, including:

- 11 from government authorities;
- 3 from special interest groups; and
- 7 from the general public.

None of the government agencies or special interest groups object to the project, though each provided comments and/or made recommendations. Five of the public submissions object to the project, while the remaining two provided comments.

TransGrid provided its response to the issues raised in these submissions in February 2020 (see **Appendix D**), along with an amendment report containing relatively minor changes to the project to address issues raised in submissions (see **Appendix E**).

A summary of the issues raised in submissions is provided below, focusing on the residual issues where stakeholders have provided additional submissions following the EIS. Full copies of the submissions are provided in **Appendix C**.

5.3 Key Issues – Government Agencies

Submissions were received from the following government agencies:

- Environment Protection Authority (EPA);
- Environment, Energy and Science Group (EES);
- Department of Primary Industries – Fisheries (DPI-Fisheries);
- Heritage Council;
- Transport for NSW (TfNSW), which provided a combined submission on behalf of Roads and Maritime Services (RMS), Sydney Metro and Sydney Trains (the 'Transport Cluster');
- State Transit;
- Rural Fire Service (RFS);
- Sydney Water;
- Canterbury Bankstown Council;
- Inner West Council; and
- City of Sydney.

Noise and Vibration was a key issue raised by the EPA, as well as by the three Councils. The agencies acknowledge that some of the construction works would exceed applicable noise criteria, and that best practice community consultation and noise management during the construction phase will be fundamental to mitigating these impacts.

The EPA identified a number of technical issues with the noise assessment, which TransGrid sought to address in its RTS.

The agencies made a number of noise and vibration-related recommendations including limiting construction hours where possible, managing out-of-hours works, providing respite for particularly noisy activities, providing best practice notification and complaints management, and preparation of a detailed construction noise and vibration management plan in consultation with the agencies.

Traffic and Transport was also a key issue raised in submissions, including submissions from TfNSW, State Transit and the Councils.

The agencies noted that the transmission cable network would cross or otherwise affect a range of existing and planned transport-related infrastructure, including classified (State and regional) roads and non-classified (local) roads, heavy rail corridors (at Muir Road Chullora, and Bedwin Road St Peters), the Sydney Metro rail line, the Inner West light rail corridor, and a number of bus service corridors.

The agencies identified a number of technical issues regarding interactions with this transport infrastructure, although they did not identify any significant issues that would fundamentally affect the project.

The agencies made a number of recommendations to manage these issues, in particular that TransGrid be required to consult closely with the agencies during detailed design and construction, undertake dilapidation surveys, make good all infrastructure impacts, and protect infrastructure outside the disturbance area.

The agencies did not raise significant concerns about the traffic-related impacts during the construction phase for the project, but did make recommendations regarding minimising disruptions, maintaining

access, works scheduling, managing diversions, obtaining relevant Roads Act approvals and preparing and implementing detailed traffic management plans in consultation with the relevant stakeholders.

Vegetation and Biodiversity was also a key issue raised in submissions from EES, DPI-Fisheries, TfNSW and the Councils.

EES raised some concerns about TransGrid's biodiversity assessment. In particular, EES considered that the wetland vegetation in Sydney Park should be further considered (which is proposed to be underbored), as well as some potential vegetation in the rail corridor at Muir Road Chullora (adjacent the proposed cable bridge), and potential indirect impacts of underboring endangered plant species at Johnson Park in the Dulwich Hill light rail corridor. It also noted that street trees may be important foraging habitat for threatened species including the Grey-headed Flying Fox, migrating birds, and microbats.

The Councils all raised considerable concerns about the potential loss of street trees along the transmission cable route, and particularly the lack of detail in the EIS about which trees may need to be removed or pruned to facilitate the project.

The Councils also raised concerns about potential long term impacts on street trees if their roots start affecting the transmission cables in the future, subsequently requiring tree removal. In particular, Canterbury Bankstown Council raised concerns about a row of about 45 fig trees within the central median of Muir Road Chullora (in an industrial area), which it believes have high retention value and a rigorous root system. Council strongly objects to their removal.

To address the street tree and other biodiversity issues, the Councils recommend that TransGrid is required to consult further with the agencies during detailed design, and implement appropriate avoidance, mitigation and compensatory measures (i.e. replacement plantings).

Other Issues raised by government agencies included:

- ***Soil and Water*** issues, including:
    - *Stormwater and Flooding* – particularly interactions with existing and planned drainage infrastructure, and potential to exacerbate flooding;
    - *Riparian Areas* – particularly in relation to the Cooks River and the wetlands in Sydney Park;
    - *Contamination* – particularly in former landfill areas in Sydney Park and Camdenville Park, as well as groundwater dewatering and asbestos management;
    - *Acid Sulfate Soils* – including the need to prepare ASS management plans for high risk areas;
- ***Heritage*** – the Heritage Council did not raise any significant issues, but recommended that TransGrid is required to prepare a Heritage Management Plan in consultation with the Council's and Sydney Water, undertake vibration monitoring and assessments for works affecting heritage items, and prepare an Unexpected Heritage Finds Protocol. Sydney Water also requested that it be consulted regarding works near its heritage listed reservoirs, and the City of Sydney recommended measures to protect the heritage listed terraces near Sydney Park;

- ***Public Infrastructure and Public Domain*** – In addition to the transport infrastructure, a key issue raised by the Councils and Sydney Water related to interactions with other public infrastructure and assets, such as parks and playground equipment, drainage infrastructure, and utilities and services. As with the transport infrastructure, the agencies recommend that TransGrid is required to consult closely with the agencies regarding interactions with the existing and planned infrastructure during detailed design (including obtaining agreements regarding these interactions), to avoid impacts as far as possible, and to make good any impacts to the satisfaction of the relevant authorities;
- ***Air Quality*** – including implementing best practice dust and odour management measures;
- ***Waste*** – including implementing best practice waste management measures; and
- ***Hazards and Risk*** – including avoiding hot works on days of extreme or catastrophic fire danger ratings, or total fire bans.

5.4 Key Issues – Special Interest Groups

The three special interest group submissions were received from:

- Ausgrid;
- Caltex; and
- Inner West Environment Group.

Ausgrid advised that it is currently working with TransGrid regarding the project and had no further comments on the project.

Caltex advised that the project would cross the Caltex-operated Sydney Metropolitan Pipeline as well as the Viva Energy-operated jet fuel pipeline to Sydney Airport. Caltex requested that TransGrid be required to consult with Caltex and Viva Energy as part of detailed design for the crossing.

Inner West Environment Group (IWEG) provided support in-principle, subject to:

- no trees are removed or damaged nor any damage to the Green Way (Johnson Park bushcare site) nor any works that might later interfere with the construction of expansion of the Green Way at a later stage;
- works be carried out in the roadway other than when crossing the light rail tracks;
- no damage be done to the Brush Boxes in Johnson Park; and
- contractors be fully briefed, be held accountable and be monitored during their work in the park.

Further, IWEG provided support for the Constitution Road route option over the Windsor Road / Terry Street option which would cause greater impact to the Green Way, and also raised concerns about flooding impacts in the Green Way.

5.5 Key Issues – Community

The seven submissions from the general public were received from people residing in the local community surrounding the project area. The objecting submissions were received from people residing in Croydon Park (3 submissions), Newtown (1 submission) and Ashfield (1 submission), while the commenting submissions were received from people Marrickville (2 submissions).

