

CHATSWOOD TO SYDENHAM
**ENVIRONMENTAL
IMPACT
STATEMENT**

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TECHNICAL PAPER 6:
LANDSCAPE & VISUAL IMPACT ASSESSMENT

Sydney Metro, City and Southwest

Chatswood to Sydenham

Technical Paper No. 6

Landscape & Visual Impact Assessment



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IRIS Visual Planning + Design

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EXECUTIVE SUMMARY

Project overview

Project overview

Sydney Metro is a new standalone rail network identified in Sydney's Rail Future. The Sydney Metro network consists of Sydney Metro City & Southwest and Sydney Metro Northwest.

The proposed Sydney Metro City & Southwest comprises two core components:

- The Chatswood to Sydenham project (the project), the subject of this technical paper, would involve construction and operation of an underground rail line between Chatswood and Sydenham
- The Sydenham to Bankstown upgrade would involve the conversion of the 13.5 kilometre Bankstown line to metro standards and upgrade of existing stations between Sydenham and Bankstown.

The Sydenham to Bankstown upgrade will be subject to a separate environmental impact assessment.

Investigations have started on the possible extension of Sydney Metro from Bankstown to Liverpool. The potential extension would support growth in Sydney's south west by connecting communities, businesses, jobs and services as well as improving access between the south west and Sydney's CBD. It would also reduce growth pressure on road infrastructure and the rail network, including the potential to relieve crowding on the T1 Western Line, T2 South Line and T2 Airport Line.

The Sydney Metro Chatswood to Sydenham project (the project) involves the construction and operation of a metro rail line. The project would be mainly located underground in twin tunnels extending from Chatswood on Sydney's north shore, crossing under Sydney Harbour, and continue to Sydenham.

The key components of the project would include:

- About 15.5 kilometres of twin rail tunnels (that is, two tunnels located side-by-side) between Mowbray Road, Chatswood and north of Sydenham Station (near Bedwin Road, Marrickville)
- Realignment of the existing T1 North Shore Line surface track within the existing rail corridor between Chatswood Station and in the vicinity of Brand Street, Artarmon, including a new bridge for a section of the 'down' (northbound) track to pass over the proposed northern dive structure
- About 250 metres of aboveground metro tracks between Chatswood Station and the Chatswood dive structure
- A dive structure (about 400 metres long) and tunnel portal south of Chatswood Station and north of Mowbray Road, Chatswood (the Chatswood dive structure)
- A substation (for traction power supply) at Artarmon
- Metro stations at Crows Nest, Victoria Cross, Barangaroo, Martin Place, Pitt Street and Waterloo; and new underground platforms at Central Station
- A dive structure (about 400 metres long) and tunnel portal between Sydenham Station and Bedwin Road, Marrickville (the Marrickville dive structure)
- A services facility (for traction power supply and an operational water treatment plant) adjacent to the Marrickville dive structure.

The project would also include a number of ancillary components, including new overhead wiring and alterations to existing overhead wiring, signalling, access tracks / paths, rail corridor fencing, noise walls, fresh air ventilation equipment, temporary and permanent alterations to the road network, facilities for pedestrians, and other construction related works.

Approach to landscape and visual assessment

This assessment considers the expected impact of the project on each surface works site in terms of:

- Landscape quality, and
- Visual amenity

The assessment identifies the landscape and visual impact during construction and operation, and during the day and at night.

The scope of the surface works at the eight station sites is limited to the construction and operation of the ground floor level entry and structural elements to provision for future above station development. Any above station development would not be undertaken as part of this project and has not been considered in this assessment.

Overview of potential impact

The following section summarises the potential landscape and visual impact which are expected to be experienced at the eleven surface works sites.

Chatswood dive site (northern) & Northern surface works

Landscape impact

Construction of the project would result in a **moderate adverse landscape impact** on the Frank Channon Walk. This would be primarily due to the direct impact of construction upon the path, and its closure during some stages of construction. Although the Frank Channon Walk would be reopened during project operation, the loss of trees, scale of adjacent retaining structure and noise walls, and overshadowing impact would result in a **minor adverse landscape impact**.

There would be indirect impact on Chatswood Park during the construction and operation of the project, however, this would result in a **negligible landscape impact**.

