



Planning &
Infrastructure

**MAJOR PROJECT ASSESSMENT:
*Epping to Thornleigh Third Track
Northern Sydney Freight Corridor
SSI-5132***



Director-General's
Environmental Assessment Report
Section 115ZA of the
Environmental Planning and Assessment Act 1979

July 2013

ABBREVIATIONS

CIV	Capital Investment Value
Department	Department of Planning & Infrastructure
DGRs	Director-General's Requirements
Director-General	Director-General of the Department of Planning & Infrastructure
EA	Environmental Assessment
EP&A Act	<i>Environmental Planning and Assessment Act 1979</i>
EP&A Regulation	Environmental Planning and Assessment Regulation 2000
EPI	Environmental Planning Instrument
ETTT	Epping to Thornleigh Third Track
MD SEPP	State Environmental Planning Policy (Major Development) 2005
Minister	Minister for Planning
PAC	Planning Assessment Commission
PEA	Preliminary Environmental Assessment
PFM	Planning Focus Meeting
PPR	Preferred Project Report
Proponent	Transport for NSW (TfNSW)
NSFC	Northern Sydney Freight Corridor
RtS	Response to Submissions

Cover Photograph: Freight on the Main North Line (TfNSW, 2012)

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EXECUTIVE SUMMARY

The proponent, Transport for NSW (TfNSW), is seeking project approval to construct approximately six kilometres of new and upgraded track along the western side of the Main North Line rail corridor between Epping and Thornleigh station in Sydney's north-west. The purpose of the proposal, known as the Epping to Thornleigh Third Track (ETTT), is to expand freight rail and passenger train capacity on the Main North Line. The additional track will allow slow moving freight trains to run in parallel to fast moving passenger trains up the steep grade exiting Sydney, and will allow freight trains to maintain momentum on the approach to this steep grade.

Currently, the section of the Main North Line between Strathfield and Broadmeadow is a shared passenger and freight line. The need to meet passenger service demands in the peak transport period means that passenger services take priority over freight. This restricts the movement of rail freight to times of the day outside the morning and afternoon passenger peak periods, which increases the requirement for freight to be transported by road at peak times. As a result, road transport of freight, being the only mode that can meet certain market demands, contributes substantially to road congestion, incurs higher freight costs and therefore limits economic productivity. The Environmental Impact Statement (EIS) estimates that without additional network expansion, core freight period capacity for interstate container freight on the Main North Line will be reached by 2015.

The ETTT proposal, including provision of a third track alignment and station works, is a key part of the Northern Sydney Freight Corridor (NSFC) Program that comprises a number of freight rail infrastructure improvements along the Main North Line between Strathfield, Sydney and Hexham, west of Newcastle. The NSFC Program is identified in various strategic plans by both NSW and Commonwealth Governments, including the Long Term Transport Master Plan and the Nation Building Program. The NSFC Program and its constituent parts are seen as priority rail infrastructure projects that will address some of the constraints currently restricting passenger and freight network efficiency on the Main North Line rail freight network.

Features of the ETTT proposal include:

- an upgrade to Cheltenham Station;
- modifications to the pedestrian underpass and commuter car park at Beecroft Station;
- construction of a new rail bridge crossing the M2 Motorway and Devlins Creek; and
- extension of Pennant Hills Station overhead concourse and a replacement footbridge south of the station.

Following a detailed review of the Proponent's EIS and Submissions Report, and the submissions received during the exhibition period for the project, the project's key issues are:

- noise and vibration;
- heritage;
- visual amenity;
- ecology; and
- traffic, transport and access.

These issues were reflected within the 426 submissions (including 15-third party submissions) received from Government agencies, local councils, and the local community during the exhibition of the assessment. As a result of the issues raised regarding potential acoustic impacts, the Department sought an independent peer review of the noise and vibration assessment and supplementary documents provided by the proponent.

The Submissions Report also provided information and assessment on four minor changes to the proposal. These include amendments to the construction impact area; re-alignment of the

Pennant Hills pedestrian footbridge; changes to the construction methodology for the Chapman Avenue overbridge; and the construction of an extension to the previously proposed culvert at Wongala Crescent to enable a potential future cycleway link. Whilst the resulting design changes will result in slight amenity impacts and minor increase in vegetation clearing, the Department considers the impacts to be minor in nature and that these impacts are not outside the scope of the EIS.

The Department has assessed the proponent's EIS, submissions from the general public and public authorities, the response to submissions and revised mitigation and management measures. The Department considers that there are a number of environmental issues that would need to be carefully addressed during construction and operation of the proposal. These issues include impacts to amenity, such as:

- noise and vibration impacts on adjacent residences;
- road changes that may temporarily increase traffic congestion and create short-term access issues;
- some change to the heritage character of train stations within the project footprint; and
- some vegetation clearing.

A combination of the imposition of the recommended conditions along with a coordinated approach across government will assist in the mitigation of these impacts and will deliver a robust strategic response to regulating network wide impacts.

Other short-term and minor residual impacts can also be appropriately managed to an acceptable level through the recommended conditions of approval, including a suite of environmental monitoring and performance requirements that focus on mitigating impacts to residents and the environment.

Consequently, the Department recommends that the Minister for Planning and Infrastructure approve the ETTT proposal, subject to the recommended conditions of approval.

1. BACKGROUND

The proponent, Transport for NSW (TfNSW) proposes to construct approximately six kilometres of new and upgraded track along the western side of the Main North Line rail corridor between Epping and Thornleigh station in Sydney's north-west (**Figure 1.1**).

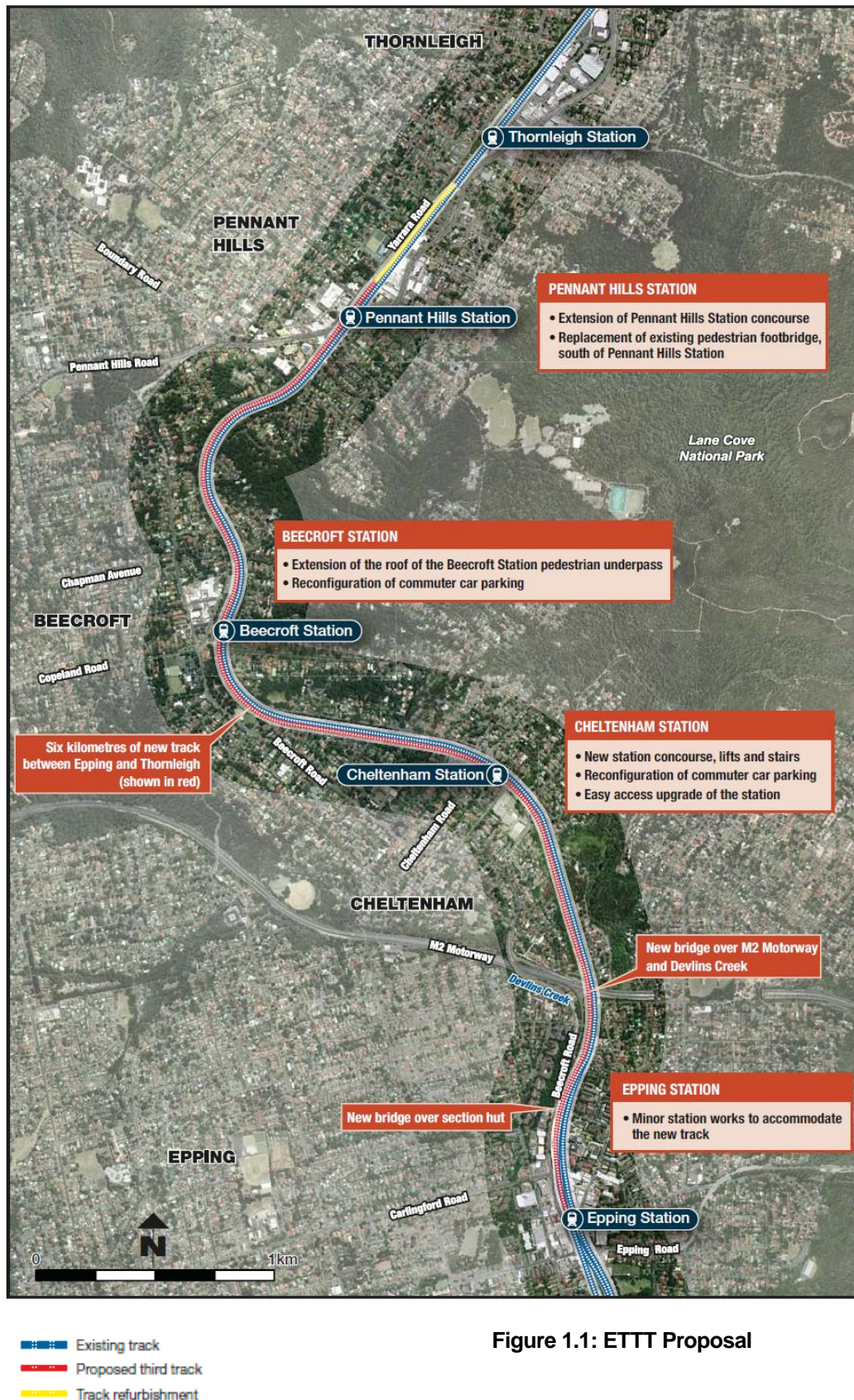


Figure 1.1: ETTT Proposal

The proposal has an estimated capital investment value of \$520 million and would require approximately 150-200 workers during peak construction periods, and 400 workers during shut down periods. It is estimated that construction will take approximately 45 months. The proposal will make a positive economic contribution to the state of NSW through increased network efficiency and capacity.

The development is one of four projects that constitute stage 1 of the \$1.1 billion North Sydney Freight Corridor (NSFC) program that will increase freight capacity between Strathfield and Broadmeadow, near Newcastle (**Figure 1.2**). The third track will also expand capacity for diesel and electric passenger services on this line. The benefits of this proposal are described in more detail in **Section 2.2**.

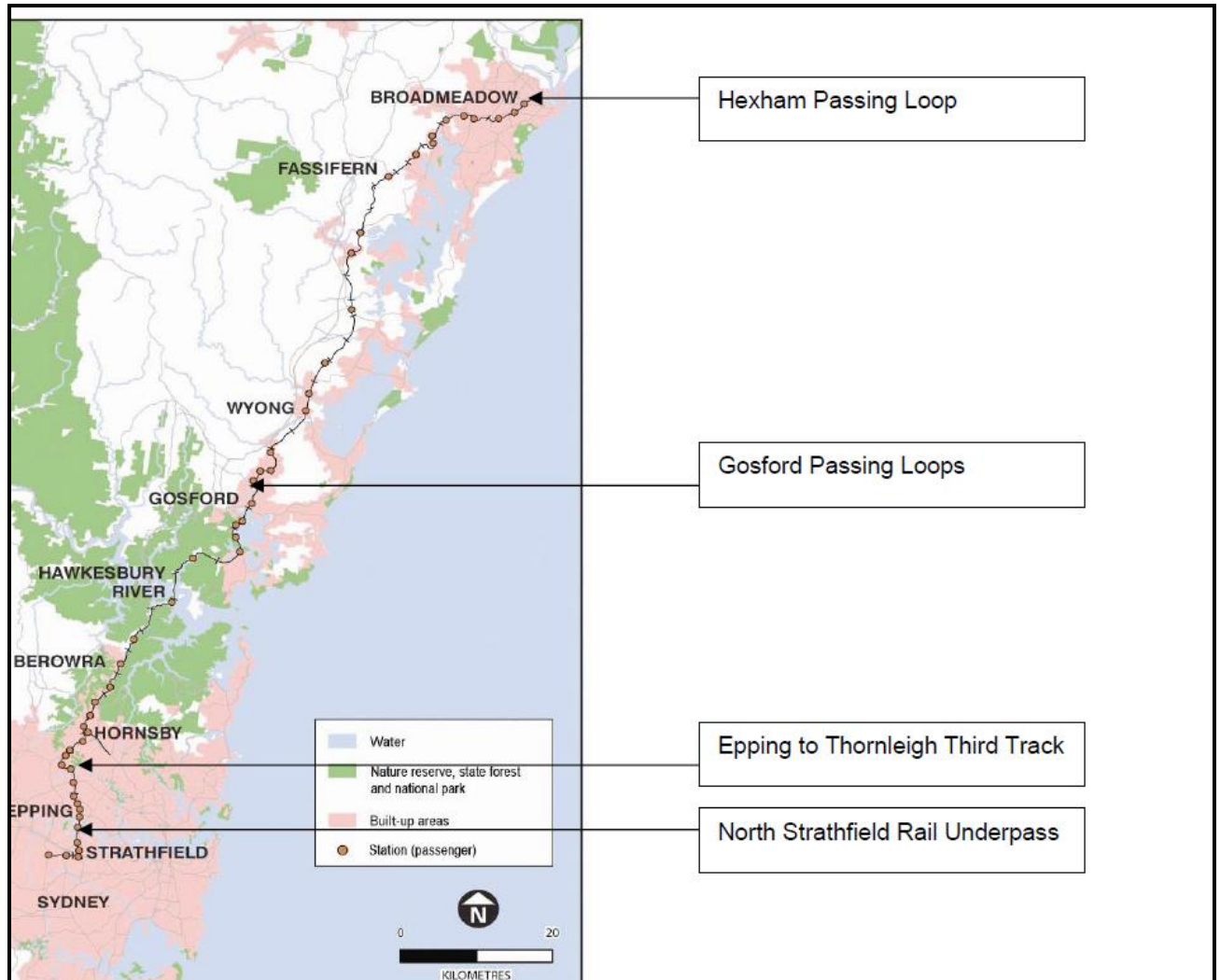


Figure 1.2: The four projects that constitute stage 1 of the NSFC Program (TfNSW, 2012)

2. PROPOSED PROJECT

2.1. Project Description

TfNSW proposes to construct and upgrade a six kilometre long electrified freight line within the established rail corridor between Epping and Thornleigh stations.

The ETTT would primarily be used by northbound freight trains which are currently slowed by the existing uphill gradients, however electric and diesel passenger services would also be able to use the track when not in use by freight services. On completion of the construction Railcorp will own, operate and maintain the third track. The proposal will provide compatible linkages to other freight rail upgrades proposed or newly completed within the Sydney metropolitan network, such as the Southern Sydney Freight Line.

Aside from track construction, the key components of the proposal include:

- an upgrade to Cheltenham Station including new overhead concourse and ticket office stairs, three new lifts, platform modifications and modification of the existing commuter car park;
- extension of Pennant Hills Station overhead concourse, including new lift and stairs, modifications to Yarrara Road footpath and roadway, and a replacement footbridge south of the station;
- modifications to the pedestrian underpass and commuter car park at Beecroft Station; and
- construction of a new rail bridge crossing the M2 Motorway and Devlins Creek

The new track would run parallel to the existing track on the western side, adjacent to established residential, commercial, educational and public recreational lands in Epping, Cheltenham, Beecroft, Pennant Hills and Thornleigh within the Parramatta and Hornsby Local Government Area (LGAs). Options for future development adjacent to the rail corridor are not expected to be affected by the proposal. The project is shown in **Figures 2.1 to 2.9** and the key components are listed in **Table 2.1**.