Key issues raised in the public submissions are summarised in the following table.

Table 3 | Key Issues Raised in Public Submissions

Issue	No. of Submissions	Issue Specifics
Social Impacts	6	• Impacts on well-being and sense of place / stress • Amenity impacts on local residents • Impacts on park use and recreation
Electromagnetic Fields (EMF)	5	• Prolonged exposure to EMF and impacts on residents
Noise and Vibration	4	• Excavation and traffic noise, particularly night time works • Cracking on residential buildings
Traffic and Transport	4	• Impacts on road surface condition • Narrow neighbourhood streets not suitable for construction vehicles • Impacts on footpaths and cyclists • Impediment on emergency vehicle access • Impact on on-street residential parking
Cumulative Impacts	4	• Associated with running second cables in the future, and other projects such as WestConnex
Adequacy of Assessment	4	• Lack of detail about where cable circuits are to be positioned
Strategic Context and Project Need	4	• Impacts on electricity prices • Opportunities to co-locate assets such as water pipelines to limit and avoid the need to relocate other services in the future
Community Consultation	3	• Information flyers handed out to residents not sufficient
Land Use and Property Value	2	• Cost to repair structural defects • Impacts to property sales and short term accommodation
Air Quality	1	• Construction dust impacts
Soil and Water	1	• Impacts on groundwater, Longswamp Creek and Sydney catchment

6 Assessment

The Department has assessed the merits of the project in accordance with the requirements of the EP&A Act and applicable NSW Government policies and guidelines.

Based on consideration of the submissions received, and its assessment of the project, the Department considers that the key issues associated with the proposal are:

- noise and vibration (**section 6.1**);
- traffic and transport (**section 6.2**); and
- vegetation and biodiversity (**section 6.3**).

The Department's consideration of these and other issues is summarised in **section 6.4**.

6.1 Noise and Vibration

The EIS includes a detailed Noise and Vibration Assessment, undertaken by AECOM. The assessment was undertaken in accordance with applicable guidelines, in particular the EPA's *Interim Construction Noise Guideline* (ICNG).

The EPA raised a number of technical issues regarding the noise assessment, including the derivation of Rating Background Levels (RBLs), the assumed operation of equipment and heavy vehicles, application of penalties in the noise model to account for annoying activities (such as jackhammers), sleep disturbance assumptions, and cumulative impacts with other infrastructure projects.

Notwithstanding these technical issues, which TransGrid sought to address with additional information, the EPA and TransGrid acknowledge that the project would significantly impact a large number of sensitive receivers during the construction phase. Whilst these impacts would be short-lived, they would nonetheless require careful management.

The operational phase of the project is unlikely to result in any significant noise and vibration impacts, and as such the following discussion focuses on the construction phase of the project.

Construction Noise Impacts

The majority of the project area comprises residential land use, with much of this being low density development. There are also areas of medium to high density residential land use, as well as pockets of commercial, industrial, recreation and open space land use, and special uses including schools, childcare centres, religious establishments, nursing homes, and a private hospital.

The noise assessment calculated Noise Management Level (NML) goals for construction works during[2] and outside standard construction hours, for a total of seven noise catchment areas across the project area.

The NMLs and other relevant noise criteria are reproduced in **Tables 4** and **5** below.

[2] Standard construction hours under the ICNG include Monday to Friday 7:00 am to 6:00 pm, Saturday 8:00 am to 1:00 pm, and no work Sunday and public holidays.

Table 4 | Noise Criteria – Residential Receivers

Receiver Type	Noise Management Level ($L_{Aeq\ 15min}$, dBA)		Highly Affected Noise Level	Sleep Disturbance Criteria ($L_{A1\ 1min}$, dBA)	
	Standard Hours	Outside Standard Hours		Screening Criteria	Awakening Reaction
Residential	40-55[1]	35-50[1]	75	45-54[1]	65

1 Range across all noise catchment areas

Table 5 | Noise Criteria – Non-Residential Receivers

Receiver Type	Noise Management Level – External, When in Use ($L_{Aeq\ 15min}$, dBA)
Commercial premises (inc. offices, retail)	70
Industrial premises	75
Medical, educational classrooms, churches, community centres	55
Active recreational areas	65

While the EPA raised some technical issues regarding the derivation of the RBLs (on which the residential NMLs are based), these issues are not significant given the exceedances of the NMLs that are predicted for a large number of receivers. That is, the assessment indicates that the construction works would be well in excess of the NMLs at a very large number of receivers, albeit for a relatively short period of time at each receiver.

The noise assessment includes estimates of how many receivers would be affected (i.e. exceed the NMLs), for each of the main construction activities. A summary of the predicted impacts during worst case operations (when all equipment is operating simultaneously), with no specific additional noise mitigation measures, is presented in **Table 6**.

Table 6 | Predicted Construction Noise Impacts – Residential Receivers

Activity	Duration	Construction Hours	No. Receivers Exceeding NMLs		No. Receivers Exceeding Highly Affected Noise Level (75dB)	No. Receivers Exceeding Sleep Awakening Reaction Criteria
			Standard Hours	Outside Standard Hours		
Site preparation	Up to 1 week	Generally standard hours[1]	13,000	16,000	2,000	1,200
Trenching and excavation	Av. trenching rate 20m/day Approx. 4 days adjacent each receiver Up to 8 weeks per section between joint bays	Generally standard hours[1]	16,500	21,500	2,000	1,400
Joint bays excavation and construction	Up to 5 weeks	Standard hours	8,000	-	138	-
Special crossings – underboring, cable bridges	Up to 10 weeks (not continuous)	All hours	4,000	12,000	31	580
Cable pulling	Up to 2 weeks per section	All hours	5,000	14,500	86	750
Construction laydown areas	24 months (not continuous)	All hours	220	1,000	-	39
Restoration of surfaces	3-5 weeks per section Approx. 3 days adjacent each receiver	Generally standard hours[1]	17,000	19,500	2,500	1,100
Substation upgrade works	Rookwood Rd – 4-6 months Beaconsfield West and Sydney South – 6-9 months	All hours	80	670	-	-

1 Works in or near classified roads and signalised intersections would likely require works outside standard construction hours.

As indicated in the table, a very large number of residential receivers would experience exceedances of the NMLs, the highly affected noise levels (i.e. greater than 75 dB), as well as the awakening reaction criteria (i.e. greater than 65 dB at night), at some stage during the construction of the project.

As well as the residential receivers, up to 550 non-residential receivers are predicted to be affected (i.e. exceed the NMLs) at some stage during the works, including numerous businesses and approximately 11 childcare centres, 9 schools, 5 religious establishments and one private hospital.

The trenching and excavation and road restoration activities are predicted to affect the greatest number of receivers. Each 600 to 800 m cable section between joint bays would take up to approximately 8 weeks to complete. The impacts would be experienced as a gradual build up of noise as the work site approaches the receiver, culminating in a period of about four days of intermittent noise levels above 75 dB when the work site is adjacent the receiver, followed by a graduate decline as the work site moves away from the receiver (see **Figure 14**).