Visual impact

There would be **minor** and **moderate adverse visual impact** created by the project during construction. These impact are primarily due to the scale and extent of the works, including the removal of vegetation along the rail corridor between Nelson Street and Mowbray Road, introduction of larger noise walls, and the scale of works occurring at the dive site. These impact are experienced in particular from Nelson Street, Gilham Street, Mowbray Road and the residential properties to the east of the existing rail corridor.

There would also be **minor adverse visual impact** experienced from elevated residences to the west of the Frank Channon Walk. In these views, the removal of vegetation within the rail corridor, and the introduction and augmentation of noise walls, would open up views to the existing corridor as well as change the character of views to include the rail corridor and construction of the new Metro line.

During operation, there would be **minor** to **moderate adverse visual impact** experienced in views to the site from residential properties to the west of Frank Channon Walk, residential properties and streets between Nelson Street and Mowbray Road, and residential properties between Mowbray and Hawkins Street. The removal of vegetation within the rail corridor would result in some unfiltered views of the corridor works and dive structure. Adverse effects to adjacent residential areas would also be caused by the provision of additional, relocated, and increasing the height of noise walls in some locations along the rail corridor.

At night there would be a **moderate adverse visual impact** during construction due to the requirement for vehicle deliveries and haulage after hours. During operation, however, there would be a **negligible visual impact** as the works would be visually absorbed into the existing character of the rail corridor and surrounding area of E3: Medium district brightness.

EXECUTIVE SUMMARY

Overview of potential impact

Artarmon substation

Landscape impact

The landscape impact of the project both during construction and operation are expected to be **negligible** at the Artarmon substation site. This is due to the containment of works within the project site, and minor requirement for haulage and deliveries.

Views to this the are predominantly neighbourhood sensitivity views from adjacent residential streets and properties. There are expected to be **negligible visual impact** experienced in views to the project during both construction and operation. This is due to the change from views of a temporary school buildings, to less visually intensive activities.

After-hours works are not required for the construction of the project at this site.

At night, during operation, there would be **negligible visual impact** during both construction and operation of the project. This is due to the surrounding **E3: Medium district brightness area** and minimal lighting required to undertake the works and operate the facility.

Crows Nest Station

Landscape impact

During construction the project would result in a **minor adverse landscape impact** on the surrounding streets of Oxley, Hume and Clarke Streets and the Pacific Highway in the vicinity of the project site. This is primarily due to the direct impact on pedestrian movement and the loss of mature street trees.

During operation, there would be **minor beneficial landscape impact** experienced on these surrounding streets and Clarke Place Park. These benefits relate to the improved access to public transport and additional pedestrian crossings which would improve overall accessibility and permeability of the entire precinct.

Visual impact

There would be a range of adverse visual impact created by the project during construction including **minor** and **moderate adverse visual impact**. These impact are primarily due to the extent of demolition works, and the scale of the acoustic enclosures and construction sites. The range of impact levels reflect the scale and proximity of the works to the viewing location. Generally impact are more substantial in the vicinity of Hume Street where the construction site works would be more complex and have a larger footprint.

There would be a **negligible visual impact** experienced in views to the site during operation of the project. In particular, the views would be restored and somewhat improved at the corner of Hume and Clarke Street where the new station entry and streetscape upgrades would be seen.

At night there would be **negligible visual impact** during construction due to the context of **E4: High district brightness area**. During operation there would also be a **negligible** visual impact as the station and associated development would be visually absorbed into the surrounding brightly lit context.

Victoria Cross Station

Landscape impact

During construction there would be a **moderate adverse landscape impact** on the Harbour cycles sculpture as it would be removed to make way for the construction site. There would also be a **minor adverse landscape impact** on Berry and Miller Streets in the vicinity of the project sites, primarily due to the direct impact on pedestrian movement and the loss of mature street trees.

During operation there would be **moderate beneficial landscape impact** experienced on these surrounding streets. These benefits relate to the improved access to public transport, footpath widening and the

creation of a plaza which would improve overall accessibility and permeability around the entire precinct. There would be **negligible landscape impact** on the surrounding landscapes of the Monte Sant' Angelo Mercy College, the MLC Building sculpture garden and Brett Whiteley Place.