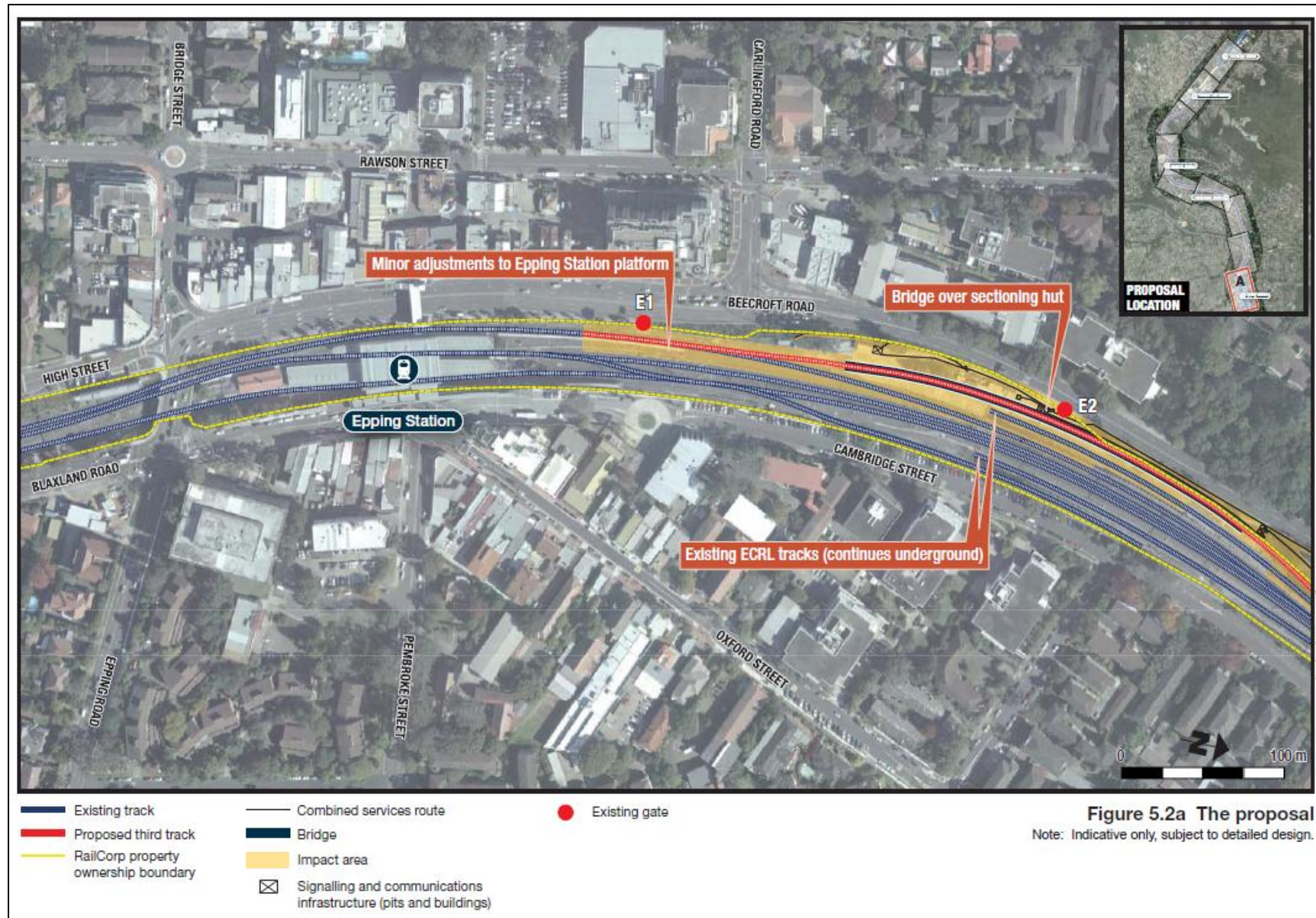


Figure 2.1 – The proposal

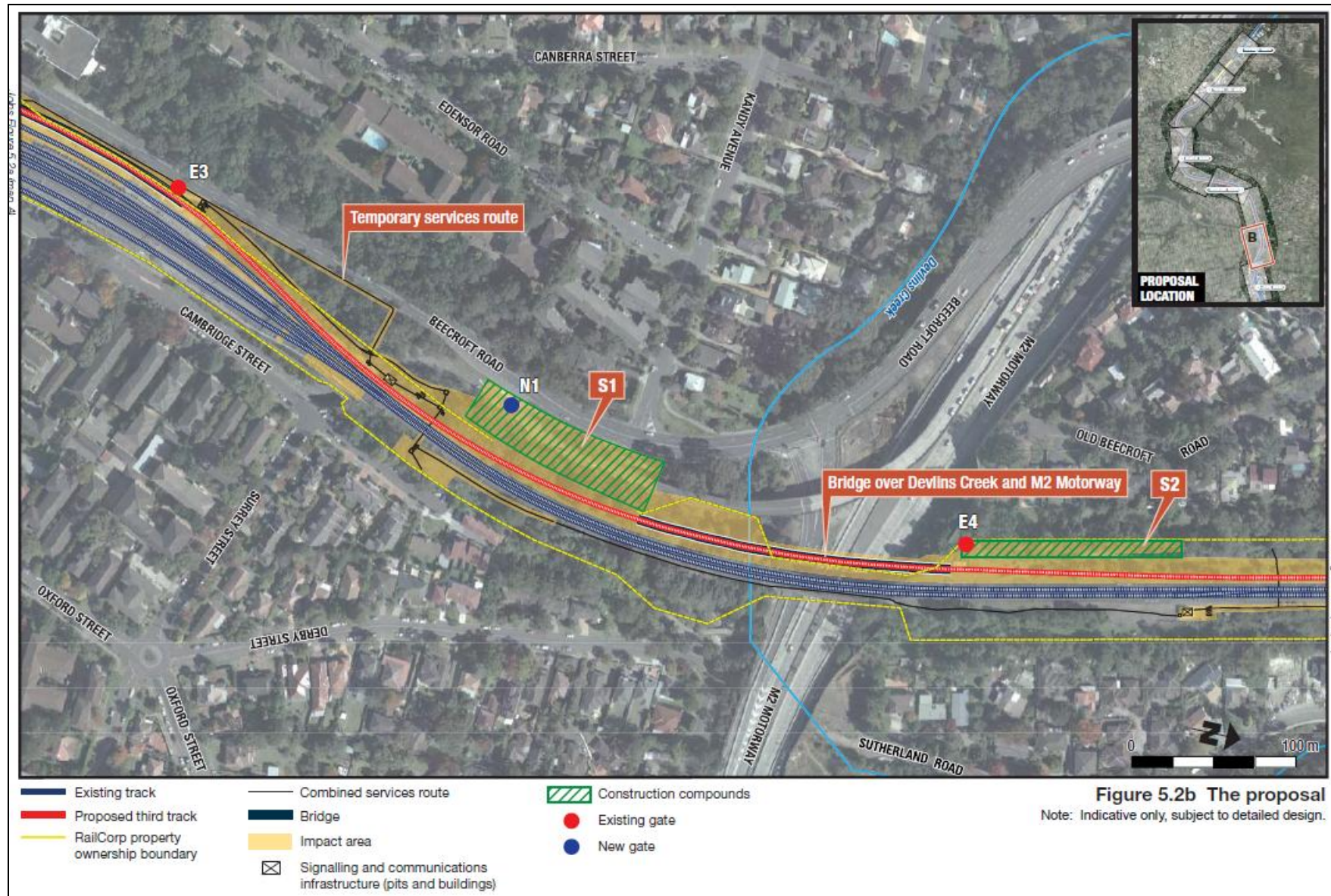


Figure 2.2

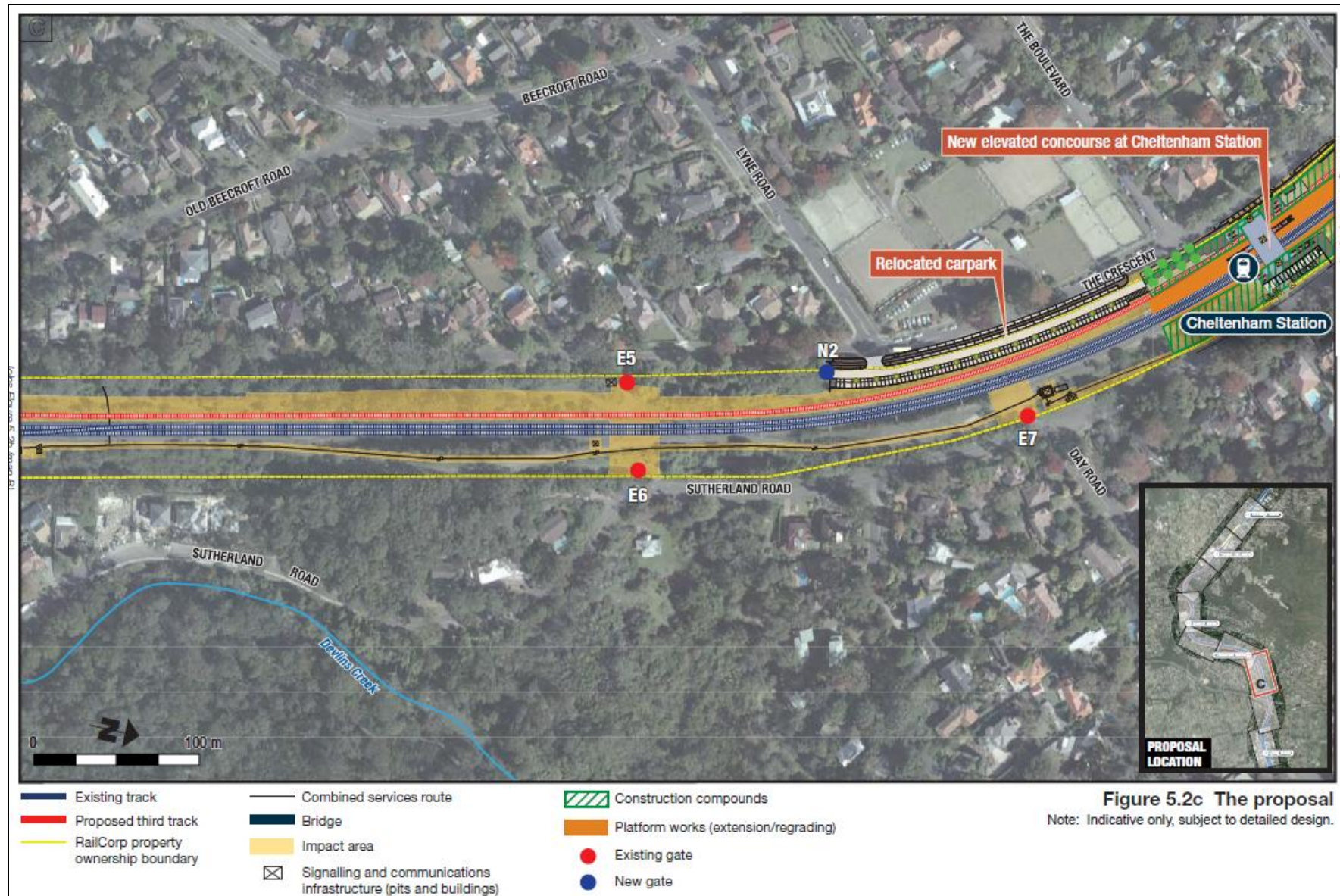


Figure 2.3

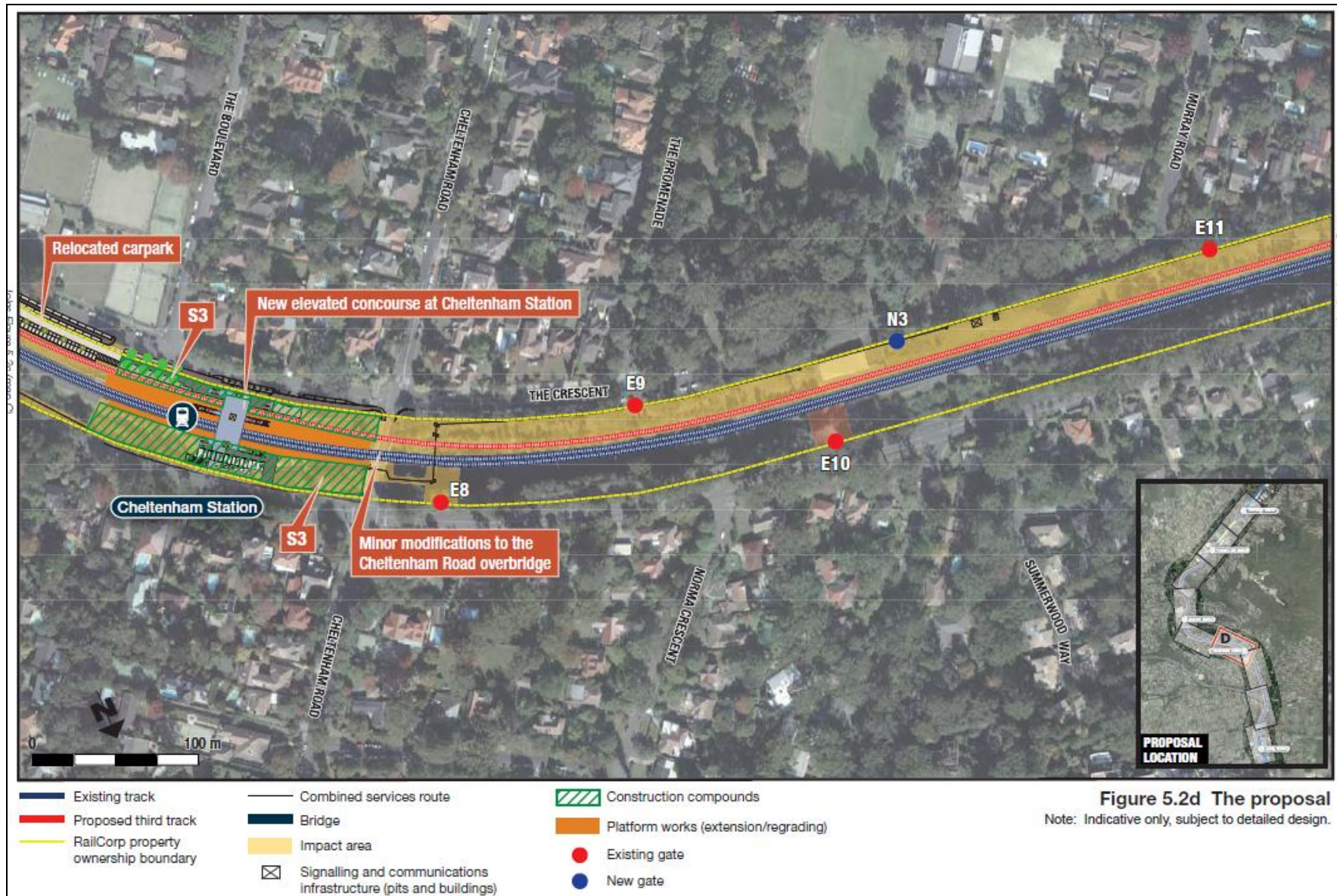


Figure 2.4



Figure 2.5.

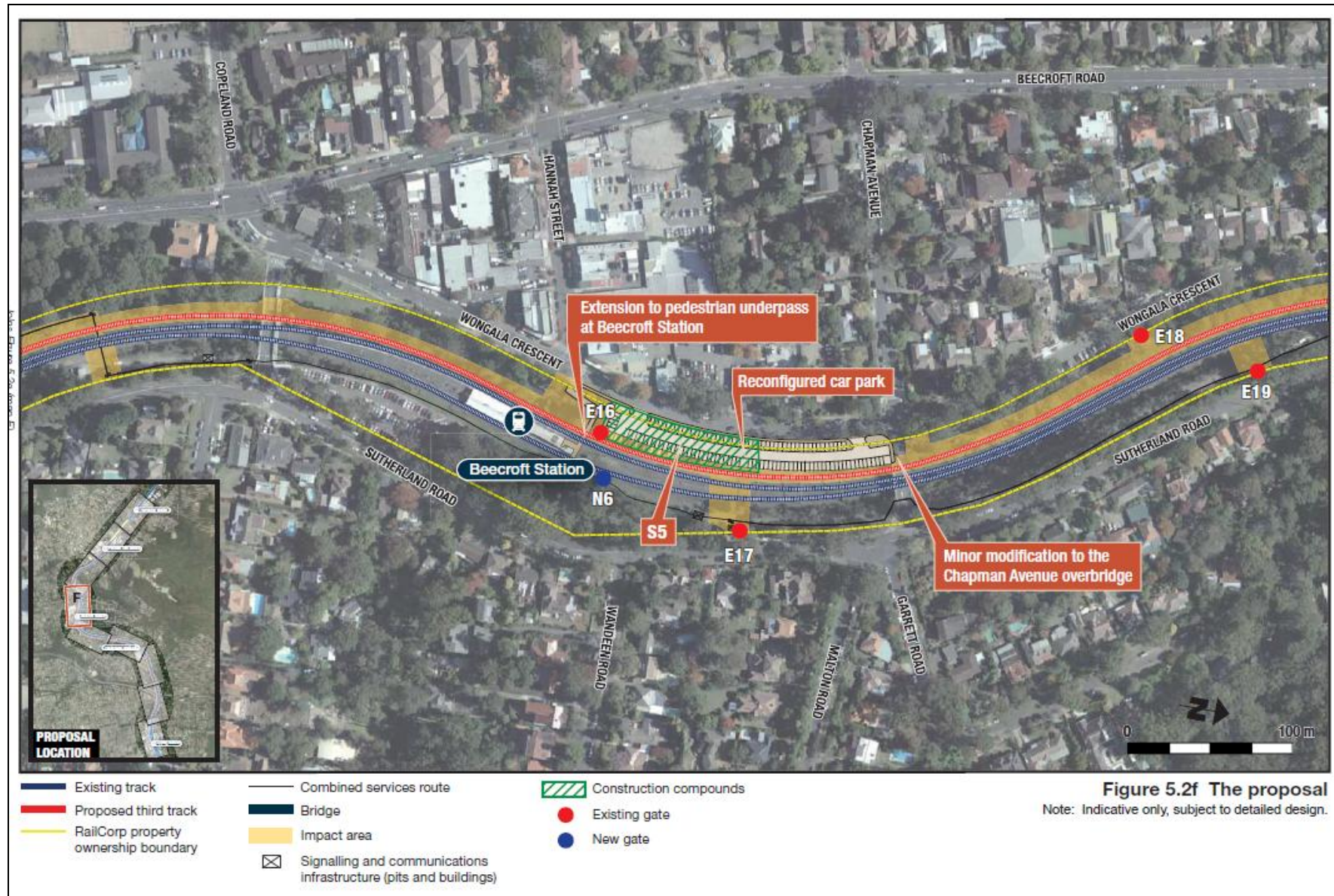


Figure 2.6

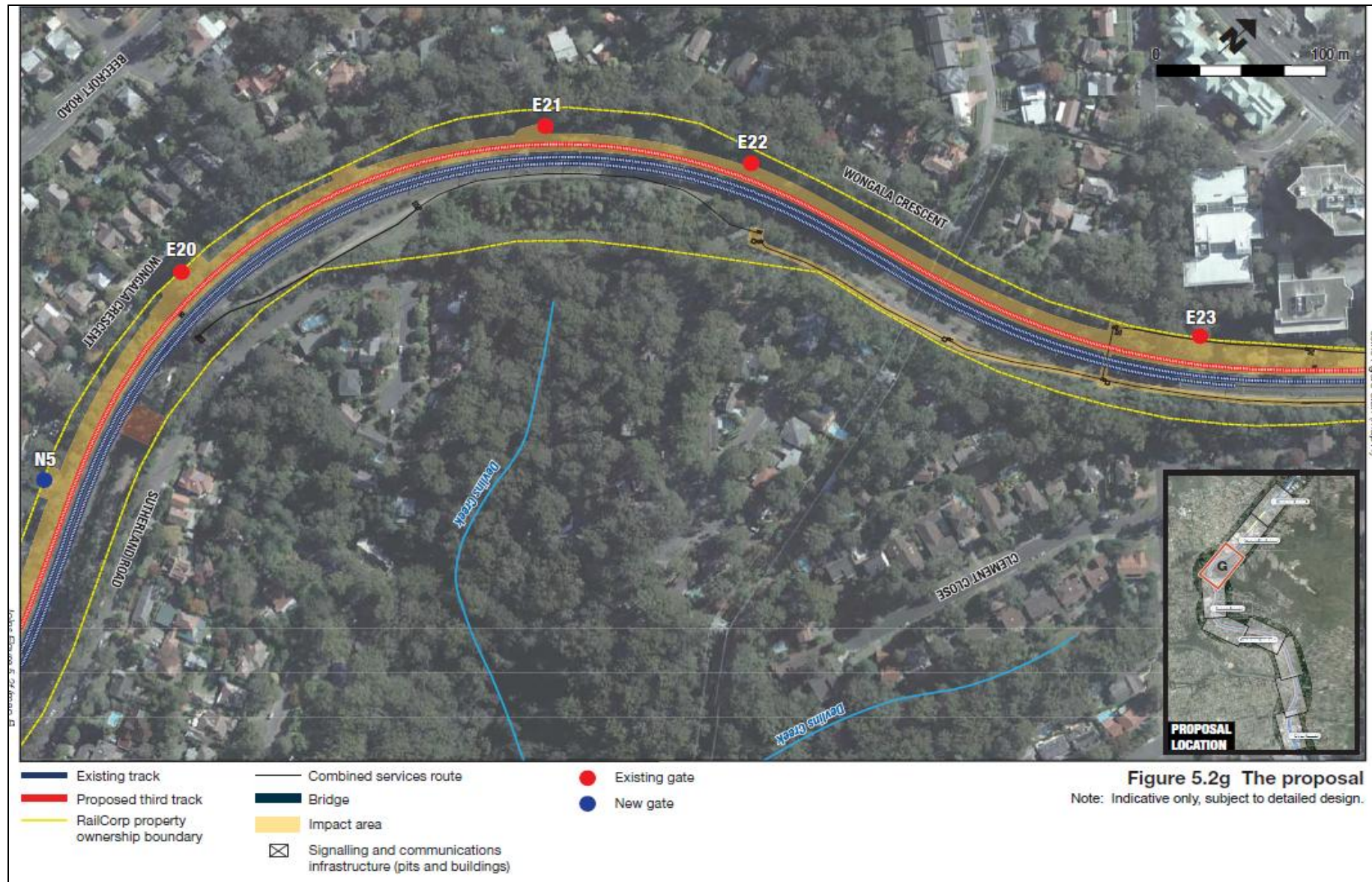


Figure 2.7

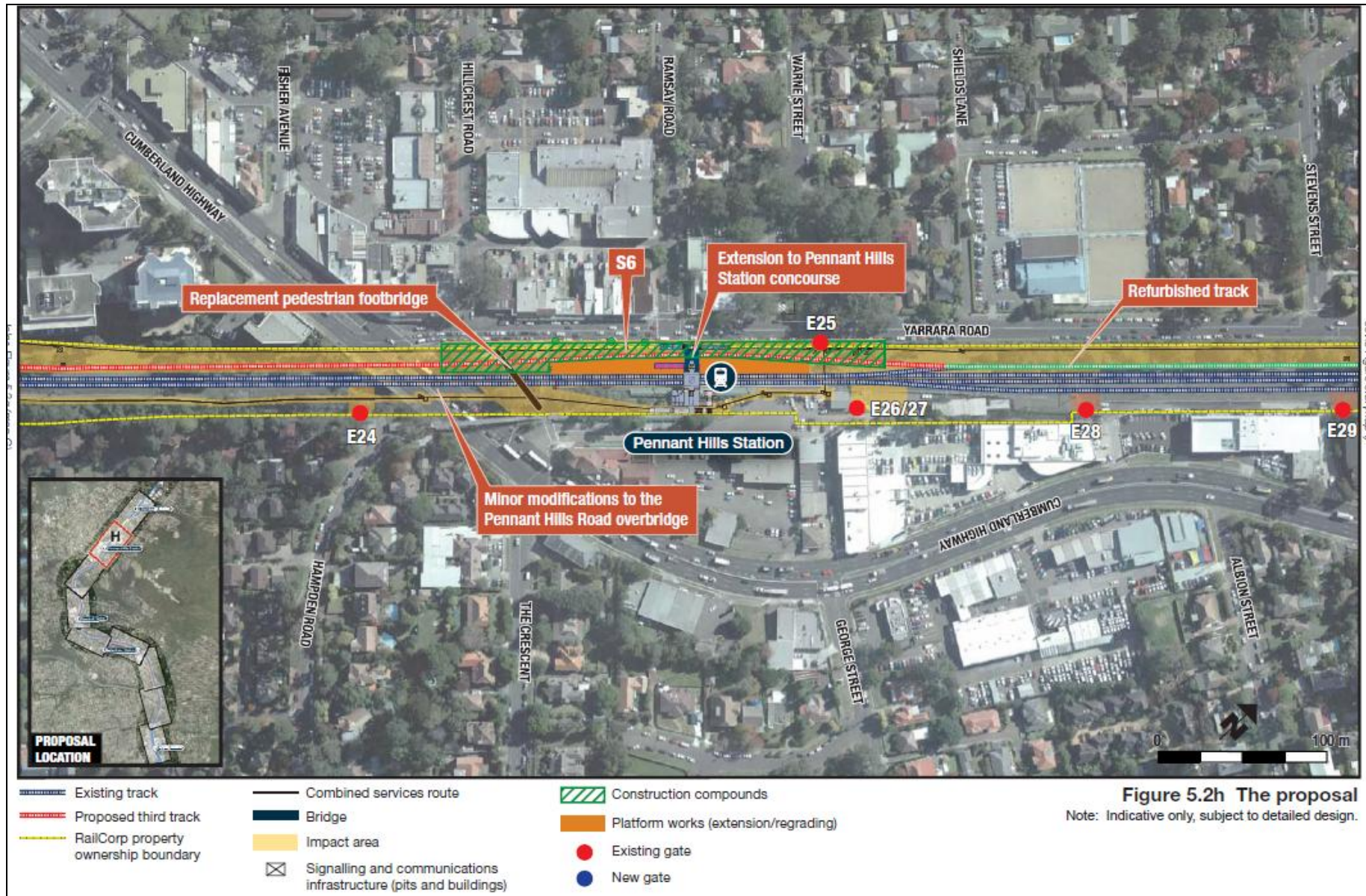


Figure 2.8



Figure 2.9

Table 2.1: Key Project Components

Aspect	Description
<i>Alignment</i>	<ul style="list-style-type: none"> provision of six kilometres of new or refurbished track on the western side (down) of the existing tracks and primarily within the rail corridor from north of Epping to the south of Thornleigh railway stations; minor widening of the rail corridor into adjacent acquired publicly owned land at Epping, Cheltenham, Beecroft and Pennant Hills; expand cuttings along the length of the alignment including the provision of a retaining wall and noise mitigation structures; and upgrade of the freight passing loop between Pennant Hills and Thornleigh stations.
<i>Station works</i>	<ul style="list-style-type: none"> modifications to Epping, Cheltenham, Beecroft and Pennant Hills railway stations and their surrounding precincts; <u>Epping</u>: minor widening of the northern end of Platform 3 by up to 30cm; <u>Cheltenham</u>: replacement of existing station buildings with a new two-storey station concourse, ticket office, three lifts, stairs, and platforms modifications, taxi, kiss and ride and cycling facilities, replacement and reconfiguration of existing car parks; <u>Beecroft</u>: demolition of part of the disused 1895 western platform, extension of pedestrian underpass by approximately 5m and reconfiguration of existing car park; and <u>Pennant Hills</u>: extension of the concourse building including provision of associated facilities (lift/stairs) and replacement of the existing separate southern pedestrian footbridge.
<i>Bridges</i>	<ul style="list-style-type: none"> new bridge section over the M2 Motorway and southern approach over Devlins Creek at Epping; a concrete maintenance bridge north of Epping station; modifications to Chapman Road overbridge north of Beecroft station; and excavation of rock to the western abutment of the Cheltenham Road overbridge together with upgrading works to the existing western bridge pier as well as the potential installation of anti-throw screens on the bridge.
<i>Ancillary</i>	<ul style="list-style-type: none"> new overhead wiring for the length of the new track; existing signalling relocated and new infrastructure installation and construction of new signalling buildings, huts and bungalows at various locations; potential relocation of high voltage cables and other power supply equipment on either side of corridor; potential relocation or protection of non-rail related utilities in and adjacent to the corridor that are owned by a range of providers (Ausgrid, Sydney Water, Optus and Telstra) together with new connections; provision of 6 new access points along the corridor; with a total of 36 for the project; and six construction compounds, located typically within the rail corridor or at stations.

Construction of the ETTT would take approximately 45 months to complete and will require approximately 17 closedown periods to construct (**Figure 2.10**). The proponent will take advantage of routine shutdown periods that have been forecast at least 12 months in advance.

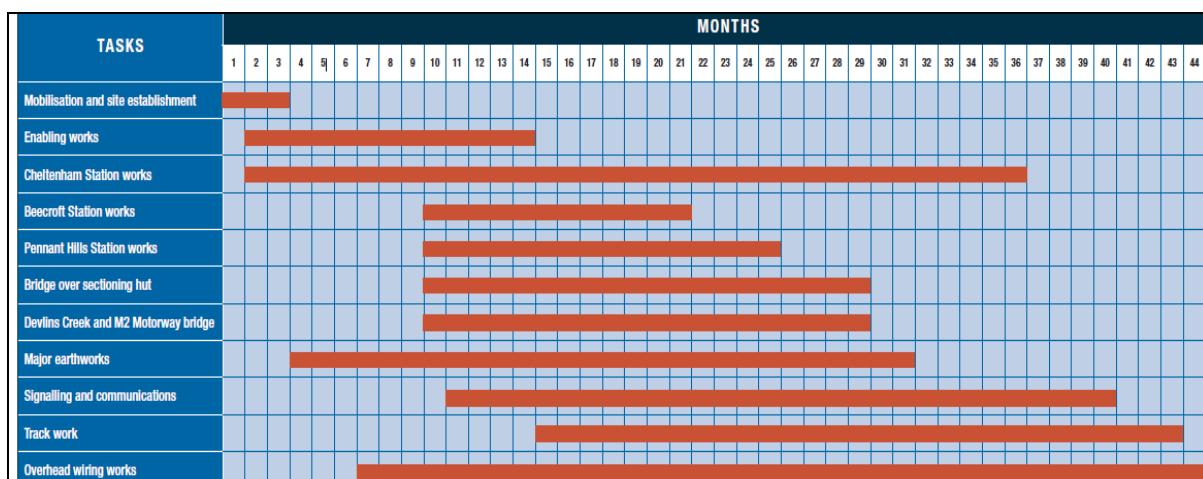


Figure 2.10: indicative program for construction works

2.2. Project Need and Justification

The Department considers that the ETTT proposal will alleviate a critical local bottleneck in the rail network between Epping and Hornsby that currently impacts on freight and passenger network efficiencies on the Main North Line. A considerable policy framework addressing NSW freight efficiency and infrastructure demonstrates the need for the proposal.

Currently, the freight rail task on the east coast is low, with the majority of freight transported by road. With freight volumes between Melbourne, Sydney and Brisbane increasing at approximately 4% per annum, heavy vehicles are predicted to double on key highways every 15-20 years unless the freight rail capacity is increased. The Main North Line between Strathfield and Newcastle is forecast to be at capacity by 2015 during the core interstate container freight transport period (4am to 10pm), therefore network expansion is required to meet this demand. Additional demand is further expected due to market response to increased freight rail capacity, rising energy costs, and increased population and economic growth.

Between Pennant Hills and Thornleigh there is a lack of suitable passing loops (an overtaking section of track) that can accommodate modern freight trains of up to 1500m in length. In addition, holding points are required closer to Hornsby which will facilitate improvements in the operational complexities around Hornsby station. The ETTT will provide a closer holding point within 4km of Hornsby as opposed to the current location at Epping that is 11km distant and located on an incline.

There are several other factors that contribute to insufficient capacity for freight and passenger movement along this corridor. These include the steep topography of the alignment, junctions causing delays at critical locations, and passenger services that restrict freight access during peak periods. The assessment indicates that this has a detrimental impact on passenger trains, as faster passenger services are sometimes delayed by slower freight trains negotiating the steep topography of the area.

Currently, NSW rail operators are unable to fulfil container freight demand for afternoon departures and early morning arrivals. This is mainly due to restrictions on access through the Sydney metropolitan rail network as legislation grants priority to passenger services during peak periods. The addition of the third track between Epping and Thornleigh stations will reduce the interaction between freight and passenger rail along this section of the network providing improved freight and passenger capacity and efficiency.

Northern Sydney Freight Corridor Program

The ETTT proposal is a key component of the Northern Sydney Freight Corridor (NSFC) Stage 1 program, which will enable new freight rail infrastructure projects, such as the Southern Sydney Freight Line, to realise the full system wide capacity of the network. The NSFC is shown in **Figure 2.11**.

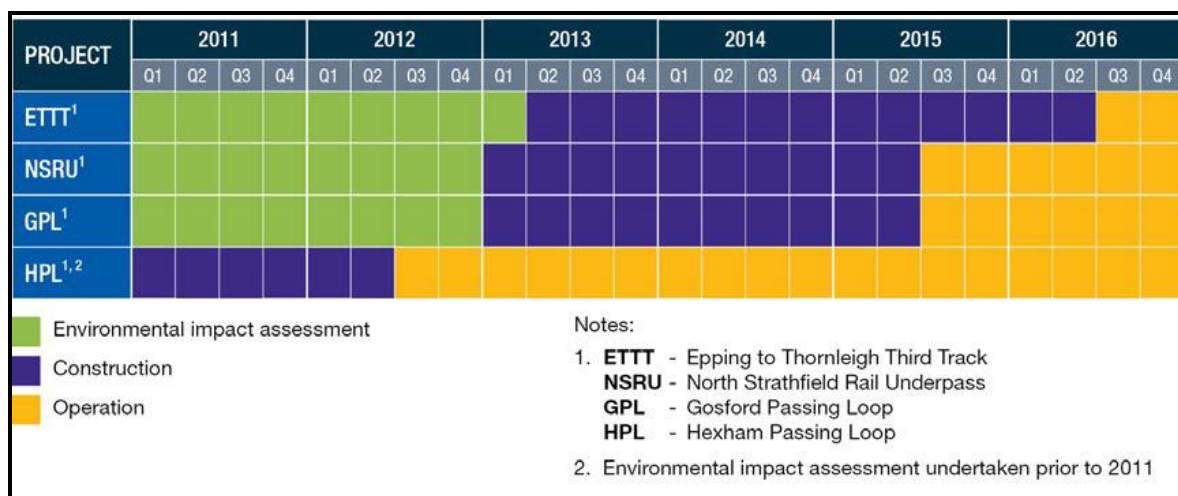


Figure 2.11: Indicative program for the NSFC (stage 1) proposals

The NSFC program is being managed by representatives of Australian Department of Infrastructure and Transport, Australian Rail Track Corporation (ARTC), TfNSW and RailCorp, and is a jointly funded initiative between the Commonwealth and NSW state governments.