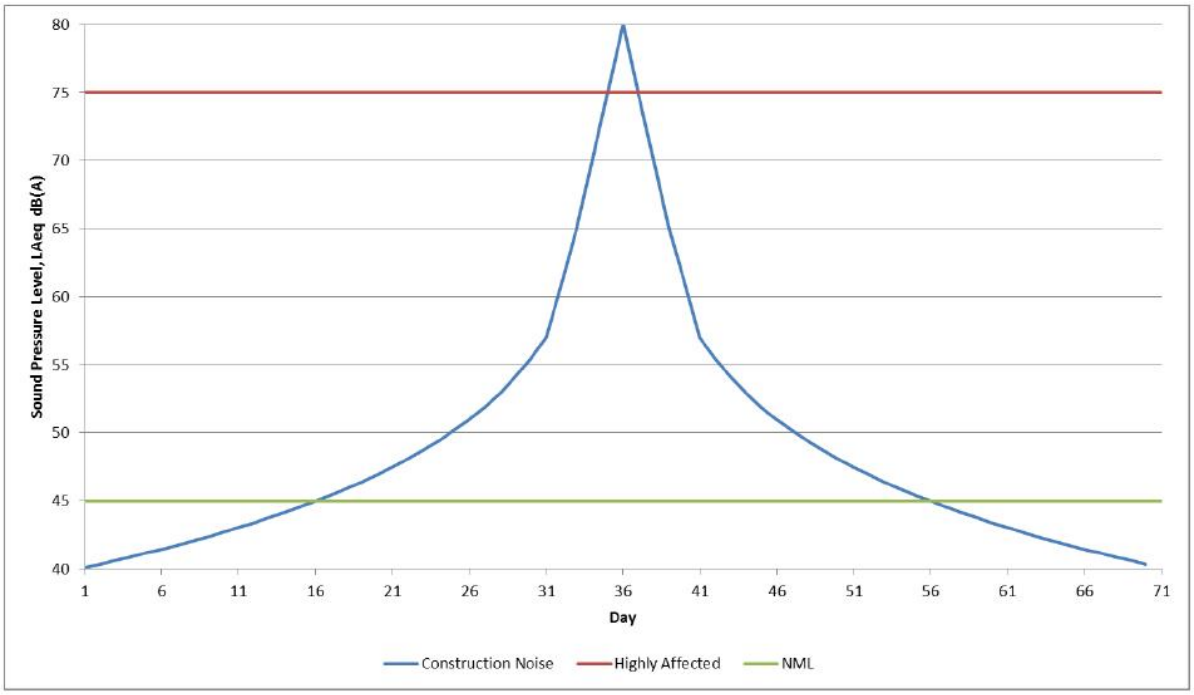


Figure 14 | Variation of Noise as Trenching Progresses

Given that the transmission cable route traverses down relatively narrow local roads for much of the route, the Department accepts there is limited opportunity to avoid these noise exceedances.

However, TransGrid is proposing to implement number of noise management measures to minimise noise impacts and provide respite for affected receivers as far as practicable. These measures include:

- restricting most of the noisy activities (including site preparation trenching and excavation, joint bays and road restoration) to standard construction hours where possible. Other activities have operational requirements to occur both during and outside standard hours;
- scheduling particularly noisy or annoying activities during less sensitive time periods (e.g. during early evening for night works), or during school holidays for works near schools;
- selecting equipment based on best practice noise performance;
- using shielding and noise curtains at stationary work sites (such as special crossings and laydown areas);
- managing construction traffic to minimise noise;
- conducting works outside standard construction hours in accordance with an out-of-hours protocol; and
- providing respite periods for works where the noise levels exceed 75 dB.

The noise mitigation measures would be managed in accordance with a comprehensive Construction Noise Management Plan, as well as a Community Consultation Strategy.

The Department acknowledges that the project is likely to result in significant noise amenity impacts to a large number of sensitive receivers during the construction phase.

Whilst these impacts would be of relatively short duration, they are still likely to result in a level of irritation and frustration in the community.

Comprehensive community engagement before and during the works will be fundamental to addressing these issues, in addition to best practice noise mitigation measures.

To ensure this occurs, the Department has recommended conditions requiring TransGrid to:

- prepare and implement a comprehensive Construction Noise and Vibration Management Plan, Community Consultation Strategy and complaints management system;
- implement all reasonable and feasible measures with the aim of meeting the NMLs, which have been standardised for all receivers (i.e. 55 dB during standard construction hours and 45 dB outside standard construction hours);
- undertake most of the works (including site preparation, trenching and excavation, joint bays and road restoration) during standard construction hours only;
- provide respite periods for highly noise intensive works; and
- undertake noisy works outside standard construction hours in accordance with an out-of-hours works protocol, prepared in consultation with the Councils.

Construction Vibration

The Noise and Vibration Assessment calculates the minimum working distances that would be required to be maintained to comply with applicable amenity and structural damage vibration criteria, for various vibration-producing activities associated with the project. The minimum distances are reproduced in **Table 7** below.

Based on these minimum working distances, the assessment indicates that some works are likely to be required to occur within these minimum distances, particularly works in narrow local roads.

Table 7 | Minimum Working Distances to Comply with Vibration Criteria

Location	Plant	Description	Minimum Working Distance (m)		
			Cosmetic Damage		Human Comfort
			Residential	Heritage	Residential
All receivers	Jack Hammer	Hand-held	1	1	1
	Hydraulic Hammer (rock breaker)	300kg – <12t excavator	2	4	7
		900kg – <18t excavator	7	12	23
		1,600kg – <34t excavator	22	34	73
	Piling Rig	Hammer – 12t downforce	15	24	50

Where works are required within the minimum working distances for cosmetic damage, TransGrid would implement vibration mitigation measures such as:

- undertaking more detailed vibration assessments to determine site specific minimum working distances;
- amending the construction method to meet the minimum working distances (eg. by using smaller machinery);
- undertaking pre and post construction building condition surveys; and
- carrying out vibration monitoring.

Where scheduled works are required within the minimum distance for human comfort, TransGrid would notify and consult with the affected receivers in a similar way to those affected by highly intensive noise.

The Department is satisfied that the project can be managed to appropriately minimise vibration-related annoyance and building damage. The Department has recommended conditions requiring TransGrid to comply with the minimum working distances as far as reasonable and feasible, and to manage any exceedances in accordance with the comprehensive Construction Noise and Vibration Management Plan.

6.2 Traffic and Transport

The EIS includes a Traffic and Transport Assessment for the project undertaken by AECOM.

The assessment includes detailed consideration of the impacts of the construction of the project on the road network and traffic flows, bus routes, rail and light rail, bicycle routes, pedestrian routes, car parking, road safety and access to property and local facilities.

Detailed traffic modelling of impacts associated with each work site, would be undertaken during detailed design as part of Construction Traffic Management Plans, which would be prepared prior to the commencement of construction works.

Ongoing operation and maintenance of the project is unlikely to result in any significant traffic or transport-related impacts. As such, the following discussion focuses on the construction-related impacts.

These construction impacts would be of short term duration only, with the impacted area progressing relatively quickly along the transmission cable route. As such, whilst the construction of the project would take approximately 24 months to complete, the most affected locations on individual streets would occur only for a short period.

It is also noted that the project has been designed to avoid traffic impacts on major thoroughfares as far as practicable, by routing the transmission cable along local roads rather than arterial roads.

This followed early project consultation with the RMS and Transport Management Centre (TMC), which raised concerns regarding traffic disruptions, particularly during the daytime on State and regional roads.