Visual impact

There would be a range of adverse visual impact created by the project during construction including **minor** and **moderate adverse visual impact** from surrounding streets. These impact are primarily due to the demolition of buildings, the establishment of acoustic enclosures and construction vehicles accessing the site. The range of impact levels reflect the sensitivity of the view and proximity to the site. The site would be viewed from footpaths directly adjacent to the construction site as well as from locations up and down Miller Street as far away as the Pacific Highway intersection in the south.

During operations, the introduction of a services facility at the northern site would have a **minor adverse visual impact** on views due to the loss of visual interest and reduced compatibility with surrounding built form.

At the southern site there would be **minor beneficial visual impact** experienced in during the operation of the project. These benefits are created by the uncluttering of views to the site and the introduction of a broad open plaza space, street trees, and a prominent station entry.

At night, in both locations, there would be **negligible visual impact** during construction, despite the requirement for vehicle deliveries and haulage at night. During operation, there would also be a **negligible visual impact** as the station lighting would be in character with the **E4: High district brightness** setting.

Blues Point temporary construction site

Landscape impact

During construction the project would result in a **high adverse landscape impact** on the Blues Point Reserve as a consequence of the

direct loss of harbour foreshore open space.

These impact are temporary, and there would be no landscape impact during operation as there are no activities proposed for this site.

Visual impact

There would be a range of visual impact created by the project during construction. In views from areas around Blues and McMahons Point there would be **high adverse visual impact**. These impact are created by the obstruction of views to the open water of the harbour and incongruent character of the project works within these views.

In views from the Harbour Bridge and the Ives stairs, there would be **moderate adverse visual impact** during construction. This is due to the disruption of the green foreshore edge seen from across the harbour.

The highly sensitive viewing location of the Sydney Opera House and forecourt is expected to experience **negligible visual impact** as a result of the project during construction. Although the site would be clearly visible, the distance and visual absorption capacity of the surrounding urban environment would result in no perceived change in the amenity of views from this location.

Negligible visual impact would be experienced from the Barangaroo Reserve during construction, where distance and intervening elements would limit the visibility of the site.

These impact are temporary, and there would be no visual impact during operation as there are no activities proposed for this site.

At night there would be **minor adverse visual impact** expected during construction. This is due to the night works that would be required at the site, particularly 24 hour deliveries and TBM retrieval activities.

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Overview of potential impact

Harbour ground improvement works

Landscape impact

During construction the landscape impact of the project would result in a **negligible landscape impact** due to the absorption capacity of the surrounding busy harbour.

These impact are temporary, and there would be no landscape impact during operation as there are no activities proposed for this site.

Visual impact

There would, however, be **negligible, minor and moderate adverse visual impact** experienced due to the Harbour Works during construction. In distant views, it is expected that the project works would be visually absorbed into the busy waters of this section of the harbour, resulting in **negligible visual impact** from the Sydney Opera House and Waverton Peninsular Reserve during construction. In views where the site is seen at a closer proximity, and where both sites would be seen there are **minor and moderate adverse visual impact**. This includes views from Blues Point Reserve, Milsons Point Wharf, Balmain East Ferry Wharf and Barangaroo Reserve.

These impact are temporary, there are no visual impact during operation as there are no activities proposed for this site.

Barangaroo Station

Landscape impact

During construction the project would result in a **minor adverse landscape impact** on Hickson Road in the vicinity of the project sites, primarily due to the direct impact on vehicular and pedestrian movement and the loss of mature street trees.

During operation, however, there would be **minor beneficial landscape impact** experienced at Hickson Road and Central Barangaroo, and **moderate beneficial landscape impact** at the Barangaroo Reserve. These benefits are due to improved

access of public transport and public realm enhancements which would increase the overall accessibility and permeability around this precinct.

Visual impact

There would be a range of visual impact created by the project during construction including **minor and moderate adverse visual impact**. These impact are the result of a balance between the mitigating effect of the existing surrounding context of construction activity on the adjacent Central Barangaroo site, and the high sensitivity of surrounding visual receptors. Greater impact would be experienced in locations of higher visual sensitivity, and where construction of the project is seen extending into new areas, such as the Millers Point cliff wall in views from the Munn Street Bridge, which would result in a **moderate adverse visual impact**.