The NSFC program (Stage 1) is a \$1.1 billion suite of rail infrastructure upgrades designed to improve access and reliability for freight trains travelling between North Strathfield and Broadmeadow on the Main North Line. In addition to the ETTT proposal, the program includes:

- a rail freight underpass at North Strathfield;
- passing loops at Gosford; and
- a passing loop at Hexham (completed).

According to the NSFC strategic report, freight rail currently has a very low share of interstate container markets, particularly along the Sydney to Brisbane route. By enhancing the capacity of the Main North Line rail network, the NSFC program will allow rail to compete with road transport for certain types of freight. This will provide benefits associated with freight rail haulage such as reduction in freight costs, reduction in road maintenance, road safety and decreased pollution.

The NSFC Program will contribute to the provision of a more efficient rail network on the east coast between Melbourne, Sydney and Brisbane. Implementation of this program is expected to result in:

- removal of more than 200,000 heavy vehicle trips per annum on key roads within 15 years of opening;
- reduction in energy consumption with an estimated 40 million litres less fuel consumed as a consequence of the decrease in heavy vehicle trips, providing a subsequent reduction of 100,000 tonnes per annum in greenhouse gas emissions;
- reduction of road maintenance costs as well as improved road safety as a result of fewer heavy vehicle movements;
- provision of capacity to meet forecast interstate container freight demand until approximately 2028; and
- an increase in northbound container freight capacity during the core freight period (4am to 10pm) from seven to 16 paths per day.

An economic appraisal was undertaken for the four proposals that are included in the NSFC Stage 1 program, in accordance with the Australian Transport Council National Guidelines. The assessment concluded that the benefit to cost ratio for the NSFC program was 3:1 at a 7% discount rate with the inclusion of wider economic benefits. The Department considers that investment in these four proposals is considered necessary as, without such investment, rail freight volumes would decrease as rail freight would be out competed by road freight, with the associated higher costs passed on to consumers. The investment in these four proposals would also ensure that other freight rail infrastructure proposals along the east coast rail network are fully realised.

The program would relieve a critical bottleneck on the East Coast rail network, create a more efficient freight rail network connecting Australia's three largest cities, facilitate national productivity improvements and increase the reliability and capacity for passenger rail services on sections of the Main North Line.

Consistency with Policy Framework

The proposal is consistent with several key strategic plans and policies released by the State and Commonwealth governments to accommodate the expected future growth and development of Sydney and the NSW economy. Plans and strategies relevant to this project are summarised by **Table 2.2** below.

The NSFC program is identified specifically in the National Land Freight Strategy, the Nation Building Program, the NSW Long Term Transport Master Plan, the Draft NSW Freight and Ports Strategy and NSW 2021. The proposal is compatible with the goals and stated aims of these plans, as it represents initiatives to accommodate forecast growth and development of the NSW economy and to address inefficiencies in the road and rail network, reduces road congestion, promotes energy efficiency, separates passenger and freight services and expands freight and passenger network capacity in line with community expectations.

The Department believes that the Epping to Thornleigh Third Track proposal is justified on the basis that it represents a vital infrastructure asset which is beneficial to public interests. The impacts of not proceeding with the project in the long term would prove detrimental to road safety, passenger and freight rail capacity and the continued growth of the NSW economy.

Table 2.2: Policy framework relating directly to the NSFC program

Commonwealth and State transport strategies	Policy overview	Objective satisfied
Draft Freight and Ports Strategy (State)	Currently under development. The policy involves the creation of strategic action areas and will outline how NSW state governments will meet freight challenges over the following 20 years via freight movement efficiency improvements and informing government and private sector investment decisions across all modes.	The NSFC is a critical link in the movement of interstate freight and also supports important passenger movements, as well as domestic coal movements to power stations on the Central Coast. The NSFC will maintain the policy of separating freight and passenger rail to achieve operational efficiencies for both.
Nation Building Program (Commonwealth)	Commonwealth funding for national and regional economic and social development via provision of improved land transport infrastructure.	The NSFC is identified as a key project of this program, as discussed in the "Sydney's Freight Bottleneck" factsheet.
NSW 2021 (State)	This is a 10 year plan focused on upgrading the economy, services, infrastructure and government accountability as well as	The NSFC is consistent with several goals of this policy, including increased investment in rail infrastructure, increased

Commonwealth and State transport strategies	Policy overview	Objective satisfied
	strengthening the local environment and the economy. The plan is based around five strategies - the third of which is Infrastructure Renovation - with 32 goals.	efficiency of freight movement through ports, reduced passenger and freight travel times and reduced road congestion.
National Land Freight Strategy (Commonwealth)	National discussion paper that provides an indicative list of projects and programs that Infrastructure Australia has flagged for inclusion in a long term national land freight network plan.	The NSFC is consistent with the key long term goals of this strategy, including, the development of efficient, sustainable freight logistics, and to improve the efficiency of freight movements across infrastructure networks nationally.
NSW Long Term Transport Master Plan (State)	Guiding transport planning and policy document to address transport challenges over next 20 years. Supports goals in <i>NSW 2021</i> , the <i>Metropolitan Strategy for Sydney</i> , the <i>State Infrastructure Strategy</i> , and national plans such as Infrastructure Australia's National Land Freight Strategy.	NSFC is specifically identified as a short to medium term solution to delivering freight network efficiency in NSW.
Draft Metropolitan Plan for Sydney (State)	This plan, currently under review, will provide strategic transport planning outcomes for residents and businesses of Sydney. The policy states that improvements to the Main North Line are a "Metropolitan Priority" for the North sub-region.	The proposal would allow for more efficient freight and passenger train interaction, and will improve the capacity of the Main North Line.
Sydney's Rail Future – Modernising Sydney's Trains (State)	This policy is a long term (20 year) plan aimed at improving the capacity and frequency of Sydney's passenger trains which will ultimately enable the network to carry an additional 100,000 people per hour during the peak. The plan is also an integral part of the NSW Long Term Transport Master Plan.	The completion of the NSFC is recognised as one of the key tasks for improving Tier 3: Intercity services.

Alternatives considered

The Proponent undertook a thorough options selection process to examine ways of alleviating constraints of the Sydney to Newcastle freight rail network, including creating additional tracks, passing loops, signalling upgrades, tunnels and underpasses. Nineteen projects were shortlisted from a group of 57 options, based on the proviso that a short term solution was required given the immediate capacity constraints of the network. Fifteen of these options were considered feasible only in the longer term and were therefore discounted due to funding restrictions, whilst the remaining four were selected as stage 1 inclusions in the NSFC program.

A preferred long term option examined was quadruplication of the line between Epping and Thornleigh, providing two lines each for passenger and freight services. However, this was considered feasible only if all nineteen additional proposed options were progressed, and was therefore discounted due to significant cost and time constraints. Further, modelling predicted that

the quadruplication option was not required until well into the future. Options that included construction footprints external to the rail corridor were also discounted as short term solutions, due to the considerable environmental, planning and community impacts as well as costs associated with land acquisition.

Another long term option considered was an M2 to Hornsby twin rail tunnel. It was not considered feasible at this time without full electrification of the Sydney to Brisbane rail corridor, which has considerable time and financial constraints. It was further discounted due to the expected dangerous concentrations of diesel fumes in the tunnel which creates significant safety concerns.

The stage 1 program was selected as a streamlined and cost effective method to provide short term (15-20 years) gains to freight network efficiency on the Main North Line, but which the provision of would not preclude future potential long term and large scale infrastructure upgrades from proceeding. The four projects chosen will build capacity in the core freight period, will be achieved with the least time and cost, and can provide sufficient rail network capacity to satisfy forecast interstate container rail freight until approximately 2028.

If the proposal was not to proceed, the Main North Line between Strathfield and Broadmeadow would reach capacity by 2015, which would result in a substantial increase in freight transported by road resulting in rising costs and impacts to road safety. The Proponent believes that given funding and time constraints, the stage 1 option that includes the Epping to Thornleigh third track proposal will provide the greatest benefit for the minimum construction time frames and environmental, economic and social impacts.

3. STATUTORY CONTEXT

3.1. State Significant Infrastructure

In January 2012, a State significant infrastructure application was submitted by TfNSW. The application was accompanied by a supporting document that stated the Proponent considered the proposal could have a potentially significant environmental impact and therefore would provide the Minister with an environmental impact statement.

Clause 1(1), Schedule 3 of *SEPP (State and Regional Development) 2011* applies to general public authority activities and states that:

Infrastructure or other development that (but for Part 5.1 of the Act and within the meaning of Part 5 of the Act) would be an activity for which the Proponent is also the determining authority and would, in the opinion of the Proponent, require an environmental impact statement to be obtained under Part 5 of the Act.

The ETTT is classified as a State significant infrastructure project under Part 5.1 of the *Environmental Planning and Assessment Act 1979* (EP&A Act) because it is declared State Significant Infrastructure (SSI) by a State Environmental Planning Policy (SEPP).

Since the Proponent is also the determining authority and has concluded that an Environmental Impact Statement (EIS) is required in accordance with Section 112(1) of the EP&A Act, approval from the Minister for Planning and Infrastructure in accordance with Section 115W of the EP&A Act is required under Part 5.1 of the EP&A Act.

3.2. Permissibility

The ETTT proposal is defined as a rail infrastructure facility under *State Environmental Planning Policy (Infrastructure) 2007* (Infrastructure SEPP). As a rail infrastructure facility being carried out by a public authority it is identified as development that is permissible without consent under clause 79 of the Infrastructure SEPP.

The majority of the ETTT is located within Hornsby Local Government Area (LGA) with the exception of the northern end of Epping Station that is situated within Parramatta LGA.

3.3. Environmental Planning Instruments

With the exception of the Infrastructure SEPP and SRD SEPP, there are no State Environmental Planning Instruments that apply to the carrying out of the ETTT project.

3.4. Objects of the EP&A Act

Decisions made under the EP&A Act must have regard to the objects of the Act, as set out in Section 5 of the Act. The relevant objects are:

- (a) *to encourage:*
 - (i) *the proper management, development and conservation of natural and artificial resources, including agricultural land, natural areas, forests, minerals, water, cities, towns and villages for the purpose of promoting the social and economic welfare of the community and a better environment,*
 - (ii) *the promotion and co-ordination of the orderly and economic use and development of land,*
 - (iii) *the protection, provision and co-ordination of communication and utility services,*

- (iv) *the provision of land for public purposes,*
- (v) *the provision and co-ordination of community services and facilities, and*
- (vi) *the protection of the environment, including the protection and conservation of native animals and plants, including threatened species, populations and ecological communities, and their habitats, and*
- (vii) *ecologically sustainable development, and*
- (viii) *the provision and maintenance of affordable housing, and*
- (b) *to promote the sharing of the responsibility for environmental planning between the different levels of government in the State, and*
- (c) *to provide increased opportunity for public involvement and participation in environmental planning and assessment.*

The objects stipulated under Section 5 of the EP&A Act are significant factors informing the determination of the application. The Department, in its assessment, has considered the appropriate management and conservation of natural and artificial resources, including natural water resources, flora and fauna, and towns and centres for the purpose of promoting the social and economic welfare of the community. The Department has also considered the proposed project in relation to the orderly development of land, the protection of communication and utility services, the co-ordination of community services and facilities, and the protection of the environment.

Object 5a(v) is relevant as the project involves the provision and co-ordination of community services and facilities via the improvement of key rail infrastructure and associated station works, which will provide more efficient passenger rail services, alleviate truck congestion on roads and reduce public costs in maintaining road infrastructure.

Object 5(c) is also relevant to the project as the issues raised by the community during the exhibition period of the EIS form part of the assessment of the project and the Department's assessment in **Section 5**.

3.5. Ecologically Sustainable Development

The EP&A Act adopts the definition of Ecologically Sustainable Development (ESD) found in the *Protection of the Environment Administration Act 1991*. Section 6(2) of that Act states that ESD requires the effective integration of economic and environmental considerations in decision-making processes and that ESD can be achieved through the implementation of:

- (a) *the precautionary principle,*
- (b) *inter-generational equity,*
- (c) *conservation of biological diversity and ecological integrity,*
- (d) *improved valuation, pricing and incentive mechanisms.*

The principles of ESD have been addressed in the EIS prepared by the Proponent. The EIS includes detailed studies in the form of Technical Papers, commissioned by the Proponent in the areas of construction traffic and transport, construction noise and vibration, European heritage, Indigenous heritage, ecology, surface water and hydrology. The results of these studies have been summarised and integrated in the body of the EIS to ensure that the principles of ESD have been adequately addressed as part of the assessment of the project. The Proponent has set out a series of mitigation and management measures that would be implemented during the project. These measures would be reviewed and augmented where necessary during construction and operation.

On this basis, and the Department's assessment of key issues is outlined in **Section 5** and based on this assessment the Department is satisfied that the proposal promotes the principles of ESD.

3.6. Environment Protection and Biodiversity Conservation Act

On 22 February 2013 the Proponent referred the proposal to the Department of Sustainability, Environment, Water, Population and Communities (SEWPaC) for consideration under the *Environment, Protection and Biodiversity Conservation Act (EPBC Act)*. The proposal was displayed on the SEWPaC website for 20 days, upon which a delegate for the Commonwealth Minister decided that the project would not require additional assessment under this Act.

4. CONSULTATION AND SUBMISSIONS

4.1. Exhibition

Under section 115Z (3) of the EP&A Act, the Director-General is required to make the EIS publicly available for at least 30 days. After accepting the EIS, the Department publicly exhibited it from 19 September 2012 until 5 November 2012 on the Department's website, and at the following exhibition locations:

- Department of Planning and Infrastructure, Information Centre;
- Hornsby Council's principal office;
- Parramatta Council's principal office;
- Nature Conservation Council of NSW;
- Transport for NSW;
- Pennant Hills Library; and
- Epping Library.

The Department also advertised the public exhibition in the Sydney Morning Herald and The Daily Telegraph on Wednesday 19 September 2012 and Hornsby and Upper North Shore Advocate and Northern Districts Times on Thursday 20 September 2012. The Department also notified relevant state and local government authorities in writing.

4.2. Submissions

The Department received 426 submissions during the exhibition of the EIS (including 15 third-party submissions) from the community and 6 submissions were received from government authorities. A summary of the issues raised in submissions from government authorities is provided at **Table 4.1** below. It should be noted that a submission was not received from Parramatta City Council.

Table 4.1: Summary of issues raised by public authorities

Authority	Comments
<i>Office of Environment and Heritage</i>	<ul style="list-style-type: none"> • Supports the identification of reduced biodiversity impacts during detailed design and construction; • Identified additional mitigation measures for the Eastern Bent Wing Bat; and • In general supports the Biodiversity Offset Strategy but noted that the biodiversity values at the offset site at Seven Hills do not match the values that will be impacted by the proposal, in regards to Blue Gum High Forest.
<i>Environment Protection Authority</i>	<ul style="list-style-type: none"> • Insufficient information regarding noise modelling assumptions and concern with forecast train numbers; • Requirement for predicted noise levels to be reported separately for passenger and freight trains; • Assessment of horn noise, predicted braking and bunching noise levels is required; • Information regarding noise mitigation measures that are feasible and reasonable to implement should be included; • Requirement for the PA system at Cheltenham Station to be designed and installed in accordance with best practice for public address systems; • Out of hours construction activities and sleep disturbance impacts; • Potential noise and vibration impacts from blasting; • Impacts of groundwater discharge and the management of dirty water; • An assessment of the potential cumulative impact of construction traffic

Authority	Comments
	<p>noise is required, together with a discussion of potential mitigation and management measures; and</p> <ul style="list-style-type: none"> • Further information on land contamination is required.
<i>NSW Health</i>	<ul style="list-style-type: none"> • Expressed concern on the impacts of sleep disturbance and the effects of noise on human health and stress; • Effective and ongoing community consultation is required; • More information is required on proposed noise mitigation; and • Proponent should commit the project to specific noise goals.
<i>NSW Heritage Council</i>	<ul style="list-style-type: none"> • Requested interpretation of Beecroft Rail Station heritage; • Requested appropriate mitigation measures to be implemented to reduce impacts on Devlins Creek causeway; and • Requested review of CEMP to comment on how the proposed mitigation measures will be implemented.
<i>Hornsby Shire Council</i>	<ul style="list-style-type: none"> • Project Design issues relating to landscaping, impacts on parks and the upgrading of Beecroft station; • Visual impacts during construction; • Parking and road network impacts and the inclusion of cycle paths along the length of the proposal; • Noise impacts on Beecroft Scout Hall; • Heritage impacts, including impacts to Cheltenham station and the Beecroft/Cheltenham Heritage Conservation Area; • Council and the community must have an opportunity to comment on the urban design and landscape strategy for the proposal; and • Council does not consider the offset measures in the biodiversity offset strategy to be suitable.
<i>Department of Primary Industries</i>	<ul style="list-style-type: none"> • Works with the potential to intercept or extract groundwater require licensing prior to the activity commencing; and • Relevant works be undertaken in accordance with NSW Office of Water's Guidelines for Controlled Activities.

Of the 426 submissions from the community, the Department received submissions from a number of special interest groups, including businesses, recreation and sporting clubs, schools, community interest groups, resident interest groups, and transport interest groups. Of the total number of submissions received, 92% objected to the proposal, 2% supported the proposal and 6% provided general comment.

Two types of pro-forma submissions objecting to the proposal were received, which accounted for 275 of the 426 community submissions or 65% of all submissions. Both pro-forma submissions contained similar issues, including

- comment on the lack of government regulation of noise and pollution impacts;
- health impacts to the community arising from sleep disturbance and increased coal dust;
- unsympathetic development of the Beecroft Cheltenham Conservation Area;
- inadequate assessment of the heritage values of the area;
- impacts to amenity from vegetation clearing; and
- questioned the proposal's justification.

A petition signed by 582 people was included as one submission. The petition raised several issues regarding the ETTT proposal, including:

- poor project justification and value for money;
- acute noise, air, visual amenity, traffic, access and local business impacts;
- subsequent health impacts from all phases of the proposal;
- detrimental impacts to property values;
- vegetation removal; and
- poor community consultation.

The key issues raised in public submissions are listed in **Table 4.2**.

Table 4.2: Summary of Issues Raised in Public Submissions

<i>Issue</i>	<i>Summary of Issue</i>	<i>Proportion of submissions (%)</i>
Noise	Submissions raised issues of excessive existing noise levels, inadequate mitigation of operational noise impacts, impacts to health from excessive noise, and inadequacy of the acoustic assessment.	89
Project justification and scope	Submissions discussed poor economic justification for the project, perceived benefit to private companies, lack of costing information, preference for track quadruplication, and the potential increase of congestion on roads.	86
Heritage (Aboriginal and Cultural)	Submissions in general raised concern regarding inadequate assessment of local heritage values, railway station upgrades unsympathetic to heritage values, loss of screening vegetation, and minimal detail on aboriginal heritage assessment.	78
Socio-economic	Submissions included perceived negative impacts to amenity, access, community health, impacts to parks and private land and decreasing land values.	78
Operational	Submissions in general raised concern regarding lack of regulatory control on rolling stock, project externalities, lack of commitment to regulate operators, and the proximity of new track to houses.	77
Ecology	Submissions discussed concern at the removal of endangered ecological communities, inadequate biodiversity assessment and offsets strategy.	75
EIS adequacy	The submissions generally mention that the document does not consider all aspects affecting the community, and the lack of thorough analysis.	74

4.3. Response to Submissions

The Proponent's Response to Submissions Report provided information and assessment on four minor changes to the proposal. These amendments include:

- an increase in construction impact area and vegetation removal in some areas, and a decrease in others;
- re-alignment of the Pennant Hills pedestrian footbridge;

- changes to the construction methodology for the Chapman Avenue overbridge which will require its closure for several weeks; and
- the construction of an extension to the previously proposed culvert at Wongala Crescent to enable a future cycleway link.

Whilst the resulting design changes will result in slight amenity impacts and minor increase in vegetation clearing, the Department considers the resultant impacts are minor in scale and are not considered to introduce significant additional impacts that are outside the scope of the EIS.

The Department has considered the issues raised by agency, council and community submissions in its assessment of the project in **Section 5**.

5. ASSESSMENT

In assessing the merits of the project, the Department has considered:

- the EIS, submissions and the Submissions Report on the project;
- the Proponent's revised management and mitigation measures;
- the relevant environmental planning instruments, guidelines and policies; and
- the objects of the EP&A Act, including the object to encourage ecologically sustainable development.

The Department considers the key issues of the assessment relate to:

- noise and vibration;
- heritage;
- visual amenity;
- ecology; and
- traffic, transport and access.

5.1. Noise and Vibration

The EIS includes a noise impact assessment undertaken in accordance with the *Interim Construction Noise Guideline* (ICNG) (DECC, 2009), the *Road Noise Policy* (OEH, 2011) and the *Interim Guideline for the Assessment of Noise from Rail Infrastructure Projects* (IGANRIP) (DECC, 2007).

The existing noise environment varies along the length of the rail corridor. The existing rail corridor includes a range of land uses, although it is dominated by low-density residential development and commercial/retail development associated with railway stations. A number of heritage items also occur in close proximity to the rail corridor, as well as, educational land uses, community centres, places of worship, outdoor active and passive recreational areas.

The study area was divided into ten noise catchment areas. Operator attended and unattended noise monitoring was undertaken at four locations which defined the background noise environment considered to be representative of the rail corridor. The results of noise monitoring are outlined in **Table 5.1**.

Table 5.1: Results of Unattended Noise Monitoring

Location	Distance to closest track (m)	Noise level (dBA)					
		Day		Evening		Night	
		RBL	L _{Aeq}	RBL	L _{Aeq}	RBL	L _{Aeq}
L1 – 32 Cambridge St, Epping	50	51	63	48	62	39	60
L2 – 20 The Crescent, Cheltenham	44	49	58	38	56	34	57
L3 – 57 Wongala Crescent, Beecroft	50	42	67	41	61	38	62
L4 – 16 Yarrara Rd, Pennant Hills	48	51	62	48	59	40	56

Source: Table 9.3 of the Epping to Thornleigh Third Track EIS, 2012

Notes:

1. Day: 7am to 6pm Monday to Friday and 8am to 1pm on Saturday;
2. Rating Background Level (RBL) and L_{Aeq} noise levels were obtained using the calculation procedures documented in the *NSW Industrial Noise Policy* (EPA 2000)

The construction NML's adopted for the project for the identified catchment areas for residential and non-residential receivers are summarised in Table 5.2.

Table 5.2: Construction Noise Management Levels

Noise catchment area	Logger	Receiver Type	Noise Management Level (NML) ($L_{Aeq(15 min)}$)			
			Standard Construction Hours ^{1, 2}	Out of Hours Works ³		
				Day ⁴	Evening ⁵	Night ⁶
1 (east) and 1 (west)	L1	Commercial	70	70	-	-
2 and 3 (east) and (west)	L1	Residential	61	56	53	44
4 and 5 (east) and (west)	L2	Residential	59	54	43	49
6 and 7 (east) and 7 (west)	L3	Residential	52	47	46	43
6 (west)	L3	Commercial	70	70	-	-
8 and 10 (east) and 9 and 10 (west)	L4	Residential	61	55	53	45
8 (west) and 9 (east)	L4	Commercial	70	70	-	-

Source: Table 9.5 of the Epping to Thornleigh Third Track EIS, 2012

Notes:

1. Standard day construction hours: 7am to 6pm Monday to Friday and 8am to 1 pm on Saturday;
2. NML for standard construction hours: RBL + 10 dBA;
3. NML for out of hours works: RBL + 5 dBA;
4. Out of hours day: 7am to 8am and 1pm to 6pm Saturday; 8am to 6pm Sunday;
5. Evening period: 6pm to 10 pm;
6. Night period: 10pm to 7am, except Sunday morning when night is extended to 8am.

Measurements of train passby noise were also undertaken and included both passenger and freight trains. Attended noise measurements were taken at the same locations described above and the noise levels were used to quantify the noise environment in the vicinity of the noise monitoring locations.

Potential noise and vibration emissions were modelled for these catchment areas for the project and the resultant predictions compared against defined criteria. The Department and the EPA are satisfied with the methods used to calculate the relevant noise levels for the project, that the noise criteria have been developed in accordance with applicable policies and guidelines and that the modelling is sufficiently conservative such that the predictions represent a worst case scenario.

The project would generate noise and vibration from both the construction and operational stages, including noise from construction related traffic as described below.

Construction Noise

Construction noise impacts have been assessed in accordance with the ICNG. For residential receivers, a NML of RBL + 10 dBA $L_{Aeq(15 minute)}$ has been assigned for construction activities during standard daytime hours and RBL + 5 dBA $L_{Aeq(15 minute)}$ for out of hours works. NML's for other sensitive receivers (e.g. educational uses or places of worship) have been applied in accordance with the ICNG and apply when the property is being used.

The expected plant and equipment to be used during construction was used to predict construction noise levels at the nearest residential and sensitive receivers. A summary of the predicted worst case noise exceedances is provided in **Table 5.3**.