Road Network

The project would have unavoidable impacts on the road network during the 24 month construction period, which would be mainly experienced at the (up to) 4 work sites along the transmission cable route at any one time.

Temporary lane closure closures and / or diversions would be required along all roads within the project area. For trenching activities, these disruptions would occur for a period of up to 2 weeks for most individual properties, or up to 8 weeks for each 600 to 800 m cable section. Other activities would involve longer disruptions, as outlined in **Table 6**.

The traffic assessment indicates that traffic flow would be maintained on all State (arterial) and regional (sub-arterial) roads during the construction works, with the exception of two regional roads (Burwood Road and Addison Road). For local roads, the narrow reserve widths mean that temporary diversions would be required on about half of the roads within the project area (see **Figure 15**).

Measures to maintain traffic flow on work sites is shown on the schematics in **Figures 12** and **13**.

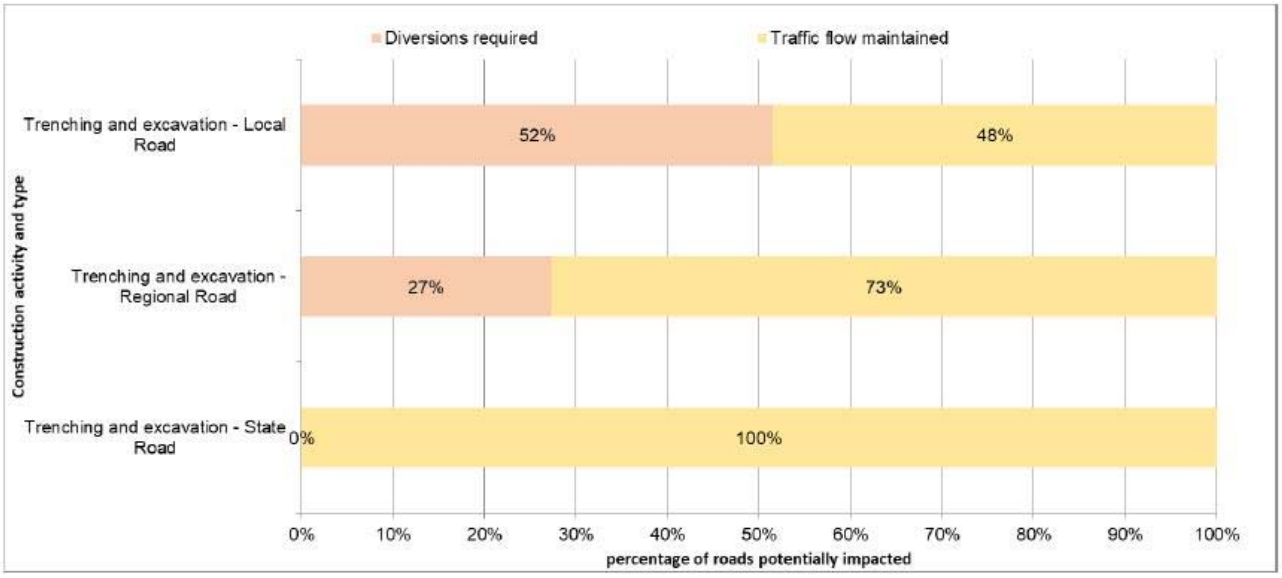


Figure 15 | Traffic Management for Trenching and Excavation

The lane closures and diversions would result in a number of temporary impacts, including:

- reduced midblock capacity and network performance;
- delays;
- queueing;
- loss of on-street parking;
- reduced speed limits; and
- delays/disruptions to property access (to be minimised as far as practicable).

These temporary impacts would likely result in some inconvenience for local residents. However, the impacts would be of relatively short duration, and are unlikely to result in significant traffic network performance or safety issues, subject to detailed traffic management and community engagement during construction works.

The Councils and TfNSW (including RMS) did not raise any significant concerns about the impacts of the project on the road network, subject to appropriate mitigation and management measures.

TfNSW noted that further assessment and consultation would be required as part of the detailed design for the project, and stated a preference for underboring of all classified roads rather than trenching.

The Councils stressed the need to keep disruptions (to traffic flows and access) to a minimum, and that works are appropriately scheduled to avoid conflicts as far as practicable (eg. work around schools to target school holidays).

The authorities also noted a number of technical requirements for working around infrastructure in the road reserves.

In this regard, TransGrid would be required to obtain separate approvals under section 138 of the Roads Act before undertaking road works on classified roads, which would address TfNSW's technical requirements.

However, in the case of unclassified (local) roads, Roads Act approvals are not required, as under clause 5 of schedule 2 of the Act, TransGrid is an authorised network operator under the *Electricity Supply Act 1995*. TransGrid states that it would nonetheless engage with the Council's regarding traffic and access impacts and management options.

To reinforce TransGrid's commitments, the Department has recommended conditions requiring TransGrid to prepare a detailed Public Infrastructure Management Plan in consultation with infrastructure providers prior to construction, which identifies all public infrastructure in the vicinity of the project area that may be affected by the project, and outlines measures for managing interactions with this infrastructure.

The Department has also recommended conditions requiring TransGrid to prepare and implement a comprehensive Construction Traffic Management Plan for the project, as well as detailed Traffic Control Plans (TCPs) for each work site. The plans would be required to be prepared in consultation with the relevant state and local roads authorities, and include (amongst other things):

- construction scheduling;
- traffic flow management, based on additional traffic assessment and modelling; and
- measures for minimising disruptions to property access and on street parking, and maintaining emergency vehicle access at all times.

The Department has also recommended conditions requiring TransGrid to construct road crossings on classified roads via underboring methods unless otherwise agreed, and to prepare and implement a detailed Community Consultation Strategy and complaints management system.

Whilst some level of inconvenience for local residents is inevitable, the Department considers that these conditions would minimise the short term traffic network impacts of the project to the greatest extent practicable

Bus Routes

There are around 24 separate bus services operating along streets within the project area. Most of these would be able to continue to operate uninterrupted during the works, with minor relocations of bus stops as the works near existing bus stops. Around seven bus services would require short term diversions of part of the bus route during the works.

TransGrid would address the required diversions and bus stop relocations in consultation with TfNSW and the bus operators, which would include comprehensive public notification with sufficient lead time.

TfNSW and State Transit did not raise any significant concerns regarding impacts to bus services, subject to the implementation of the proposed mitigation measures, and ongoing consultation.

The Department has recommended conditions requiring TransGrid to address these matters as part of the Construction Traffic Management Plan.

Rail and Light Rail

The project involves a number of crossings of rail infrastructure. The crossings, and the cable crossing construction method, include:

- Muir Road, Chullora – cable bridge;
- Enfield Intermodal Freight Line, Belfield – underbore;
- Arlington Light Rail Station, Dulwich Hill – underbore; and
- Bedwin Road, St Peters – cable / cycle bridge.

The rail crossings have been designed to minimise interruptions to the rail infrastructure services during the works. TfNSW does not object to the crossing construction methods, but identified a number of potential conflicts with existing and planned rail infrastructure. TfNSW noted that these issues would need to be addressed as part of detailed design for the project, in close consultation between the authorities.

As outlined above, the Department has recommended conditions requiring TransGrid to prepare a detailed Public Infrastructure Management Plan to address these interactions.