In addition, there would be temporary **minor adverse visual impact** experienced during the power upgrade works on Hickson Road, Sussex, Shelley, Lime and Erskine Streets.

During the operation of the project **negligible visual impact** are expected from most assessed viewing locations, due to the integration of the project into the surrounding Central Barangaroo development. There is a **moderate adverse visual impact** expected from views at the North Cove plaza (in Barangaroo Reserve), where the service facilities would be located adjacent to the Millers Point cliff wall, and become a prominent element in streetscape views.

At night there would be **negligible impact** expected during construction and operation. This is due to the existing construction activity, experienced in views from the west, and containing effect of the Millers Point cliff wall to viewing locations to the east.

Martin Place Station

Landscape impact

During construction the project would result in a **minor adverse landscape impact** on Hunter, Castlereagh and Elizabeth Streets in the vicinity of the project sites. Furthermore, the removal of the P&O Fountain would result in a **moderate adverse landscape impact**.

There would be a **very high adverse landscape impact** on Martin Place during construction due to the diversion of pedestrian movement on these streets and a portion of Martin Place during construction, as well as the loss of trees and plaza space for community use.

During operation there would be a **minor beneficial landscape impact** on Hunter, Castlereagh and Elizabeth Streets where they surround the project site. The improvements to Martin Place would create a **high beneficial landscape impact** due to the integration of the station with Martin Place, and improvements to legibility and accessibility in particular.

Visual impact

There would be a range of visual impact experienced during construction. This would include adverse impact on views from the surrounding streets and public squares, including: **minor adverse** impact in views from Richard John Square, **moderate adverse** impact from Chifley Square, and **very high adverse visual impact** from Martin Place.

The impact during construction are primarily derived from the demolition of buildings and the establishment of acoustic enclosures. The highly sensitive nature of views within this precinct result in higher visual impact. There would also be temporary **minor adverse visual impact** experienced during the power upgrade works on Hunter, Margaret, George and Napoleon Streets.

During operation there would be **high beneficial impact** on views in the vicinity of Martin Place, as the design offers an

improvement to the current views in this area.

At night there would be **negligible visual impact** during construction and operation. This is due to the enclosure of light within the acoustic enclosures and the surrounding setting of **E4: High district brightness** environment.

Pitt Street Station

Landscape impact

During construction the project would result in a **minor adverse landscape impact**, and a **minor beneficial** impact. These impact are primarily a consequence of the street level impact of construction on pedestrian movement. During operation, the existing highly urban environment would be improved by street level activation and legible public transport access points.

Visual impact

There would be a **minor adverse visual impact** experienced in most views in the vicinity of the project during construction. These impact are derived primarily from the demolition of buildings, however, the mixed character of this precinct would largely absorb this visual change. A **moderate adverse** visual impact is expected from Hyde Park in the view along Park Street. This is due to the higher visual sensitivity of this location.

There would also be temporary **minor adverse visual impact** experienced during the power upgrade works on the Surry Hills substation connection option, and **minor to moderate adverse visual impact** would be experienced on the Pyrmont substation connection option due to the sensitivity of views to Town Hall, the QVB, and Cockle Bay.

During operation there would be **negligible** visual impact created by the project due to the visual absorption capacity of the surrounding urban environment.

At night, there would be **negligible visual impact** during construction and operation.

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Overview of potential impact

This is due to the enclosure of light within the acoustic enclosures and the surrounding setting of **E4: High district brightness** environment.

Central Station

Landscape impact

During construction there would be a **moderate adverse landscape impact** experienced at the northern concourse due to impact on pedestrian connectivity, legibility of the station entry from the north, and the reduced activation and comfort of the entry plaza created by the loss of retail tenancies, trees and construction activity.

During operation, however, there would be **negligible landscape impact** experienced due to the reinstatement of impacted public realm areas.

Visual impact

There would be a range of visual impact created by the project during construction including **minor** and **moderate adverse visual impact**. These impact are due primarily to the sensitivity of views and the scale of works. In particular, the scale of the new built elements, including the temporary pedestrian bridge between Platforms 1 and 23, and the Sydney Yards access bridge between Regent Street and the Sydney Yards laydown site.