Table 5.3: Predicted Range of Worst Case Exceedances of Construction Noise Management Levels

Modelling Scenario	Standard Construction Hours Daytime (L_{Aeq} (15 min))	Out of Hours Works L_{Aeq} (15 min)			Sleep Disturbance Screening Criteria ($L_{A1(60\text{ secs})}$)
		Day	Evening	Night	
Piling works	0-18	0-23	10-27	15-35	13-33
Bulk excavation works	0-27	0-32	25-37	28-41	28-39
Embankment construction and temporary earthworks	0-18	3-23	6-29	15-34	17-32
Retaining walls	3-22	7-27	18-31	21-37	19-35
Access roads	0-20	0-25	15-29	19-33	17-31
Bridge and viaduct	0-11	0-16	8-19	17-28	15-26
Bridge strengthening	0-11	0-16	0-27	8-31	6-29
Drainage works (i.e. culverts)	2-25	7-30	10-35	19-39	17-37
Station works	0-15	0-20	4-31	12-35	10-33
Tracks and turnouts	3-22	6-27	11-30	19-38	17-36
Track laying	5-25	5-30	20-34	29-39	27-37

Source: Table 9.7 of the Epping to Thornleigh Third Track EIS, 2012

Table 5.3 shows that the predicted construction noise levels will exceed the NML's at residential receivers within each noise catchment area. Calculations within the EIS also show that predicted construction noise levels will exceed NML's at sensitive receivers along the rail corridor with exceedances of between 3-25 dBA likely at educational use receivers, 20-28 dBA at the two community centres (Pennant Hills and Beecroft), 2-14 dBA at places of worship and 3-17 dBA at outdoor recreational areas, with the Beecroft Village Green being the most impacted.

It is recognised that it is not possible to minimise construction noise levels to achieve the NML's due to the nature and character of the construction works required (i.e. linear infrastructure in an urban environment in close proximity to residential receivers), which is why the approach of the ICNG is that when unavoidable noise impacts are to occur, they are required to be managed rather than completely mitigated.

The *Construction Noise Strategy (Rail Projects)* (TfNSW, 2011) provides guidance on how construction noise and vibration impacts can be managed through the application of feasible and reasonable measures. For this project, a suite of measures would be utilised including but not limited to:

- community consultation;
- site inductions;
- the preparation of site specific construction noise and vibration management plans;
- noise and vibration monitoring;
- scheduling works so that high noise activities are undertaken during less sensitive time periods;
- provision of respite periods;

- planning works to reduce reversing movements; and
- fitting of non-tonal reversing beepers on construction vehicles and mobile plant.

The EIS also states that due to the assessment indicating potential for significant exceedances at a number of sensitive receivers, additional measures would be implemented to reduce impacts and these would be defined in noise management plans.

Construction activities also have the potential to generate ground-borne vibration and equipment such as rockbreakers, jackhammers, excavators and vibratory rollers are the main types of vibration-intensive plant. The EIS states that construction vibration is expected to be below the cosmetic damage criteria, however, ground-borne vibration generated during the use of the heaviest plant may exceed the recommended vibration levels for human response. Due to the number of heritage-listed items in close proximity to the rail corridor, further assessment would be undertaken during the detailed design stage once the existing building condition and site-specific construction activities are known.

Of the 426 submissions received only a relatively small number of submissions commented on construction noise associated with the project, with the majority more concerned with existing noise and operational noise (discussed later in this section). As part of the Response to Submissions Report, the Department considers that the Proponent adequately addressed the comments raised in submissions in relation to construction noise and notes that a separate addendum report was also prepared to address construction traffic noise as part of the document. In relation to construction traffic impacts, peak 1-hour construction vehicle movements may result in exceedances of the road traffic noise criteria by up to 1 dBA during the day and up to 6 dBA during the night (specifically for the one hour between 6 am and 7 am). The Proponent has stated that existing traffic noise and potential construction traffic noise impacts would be confirmed during the detailed design stage and the preparation of a Construction Noise and Vibration Management Plan (CVNMP).

The Department supports the Proponent's approach in relation to the management of construction noise and vibration and is satisfied that the management and mitigation measures presented are representative of current best practice. To ensure that construction noise is appropriately managed, and noting that the Proponent has committed to the preparation of a CNVMP, the Department has strengthened this commitment by outlining the specific factors that need to be addressed in the plan which include requiring that detailed noise and mitigation measures be clearly articulated. In addition, the Department has recommended that consideration be given to key noise generating activities, the scheduling of works and respite periods and that the Proponent be required to identify how the noise measures implemented will be monitored and non-compliances rectified.

The Department also understands that while construction works are proposed to be undertaken during standard hours that out of hours works may also be required. The Proponent has not specifically provided justification for works to be undertaken outside standard construction hours, however, the Department recognises that there will be circumstances when flexibility in working hours is warranted (i.e. during a rail possession or for the delivery of materials). The Department has therefore recommended conditions of approval that generally restrict construction to standard hours, that is, 7 am to 6 pm Monday to Friday and 8 am to 1 pm on Saturday, unless certain circumstances exist, and that such activities be only undertaken when absolutely necessary, in recognition of likely NML exceedances. In addition to those outlined above, it is recommended that activities outside these hours are also permitted where the NML's set by the ICNG would be met, where there is a negotiated agreement with affected receivers or the works are approved through an EPL.

Operational Noise

The project is considered to be classified as “redevelopment of an existing railway line” in relation to the noise trigger levels in the IGANRIP. The levels for residential noise sensitive receivers are 65 dBA $L_{Aeq(15 \text{ hour})}$ and 85 dBA L_{Amax} for daytime (7 am to 10 pm) and 60 dBA $L_{Aeq(15 \text{ hour})}$ and 85 dBA L_{Amax} for night time (10 pm to 7 am). In accordance with IGANRIP, an exceedance is considered to be where the abovementioned criteria are exceeded and where an increase of 2 dB or more occurs in the L_{Aeq} in any hour or an increase of 3 dB or more in the L_{Amax} . Non-residential land uses also have specific criteria and these have been documented in Table 9.11 of the EIS.

The project has the potential to result in operational noise impacts from a number of sources, including:

- additional freight train movements;
- the new track being located closer to residential receivers;
- a reduction in the shielding provided by some existing cuttings;
- impact noise from new crossover locations, potentially increasing L_{Amax} noise levels;
- noise associated with trains stopping or stopped at signals (braking, bunching and idling noise); and
- noise from the new public address system at Cheltenham Station.

The number of diesel freight train movements would increase from an average of 20 per day in 2011, to 28 per day in 2016 (with or without the project) and 44 per day in 2026 (or 32 without the project). In 2026, the project would result in an additional 9 freight movements during the day and 3 additional freight movements at night when compared to the “no build” option. The Proponent has stated that the number of passenger trains is not expected to change in the future, with or without the project. The project would result in the average number of night-time freight passbys increasing from the current 9 events per night prior to opening to 18 events per night in 2026 which is less than the forecast 21 events per night in year 2026 without the project.

A number of rail scenarios were modelled to determine the potential operational noise impacts from the project. To assess the noise level increases, predicted noise levels for the “ten years after opening” (year 2026) scenario were compared against the predicted noise levels for the “prior to opening” (year 2016) scenario. The Department notes that existing operational noise levels already exceed the IGANRIP noise trigger levels at a number of residential receivers within the rail corridor during both day and night time periods with some receivers substantially exceeding these levels (i.e. noise catchment areas 2 (east), 4 (west), 7 (west), 8 (east) and 10 (east)). The Proponent has stated that consistent with the IGANRIP, the management of existing noise from current rail operations is not within the scope of the project.

The results of the assessment indicate that after the project opens (year 2016), maximum increases in noise levels are predicted to be up to 2 dBA for receivers located on the western side of the rail corridor. However, an increase in the L_{Amax} of 3.4 dBA is predicted at one residential receiver in noise catchment area 3 as a result of freight trains operating on the new track. The EIS states that L_{Amax} levels would generally reduce slightly for those receivers located on the eastern side of the corridor as a result of freight train movements being located further away from these receivers.

The results for “ten years after opening” (year 2026) show that the project results in average increases of 1.6 dBA during the day and 1.8 dBA during the night on the western side and 0.9 dBA for day and 1.1 dBA for night on the eastern side of the rail corridor. L_{Amax} levels would remain consistent with the after opening scenario with typical predicted increases of up to 2 dBA for those receivers located on the western side. The assessment found that 25 residential receivers would exceed the night time IGANRIP trigger levels in noise catchment

areas 3, 4, 7 and 9 on the western side of the corridor and one receiver would exceed the IGANRIP L_{Amax} level by 3.4 dBA. When compared with the “no build” option, the assessment indicated that noise levels on the western side of the corridor would generally be within 2 dBA of the predicted noise levels in the same year if the project was constructed.

An increase in noise levels of greater than 2 dBA is predicted to occur at a number of sensitive receivers and therefore noise mitigation would need to be considered. These locations include the Emmaus Bible College at Epping, the Arden Anglican School and Primary Campus at Beecroft, Beecroft Scout Hall and the Pennant Hills Library and Community Centre at Pennant Hills.

In relation to vibration, the results of the assessment indicate that the total vibration dose levels are predicted to be below the trigger levels for both day and night time periods. Options that are not considered feasible as they negate the objectives of the project include reduced train speeds, reduced number of trains or train length. Other source control options relating to rolling stock (such as quieter locomotives) are also outside the control of the project but are currently being investigated by TfNSW.

The Proponent stated that on completion of detailed design, a feasible and reasonable review would be undertaken to confirm mitigation measures and has indicated that the provision of concrete ballasted bridges, track lubrication around curves and building treatments are being considered.

Of the 426 submissions received during the exhibition period, noise was the most frequently raised issue of concern with existing noise raised in 341 submissions and operational noise from the project and proposed mitigation raised in 62 and 114 submissions respectively. Many of the comments made in public submissions, however, related to the existing noise already exceeding the trigger levels, unacceptable levels of existing wheel squeal and the number of sleep disturbances that occur on a regular basis. A key concern for the community is the number of noisy freight trains that utilise the line, particularly during the night, and the increase in noisy events in future as a result of the project. Noise and/or vibration was also raised as an issue by the EPA, NSW Health, NSW Heritage Council (in relation to vibration related impacts to the stone causeway at Devlins Creek) and Hornsby Shire Council.

The Department understands that the NSW Government is committed to implementing a comprehensive approach to managing the environmental impacts of noise from the rail system as a whole. Key parts of this approach include a noise abatement program to address existing acute levels of rail noise on a priority basis and rolling stock standards to improve noise and other emissions from these sources, which may include changes to regulation and compliance checking. The Proponent has also made a commitment to examine curve squeal in more detail during the detailed design phase of the project as recent data has identified that noise levels on small radii curves near Beecroft Station are higher than what was assumed in the noise modelling undertaken as part of the EIS. The Proponent has indicated that while an increase in source noise levels would not alter the relative increase as a result of the project, the number of receivers that would experience noise above the noise trigger levels would increase.

The issues that were raised in the submissions have been specifically addressed by the Proponent in its Response to Submissions Report. The Department notes that this report also provided an addendum to the previous noise and vibration assessment and included an additional assessment for the Beecroft Scout Hall; and discussion of the potential impacts of braking, bunching and horn noise as well as the different noise contributions expected from freight and passenger trains within the rail corridor. The addendum report indicates that specific mitigation measures will need to be implemented to reduce noise impacts at the Scout Hall during both construction and operational stages.

As a result of the number of submissions that raised noise as an issue of concern, the Department commissioned an independent peer review of the noise and vibration assessment as well as the Proponent's Response to Submissions Report. The independent peer review was undertaken by Wilkinson Murray, a specialist firm of acoustical and air quality consultants.

The review stated that the rail noise assessment was conducted in accordance with the IGANRIP and that the assumptions used in the noise modelling were satisfactory. The review, however indicated that while the noise assessment presented noise predictions based on the results of a representative location within the noise catchment area, because the representative location was not identified, this diminished the transparency of the assessment and limited the ability to verify mitigation measures, and in particular at-source noise controls.

In relation to noise mitigation, the review stated that while a comprehensive list of options were presented, the discussion of noise barriers was brief. The peer review indicated that even though a noise barrier would probably be limited to a height of 4m, and have a minimal affect on L_{Amax} levels, reduction of L_{Aeq} noise levels, which can often be due to noise at track level, could be achieved.

For the design of noise mitigation along the corridor, the review stated that it would be useful to know the absolute noise levels and the predicted noise level at all houses that face the rail line and recommended that an Operational Noise and Vibration Plan be prepared to further define impacts and mitigation measures and to present the following:

- tabulated noise level predictions, including increases in L_{Aeq} presented to 0.1 dBA precision, at all residences facing the "down" side of the line;
- those predictions should be grouped by catchment; and
- the table should show whether the residence has one, two or more storeys.

Despite the review identifying some faults within the assessment, the Department considers that such faults are not determinative matters and that the independent review considered the construction noise assessment and concluded that the assessment was comprehensive and that the assumptions made were reasonable. As a result, the Department has generally adopted the recommendations of the assessment in its recommended conditions.

Following the receipt of the Response to Submissions Report and the Department's review of the issues raised in relation to noise in the submissions, the Department consulted with the Proponent and its noise consultant to discuss further feasible and reasonable noise mitigation measures that could be implemented as part of the project. Feasible and reasonable mitigation measures that are to be further considered and subject to confirmation during detailed design include:

- relocation of signals;
- gauge face lubricators for curve squeal;
- composite sleepers and alternative rail and fastening systems on the third track (for new sections of track with small radii curves); and
- property treatments, including treating houses on the basis of proximity to curves rather than trigger level exceedances.

Whilst the Department is generally satisfied with the noise assessment and that its consultant's findings and recommendations can be considered and addressed during detailed design, it acknowledges the communities concern in relation to existing noise levels. Whilst this issue generally falls outside the scope of rail infrastructure assessments the Department considers that it is prudent for the Proponent to consider broader corridor noise issues. Consequently, the Department has recommended a number of initiatives to help address noise impacts at its source, as this approach provides for the broader management

and mitigation of noise impacts, which is preferable to property treatments. These initiatives include the Proponent installing gauge face lubricators for curve squeal regardless of the feasible and reasonable noise mitigation review and the development of a Source Noise Monitoring Plan to assist in identifying and managing freight trains and in the development of rail noise initiatives as described above.

In addition and in response to its assessment and the independent noise peer review, the Department has also recommended a number of noise and vibration conditions of approval to minimise operational impacts from the project. These conditions are summarised as follows:

- design and operation of the project (including any stationary facilities) with the objective of not exceeding the air-borne and ground-borne noise trigger levels at existing developments;
- design and operation of the project with the objective of not exceeding the vibration goals for human exposure for existing sensitive receivers;
- the preparation of an Operational Noise and Vibration Review to confirm noise and vibration control measures that will be implemented; and
- an Operational Noise and Vibration Compliance assessment to confirm the predictions of the assessment, the need for recalibration of the noise model and an assessment of the performance and effectiveness of the applied mitigation measures and whether any additional measures are required.

As noted, the Department has carefully considered the issue of noise and vibration impacts, including through the engagement of an independent and qualified professional. The Department considers that the assessment is adequate, and has been carried out in accordance with relevant guidelines and that at a project level, the impacts can be appropriately managed. Notwithstanding, it has recognised the broader issue of existing noise impacts along the corridor and has recommended a number of conditions which will assist in the future management of this issue.

5.2. Heritage

European and Environmental Heritage

The ETTT would pass through an area that contains several locally listed European heritage items and potential archaeological sites. The heritage significance of the area is recognised by the designation of parts of the locality as conservation areas under the *Hornsby Local Environmental Plan 1994*. The European heritage technical report included in the EIS describes the study site as containing 44 heritage listed sites within an area of approximately 50m on either side of the Main North Line rail corridor between Epping and Thornleigh Stations.

The study area bisects the Beecroft/Cheltenham Heritage Conservation Area (including several listed bushland areas) and is adjacent to The Crescent, Pennant Hills Heritage Conservation Area (**Figure 5.1**). Several properties of local heritage significance occur on the western side of the corridor and include properties along The Crescent and the Cheltenham Recreation Club grounds. To the south of the site, the proposal passes over the convict-built stone causeway over Devlins Creek at Epping. The bushland between Beecroft and Pennant Hills Stations is listed on RailCorp's s170 register.

The Department received 331 submissions regarding potential European heritage issues, which are summarised by the following points:

- proposed structures along the rail corridor, in particular the new Cheltenham Station concourse, are out of character for the heritage conservation area;
- impacts to heritage conservation areas are unacceptable;

- vegetation clearance along the corridor is excessive, and may impact on heritage values;
- significant impacts to elements of the Beecroft Station Group; and
- inadequacy of assessment, in particular regarding community consultation.



Figure 5.1: Heritage items within the study corridor

The EIS concludes, through its Statement of Heritage Impacts, that most of the listed heritage items located in the study area would not be directly impacted by the proposal. Thirteen items have the potential to be directly affected; however, the Proponent considers that impacts to the overall heritage significance of these items were identified and are not considered to be significant as the proposal is mostly confined within an established rail corridor.

The assessment identified that impacts will occur to three locally listed areas of bushland proximate to the rail corridor, as removal of trees will occur on these bushland areas. Although given that a band of vegetation will remain, the impacts are expected to be minor.

Impacts are expected at the Beecroft Railway Station group, which is listed on the *Hornsby LEP* and RailCorp's Section 170 register. Potential impacts may arise from replacement of the subway roof and the extension of the heritage listed pedestrian tunnel; partial or complete removal of the disused side platform (1895) within the station; and from excavation and removal of vegetation, including two Bunya pines, within the Beecroft Station Gardens.

The local heritage items located near Cheltenham Station, including the gardens and/or houses at 44-56 The Crescent, have the potential to be impacted by the construction of the new two-story station concourse, and by the removal of trees along the car park edge. This is likely to affect views from these houses to the new concourse, necessitating the need in some cases for buffer planting and screening vegetation to reduce the level of these impacts. The loss of the Bunya pines in the station gardens would have some impact on views toward the park from the rail line, and may affect the aesthetic values of the station precinct, particularly of the gardens themselves. These impacts are expected to be minor, as an additional four Bunya pines are located within the gardens and will remain in situ. The technical paper states that whilst vegetation removal may expose houses along The Crescent to the new station concourse and third track, enough screening vegetation will remain to prevent adverse impacts to the views or settings of these items, and will not significantly impact on the heritage values of gardens and houses.

In its submission, Hornsby Shire Council considers that removal of remnant trees within the Heritage Conservation Areas and heritage listed items will have an adverse and significant impact on the landscape qualities of adjoining streetscapes and the visual catchment of the Beecroft and Cheltenham Heritage Conservation Areas. Council recommended that supplementary and/or replacement planting should be included to mitigate visual impacts, and that alternative options be considered to lessen the impacts on heritage items. The Council agrees with archival recording of the side platform at Beecroft Station prior to removal; however it states that the removal of Bunya Pines in the adjacent gardens constitutes an adverse impact to the visual setting of the station. It further requests that measures are put in place to protect the remaining Bunya pines at the site to ensure that visual and aesthetic impacts on residential streets and the station gardens are minimised.

In regards to the heritage conservation area at Cheltenham, the Council states that the assessment failed to properly describe the impacts to the heritage area from the demolition of the existing station or from the proposed new station. Of particular concern is the lack of landscape and station design plans included in the assessment, and it recommends that community and council be consulted and engaged in the process of finalising these plans.

In its Response to Submissions, the Proponent included information about modifications to the construction impact area that will potentially impact further on European heritage. This includes a greater area of impact to heritage bushland to the south of the project (B1 in **Figure 5.2**), a larger bridge construction footprint that increases risks of impacting the Devlins Creek causeway (B2 and C1 in **Figure 5.2**), and clearing of vegetation potentially impacting the heritage listed house "Ashby" ('E' in **Figure 5.3**).

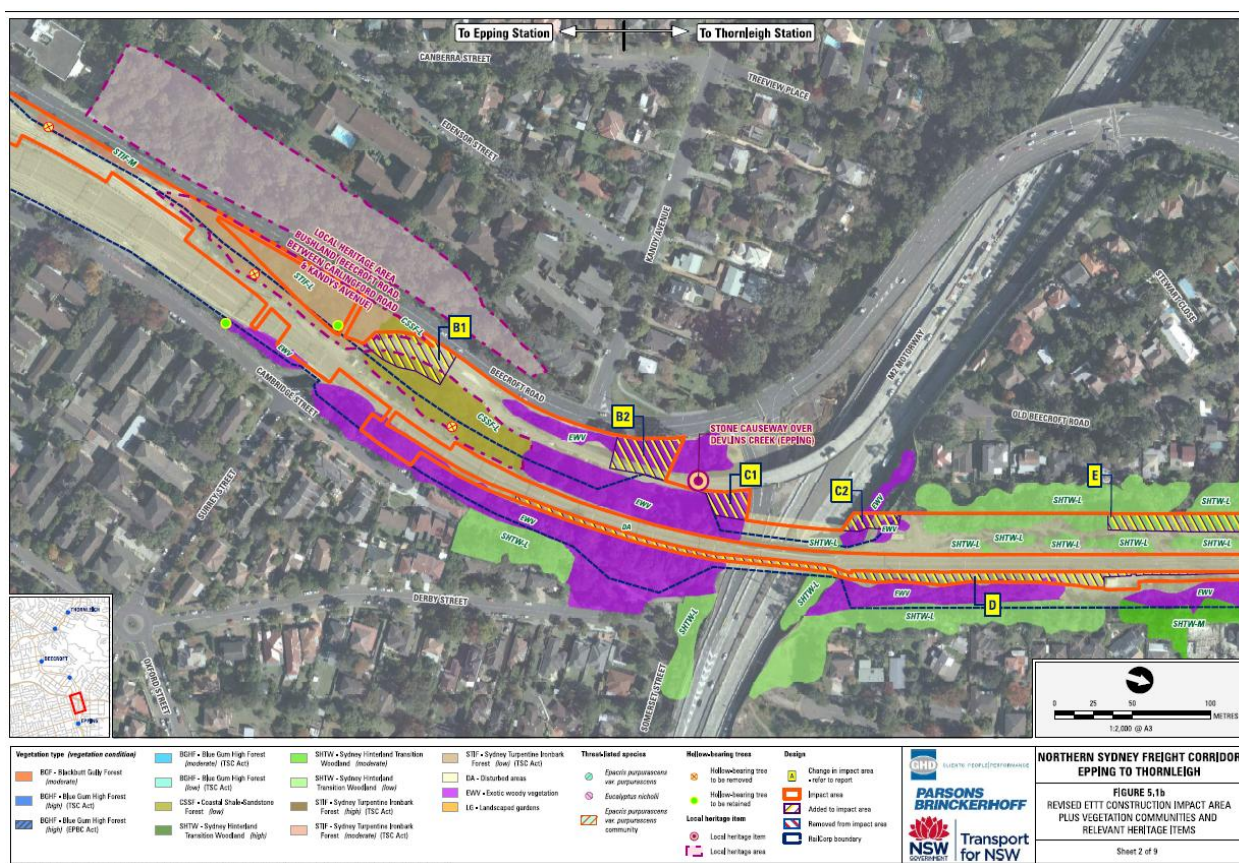


Figure 5.2: proposed additional construction impact areas affecting heritage (B1-Bushland, B2 and C1-Stone Causeway), as outlined in the Response to Submissions report.

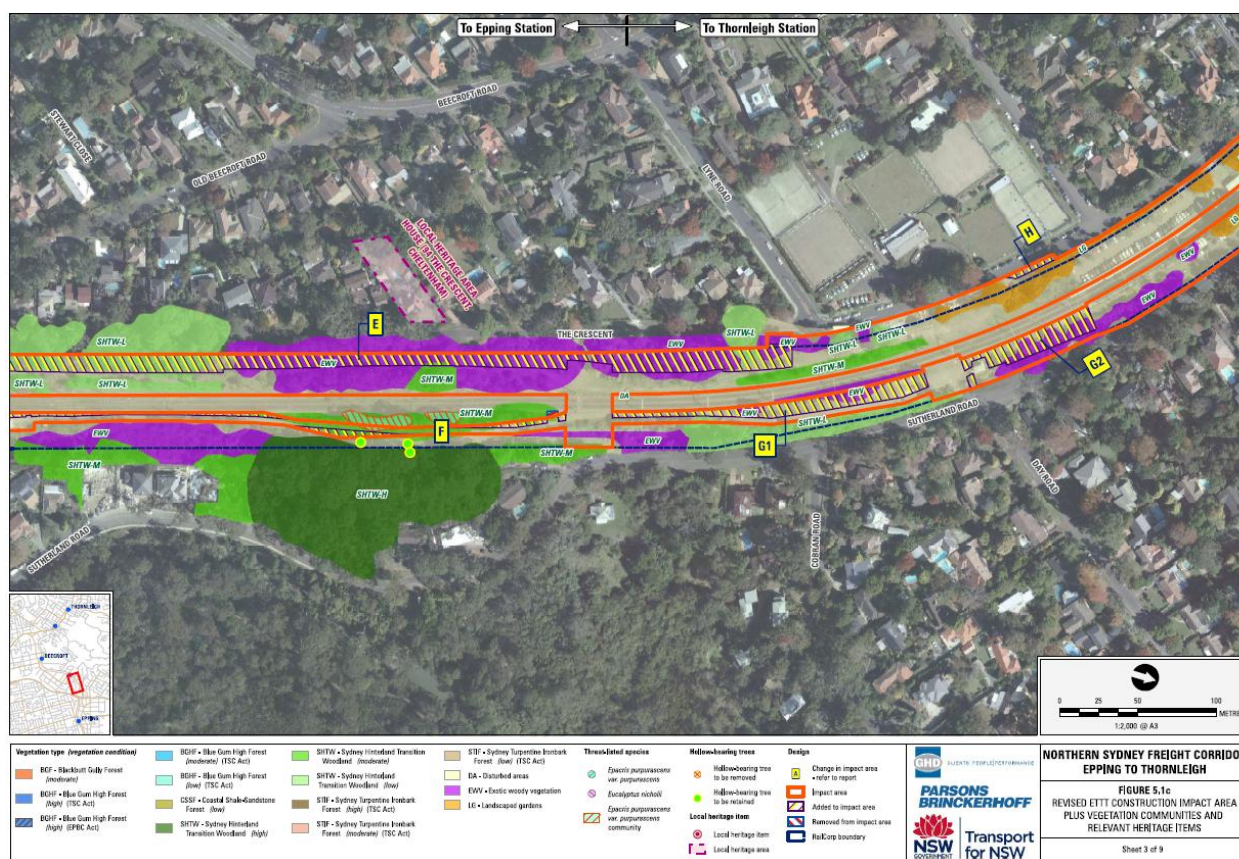


Figure 5.3: Proposed additional construction impact areas affecting heritage (E- “Ashby”).