Cycle and Pedestrian Routes

The transmission cable route involves or crosses a number of dedicated cycle ways, bicycle friendly roads and pedestrian paths. Some of these would be subject to temporary diversions during the construction works, although pedestrian access to properties would be maintained at all times.

The public authorities did not raise significant concerns regarding cycling and pedestrian access, subject to maintaining access throughout the works. Inner West Council supports the construction of the proposed cable bridge over the rail line at Bedwin Road as a shared cycle bridge, and TransGrid notes that it would consult with Council and TfNSW in relation to this bridge.

The Department is satisfied that cycling and pedestrian access is able to be appropriately maintained and managed, and has recommended conditions requiring TransGrid to maintain appropriate access during the works.

Conclusion

As with any major infrastructure project involving disruptions to local roads and transport infrastructure, the project is likely to result in some temporary impacts to the amenity of the transport network in the vicinity of the project area. This is likely to result in some short term inconvenience for local residents, road users and people using buses on some streets.

However, the transport assessment indicates that disruptions are unlikely to result in significant impacts to the wider transport network performance, or to transport safety, subject to comprehensive traffic management and ongoing community engagement during the works.

To ensure this occurs, the Department has recommended conditions requiring TransGrid to:

- implement all reasonable and feasible measures to maintain pedestrian, vehicle and public transport access, and reasonable parking, for all affected properties and businesses;

- maintain safe pedestrian and cycle access around work sites;
- avoid trenching and joint bays in classified roads;
- prepare and implement a comprehensive Construction Traffic Management Plan including detailed TCPs for each work site, in consultation with the relevant roads authorities; and
- prepare and implement a comprehensive Community Consultation Strategy, and maintain a detailed complaints management system.

6.3 Vegetation and Biodiversity

The EIS includes a Biodiversity Development Assessment Report, undertaken by Eco Logical in accordance with the requirements of the *Biodiversity Conservation Act 2016* (BC Act) and the *Biodiversity Assessment Method 2017*. The EIS also includes an Arborist Assessment, undertaken by Eco Logical, which assesses the retention value of individual trees along the transmission cable route, with the assessment undertaken in accordance with applicable guidelines.

Vegetation and Plant Community Types

The vast majority (93%) of the project area comprises an urban landscape (mainly residential streets) containing sparse native and exotic vegetation (mainly street trees and associated verge lawn/gardens).

The remaining 7% of the project area was classified in the Biodiversity Assessment as comprising two Plant Community Types (PCTs), namely:

- Mangrove Forest[3], located on the southern bank of the Cooks River (see **Figure 16**). There is approximately 0.76 hectares of this PCT in the project area; and
- Turpentine-Grey Ironbark Forest[4], located in the light rail corridor near Terry Road in Dulwich Hill (see **Figure 17**). It comprises approximately 0.2 hectares of planted vegetation, associated with the Johnson Park bushcare site.

[3] Mangrove Forest in the Estuaries of the Sydney Basin Bioregion and South East Corner Bioregion (PCT 920)
[4] Sydney Turpentine-Grey Ironbark Open Forest on Shale in the Lower Blue Mountains and Sydney Basin Bioregion (PCT 1281)

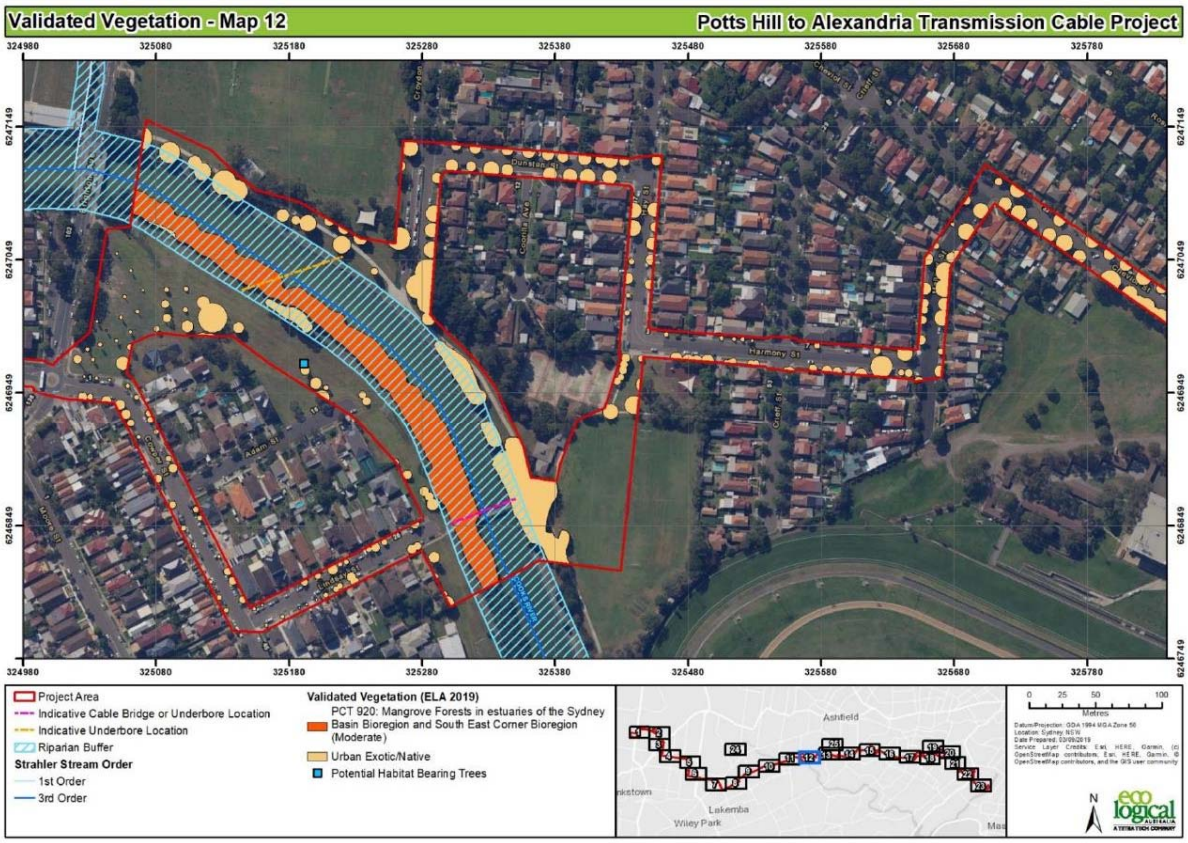


Figure 16 | Location of Mangrove Forest PCT

Figure 17 | Location of Turpentine-Grey Ironbark Forest PCT

The Johnson Park bushcare site includes species associated with Sydney Turpentine Ironbark Forest, which is listed as a critically endangered ecological community (EEC) under the BC Act and the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). However, the assessment considers that the vegetation on the site is unlikely to meet the EEC criteria, given that it comprises planted vegetation and lacks a canopy.

Subsequent to the EIS, TransGrid committed to underboring the Cooks River from the end of Lindsay Street into Lees Park, which would avoid the need for any clearing of the Mangrove Forest PCT. The proposal also involves underboring of the Sydney Turpentine PCT at Dulwich Hill, which would also avoid the need for any clearing of this community.

Consequently, the project (as amended) does not involve any direct impacts on PCTs or EECs.

The Department's EES Group made some comments regarding the identified PCTs and other possible PCTs in the project area.