During operations there would be mainly **negligible visual impact** as the temporary bridge would be removed and the station platforms reinstated. However, there would be **moderate adverse visual impact** at Regent Street and from trains within the corridor where the Sydney Yards access bridge would be seen as it and continue to be used for access to the Yards and at the Station as the services building at the southern end of the proposed Metro platform alters views.

At night there would be **negligible visual impact** during construction and operation of the project due to the existing lit context of **E4: High district brightness**.

Waterloo Station

Landscape impact

During construction the project would result in **negligible to minor adverse landscape impact**. These impact are primarily a consequence of the street level effects of construction on pedestrian movement and the reduced shade due to removal of buildings with awnings and street trees.

During operation there would be a **minor beneficial landscape impact** experienced at the site. This would be due to the combined effect of localised footpath improvements, the introduction of a legible public transport node.

Visual impact

There would be a **negligible to minor adverse visual impact** on most views in the vicinity of the project during construction. These impact are primarily derived from the demolition of existing buildings. There would also be a **moderate adverse impact** in views from Botany Road where the setting of the heritage listed church is altered.

There would also be temporary **minor adverse visual impact** experienced during the power upgrade works on Cope, Wellington and George Streets to connect with the Zetland substation.

During operation there would be **negligible visual impact** as the precinct would readily absorb the visual change due to the existing eclectic mix of character and future urban renewal project (subject to separate assessment).

At night the project would result in **minor adverse visual impact** during construction, due to the requirement for vehicle deliveries and haulage at night. During operation, however, there would be a largely **negligible impact** experienced due to the existing area of **E3: Medium district brightness**, and precedent of commercial development.

Marrickville dive site (southern)

Landscape impact

There would be a **minor adverse landscape impact** on the Marrickville Flood Storage Reserve during construction. Although there would be no direct impact on the reserve, the loss of warehousing that is located directly adjacent would alter the landscape character of its setting. There would also be a **minor adverse landscape impact** on the street art precinct within the industrial areas of Marrickville during construction due to the removal of industrial buildings which include graffiti.

During operation there are expected to be **negligible** landscape impact as the site would be returned to light industrial use.

Visual impact

As a result of the project there would be mainly **negligible visual impact** during both construction and operation. This is primarily due to the consistency in character between the existing light industrial landscape and the proposed construction site works and operational site features, as well as the relatively low sensitivity of surrounding viewing locations. There would be a **minor adverse visual impact** on views from the rail corridor due to the scale and increased sensitivity of these views which are seen by large number of viewers.

During construction there would be temporary **minor adverse visual impact** experienced during the power upgrade works on Lord, John, Council May Streets and the Princes Highway to Sydney Park.

During both construction and operation there would be a **minor adverse visual impact** on views from the rail corridor due to the scale and increased sensitivity of these views which are seen by large number of viewers.

Similarly, at night there is expected to be a **negligible visual impact** during construction and operation. This is due to the relatively low sensitivity of surrounding viewing areas and absorption of the change into the

surrounding **E3: Medium District Brightness** area. Although this activity would potentially create a slight reduction in the amenity of these views, the overall impact is not substantial.

Summary of mitigation response

In summary, the following mitigation measures are proposed to avoid, reduce and manage the identified potential adverse operational and construction landscape and visual impact.

During construction, proposed mitigation measures include:

- Where feasible and reasonable, the elements within construction sites would be located to minimise visual impact, for example materials and machinery would be stored behind fencing.
- Existing trees to be retained would be protected prior to the commencement of construction in accordance with Australian Standard AS4970 the Australian Standard for Protection of Trees on Development Sites and Adjoining Properties.
- Lighting of compounds and construction sites would be oriented to minimise glare and light spill impact on adjacent receivers.
- Visual mitigation would be implemented as soon as feasible and reasonable after the commencement of construction, and remain for the duration of the construction period.
- Opportunities for the retention and protection of existing street trees would be identified during detailed construction planning.
- The design and maintenance of construction site hoardings would aim to minimise visual amenity and landscape character impact, including the prompt removal of graffiti. Public art opportunities would be considered.