The proposed design change at area B1 would result in additional impact to the heritage listed "bushland - on the road reserve between Carlingford Rd and Kandy Avenue" (*Hornsby LEP 1 357*), due to increased vegetation clearing on the eastern side of Beecroft Road. The Proponent considers that vegetation removal would be minor and will only involve clearing at the fringes, and will not change the screening capacity that this bushland area provides.

A number of community submissions raised concerns regarding the potential impact on the heritage listed and convict built Devlins Creek causeway from the construction of the rail bridge over the M2 Motorway. In addition, the Heritage Council sought clarification on the environmental management measures proposed to manage vibration damage to the stone causeway, including a recommendation to protect the site from accidental damage via fencing. The Response to Submissions Report states that this site may be under greater threat given the increase to the construction impact area of the bridge design.

The causeway, constructed c1830, is of local heritage significance for its historic and research values, as a rare and significant remnant of the Great North Road, which opened the area for European settlement. The stone causeway over Devlins Creek may potentially extend beneath existing fill on either side of the Creek, and as such its total extent is unknown. These parts of the causeway would be of high archaeological potential as they are likely to have been subject to fewer disturbances than the exposed area and would potentially be better preserved. The concept design for the bridge states that any portions of the causeway that are currently beneath the ground surface would be protected by the existing fill, provided that no excavation is proposed within the area of high archaeological potential.

The Statement of Heritage Impact assessment concludes that given the highly disturbed context of the item, direct impacts to the heritage significance of the stone causeway are unlikely to occur as a result of the proposal. It notes that indirect impacts are possible, with accidental damage potentially occurring from construction machinery, including from vibration impacts, although appropriate mitigation should decrease the likelihood of this occurring.

In light of this, the Proponent undertook a review of the construction methodology for the viaduct and temporary embankment, required as part of the expanded bridge construction, to confirm the adequacy of the environmental management measures proposed for the protection of the causeway. During construction, the causeway will be partially protected by extending the culvert out over the Creek and by the construction of two temporary retaining wing walls extending from the western end of the culvert. The temporary culvert would be constructed from a series of precast concrete arch units, and the proposed embankment would extend over the culvert.

It identified that there are areas of the causeway outside of the protection provided by the culvert and retaining walls; therefore there are potentially exposed areas at risk from damage during construction. To alleviate this, the Proponent proposes to temporarily cover this section with plastic sheeting and then with fill, to mitigate and avoid impacts to the stone work of the structure. Should excavations be required in the vicinity of the causeway, a suitability qualified archaeologist will supervise the works to reduce the potential for accidental impacts during construction. Revised environmental management and corrective management procedures have been included in the Response to Submissions Report to mitigate and avoid impacts to this structure.

The heritage listed house, 'Ashby' is located adjacent to the construction impact zone area labelled 'E' in **Figure 5.3**. Clearing additional to that mentioned in the EIS is required to facilitate construction of the third track on the western side of the corridor. The existing exotic vegetation outside of the rail corridor in this area is dense, and is considered to contribute to

the setting of the heritage item at this location. Provided that this screening vegetation is retained, the Proponent states that there would be no negative impacts to the heritage value of the item.

The Heritage Council agrees with the outcomes of the heritage assessment included in the EIS, stating in its submission that its recommendations have been adopted by the Proponent, particularly with regard to interpretative materials at Beecroft Railway Station, and the methodology for construction in the vicinity of the Devlin's Creek causeway. It recommends that the causeway is protected by fencing during construction, and that a framework should be identified that outlines procedures for monitoring and managing vibrational impacts should they occur during the construction phase. The Heritage Council further recommends that vegetation between the railway corridor and the adjacent heritage conservation areas should be retained, and where possible landscaped, in an effort to screen the development (both during construction and operation) from the surrounding areas, to conserve the character of the locality and to mitigate much of the community heritage concern relating to the project.

In the EIS and Response to Submissions Report, the Proponent has included and updated various mitigation and management measures that ameliorate impacts to European heritage at risk from the proposal. The Proponent has committed to the delivery of an Urban Design and Landscape Plan to be developed in consultation with the community and council, to evaluate the retaining and replanting of screening vegetation, the use of sensitive design and surface finishes and interpretive archival recording and treatment of heritage items. The Proponent will seek community feedback on design elements including building design treatments and landscaping of Cheltenham Station and will undertake protective measures for the Bunya pines at Beecroft Station Gardens.

The Department notes that European heritage impacts to items and the Beecroft Cheltenham Heritage Conservation areas are generally low as the project is primarily located within the existing rail corridor. The Department also acknowledges that the ability to reduce impacts further is also limited due to corridor constraints. As noted a significant issue raised by the community was the potential impacts to Cheltenham Station, which is to be upgraded to meet modern accessibility standards. The Proponent has committed to further design review in consultation with the community to address heritage, scale and landscaping impacts. The Department supports this approach and has recommended a condition to reflect this commitment

Notwithstanding these management measures, the Department considers that there are risks to the heritage values of the landscapes mentioned above, and recommends the Proponent include prescriptive management measures under a Construction Heritage Management Plan, prepared in consultation with the NSW Heritage Council and Hornsby Shire Council, to complement the Urban Design and Landscape Plan and other mitigation measures committed to. This condition would ensure that residual impacts to European heritage values are low and are able to be managed through the Proponent's management and mitigation commitments.

The Department has considered the potential impacts and risks to heritage items and is satisfied that the mitigation measures put forward by the Proponent are equivalent to the level of impact anticipated. Overall, the Department is satisfied that the residual impacts to European heritage values are generally low and are able to be managed through the Proponent's commitments and the Department's recommended conditions, as outlined above.

Aboriginal Heritage

The assessment and surveys of potential Aboriginal heritage were undertaken in consultation with the Aboriginal community, with the consultation process including meetings, provision of reports for comment, and site surveys/ inspections. The assessment undertook a

comprehensive site survey of the subject area with Aboriginal stakeholder groups that included members from:

- Darug Custodial Aboriginal Corporation;
- Darug Tribal Aboriginal Corporation;
- Darug Land Observations; and
- Darug Aboriginal Land Care Inc.

Representatives of the Metropolitan Local Aboriginal Land Council and the Deerubbin Local Aboriginal Land Council were invited to participate in the site survey, but were unable to attend.

No Aboriginal sites or areas of archaeological potential, or areas of cultural significance were identified within the development footprint. Sections of the rail corridor are highly modified as a result of construction of rail infrastructure, and are considered to have low archaeological potential as a result of disturbance during construction and/or from subsequent erosion. Mature trees were examined throughout the study site for any signs of cultural markings, however none were found and the site contained limited intact soils.

A database search of the Aboriginal Heritage Information System identified a total of 17 Aboriginal items in proximity of the proposal. Of these items, the majority are located away from the study area, with only one item located in the vicinity of the proposal. This item is located to the north of the M2 on the eastern side of the rail corridor, away from the proposal site. This site was recorded as a single artefact on a road verge, however during surveys associated with the M2 Motorway Upgrade, this item could not be relocated (AECOM 2010). A known (but not registered with AHIMS) site is located along Devlins Creek to the west of the proposal site; however this item would not be impacted by the proposal.

OEH reviewed the Aboriginal heritage technical report and was satisfied that Aboriginal community consultation and the site survey were undertaken in accordance with relevant guidelines, and agreed with the results of the assessment that the subject area has limited archaeological potential and that there are no Aboriginal heritage constraints associated with this project.

The proponent has committed to a framework should Aboriginal objects be located during works. Should any potential objects be uncovered during construction, all works would stop in the vicinity of the find, and the OEH, Metropolitan Local Aboriginal Land Council, Deerubbin Local Aboriginal Land Council and a suitably qualified archaeologist would be notified. If needed, further archaeological investigations would be undertaken before works recommence. Further, if the proposal design is changed, and areas not surveyed are to be impacted, further archaeological assessment would be undertaken.

Overall, given the Department's recommendation to document these procedures in the Heritage Construction Management Plan, it is considered that the Proponent's mitigation measures provide an appropriate framework to manage potential impacts during construction.

5.3. Visual Amenity

The study area in the vicinity of the rail corridor is generally undulating with low river valleys to the south of Beecroft and elevated areas to the north. The land use surrounding the rail corridor is highly modified and is characterised by low density residential development and commercial/retail uses, concentrated at Epping, Beecroft, Pennant Hills and Thornleigh railway stations. Some vegetation occurs adjacent to the corridor and includes protected tree populations and bushland reserves as well as mature vegetation and landscaping within the forecourts of the stations and within residential gardens. There is a concentration of dense

vegetation in the vicinity of Cheltenham and Beecroft stations. A number of schools and recreational facilities are also located in the vicinity of the corridor. Items of local heritage significance also occur and these have been considered in **Section 5.2**.

A landscape and visual impact assessment was undertaken for the project and documented in the EIS. The visual assessment considered the potential impacts in relation to representative viewing locations adjacent to the corridor. The visual impacts of the project include vegetation clearing, widening of cuttings and embankments, construction of retaining walls, new bridge structures and altered station structures and car parks, new infrastructure such as tracks and overhead wiring and rehabilitated construction sites. The EIS identified visual impacts of the project at a number of locations and these are summarised in **Table 5.4** below.

Table 5.4: Visual Impacts at Representative Locations Along the Corridor

Visual Receptor	New Visible Components	Potential Impacts
<i>Beecroft Road, Epping</i>	Construction activities such as machinery, lighting and construction compound 1, new bridge north of the existing sectioning hut north of Epping Station and overhead wiring. The operational track would be located six metres closer to Beecroft Road.	Views of the project would be available during both construction and operation but impacts would be minimal as current views are dominated by rail infrastructure and transient views from motorists on Beecroft Road would be short term.
<i>Our Lady Help of Christians Primary School, Epping</i>	Construction activities such as machinery and lighting, new bridge north of the existing sectioning hut north of Epping Station and overhead wiring.	The project would be partly visible from the school, however, existing vegetation and fencing around the school would limit views to some extent, minimising visual impacts at this location.
<i>Kandy Avenue, Epping</i>	Construction activities such as machinery, lighting, construction compound 1, earthworks and vegetation clearing, new bridge over M2 Motorway at Devlins Creek and overhead wiring. The operational track would be located 8m closer to residences in Kandy Avenue.	Properties at the eastern end of Kandy Avenue would have views of the project during its construction and operation and result in moderate visual impacts. Impacts on views would be minimised by the reinstatement of screening vegetation along the corridor where feasible and retention of existing vegetation at some locations.
<i>The Crescent, Cheltenham</i>	Construction activities such as machinery, lighting, construction compound, vegetation clearing, removal of existing car park. A new car park and an elevated concourse will be constructed at Cheltenham Station and be about 15m closer to properties along The Crescent. The third track is expected to be ten metres closer to residences.	Construction would be clearly visible from properties along The Crescent although some screening would be provided by existing vegetation and fences. During operation, the elevated concourse would also be visible and there is potential for overshadowing of properties on The Crescent and Sutherland Road. The elevated structure may also result in privacy impacts to adjoining properties. Due to the distance between the station and residential properties, these impacts are considered to be minimal.
<i>Cheltenham Road Overbridge, Cheltenham</i>	Construction activities such as machinery, lighting, construction compound, vegetation clearing, and earthworks. A new elevated	Patrons of Cheltenham Station will gain views of construction including the compound located within the existing western commuter car park. Views of the

Visual Receptor	New Visible Components	Potential Impacts
	concourse and forecourt, widened cutting and retaining walls will be constructed as well as the third track and overhead wiring.	new elevated concourse would be prominent. Views from this location would be direct but transient and therefore result in minimal visual impacts.
<i>Beecroft Village Green, Beecroft</i>	Construction activities such as machinery, lighting, construction compound 4, vegetation clearing, the third track and overhead wiring. The operational track would be about 6m closer to Beecroft Village Green.	The project would be highly visible from this location during construction due to the removal of vegetation that currently screens views of the rail corridor. During operation, visual impacts will occur but would lessen over time as vegetation screening is reinstated.
<i>Wongala Crescent, Beecroft</i>	Construction activities such as machinery, lighting, and vegetation clearing. A new car park, overhead wiring and third track is to be constructed with the track located about 6m closer to residences along Wongala Crescent.	Construction would be visible but some screening would be provided by vegetation to the south of Beecroft Station. North of the station, views of construction would be direct as a result of vegetation clearing. During operation, visual impacts are considered to be minor.
<i>Cumberland Highway Overbridge, Pennant Hills</i>	Construction activities such as machinery, lighting, vegetation clearing and earthworks. The works require the removal of a business at corner of Pennant Hills and Yarrara Roads, the construction of a new pedestrian footbridge, extension of elevated station concourse to the west, overhead wiring and third track.	While construction works would be clearly visible, views of road users and pedestrians would be of a short-term nature and therefore impacts are considered minimal. During operation, views would not differ substantially from the existing situation and impacts are considered negligible.
<i>Yarrara Road, Pennant Hills</i>	Same as above activities with the exception of earthworks which would not be visible. The operational rail track would be located 11m closer to Yarrara Road and the extension of the concourse would be eight metres closer.	Vegetation clearing would increase views along the corridor and because a substantial amount of work is proposed at Pennant Hills Station, visual impacts during construction would be moderate. During operation, visual impacts would be minor and would be further minimised as vegetation planted for screening increases over time.
<i>Passengers on trains</i>	Construction activities such as machinery, lighting, vegetation clearing and earthworks. New station concourse at Cheltenham and changes at Pennant Hills and Beecroft stations. Widened cuttings and retaining walls, new track and overhead wiring.	Visual impacts to passengers are considered to be negligible during construction and operation as views would be of a transient nature.

There would be a permanent change in the visual landscape and amenity for some viewing locations in the study area as a result of the introduction of new structures and the removal of screening vegetation. Generally, the removal of vegetation would increase the visibility of rail

infrastructure and trains. As outlined in **Table 5.4**, the new track would be located between 6 and approximately 15m closer to residential properties, the closest of which would be to the residences located along The Crescent at Cheltenham. At a project wide level, there is also the potential for reduced privacy for some residential properties immediately adjacent to the corridor and the Department has recommended that the Proponent identify opportunities to further screen views of the project where moderate or high visual impacts result, in consultation with the landowner.

The Proponent has indicated that where screening vegetation is removed, opportunities to mitigate views would be identified as part of an Urban Design and Landscape Plan to be prepared to reduce visual impacts. However, the Department understands that planting of vegetation within the rail corridor is often not possible due to safety concerns and the need to provide appropriate clearance distances to trains. The Proponent has committed to undertaking consultation with neighbouring residents of Cheltenham Station to discuss building treatments and landscaping requirements and the Department is supportive of this approach.

The Proponent has outlined a number of measures that would be implemented to mitigate visual impacts of the project. During the detailed design stage, the Proponent has indicated that it would prepare an Urban Design and Landscape Plan in consultation with RailCorp, the operator of the rail line, and Hornsby Shire Council, ensure that light spill is minimised during construction and operation and engage with affected residents at Cheltenham to gain information about design elements for building treatments and landscaping that could be considered as part of the project. During construction, the Proponent has stated that it would avoid unnecessary loss or damage to vegetation, undertake rehabilitative planting as early as possible to replace vegetation that provided screening, minimise light spill to adjacent areas, remove temporary hoardings, barriers, traffic management and signage when no longer required, screening worksite compounds with shade cloth or similar as necessary to minimise visual impacts from elevated locations, manage graffiti, landscape new embankments, provide visual screening where possible and storing machinery and other equipment in a tidy manner. The Proponent has also committed to implement measures during construction to ensure the protection of the remaining Bunya Pines within the formal garden at Beecroft Station.

Of the submissions received during the exhibition period, 44 submissions (10%) raised landscape and visual amenity as an issue of concern for the project. Issues raised related to visual impacts, urban design, mitigation measures, impacts to privacy (overlooking) and overshadowing, impacts from lighting, queries regarding the methodology used in the assessment and proposed landscaping measures. The Department notes that Hornsby Shire Council was the only government agency that raised visual impacts and landscaping as an issue of concern with the remaining issues related to visual amenity being raised through public submissions. Council stated that removal of existing vegetation would result in increased visibility of rail infrastructure and result in a significant impact on the visual character of the rail corridor and adjacent lands. Council considered that the measures proposed in the EIS should be imposed and enforced and that additional measures should also include:

- incorporation of architectural treatment and detailing of finishes within key elements of temporary structures;
- the provision of temporary landscaping/planter boxes, where appropriate, to soften views of construction sites and adjoining sensitive areas;
- the provision of trees within the proposed new commuter car parks to improve the landscape quality; and
- replacement planting including indigenous species and understorey vegetation, adjacent to the rail corridor, following the completion of construction works to assist in screening the railway and retaining the landscape setting.

The Department has reviewed the assessment undertaken, the issues raised in the submissions and the Proponent's response to the submissions and considers that the issues raised have generally been addressed and that the commitments made in relation to reducing visual amenity and landscape impacts would minimise potential adverse impacts to a large extent. While the Department notes that Council raised a number of comments regarding visual impacts associated with construction, the Department considers that these could be addressed as part of the Construction Environmental Management Plan and has therefore recommended that minimising visual impacts be conditioned as a requirement of this Plan.

In relation to Cheltenham Station, due to community feedback provided at community information sessions conducted by the Proponent and the number of submissions that commented on the proposed station design, the Proponent has stated that possible architectural changes are currently being investigated to determine their feasibility. In addition, the Proponent has stated in its Response to Submissions Report, that it is currently investigating whether access to the proposed island platform created by the new third track could be provided by widening the existing Cheltenham Road bridge and providing access via a new lift and stairs instead of building a separate overhead concourse structure over the tracks. This would result in the existing station buildings being largely unaffected, subsequent reduced maintenance of the existing station accesses and substantially reduced visual, privacy and overshadowing impacts. The Proponent has indicated that there are a number of engineering issues that need to be resolved, however, and if this option is found to be feasible, further consultation will be undertaken with the community. The Proponent has also indicated that due to the overwhelming interest by the wider community on the design of Cheltenham Station, it would undertake consultation with the broader community instead of just the directly affected residents, as previously proposed. The Department is supportive of this approach.

In the event that the elevated concourse remains as the preferred option, the Department has recommended that the Proponent, as part of the Design and Landscape Plan, specifically consider minimising the height and associated overshadowing impacts from the structure at Cheltenham Station and to replace as much screening vegetation as possible as part of rehabilitation works for the project.

The Department acknowledges that it is difficult to specify exactly what mitigation measures and treatments will be implemented at this stage of the project. The Department therefore considers that the preparation of a Design and Landscape Plan is the correct approach in relation to formulating measures to implement as part of the project's construction to reduce visual impacts. The Department has reiterated the Proponent's commitment to the preparation of this Plan in consultation with Council and the community as part of the recommended conditions of approval. This consultation will facilitate the incorporation of Council's recommendations into the Plan.

5.4. Ecology

The EIS generally describes the study area as comprising poor habitat due to past disturbances within the rail corridor and the proximity to residential development and other urban uses. The ecological assessment included a desktop review of database and historical records, a review of previous assessments and field surveys of the study area undertaken in August 2011 and February 2012.

Of the seven vegetation communities that were identified in the study area as shown in **Figures 5.4a-h**, four are native and two are listed as endangered ecological communities (EECs) under both the *Threatened Species Conservation Act 1975* (TSC Act) and the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). The EECs are:

- Sydney Turpentine Ironbark Forest – listed as endangered under the TSC Act and critically endangered under the EPBC Act; and
- Blue Gum High Forest – listed as critically endangered under both TSC Act and EPBC Act.

In addition to the above EECs, Blackbutt Gully Forest is listed as locally significant as it is poorly conserved in conservation reserves.

A total of 285 flora species were recorded in the study area, 185 of which are native. Two flora species are listed as threatened, as follows:

- *Epacris purpurascens* var. *purpurascens* – listed as vulnerable under the TSC Act. This species occurred as two populations – one to the west and the other to the south of Cheltenham Station growing on the edge of railway cuttings within Sydney Hinterland Transition Woodland. A total of 106 individuals were recorded; and
- Narrow-leaved Black Peppermint (*Eucalyptus nicholii*) – listed as vulnerable under the TSC Act and the EPBC Act. This species, comprising one individual, was recorded on the eastern side of the rail corridor to the south of Thornleigh Station. This species would not be affected by the project.

Three fauna habitat types were identified in the field surveys: wooded areas, disturbed land and aquatic habitat (creeks and drainage depressions).

A total of 57 species were identified during the field surveys, comprising 52 native and five exotic species. Of these, 6 species are listed as threatened and one species is listed as an endangered population, as follows:

- *Ninox strenua* (Powerful Owl) – listed as vulnerable under the TSC Act;
- *Callocephalon fimbriatum* (Gang-gang Cockatoo) – listed as an endangered population under the TSC Act;
- *Glossopsitta pusilla* (Little Lorikeet) – listed as vulnerable under the TSC Act;
- *Pteropus poliocephalus* (Grey-headed Flying Fox) – listed as vulnerable under both the TSC Act and the EPBC Act;
- *Miniopterus schreibersii oceanensis* (Eastern Bentwing Bat) – listed as vulnerable under the TSC Act;
- *Falsistrellus tasmaniensis* (Eastern False Pipstrelle) - listed as vulnerable under the TSC Act; and
- *Scoteanax rueppellii* (Greater Broad-nosed Bat) – listed as vulnerable under the TSC Act.