Firstly, EES noted that its mapping indicates that vegetation within the freight rail corridor at Muir Road Chullora is classified as Castlereagh Ironbark Forest, which is consistent with the Cooks River-Castlereagh Ironbark Forest EEC listed under the BC Act.

TransGrid has classified the localised area of the Muir Road rail corridor as 'urban and exotic and native vegetation', as the area in which the proposed cable bridge is proposed to be located comprises street trees and / or weeds dominated land (including lantana, blackberry and pampas grass).

The Department's inspection of this site confirmed that this part of the rail corridor is indeed dominated by weeds. Given the degraded nature of the crossing location, and that the crossing would be located immediately adjacent to existing road and rail infrastructure, the Department is satisfied that the proposed cable bridge is unlikely to result in any significant biodiversity impacts in this location.

Secondly, EES noted that the Sydney Turpentine vegetation at the Dulwich Hill bushcare site may potentially classify as an EEC, notwithstanding that it is planted vegetation. Whilst EES acknowledges that the project would avoid direct impacts on this community through the proposed underboring, it questioned whether the proposed underboring could affect the EEC indirectly.

The Department accepts that the underboring would be located well below the vegetation (i.e. typically 4 to 10 m below ground), and is very unlikely to result in any adverse direct or indirect impacts to the community, subject to appropriate construction management.

The other main issue identified by EES related to the constructed wetlands in Sydney Park. EES questioned whether the wetlands constituted a PCT notwithstanding their constructed nature, and noted that the vegetation still needs to be considered for its value as threatened species habitat.

TransGrid has committed to underboring the wetlands, and to avoiding all tree removal in Sydney Park.

The Department is satisfied that these measures, along with the measures to minimise construction-related impacts, would adequately protect the wetland vegetation and habitat within Sydney Park.

The Department has recommended conditions requiring TransGrid to:

- ensure the project has no impacts on PCTs, threatened species, populations and EECs, fish habitat and significant trees (see below), and trees in sensitive areas such as Sydney Park and the Johnson Park bushcare site;
- implement reasonable and feasible measures to avoid or minimise impacts on other trees in the project area, and provide replacement plantings for any trees that are not able to be avoided (see below); and
- prepare and implement a detailed Vegetation and Biodiversity Management Plan for the project, in consultation with EES and the Councils.

Threatened Species

The Biodiversity Assessment identified key fish habitat along the Cooks River (associated with the Mangrove Forest PCT), as well as potential habitat for 6 threatened fauna species, including 4 bats, a sea eagle and the Grey-headed Flying Fox.

The project is unlikely to result in any significant impact on habitat for these threatened species, given TransGrid's commitment to avoiding clearing of the Mangrove Forest PCT and associated fish habitat, and the urban nature of other vegetation in the project area, as well as the relatively minor clearing of vegetation required for the project.

Consequently, no biodiversity offsetting is required for the project under the BC Act or the EPBC Act.

Notwithstanding, TransGrid has committed to undertaking pre-clearance surveys of street trees that are required to be removed, avoiding clearing in key breeding seasons where possible, and to replanting with habitat species (e.g. for Grey-headed Flying Fox) where feasible, in consultation with the Councils. The Department has recommended conditions in this regard.

Trees

The Arborist Assessment identified a total of 2,367 trees (mainly street trees) across the project area, including:

- 104 high retention value trees;
- 1,580 medium retention value trees; and
- 683 low retention value trees.

TransGrid has not identified which or exactly how many of these trees would be removed or otherwise pruned for the project, as it would not be in a position to confirm this until detailed design is complete.

This issue has been a key source of concern for the Councils in understanding the impacts on street trees within their LGAs.

Based on the concept design, TransGrid estimates that between 2 and 5 % of the trees in the project area would require removal (i.e. up to about 120 trees across the 20 km transmission cable route). Further, TransGrid has committed to avoiding any tree removal in some key sensitive sites, including:

- Sydney Park in Alexandria;
- Constitution Road in Dulwich Hill;
- Johnson Park bushcare site in Dulwich Hill;
- Mildura Reserve in Campsie (i.e. adjacent to Cooks River); and
- heritage listed trees in Fifth Avenue in Campsie.

TransGrid has also committed to avoiding removal of all other trees where reasonable and feasible (generally through locating the transmission cable infrastructure beneath the road carriageway), with priority given to high retention value trees. Where this is not possible, it has committed to implementing a replanting strategy / landscape plan to compensate for the loss, in consultation with the relevant Council.

While the Department acknowledges these commitments, it considers that TransGrid should ensure that the project does not cause any short term or long term impacts on all high retention value trees in the project area, and has recommended conditions in this regard.

It has also recommended conditions requiring TransGrid to prepare and implement detailed Landscape Plans prior to construction, in consultation with the Councils. The plans would include details on all vegetation required to be removed or pruned, as well as replacement and or compensatory plantings.

The Department has required that these compensatory plantings provide at least two new trees for every tree that is required to be removed, or other measures to ensure that biodiversity values in the area are improved over the long term. These compensatory measures are consistent with the Premier's Priorities for *Greening Our City*, which seek to increase the tree canopy and green cover across Greater Sydney by planting one million trees by 2022.

The Department considers that these conditions would address the concerns raised by the Councils. The recommended conditions also address the ongoing concerns raised by Canterbury Bankstown Council regarding the fig trees along Muir Road in Chullora (classified as medium retention value trees), which Council believes should be retained and protected. The recommended conditions require TransGrid to ensure that the project does not impact these fig trees.

As outlined above, the Department has also recommended conditions requiring TransGrid to develop a comprehensive Vegetation and Biodiversity Management Plan for the project.

With the implementation of these measures, the Department is satisfied that the vegetation and biodiversity impacts of the project can be adequately avoided, minimised and/or managed.

6.4 Other issues

The Department's consideration of other issues associated with the project is summarised in **Table 8**.

Table 8 | Consideration of Other Issues

Issue	Findings	Recommendations
Soil and Water – Erosion and Sedimentation	Erosion and sedimentation risks are similar to any other large infrastructure construction project, and can be managed by implementing well established best practice measures, with particular attention near riparian areas such as the Cooks River.	The recommended conditions require TransGrid to prepare and implement a detailed Soil and Water Management Plan (SWMP) for construction, including Erosion and Sediment Control Plans (ESCPs), in consultation with the Councils.
Soil and Water – Surface Water and Riparian Areas	The main waterbody in the project area is the Cooks River. The transmission cable would cross the river via underboring techniques, with no significant impacts on the river or its riparian area expected. The transmission cable would also cross Coxs Creek in the western portion of the project area. The Creek is a concrete channel in the project area, and the crossing (via trenching under the base slab) is not expected to have any significant impacts on the creek. The other significant waterbody in the project area is the constructed wetlands in Sydney Park. The wetlands would be underbored to minimise impact. A number of other culverts, stormwater pits and pipes would be affected, which would be temporarily supported or relocated as required.	The recommended conditions require TransGrid to: • not pollute any waters; • undertake works on waterfront land in accordance with DPIE-Water's guidelines; and • prepare and implement a Surface Water Management Plan, in consultation with the Councils.
Soil and Water – Flooding	The Cooks River and other waterbodies and stormwater drainage systems in the project area are subject to flooding and/or overland flow. The Councils and Sydney Water raised concerns regarding potential impacts on existing and proposed drainage infrastructure, and flooding impacts, and recommended that they be consulted during detailed design and before construction to ensure that the transmission cable infrastructure does not adversely affect drainage infrastructure. TransGrid proposes to make good all affected drainage infrastructure to match pre-existing conditions, and to develop a Flood Mitigation Strategy to demonstrate that existing flood characteristics in flood prone land would not be exacerbated.	The recommended conditions require TransGrid to: • ensure that the project does not materially alter flood characteristics; • prepare and implement a Flood Mitigation Strategy and Flood Management Plans in consultation with the Councils; and • prepare and implement a Public Infrastructure Management Plan in