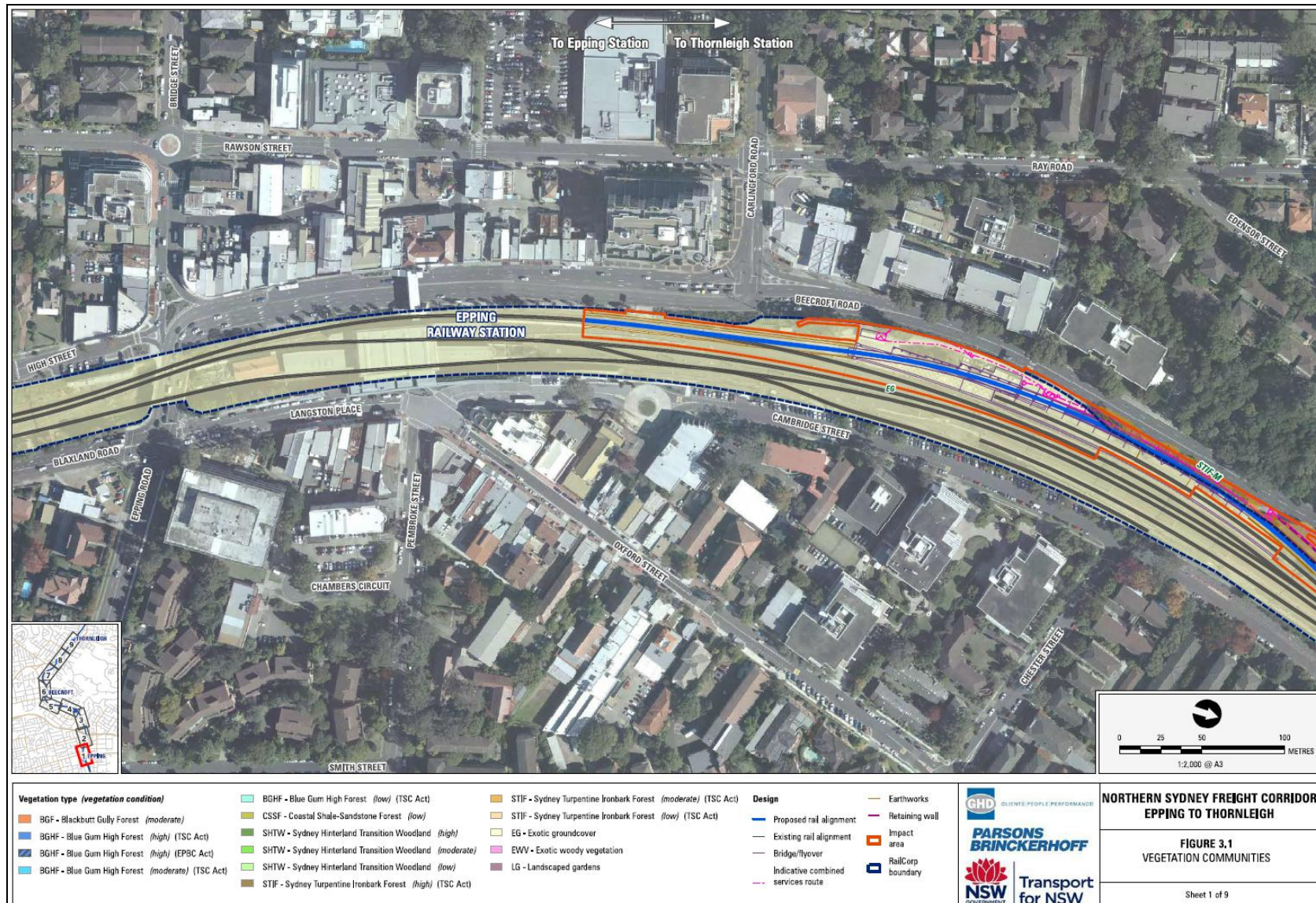


Figure 5.4a – Vegetation communities in the vicinity of the Proposal

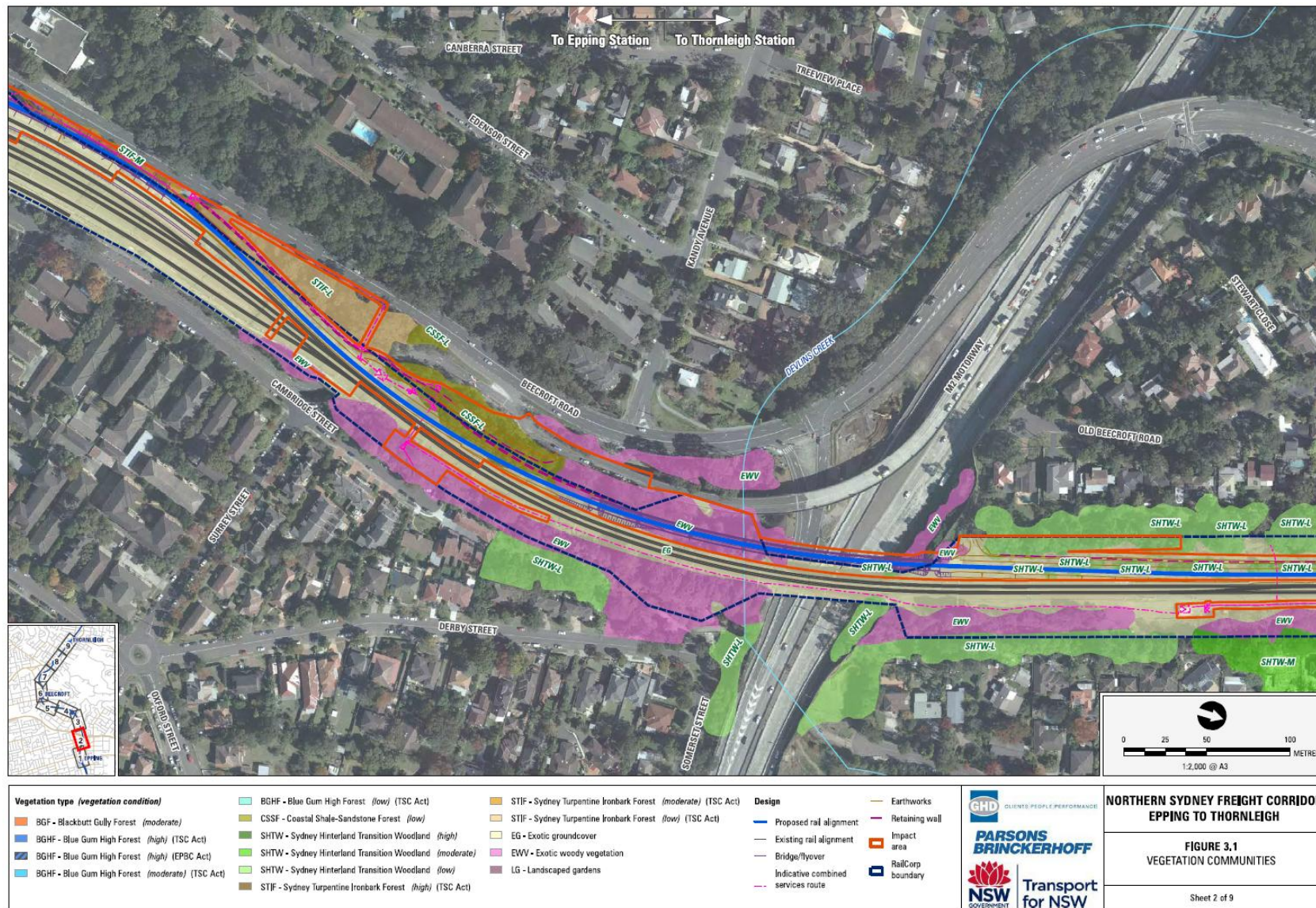


Figure 5.4b – Vegetation communities in the vicinity of the Proposal

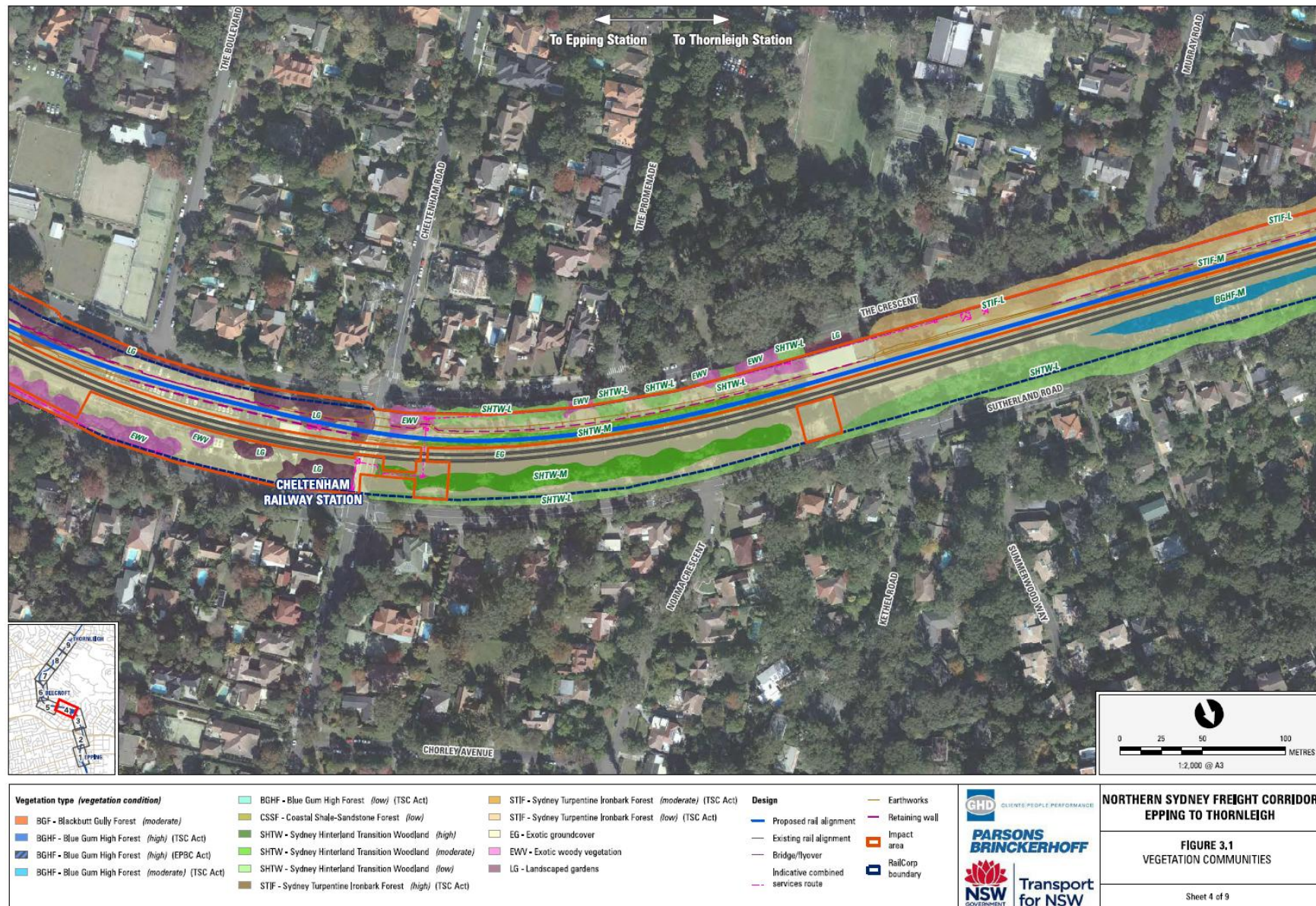


Figure 5.4c – Vegetation communities in the vicinity of the Proposal

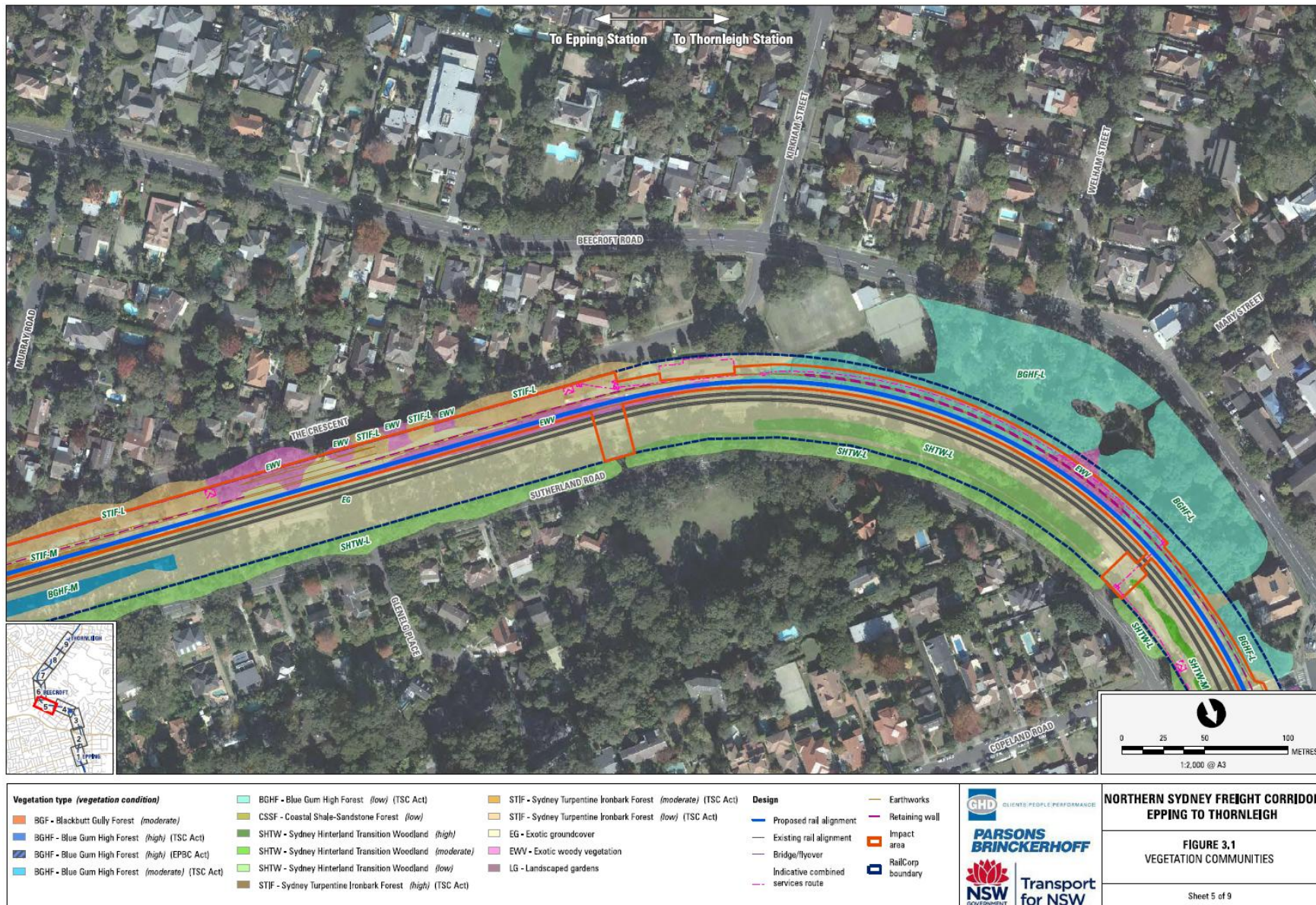


Figure 5.4d – Vegetation communities in the vicinity of the Proposal

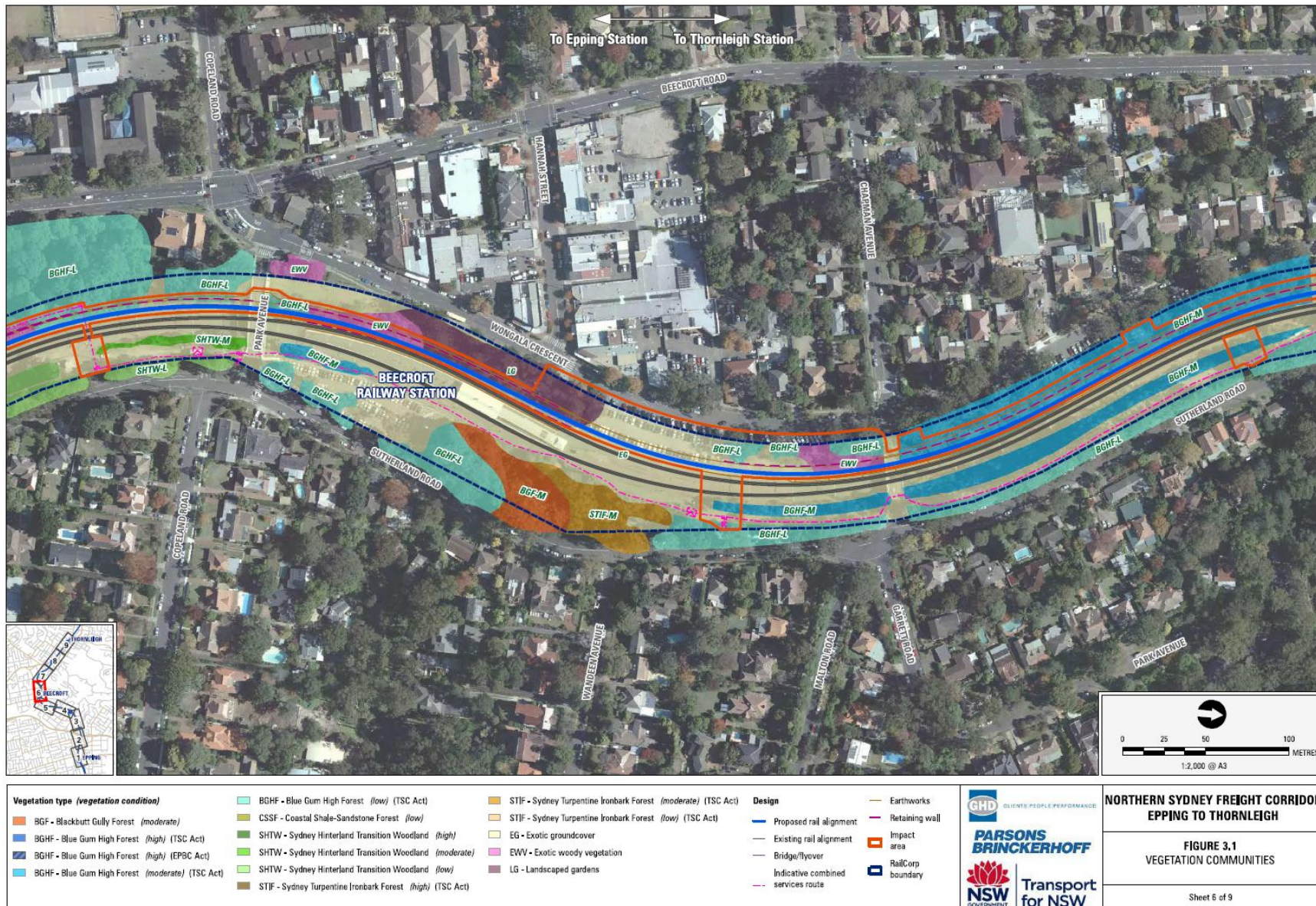


Figure 5.4e – Vegetation communities in the vicinity of the Proposal

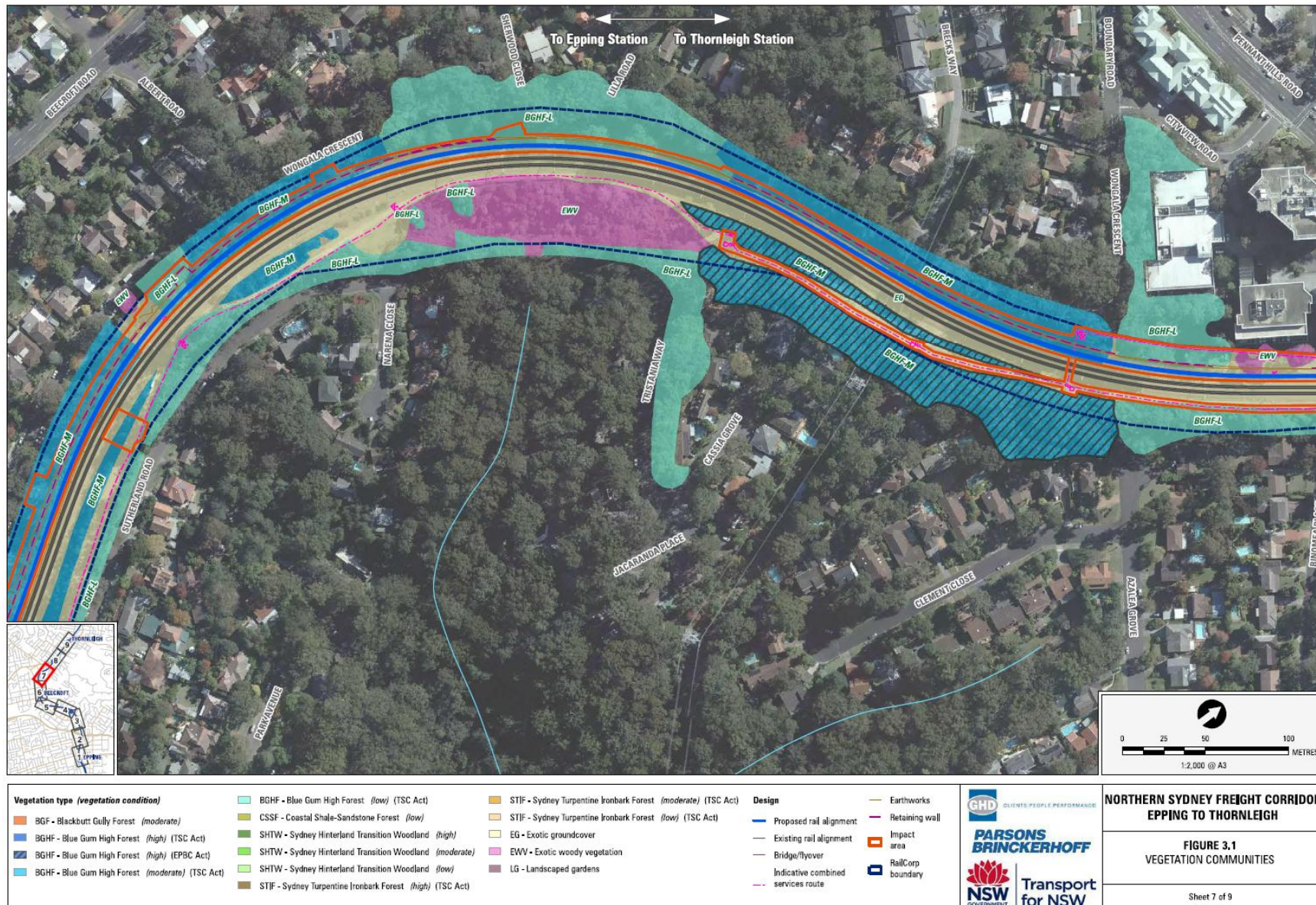


Figure 5.4f – Vegetation communities in the vicinity of the Proposal

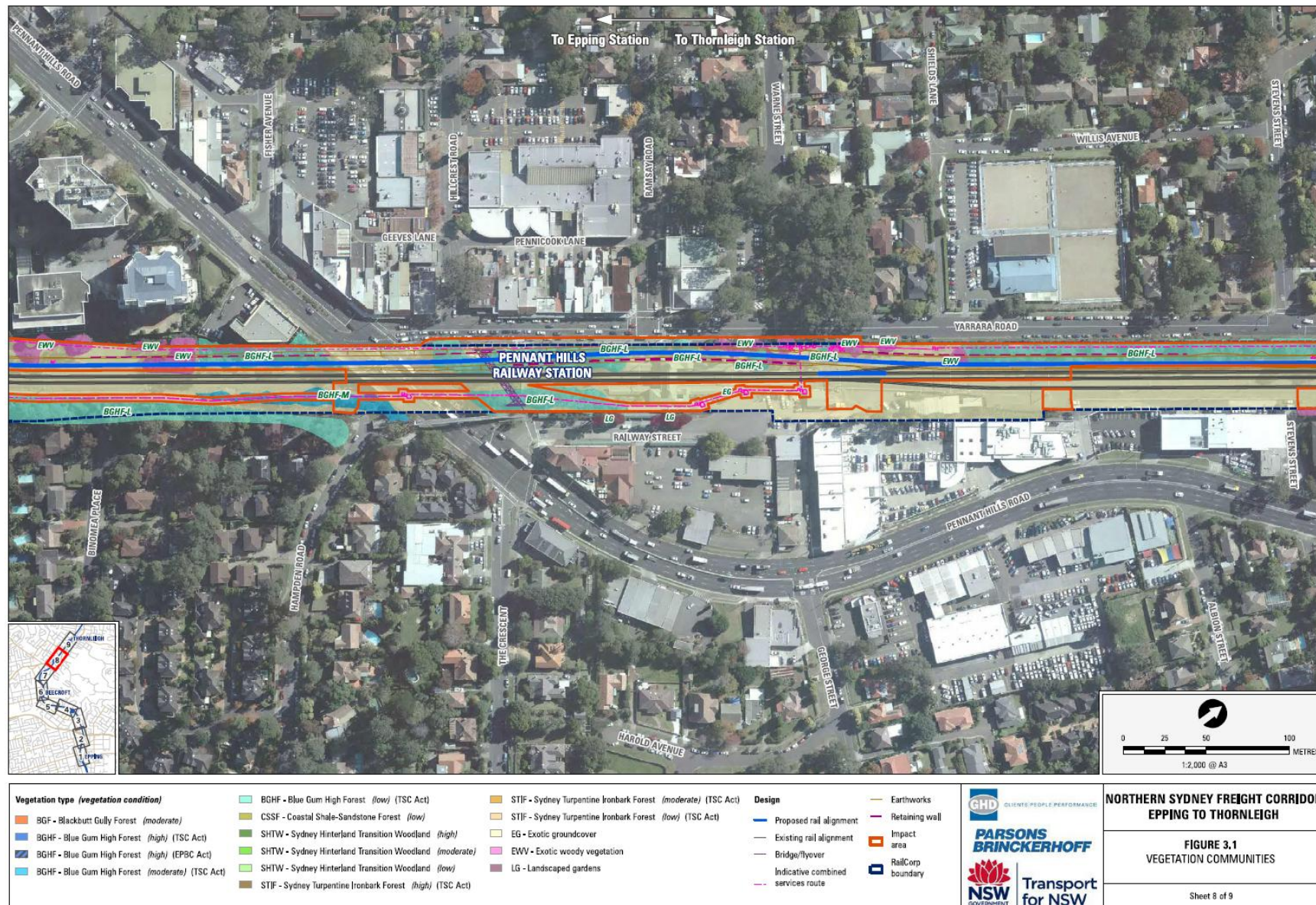


Figure 5.4g – Vegetation communities in the vicinity of the Proposal

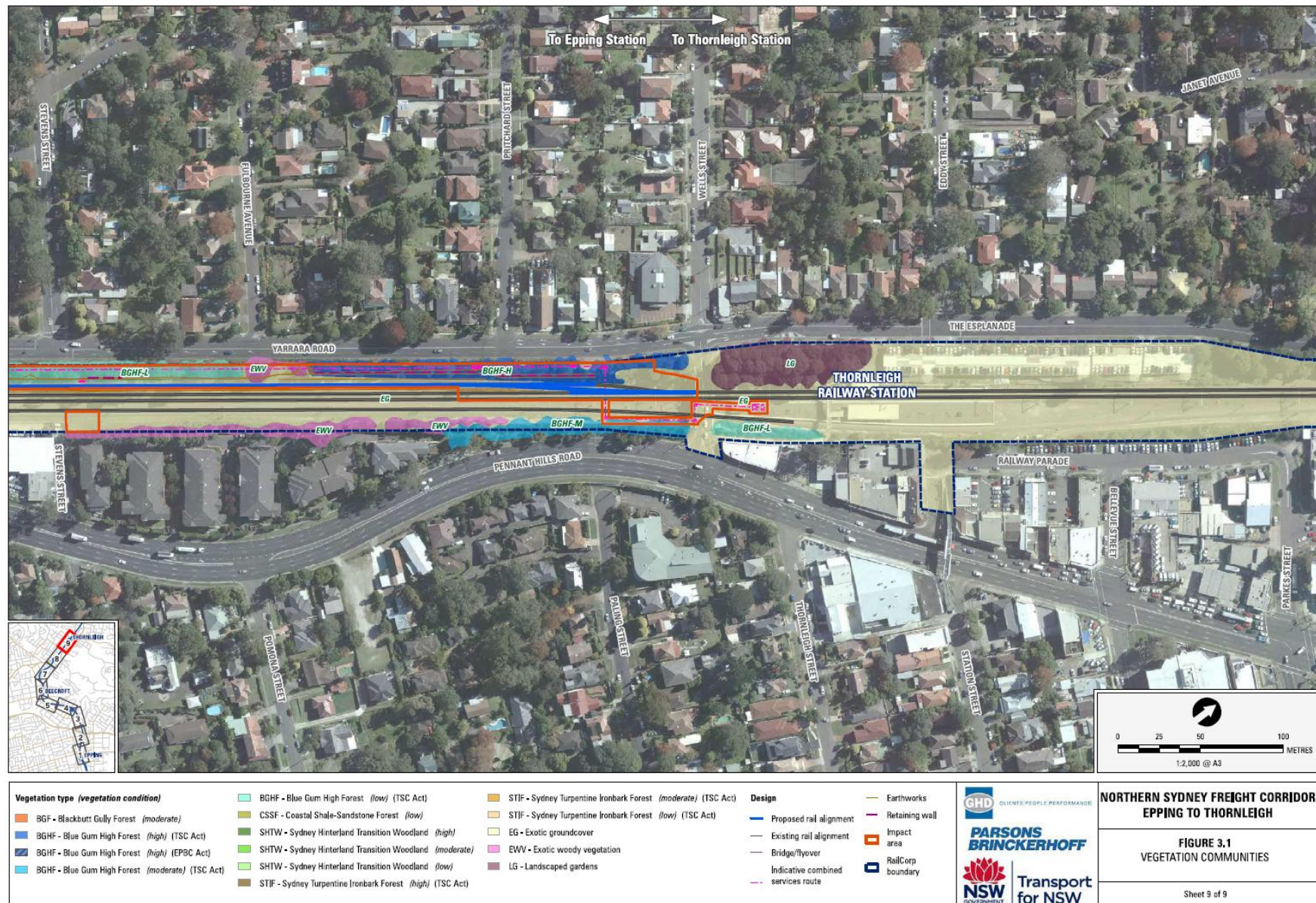


Figure 5.4h – Vegetation communities in the vicinity of the Proposal

Two other threatened microbats could also occur in the study area and include the East Coast Freetail Bat (*Mormopterus norfolkensis*) and the Yellow-bellied Sheath-tail Bat (*Saccolaimus flaviventris*).