Issue	Findings	Recommendations
	Site specific Flood Management Plans would also be prepared to manage potential flood and water flow impacts. The Department is satisfied that these measures would appropriately manage flood risk associated with the project, subject to close consultation with the applicable authorities regarding infrastructure interactions during detailed design and construction.	consultation with applicable authorities, to manage infrastructure interactions (including drainage infrastructure).
Soil and Water – Contamination	The EIS includes a preliminary site contamination assessment that identifies a number of areas of potential contamination within the project area. Two areas of high risk were identified at the far eastern end of the transmission cable route, namely: • Camdenville Park, which was a former landfill; and • Sydney Park to the Beaconsfield West substation, which was also subject to former landfilling and industrial land use. A number of other medium risk areas were identified along the route, associated with past and present industrial land uses, service stations and other potentially contaminating land uses. To manage contamination risk, TransGrid proposes to undertake more detailed soil investigations of contamination risk areas, and develop site specific management plans for addressing excavations in the former landfill areas at Camdenville Park and Sydney Park. It also proposes a number of other measures, including developing an Asbestos Management Plan and Unexpected Finds Protocol for addressing any unidentified contamination that is encountered during the works. The EPA further recommends that a site auditor is engaged to review the management plans and prepare a Site Audit Statement in accordance with the *Contaminated Land Management Act 1997* for the landfill sites and any unexpected contamination.	The recommended conditions require TransGrid to: • prepare and implement a detailed Contaminated Land Management Plan, Asbestos Management Plan and Unexpected Finds Procedure; and • engage an accredited site auditor to prepare a Site Audit Statement confirming that the proposed measures are appropriate for managing contamination risk in the former landfills and any other identified areas of contamination.
Soil and Water – Acid Sulfate Soils	The EIS identifies areas of acid sulfate soils (ASS) risk within the project area, particularly within and adjacent to the Cooks River, near Camdenville Park in St Peters, and near the Alexandra Canal. TransGrid proposes to develop ASS management plans to manage ASS risk in these areas. The Department is satisfied	The recommended conditions require TransGrid to: • ensure construction activities in areas of ASS risk comply with the government's ASS Manual; and

Issue	Findings	Recommendations
	that these risks can be appropriately managed using standard best practice measures.	• prepare and implement an ASS Management Plan for the project.
Air Quality	The EIS includes a qualitative air quality assessment which indicates that, with implementation of standard best practice dust mitigation measures, the project would not result in any significant dust nuisance or human health impacts. There is potential for adverse odour associated with excavation in the former landfills at Camdenville Park and Sydney Park, as well as near Arlington Oval, Marrickville Park and Henson Park, which may also contain landfill gas. TransGrid has committed to undertake further investigations in these areas, and prepare site specific landfill gas management plans for sites where landfill gas is identified.	The recommended conditions require TransGrid to: • implement all reasonable and feasible measures to minimise emissions of dust and other pollutants; and • investigate and manage landfill gas as part of the Contaminated Land Management Plan
Heritage – Aboriginal	The EIS includes an Aboriginal heritage assessment, which included desktop assessment, consultation with 15 Registered Aboriginal Parties (RAPs), survey and assessment of the project area. No Aboriginal objects were identified within or in close proximity to the project area, primarily due to the highly disturbed nature of the area. However, the southern bank of the Cooks River in Mildura Reserve (north of Lindsay Street), was identified as having potential Aboriginal archaeological sensitivity. Subsequent to the EIS, TransGrid amended the project to remove the option of crossing the Cooks River north of Lindsay Street in Mildura Reserve, and is now proposing to cross the river via underboring from the Lindsay Street road reserve. With this amendment, the Department is satisfied that the project is unlikely to result in any significant Aboriginal heritage impacts.	The recommended conditions require TransGrid to: • avoid disturbance of the areas of potential Aboriginal archaeological sensitivity in Mildura Reserve; and • prepare and implement an Unexpected Heritage Finds Procedure.
Heritage – Historical	There are 9 historical heritage items within the project area, and two State Heritage Register (SHR) listed items immediately adjacent to the project area. These items include: • Potts Hill Reservoirs 1 and 2 (SHR); • Alexandra Canal (SHR); • City Tunnel; • Service Avenue Heritage Conservation Area; • Inter War Street Trees; • Ashbury Heritage Conservation Area; • Henson Park; • Brick Paving at Marrickville;	The recommended conditions require TransGrid to: • avoid impacts on the high retention value trees in HCAs, the heritage listed trees in Fifth Avenue in Campsie, and the heritage brick paving in Marrickville; • prepare and implement a Heritage Management

Issue	Findings	Recommendations
	• Abergeldie Estate Heritage Conservation Area; • Goodsell Estate Heritage Conservation Area; and • Llewellyn Estate Heritage Conservation Area. The project is not expected to have significant impacts on any of these heritage items, apart from temporary visual impacts during construction. The main potential for direct impact is the removal of street trees in the Heritage Conservation Areas, which as outlined in Section 6.3, has not been confirmed at this stage. The recommended conditions require TransGrid to avoid impact to the high retention value trees. The project also has the potential for indirect impact associated with vibration damage. The Department and the Heritage Council are satisfied that these potential impacts can be adequately managed, subject to conditions.	Plan, including an Unexpected Heritage Finds Procedure; • comply with relevant vibration criteria for protecting heritage structures; and • prepare and implement a detailed Noise and Vibration Management Plan, including measures for protecting heritage structures from vibration damage.
Visual Amenity	The main visual impacts associated with the project relate to the potential removal of medium and high retention value street trees, including trees in Heritage Conservation Areas. Avoiding and/or mitigating impacts on these trees is addressed in Section 6.3 above. Other visual impacts, including impacts associated with cable bridges, lighting impacts and temporary impacts during construction, are not expected to significantly impact the visual amenity of the project area following rehabilitation, and can be appropriately managed during construction works.	The recommended conditions require TransGrid to: • avoid impacts on significant trees (see Section 6.3); and • minimise light spill and lighting impacts.
Hazards and Risk	The EIS includes an Electric and Magnetic Fields (EMF) assessment, which predicts that EMF levels would be approximately 221 mG directly above the trench. This is well below the relevant EMF criteria[5] of 2,000 mG for general public exposure, or 1,000 mG for persons wearing older type implant medical devices (AIMDS). The EMF levels drop to less than 10 mG at an offset distance of 10 metres from the edge of the trench. The assessment also indicates that EMF levels associated with joint bays, cable bridges and substations would comply with the applicable criteria, as would EMF levels during emergency operations (when the cable is operating at maximum capacity) and cumulative operations (with other electrical infrastructure, and/or the proposed future transmission cable expansion).	The recommended conditions require TransGrid to: • manage dangerous goods in accordance with relevant guidelines; and • comply with the applicable EMF criteria.