The vegetation communities in the study area provide habitat to a range of fauna species. A range of myrtaceous trees were identified including a number of Eucalyptus and Angophora species which provide foraging resources for a range of birds and arboreal mammals. During the field survey, the Gang-gang Cockatoo was identified foraging on fruits of *Eucalyptus pilularis* in the stand of Blackbutt Gully Forest adjacent to Beecroft Station.

The Department understands that the design of the proposal has avoided or minimised impacts on vegetation and that construction compounds and access tracks have been located in disturbed areas to avoid any unnecessary clearing of native vegetation. The Department notes that further investigations to avoid or minimise impacts on vegetation would be undertaken during the detailed design of the project and this may result in reduced impacts. The Department considers that the construction sites should be rehabilitated if they are not required to be utilised for operational purposes. This rehabilitation should be undertaken in consultation with Hornsby Council and the Department has recommended a condition to this effect.

The Response to Submissions Report outlines design refinements made to the project following the exhibition of the EIS and states that construction of the project would result in the clearing of approximately 4.3 hectares of native vegetation which would include the removal of up to approximately 2.3 hectares of Blue Gum High Forest, 0.8 hectares of Sydney Turpentine Ironbark Forest, 0.9 hectares of Sydney Hinterland Transition Woodland and 0.3 hectares of Coastal Shale-Sandstone Forest. Approximately 10.4 hectares of non-native vegetation communities would also be cleared, including exotic vegetation such as weeds (2.2 hectares), disturbed areas (7.8 hectares) and existing landscaped gardens (0.4 hectares).

The Department understands that three individuals of the threatened species *Epacris purpurascens* var. *purpurascens* would be directly impacted by the proposal in the EIS. The Department understands that 0.3 hectares of additional potential habitat for this species would be impacted by the proposal south of Cheltenham Station (i.e. a total impact on 1.8 hectares of habitat) and a number of individuals of this species may be directly affected. Whilst this increase is not expected to have a significant impact, the Department has recommended that areas of retained vegetation containing this species in the vicinity of the construction footprint be protected by temporary fencing so that no additional individuals are inadvertently disturbed or impacted during construction works, over and above the three individuals assessed as part of the EIS.

The clearing of vegetation would result in direct impacts to fauna habitat within the study area. In relation to fauna habitat, 6.5 hectares of forest and woodland vegetation would be directly affected which provides foraging habitat for a range of fauna species, including threatened species. In addition nine hollow-bearing trees would require removal, however, these hollows would be replaced with nest boxes installed at a ratio of two nest boxes for every hollow removed in adjoining areas of retained vegetation. The proposed offset package would also provide offsets for the habitat lost as a result of the proposal.

The proposal would impact on a wildlife corridor associated with Devlins Creek which links Chilworth and Beecroft Reserves with the Lane Cove National Park. A number of threatened species such as the Gang-gang Cockatoo, the Powerful Owl, Glossy-black cockatoos and the Green and Golden Bell Frog (*Litoria aurea*) have been recorded within this corridor. However, only the Gang-gang Cockatoo and the Powerful Owl were recorded within the study area during the relevant field surveys. This corridor is at its narrowest

where it crosses the existing rail corridor. The Proponent has noted that the wildlife corridor is fragmented in this location by Beecroft Road, the former bus overpass, the railway corridor and the M2 Motorway. The existing railway corridor forms a gap of about 15m and the proposed third track would increase this gap to approximately 25m. The EIS states that the project is unlikely to substantially decrease the movement of terrestrial and aquatic fauna along this section of the wildlife corridor. Similarly, the proposal would increase the fragmentation of the wildlife corridor which links Observatory Park with the Lane Cove National Park and would increase canopy gaps in the vegetation from 15m to approximately 30m.

The project is unlikely to create additional barriers to fauna movements through the wildlife corridors. Existing viaducts and the presence of roads and other infrastructure limit the connectivity for fauna and therefore it is not expected that the proposal would increase these impacts to a large extent. The proposal is not expected to result in adverse impacts to existing fauna located in the area and the wider region.

Indirect impacts of the proposal include increased edge effects and weed incursion, noise and lighting impacts, particularly during construction, potential increased erosion and sedimentation impacts and the transportation of pollutants into adjacent waterways and the potential of fauna mortality from the collision with trains along the third track, although the expected incidence of the latter is expected to be low. These impacts can be reduced through a range of standard mitigation measures and accordingly the Department has recommended that these issues be addressed in a Construction Flora and Fauna Management Plan for the project.

The Proponent has prepared a biodiversity offset strategy to offset unavoidable residual impacts of the proposal. The Strategy is based on the NSW Biobanking Scheme as modified to reflect the state significant infrastructure assessment process. The Proponent has indicated that the final offset package may result in the offset providing a Tier 3 "Mitigated Net Loss" outcome due to the difficulties in sourcing appropriate Blue Gum High Forest offset credits due to the reliance of Sydney Turpentine Ironbark Forest credits. As a consequence, the Proponent will likely need to supplement biobank credits with land management activities.

Of the 426 submissions received on the project, 319 submissions raised ecology as an issue of concern. Specific concerns were raised regarding the clearing of vegetation, the impact the proposal would have on fauna species known to occur in the area, the mitigation measures proposed and the offset strategy outlined.

The removal of Blue Gum High Forest in the study area would be significant as it represents the removal of 6% of this community's extent within the Hornsby LGA and the community is listed as critically endangered under both the EPBC and TSC Acts. While most of the Blue Gum High Forest to be impacted by the project (0.8 hectares) is of moderate condition, a small amount (0.2 hectares) is of high condition. Notwithstanding the condition level of this vegetation community, the Department considers the residual impact on this EEC to be significant as the biodiversity offset proposal presented by the Proponent does not directly provide an offset for this community. Due to the fragmented nature of the Sydney Turpentine Ironbark Forest, direct impacts to this community were not considered to result in significant biodiversity impacts.

A number of submissions, including that of Hornsby Shire Council, were concerned that the purchase of biobanking credits to offset the impacts to Sydney Turpentine Forest and Blue Gum Forest would be from a site within The Hills Shire despite the impacts occurring within the Hornsby Shire. Hornsby Shire Council also stated that the loss of hollow bearing trees should be replaced with nestboxes, that alternate offsetting should also include rehabilitation of the Council's existing Blue Gum High Forest reserve system, that the CEMP should

provide for the long term rehabilitation and management of vegetation within the rail corridor due to increased edge effects leading to increased weed incursion and increased fragmentation of habitat. The Council also stated that measures to reduce Myrtle Rust and Phytophthora should be implemented during construction. Other submissions raised the issue of the ongoing maintenance of replaced vegetation and the impact of construction noise on wildlife. The Department notes that the Proponents Response to Submissions Report generally addresses all of the issues that were raised by Council.

The main concern OEH raised regarding the proposed offset strategy was that the biodiversity values represented at the preferred site at Seven Hills do not match the values that will be impacted by the proposal, particularly in relation to Blue Gum High Forest. The Proponent, in its response to submissions stated that the final impact area may change as further design refinements were undertaken during the detailed design stage and therefore the area requiring offsetting may also change. The Proponent, however, did confirm that rehabilitation works proposed adjacent to the construction areas would be in addition to any of the proposed offsets.

The Proponent states in its Response to Submissions Report that it has utilised a modified form of the Biobanking Assessment Methodology and that projects assessed under State Significant Infrastructure do not have to meet the "improve or maintain" standard, which is normally required under Biobanking. The Department disagrees with the Proponent's assertion as the Director-General Requirements for this project specifically stated that a strategy to offset ecological impacts and native vegetation clearance was required to be developed, consistent with the "improve or maintain" principle and therefore while the Proponent has nominated a biobanking site to offset the impacts to Sydney Turpentine Forest, the Department agrees with Hornsby Council and OEH in that this site cannot be used solely to offset impacts to Blue Gum Forest and therefore the residual impacts (i.e. biobanking credits) to this community remain partly outstanding and an offset needs to be established.

The Department has reviewed the EIS, the issues raised in the submissions received and the Proponent's response to the submissions and design refinements proposed as part of the project and notes that the overall impact on ecology has increased slightly as a result although the significance of the impacts have essentially remained as assessed in the EIS.

The Department considers that the Proponent's proposed offset credits would adequately compensate for the impacts from the project on Sydney Turpentine Ironbark Forest but would not provide sufficient compensation in relation to the project's impacts on Blue Gum High Forest as the proposed biobank site does not include this EEC. The Department does not consider that the proposed biobank site would achieve an overall conservation outcome of improving or maintaining the viability of the Blue Gum High Forest EEC. In order to rectify this loss in overall biodiversity, the Department has recommended that the Proponent develop and implement strategy to offset the biodiversity impacts associated with the project and that the offsets, to the greatest extent practicable, achieve an improve or maintain outcome. In this respect, the Department notes the potential to supplement the biobanking site with other initiatives including land management and rehabilitation. The Department also notes that Hornsby Council suggested that offsetting for the impacts to Blue Gum High Forest could also include rehabilitation works to Council's existing Blue Gum High Forest reserve system. In order to resolve offsets for the project, the Department has recommended that the Proponent develop a Biodiversity Offset Package in consultation with OEH and Hornsby Council and that this be submitted for the approval of the Director General.

5.5. Traffic, Transport and Access

The construction traffic and transport assessment details the impact of traffic (both heavy and light vehicle movements) on proposed access routes to and from construction sites. These sites will be in use over various time frames and intensity of the 45 month construction period. Potential impacts from the construction of the ETTT proposal may result in:

- potential road closures;
- disruptions to traffic, cyclist and pedestrian access (increased vehicle delays and queue lengths at intersections; potential road, bridge and footpath closures);
- passenger access changes to railway stations; and
- temporary changes to both on-street and off-street parking at designated commuter car parks.

Construction traffic will be generated by the haulage of at least 65,000m³ of fill material and the delivery of construction vehicles such as dump trucks, cranes, concrete mixers and other materials. Six construction compounds will be required for the construction of the ETTT, and would be sited at locations typically within the rail corridor or at stations. A number of administrative offices or satellite compounds may also be required, and would be located on land leased from private property owners remote from the construction sites. **Table 5.5** outlines construction site compound locations, expected uses, and means of access to the sites. Indicative locations and haulage routes for each of the compounds are located in **Figure 5.5**. In total, 36 access points (30 are currently in use) to the railway corridor would be available for use during construction, located on both sides of the rail corridor.

Table 5.5: Indicative location and uses of compound sites

Number	Location	Use of Site	Access	Expected period of use
S1	Existing bus flyover roadway to the south of the M2.	Used for works south of the M2 including bridge construction.	Bus underpass and Cambridge Street to Epping Road.	May 2013 to June 2016.
S2	Within the rail corridor to the north of the M2.	Compound for M2 Motorway Bridge construction and other major works.	Existing corridor access road and Old Beecroft Road.	May 2013 to June 2016.
S3	Cheltenham Station in the vicinity of the existing car park.	Cheltenham Station construction.	The Crescent, Cheltenham.	April 2013 to December 2016.
S4	Within the rail corridor to the south of the Beecroft scout hall.	One way truck access/egress compound. Storage and removal of spoil. Major excavation works.	The Crescent, Beecroft.	April 2013 to December 2016.
S5	Beecroft Station in the vicinity of the existing car park.	Beecroft Station works.	Wongala Crescent, Beecroft.	April 2013 to December 2016.
S6	Within the rail corridor to the west of Pennant Hills Station.	Pennant Hills Station construction. Excavation and retaining wall construction.	Yarrara Road.	April 2013 to December 2016.

Traffic flow is generally proposed to be maintained in the vicinity of the proposal, however there may be the need to temporarily close certain roads and footpaths to allow for construction works, for instance temporary lane and carriageway closure on the M2 for the proposed rail bridge works at Epping, and closure of the Chapman Avenue overbridge for abutment strengthening (for approximately three weeks).

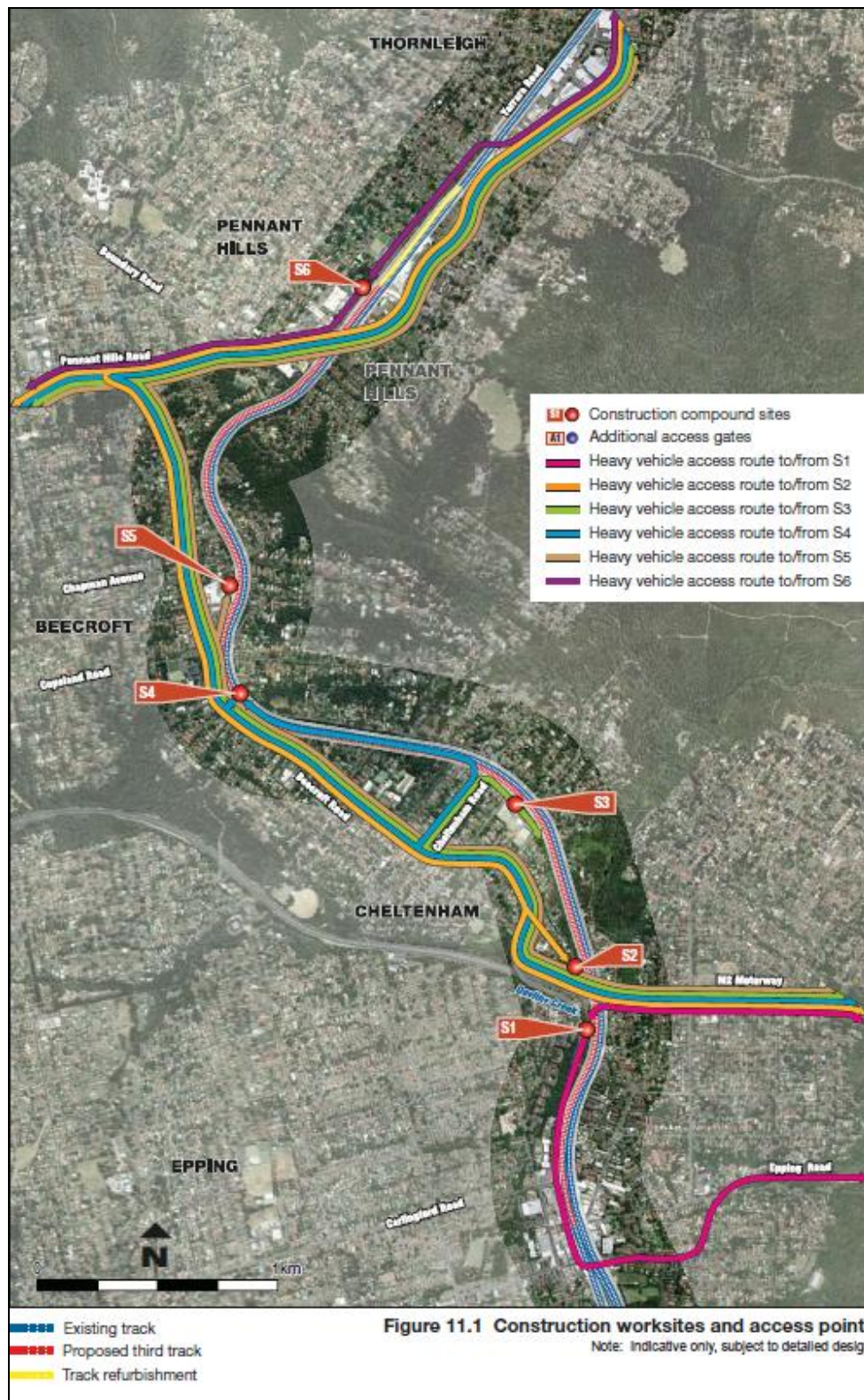


Figure 5.5: Indicative Construction sites, access points and key haulage routes

Overbridges at Cheltenham Road, Chapman Avenue, Copeland Road and Pennant Hills Road would not be required to be replaced, however foundation works will be required to provide space for the third track which may necessitate temporary lane and/or carriageway closures. Details of any temporary lane or road closures required would be contained within the traffic management plans to be provided to the Department in consultation with other relevant authorities.

Hornsby Shire Council raised several issues in relation to construction traffic access, parking impacts and road and cycleway network impacts. Council requested that access to the rail corridor should be consolidated where possible, in order to minimise loss of kerbside parking for residents and to reduce disruption to local traffic. Council also requested that more information be provided in regards to the changes and potential loss of parking, in particular to areas in proximity to train stations and the Arden school. It suggested that construction should be staged to minimise impacts to the local network, and requested input into relevant Construction Traffic Management Plans to strengthen the Proponent's commitments to mitigate traffic and pedestrian impacts.

A range of community submissions raised concerns regarding access, transport and traffic issues associated with the proposal. In summary these issues included:

- pedestrian and cyclist impacts and the need to provide pedestrian and cycle access to and from stations and along the rail corridor;
- access to parking in the proximity of stations;
- impacts to rail services during construction;
- the potential impacts on the local community due to the loss of road space, in particular to accommodate the proposed Pennant Hills Station Concourse extension;
- scepticism at assessment findings in relation to parking survey and traffic impacts; and
- loss of on-street and commuter parking to accommodate construction vehicles, construction works and road changes.

In general, however, construction traffic and access impacts are expected to be manageable through a comprehensive management framework and associated measures identified in the EIS. Specific details of impacts are addressed in the following parts of this section.

Construction traffic assessment

During a typical working day, the proposal would generate a maximum of approximately 40 heavy vehicle movements per hour and about 200 light vehicle movements at the start and finish of each shift. This would increase by up to 840 (440 heavy) daily vehicle movements in peak construction times, which will be concentrated on closedown periods during weekend and public holidays.

The construction traffic assessment for the ETTT was based on traffic count information and the use of SIDRA traffic modelling software to determine the intersection performance of local and arterial roads. The assessment compared current traffic conditions with construction traffic and intersection performance scenarios and compared a number of parameters, such as queue lengths, level of service and the degree of saturation.

Of the additional light vehicle movements created from construction traffic, the assessment concludes that 33% of these movements would occur in the afternoon peak (67 light vehicles), representing between 1.9% and 2.5% of total traffic in the afternoon peak on Beecroft Road. Additional heavy vehicle movements during peak construction times represent approximately 2.4% of daily traffic on Beecroft Road.

Whilst the road network is currently operating at or very close to its capacity, the assessment states that traffic impacts to key intersections would be minor, and would not impact on residential amenity. The impact on intersection performance would comprise a small change

in average vehicle delays and a slight increase in queue lengths, with no change in the degree of saturation or level of service.

As discussed, Chapman Avenue overbridge will be closed to traffic for approximately three weeks whilst foundation works can occur. SIDRA traffic modelling was undertaken to assess the impacts of this closure on surrounding key intersections on the local road network, and found that intersection performance would not be significantly impacted by the redistributed traffic volumes generated as a result of the temporary closure of the overbridge.

There is the potential for the M2 motorway to be closed to allow for construction works on the ETTT proposal. While full closure is not anticipated, short-term lane or carriageway closures will be required to complete the rail bridge at Epping, especially where lifting of bridge components over traffic is required. Should carriageway closures be necessary, contra flows will be implemented and works will be undertaken at night. Periodic lane closures of the M2 and the Beecroft on/off ramps will be required for pier construction on either side of the motorway; however these works will occur outside of peak hour and at night time, and will be undertaken in consultation with Hills Motorway and RMS, and managed through Traffic Management Plans.

The key impacts of the ETTT proposal are centred on construction traffic generation and the implications of increased light and heavy vehicle movements resulting from construction activities. Whilst the impacts will be noticeable, the Department considers that impacts are generally acceptable in noting that the majority of key intersections will retain their respective level of service and degree of saturation. Where feasible, the Proponent has the capacity to reduce impacts through appropriate design and management measures, including avoidance of afternoon peak periods, for instance avoiding student arrival and departure times at the Arden School on Wongala Crescent.

Overall, it is considered that construction of the ETTT proposal would be unlikely to result in significant impacts on the surrounding road network or intersection performance during a typical weekday. Given the minor changes resulting from construction traffic, the Department is satisfied that potential impacts can be successfully mitigated via a Construction Traffic Management Plan that will include input from agency stakeholders.

The Department acknowledges that due to the residential location of the construction and the scale of the works that there will be impacts to the local community in regards to traffic and transport amenity. The Department considers, however, that these impacts will be temporary in nature, and will be dispersed over the 6km length of the rail corridor and the 45 month construction time frame. Further, given the proposed commitments by the Proponent, and conditions recommended by this report, adverse long term impacts are unlikely.

Pedestrian, Cyclist and Public Transport Access

Pedestrian and cyclist access to Cheltenham, Beecroft and Pennant Hills stations will be impacted by construction of the proposal. Alternative access points are detailed by the EIS and are included at **Figure 5.6**. Access will be maintained during the construction phase whilst stations are operating.

At Cheltenham Station, there would be some changes to pedestrian and commuter access to Platform 2 during construction, however these works are expected to have little impact on commuters, as access would be maintained until the new overhead concourse is constructed. Access from the eastern side of the station would also be altered during operation.

The Beecroft Station underpass would be closed only during rail closedowns, restricting pedestrian access from the western side of the corridor. This will impact on commuters and pedestrians using the underpass to connect to the station, and train passengers accessing

the temporary bus services from the eastern side of the railway corridor. Alternative access routes would be available via either the Chapman Road or Copeland Road overbridges.

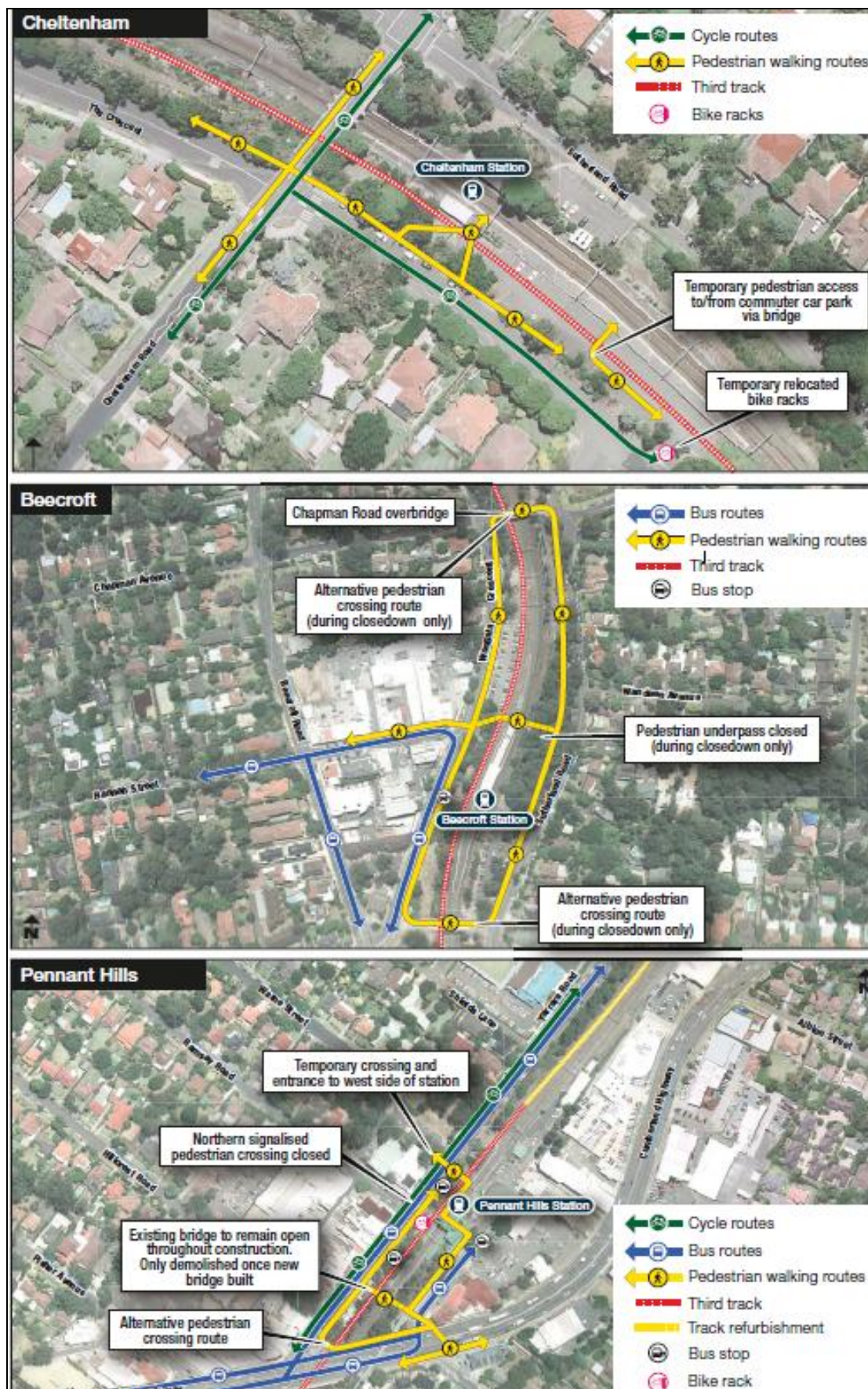


Figure 5.6: Pedestrian and commuter access to stations during construction

Four minor design changes were proposed in the Proponent's Response to Submissions report, one of which flags the temporary closure of the Chapman Avenue traffic and pedestrian overbridge for a period of up to three weeks. This will affect pedestrians accessing Beecroft station from the north. Access will be maintained to pedestrians and cyclists via a detour when the bridge is not in operation. Bridge closure times would be determined in consultation with Hornsby Shire council and the community and will be advertised ahead of time.

At Pennant Hills Station, there would be some changes to pedestrian access due to footpath closures and road changes at Yarrara Road, which are required due to the extension of the overhead concourse. The existing footbridge will be replaced but will remain in operation until the new footbridge is available for use, and as discussed in the Proponent's Submissions report, its location will be slightly altered to address pedestrian safety.

Station construction works may necessitate the temporary relocation of bus stops, particularly on the western side of Pennant Hills Station. The impacts are expected to be minor. However, there will be some inconvenience to commuters due to increased walking distances for people interchanging between bus and rail services. Consultation would be undertaken with relevant stakeholders including bus operators to lessen the impacts to passengers and commuters.

In response to Hornsby Shire Council's request for continuous cycleway linkages, the Proponent would endeavour to construct an extension to the previously proposed culvert at Wongala Crescent to enable this linkage, despite this area falling outside the scope and footprint of this proposal. The cycleway between the Beecroft Village Green and The Crescent appears to be more difficult to implement; however, the Proponent has committed to investigating the matter further in consultation with Council.

The Department agrees with the measures proposed by the Proponent and has reinforced these measures in the recommended conditions to manage potential access issues and conflicts between pedestrians, cyclists and traffic. Overall, the Department considers that while there would be some minor changes to pedestrian and cyclist routes during construction, these impacts are considered to be minor for a project of this scale. It also notes that operational changes are generally positive, particularly in relation to improved access at Cheltenham Station.

Parking

Some changes to designated commuter car parking areas at Cheltenham and Beecroft and street parking in the vicinity of all three stations would be necessary to facilitate construction; however there will be no overall net loss of car parking spaces upon completion of the proposal. During construction 15 commuter car parking spaces at Cheltenham and 20 spaces at Beecroft station would be unavailable for a period of 12 months, representing a total loss of 18% and 12% respectively of available commuter parking spaces at these stations.

Parking surveys were undertaken as part of the assessment to gauge potential impacts from the proposal on parking access. These surveys indicate that within 400 metres (walking distance) of Cheltenham, Beecroft and Pennant Hills stations there is ample street parking available to offset any temporary loss of commuter spaces.

Several community submissions raised concerns that shops at Beecroft Village and Pennant Hills Station will suffer a loss of trade caused by construction, traffic congestion and loss of parking that could potentially result in business closures.

The construction of the designated commuter car parks at Cheltenham and Beecroft stations would be staged to minimise disruption to car parking facilities as far as possible. Parking for

construction workers throughout the site would also be provided separately from designated commuter car parks and commuter parking in adjacent streets, and generally within the rail corridor. Business owners and the local community would be given advanced warning of any amendments to traffic, access and parking to assist them to plan for these changes.

The assessment states that given these measures, the proposal would not directly result in any adverse impacts to businesses or commuters. The Proponent has also committed to minimising impacts to businesses, and will prepare a business management strategy in consultation with directly affected businesses to demonstrate that there will be no adverse impacts from the proposal. The Department agrees with this conclusion, particularly in relation to the temporary loss of spaces at stations. In relation to construction worker parking, the Department recommends that the Proponent's commitment on this matter be reinforced by a condition of approval.

In relation to operation impacts, the Department notes that parking provision will not be significantly altered. To address Council's and the community's concerns in relation to designated access of parking, the Department has recommended that parking be considered in the Design and Landscape Plan and that changes meet relevant road design standards. This would be undertaken in consultation with Council and the community.

Notwithstanding this, to enhance the Proponent's management commitments, the Department has recommended a condition of approval to ensure that potential impacts will be further alleviated. In relation to the commuter parking at stations and in particular potential on-street parking impacts, the Department considers that potential impacts will be minor and of short-term duration only.

Cumulative impacts

There is the potential for other local infrastructure projects to provide a cumulative impact on the traffic capacity of the area. Notable projects in the vicinity of ETTT works include the North West Rail Link, the M2 upgrade and other projects identified in the NSFC program.

Two NWRL construction sites, at Epping and Cheltenham, will be located within close proximity to haulage routes and access locations that will service the ETTT proposal, primarily at S1 (**Figure 5.5**). The expected traffic volumes from the combined projects at this location are low, and impacts to Beecroft Road are considered negligible.

RMS has indicated that the M2 works will be completed prior to the commencement of the ETTT. Should the M2 works be delayed, staging of the ETTT proposal will ensure that any overlap is avoided. The Proponent has noted that whilst staging will minimise the quantum of impacts, the effect will be to prolong amenity and traffic impacts over a longer time frame. To mitigate this, the Proponent has committed to undertaking works out of hours.

There are two remaining projects to be constructed as part of the current NSFC program, and the closest, the North Strathfield Rail Underpass, is geographically separated far enough from the ETTT proposal that cumulative traffic and transport impacts would not be problematic.

The Department supports the environmental management commitments from the Proponent that include a requirement for coordinating activities with major projects in the area to minimise potential cumulative impacts. As there is the potential for combined traffic disruption to occur from infrastructure projects in the locality, the Department recommends that a condition be imposed that requires the Proponent to consider and adapt management measures to address cumulative impacts.

5.6. Soil and Water

The construction of the ETTT proposal would include earthmoving and excavation activities associated with the widening of existing cuttings and for cut and fill to accommodate space for the third track. While most of the third track will be located within existing cuttings, construction works have the potential to result in soil erosion, disturbance of contaminated soil and may create land stability issues. Potential water quality impacts could also result from the management of spoil stockpiles, piling activities and from spills during construction and operation of the proposal. In regards to operation, surface water impacts would be consistent with existing operations and would be managed through the stormwater/track drainage system.

Approximately 95,000m³ of spoil would be excavated during construction and spoil would be reused on site where practicable for backfilling, access roads and retaining wall construction at fill locations. At least 65,000m³ of spoil is expected to require off-site disposal.

The assessment found that several soil samples exceeded existing contamination guidelines. Exceedences of the total petroleum hydrocarbon, arsenic and asbestos criteria were identified at several locations. Asbestos samples included chrysotile asbestos fibres at depths of 0.1m, and fragments of potential asbestos containing material were also found in a number of services trenches.

The assessment states that where indicated in the Phase II report, further testing would be required to assess any areas which may pose risks to human health or other aspects of the environment. This testing would examine potential for acid sulphate soils, saline soils, asbestos containing materials as well as other types of contamination. Mitigation measures would then be developed during detailed design to appropriately manage potential risks.

In relation to groundwater, impacts are expected to be minimal due to limited increased interactions. Potential impacts primarily relate to impacts on two existing bores, which the proponent has proposed to avoid during detailed design. Notwithstanding, groundwater monitoring indicated concentrations of heavy metals which exceed the *Australian and New Zealand Environment Conservation Council (ANZECC) 2000* freshwater trigger values at ten locations, with toluene exceedence detected at one location. The assessment states the source of these contaminants is unknown, and that further investigations are required to determine if the contamination is localised or representative of regional groundwater quality.

In its submission on the EIS, the EPA raised a number of issues regarding the lack of detailed information in the assessment on spoil management, water quality management, dewatering options (including treatment) and contaminated land assessment and management, and recommended that the Proponent undertake further assessment to investigate these aspects. The EPA also included several recommendations regarding water treatment, erosion and sediment control, and spoil management. Given the potential for a large amount of spoil to be taken to landfill, the EPA recommends that reuse options at offsite locations should be investigated, prior to disposing of excess spoil material to landfill, in accordance with the *Waste and Resource Recovery Act 2001*.

The Proponent has included an environmental management measure for unidentified contamination and asbestos. The assessment states that if further investigation identifies additional instances of contaminated soil then work in the relevant area would cease immediately. Following detailed reporting of the incident, remediation activities would not take place until receipt of an investigation report, and works would only recommence upon receipt of a validation report from a suitably qualified contamination specialist detailing that the remediation activities have been undertaken in accordance with the investigation report and remediation methodology.

Several submissions were received in relation to embankment stability and potential landslip risks. The Proponent has committed to additional geotechnical assessment to measure potential stability issues and potential impacts to adjoining properties and structures, and to the appropriate design of embankments to facilitate this risk. Monitoring would be undertaken during construction to ensure that ground movements and groundwater levels are consistent with predictions.

The Department considers that while there could be construction and operational impacts to soils and water from the project, the Proponent has committed to a large number of specific mitigation measures to ensure that potential impacts are avoided where possible or if they occur that impacts can be managed to acceptable standards.

Should dewatering be required during construction, the Proponent has indicated that groundwater quality would be subject to testing and where it does not meet license requirements would be treated prior to discharge and managed in accordance with the requirements of the *Waste Classification Guidelines* (DECCW 2009a) and Transport for NSW's *Water Discharge and Re-use Guideline* (2012e). Any operational water quality impacts would be managed through the application of RailCorp's existing environmental management system and construction of an appropriate stormwater/track drainage system developed during detailed design.

Notwithstanding these commitments, the Department recommends that assessment and certification is undertaken by a qualified Site Auditor to ensure that contaminated soil and groundwater are appropriately managed and/or remediated. In order to manage water quality impacts, the Department has recommended a condition of approval that requires that any water discharged must be suitable for the receiving environment and that it comply with section 120 of the *Protection of the Environment Operations Act 1997*. All water leaving the site during both construction and operation is required to comply with this requirement.

The Department also notes that the Proponent has since committed to a framework for managing potential impacts from the proposal, including for the preparation of a comprehensive CEMP that will consist of several management plans designed to mitigate and manage the potential risks to community health and receiving environments. These sub-plans include a sediment and erosion control plan, soil and water management plan, a contamination management plan and an asbestos management plan. The CEMP would include measures to manage spoil and waste and would include measures relating to the management of contamination and hazardous materials. Plans will be prepared in line with relevant guidelines and in consultation with applicable agencies. The Department supports the preparation of this Plan and has recommended it as a condition of approval, to strengthen the Proponent's commitments and to include specific requirements to demonstrate the effectiveness of the proposed mitigation measures.

5.7. Air Quality

Regional air quality monitoring data obtained from the OEH monitoring stations at Lindfield and Chullora (approximately 6.5 and 13 km respectively from the project) indicated that existing background air quality is generally below OEH goals. Ambient air quality in the vicinity of the alignment is typical of a developed residential and commercial area. The dominant sources of emissions in the area include combustion emissions and suspended dust from the operational impacts from traffic on local roads, existing fugitive emissions from rail operations within the Epping and Thornleigh corridor and other associated impacts of operating freight and passenger trains on a rail corridor.

The construction and operation of the ETTT proposal has the potential to impact the surrounding air quality in relation to fugitive dust, exhaust and particulate matter generation from vehicular, diesel locomotive and plant emissions and earthwork activities.

During construction, the main sources of air emissions are anticipated to be dust from earthworks and exhaust emissions from motor vehicles and construction machinery. Emissions generated from construction vehicles, equipment and plant would be associated with diesel combustion. These emissions consist of carbon monoxide (CO), nitrous oxides (NO_x or NO₂), sulphur dioxide (SO₂), particulate matter (PM) and hydrocarbon compounds. The quantity of gaseous and particulate matter emissions would be dependent on the fuel type, prevailing weather conditions and hours of operation of plant and equipment. Higher concentrations of emissions are likely to be generated at construction compounds, where multiple types of vehicle and plant would be required.

Freight train movements will increase through this section of the Main North Line as outlined in **Table 5.6**, and will more than double within 15 years. The main air quality impacts during the operation phase would result from emissions generated by diesel freight train and passenger train locomotives that travel along the Main North Line between Epping and Thornleigh railway stations. Particulate matter will also be generated by wheel and brake action and lift-off of surface particles within the rail corridor, although the impact of these emissions will be negligible.

Table 5.6: Existing and forecast diesel freight and passenger train movements between Epping and Thornleigh stations

Year	Existing and forecast daily freight train movements each direction			Existing and forecast daily diesel passenger train movements (each direction)	
	Av/day	Av/night	Peak	Number	
2011	11	9	16	5	
2016	14	14	21	5	
2026	23	21	31	5	

Source: Air Quality Impact Assessment, ETTT 2012

Pollutants associated with freight rail operation include NO_x or NO₂, PM10 and PM2.5, CO, SO₂ and trace levels of volatile organic carbons (VOC's) and hydrocarbons.

A number of submissions raised concerns in relation to the health impacts of increased rail freight and fugitive dust emissions. These concerns were particularly focused on the increase in diesel particulate matter and coal dust generated from uncovered coal freight wagons transiting the corridor.

Currently, there are two coal trains per week that transfer coal from the Hunter Valley to the Port Kembla Steel Works. Coal is also infrequently transferred through the area from the western coalfields to the power stations on the Central Coast and the Port of Newcastle, and also from Newcastle to Port Kembla due to constraints at the Newcastle Port. There is however no current constraint on coal haulage at this location as there is significant spare capacity on the Main North Line. Accordingly, given the project justification is to enable increased haulage of container freight, the Department considers that the volume of coal freight traversing the area is not expected to increase as a result of the proposal. It is also likely that as port capacity increases at the Port of Newcastle, coal transferred through this corridor will decline over time.

The air quality assessment indicated that modelled cumulative operational levels of NO₂, CO, SO₂ and VOC's (as benzene) levels would comply with OEH criteria at all measurement locations. Predicted CO, SO₂ and VOC's (such as benzene) concentrations would also comply with OEH criteria. The Department is satisfied with the assessment methodology undertaken for the construction and operation of the project and considers that the predicted

incremental and marginal increases are not significant, and that specific mitigation measures are not required.

NSW Health noted in its submission that the data presented in the air quality technical paper was incorrect. The Proponent acknowledged that Table 7.3 of the EIS air quality technical paper was incorrect and included revised data for the predicted PM10 incremental impacts in the Submissions Report. The cumulative results presented are still within the 24 hour annual average air quality criteria of 30 µg/m³ and 50µg/m³ respectively.

Notwithstanding, whilst TfNSW will not be directly responsible for the operation of the completed proposal, it has committed to working with rail-freight operators and the EPA to improve the regulatory framework of the sector. This will help to improve the network-wide environmental performance, particularly in relation to air pollution. The Department also notes that whilst not modelled, there is expected to be regional air quality benefits of reduced growth in heavy truck movements as a result of the project.

The Department considers that dust and exhaust emissions generated during the construction works can largely be controlled through the implementation of standard mitigation measures, which are routinely and successfully adopted during similar construction projects. The Proponent has committed to the development and implementation of a CEMP that incorporates a Dust Management Plan that would identify triggers and procedures for specific corrective measures.

In relation to issues raised by the community concerning existing air quality, operation air quality and air quality impact mitigation, the Department is satisfied that the Proponent has adequately responded to these matters as discussed above. Overall, the Department is generally satisfied that the Proponent has provided a suitable management framework, including the commitment to minimise the dust and exhaust emissions associated with construction and operation of the project.

5.8. Greenhouse Gas and Climate Change

The climate change risk assessment identifies components of the proposal that are at most risk from climate change impacts. The assessment identified one potential high risk and one potential medium (tolerable) risk as a result of climate change.

The potential for increased frequency and severity of heat waves in the future represents a high risk to the project, due to the potential increased likelihood of line buckling under sudden extreme temperature increases. The Proponent has committed to several measures to mitigate this risk, including identifying specific areas of vulnerability, increase frequency of maintenance, use of concrete sleepers and undertaking speed restrictions in extreme temperatures.

The increased frequency and severity of storms is considered a medium risk, due to the potential for damage to overhead powerlines, signalling and communications that may impact the suburbs of North Epping and Thornleigh. Design actions include assessing the resilience of overhead structures and powerlines, potential reinforcement measures and installation of lightning conductors where necessary.

Greenhouse gas emissions would be generated during the construction and operational phases of the ETTT proposal. A preliminary scope 1 assessment of greenhouse gas emissions (GHG) was undertaken for the construction phase, and estimated that the construction works would generate a total of approximately 9,435 tCO₂-e GHG, made up of the following (in tCO₂-e GHG):

- stationary diesel consumption (plant equipment, construction vehicles): 3,990;
- transport diesel consumption (site vehicles, transportation of waste): 2,200;

- transport petrol consumption (plant equipment, construction vehicles): 65;
- transport petrol consumption (site vehicles, transportation of waste): 2400; and
- vegetation clearing: 780.

Operational greenhouse gas emissions would primarily be associated with the operation of rolling stock and the operation and maintenance of the infrastructure. The Proponent has identified commitment to minimisation of greenhouse gas impacts, including:

- undertaking a detailed greenhouse gas assessment, including an inventory of Scope 1 (operation), 2 and 3 emissions, once more accurate information is available;
- use of alternative or low carbon fuels where reasonable and feasible; and
- general construction emissions reduction methods.

Further, the Department notes that there will be measurable savings of emissions from the overall NSFC program, as a result of reducing the growth of heavy vehicles on the road by more than 200,000 vehicle trips per year.

The Proponent is working with industry and government to improve the environmental performance and efficiency of the NSW freight network and work is underway to quantify greenhouse gas emissions and to develop strategies to improve environmental performance sector-wide. The Department considers that improvements to the environmental performance of the network are important from a climate change, energy security, and human health perspective.

Overall, the Department is generally satisfied that the Proponent has provided a suitable framework to ensure construction of the project is undertaken to avoid, reduce and manage identified potential impacts as much as possible.

5.9. Waste

Several types of waste are likely to be generated during construction works. Key waste streams include spoil excess from excavations (approximately 65 000m³), construction and demolition waste (approximately 28 000 tonnes), solid waste such as concrete and asphalt (approximately 12 400 tonnes) and liquid wastes and wastewater.

The Proponent has committed to investigating opportunities for reusing, reprocessing and recycling construction waste products during construction procurement, to be included in a waste management plan that would be prepared as part of the CEMP. Construction waste would be managed through the waste hierarchy established under the *Waste Avoidance and Recovery Act 2001*. Waste requiring off-site disposal would be classified in accordance with the OEH's Waste Classification Guidelines (2009a) prior to disposal.

The Department notes that the disposal of spoil to landfill would need to meet the approval and/or licensing requirements applicable to these activities, for traffic, delivery timeframes, and for handling requirements. As no significant waste impacts are expected to result from the construction of the ETTT, the Department is generally satisfied that the Proponent has provided a suitable framework to identify and manage any potential impacts. Standard waste management requirements have also been included by the Department as recommended conditions of approval.

In relation to the operation of the project the Department is satisfied that potential waste sources can be adequately managed through standard design and management measures and supports the Proponent's commitment on this issue.

In relation to other issues, the Department is satisfied that these have been adequately addressed in the EIS and the Response to Submissions and that no further assessment of these matters is required.

6. CONCLUSION

The NSFC Program is a key government priority identified in various policies, including the Nation Building Program and the NSW Long Term Transport Master Plan. These plans provide for an increased share of rail in the overall freight task, to accommodate forecast growth and development in NSW, incorporate transport energy efficiency solutions and to address the inefficiencies in the east coast rail network. There is variously identified an increased need to transport bulk freight by rail, to alleviate road congestion, separate passenger and freight services, and to thereby expand freight and passenger network capacity at both local and regional scales on the east coast.

The Department considers that the Epping to Thornleigh Third Track proposal is justified on the basis that it represents a vital infrastructure asset which is beneficial to public interests. The impacts of not proceeding with the project in the long term would prove detrimental to road safety, passenger and freight rail capacity and the continued growth of the NSW economy.

Following a detailed assessment of the Proponent's EIS and Submissions Report, and the submissions received from agencies, councils and the public during the exhibition period for the project, the Department is satisfied that the impacts of the project can be appropriately mitigated or managed to acceptable levels. The Department therefore recommends that the proposal be approved subject to the recommended conditions of approval.

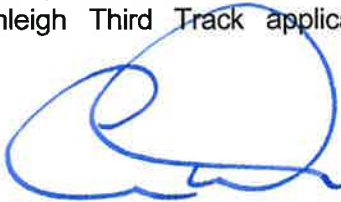
The recommended conditions of approval for the project provide for the mitigation and management of key impacts associated with the project. These include specific environmental performance conditions for noise and vibration impacts, transport and access impacts, heritage impacts, ecological impacts, soil and water quality impacts, visual impacts and urban design requirements. The Department has also recommended conditions of approval for construction environmental management planning, including the requirement for a Construction Compound and Ancillary Facilities Management Plan, a Construction Noise and Vibration Management Plan, a Construction Traffic Management Plan, a Construction Soil and Water Quality Management Plan, a Construction Heritage Management Plan, a Construction Flora and Fauna Management Plan, and a Construction Air Quality Management Plan.

The Department believes that these requirements would provide for the implementation of best management practices during design and construction of the project, and would ensure that the construction impacts of the project on the surrounding environment and the amenity of local residents are managed to acceptable levels.

7. RECOMMENDATION

The Department, based on the above assessment, recommends that the Minister for Planning & Infrastructure approve the Epping to Thornleigh Third Track application, subject to the recommended conditions of approval.


A/Director 9/7/13
Infrastructure Projects

 9.7.13
Executive Director
Development Assessment Systems and
Approvals


Director-General 10/7/2013

APPENDIX A ENVIRONMENTAL ASSESSMENT

See the Department's website at

http://majorprojects.planning.nsw.gov.au/index.pl?action=view_job&job_id=5132

APPENDIX B SUBMISSIONS

See the Department's website at

http://majorprojects.planning.nsw.gov.au/index.pl?action=view_job&job_id=5132

APPENDIX C PROPONENT'S RESPONSE TO SUBMISSIONS

See the Department's website at

http://majorprojects.planning.nsw.gov.au/index.pl?action=view_job&job_id=5132

APPENDIX D RECOMMENDED CONDITIONS OF APPROVAL