[5] Based on the International Commission on Non-Ionizing Radiation Protection (ICNIRP) 2010 *Guidelines for limiting exposure to time-varying electric and magnetic fields (1 Hz to 100 kHz),* and European Standard EN 50527-1 (2016) *Procedure for the Assessment of the Exposure to Electromagnetic Fields of Workers Bearing Active Implantable Medical Devices*.

Issue	Findings	Recommendations
	Notwithstanding the above, TransGrid has committed to undertaking further assessment and verification of EMF levels during detailed design, and following commencement of operations. The Department is satisfied that the project is unlikely to result in any significant EMF-related impacts, or impacts associated with other hazards and risks such as dangerous goods and bush fire.	
Public Infrastructure	A large amount of existing and planned infrastructure is located within the project area, including: • roads and traffic infrastructure; • rail infrastructure; • stormwater drainage infrastructure; • utilities (water, sewer, electricity, gas, fuel pipelines[6] and communications); • survey marks and associated infrastructure; and • recreation / playground equipment. Most of the infrastructure providers, including the Councils, TfNSW (Transport Cluster), Sydney Water and Caltex, requested that they are consulted further during detailed design for the project, in order to avoid and/or manage potential conflicts with their existing and planned infrastructure in the project area. The authorities also recommended that TransGrid is required to make good any impacts to infrastructure to the authorities' satisfaction, minimise disruptions, undertake dilapidation reports before and after construction, protect infrastructure that is outside the disturbance areas, and continue consultation throughout the project. The Department notes that there is an established statutory framework for addressing public infrastructure interactions, including: • requirements to obtain separate Roads Act approvals for works in public roads[7]; • requirements under the *Sydney Water Act 1994* to protect and or compensate for damage to Sydney water infrastructure; • requirements under the *Local Government Act 1993* to protect council property from damage;	The recommended conditions require TransGrid to: • prepare and implement a detailed Public Infrastructure Management Plan; • prepare pre-construction and post-construction dilapidation reports of all public infrastructure in the vicinity of the project; and • repair, relocate or otherwise compensate any affected public infrastructure, to the satisfaction of the applicable authority.

[6] Including the Caltex operated Sydney Metropolitan Pipeline and Viva Energy jet fuel pipeline to Sydney Airport.
[7] As outlined in Section 4.1, this would only apply to classified roads for this project as TransGrid is an authorised network operator.

Issue	Findings	Recommendations
	• requirements under the *Pipelines Act 1994, Gas Supply Act 1996*, and *Telecommunications Act 1997*, to protect relevant linear infrastructure from damage; and • requirements under the *Transport Administration Act 1988* to protect transport infrastructure and compensate for any damage. The Department acknowledges that these and other statutory requirements would assist in managing the interactions between the project infrastructure and existing public infrastructure in the area. However, to provide for the orderly management of infrastructure interactions , the Department has recommended conditions requiring TransGrid to prepare a detailed Public Infrastructure Management Plan for the project, in consultation with the relevant infrastructure providers.	
Social and Economic	The main social and economic impacts associated with the project relate to the construction phase, and include temporary amenity impacts such as noise and vibration, dust, visual amenity, and traffic and transport (including access, disruption and congestion). As outlined in the above sections, these impacts are likely to result in some inconvenience and annoyance for sensitive receivers, including local residents, businesses, educational facilities, health facilities, religious establishments, and recreational land users. However, the impacts would be of relatively short duration for each individual receiver, as the construction work sites would progress relatively quickly along the transmission cable route. The Department is satisfied that these impacts can be managed to an acceptable standard, subject to best practice community engagement and environmental management during the works. The project is not expected to have any significant ongoing adverse social and economic impacts during operations. Indeed, the project would have considerable positive benefits by shoring up Sydney's critical energy network supply.	The recommended conditions require TransGrid to: • prepare and implement a range of management plans, in consultation with the Councils; • prepare and implement a detailed Community Consultation Strategy; • maintain an effective complaints management system; and • ensure public access to all applicable project information.
Other Issues	The Department is satisfied that other issues associated with the project are minor issues and can be appropriately minimised and managed, subject to implementation of standard best practice construction management.	-

7 Evaluation

The Department has assessed the project application, EIS, submissions on the project, TransGrid's responses to these submissions and its amendment report, in accordance with the objects of the EP&A Act and the principles of ecologically sustainable development.

Based on this assessment, the Department is satisfied that TransGrid has designed the project in a manner that is consistent with applicable strategic plans and statutory planning instruments, and minimises the potential impacts on the surrounding community and the environment as far as is practicable.

Nonetheless, the Department acknowledges that the project is likely result in some short term annoyance and inconvenience for the local community, particularly in relation to noise and traffic disruption during construction works. These impacts would be of relatively short duration as the construction zone for the transmission cable works pass by each sensitive receiver.

The Department has recommended a detailed suite of conditions to ensure that these and other residual impacts associated with the project are effectively minimised, mitigated and/or managed to achieve an acceptable outcomes. The Department believes that the conditions reflect current best practice for the regulation of infrastructure projects of this nature in NSW.

The Department also recognises that the project would provide major social and economic benefits for inner Sydney, the Sydney CBD and to NSW, including:

- shoring up Sydney's critical high voltage electricity network in both the short term and long term;
- contributing to a reliable, secure and affordable source of electricity for Sydney households and businesses;
- generating a direct capital investment of $285 million; and
- generating up to 140 jobs over the 24 month construction period.

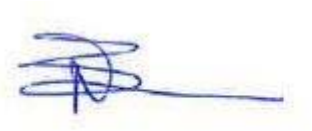
The Department has carefully weighed the impacts of the project against the significance of the infrastructure and its socio-economic benefits. On balance, the Department is satisfied that the project's benefits outweigh its residual costs, and that it is in the public interest and should be approved, subject to conditions.

8 Recommendation

It is recommended that the Executive Director, Energy, Resources and Compliance, as delegate for the Minister for Planning and Public Spaces:

- **considers** the findings and recommendations of this report
- **accepts and adopts** all of the findings and recommendations in this report as the reasons for making the decision to grant approval to the application
- **agrees** with the key reasons for approval listed in the notice of decision
- **grants approval** for the application in respect of the Powering Sydney's Future project (SSI 8583) as amended, subject to the conditions in the attached project approval
- **signs** the attached project approval and recommended conditions of approval.

Recommended by:



12/5/20

Nicole Brewer
Director
Energy Assessments

9 Determination

The recommendation is **Adopted ~~/ Not adopted~~** by:

14/5/20

Mike Young
Executive Director
Energy, Resources and Compliance

Appendices

Appendix A – Recommended Instrument of Approval

Appendix B – Environmental Impact Statement

Refer to – https://www.planningportal.nsw.gov.au/major-projects/project/9956

Appendix C – Submissions

Refer to – https://www.planningportal.nsw.gov.au/major-projects/project/9956

Appendix D – Submissions Report

Refer to – https://www.planningportal.nsw.gov.au/major-projects/project/9956

Appendix E – Amendment Report

Refer to – https://www.planningportal.nsw.gov.au/major-projects/project/9956

Appendix F – Additional Information

Refer to – https://www.planningportal.nsw.gov.au/major-projects/project/9956