- The selection of materials and colours for acoustic sheds would aim to minimise their visual prominence.
- Tunnel boring machine retrieval works at the Blues Point temporary site would be timed to avoid key harbour viewing events.
- Benching would be used where feasible and reasonable at Blues Point temporary site to minimise visual amenity impact.

During operation, proposed mitigation measures include:

- Cut off and direct light fittings (or similar technologies) would be used to minimise glare and light spill onto private property.
- Where feasible and reasonable, vegetation would be provided to screen and visually integrate sites with the surrounding area.
- Identify and implement appropriate landscape treatments for Frank Channon Walk.
- The architectural treatment of Artarmon substation would minimise visual amenity and landscape character impact.
- The Harbour Cycles sculpture at North Sydney would be reinstated at a location determined in consultation with North Sydney Council.
- The P&O Fountain at 55 Hunter St would be reinstated at a location determined in consultation with City of Sydney Council.
- Opportunities would be investigated to provide a permanent wall for street art at Marrickville dive site in consultation with Marrickville Council.
- Noise walls would be transparent where they are augmenting existing transparent noise walls.

01 INTRODUCTION

The project

Sydney Metro is a new standalone rail network identified in Sydney's Rail Future. The Sydney Metro network consists of Sydney Metro City & Southwest and Sydney Metro Northwest.

The proposed Sydney Metro City & Southwest comprises two core components:

- The Chatswood to Sydenham project (the project), the subject of this technical paper, would involve construction and operation of an underground rail line between Chatswood and Sydenham
- The Sydenham to Bankstown upgrade would involve the conversion of the 13.5 kilometre Bankstown line to metro standards and upgrade of existing stations between Sydenham and Bankstown.

Both components are subject to assessment and approval by the Minister for Planning under Part 5.1 of the NSW Environmental Planning and Assessment Act 1979 (EP&A Act). The Sydenham to Bankstown upgrade will be subject to a separate environmental impact assessment.

Sydney Metro Northwest (formerly the North West Rail Link) is currently under construction, services will start in the first half of 2019. This includes a new metro rail line between Rouse Hill and Epping and conversion of the existing rail line between Epping and Chatswood to metro standards.

Investigations have started on the possible extension of Sydney Metro from Bankstown to Liverpool. The potential extension would support growth in Sydney's south west by connecting communities, businesses, jobs and services as well as improving access between the south west and Sydney's CBD. It would also reduce growth pressure on road infrastructure and the rail network, including the potential to relieve crowding on the T1 Western Line, T2 South Line and T2 Airport Line.

The Sydney Metro Delivery Office has been established as part of Transport for NSW

to manage the planning, procurement and delivery of the Sydney Metro network.

The Sydney Metro rail network is shown in Figure 1 1.

1.1 The Sydney Metro network

The customer experience underpins how Sydney Metro is being planned and designed.

The customer experience incorporates all aspects of travel associated with the transport network, service and project including:

- The decision on how to travel
- The travel information available
- The speed and comfort of the journey
- The range and quantity of services available at stations, interchanges and within station precincts.

A high quality 'door to door' transport product is critical to attract and retain customers and also to meet broader transport and land use objectives. This includes providing a system that is inherently safe for customers on trains, at stations and at the interface with the public domain; providing direct, comfortable, legible and safe routes for customers between transport modes; and provide a clean, pleasant and comfortable environment for customers at stations and on trains.

Key features of the metro product include:

- Comfortable carriages with space for customers to sit or stand
- A 'turn-up-and-go' service, with high frequency trains, reduced journey times with faster trains, and new underground routes through the Sydney CBD
- Increased capacity to safely and reliably carry more customers per hour due to the increased frequency of trains
- Reduced dwell times at stations as each carriage would be single-deck with three doors, allowing customers to board and alight more quickly than they can with double-deck carriages.

The Chatswood to Sydenham project would have the capacity to run up to 30 trains per hour through the Sydney CBD in each direction, which would provide the foundation for delivering a 60 per cent increase in the number of trains operating in peak periods, and cater for an extra 100,000 customers per hour.

1.2 Overview of the project

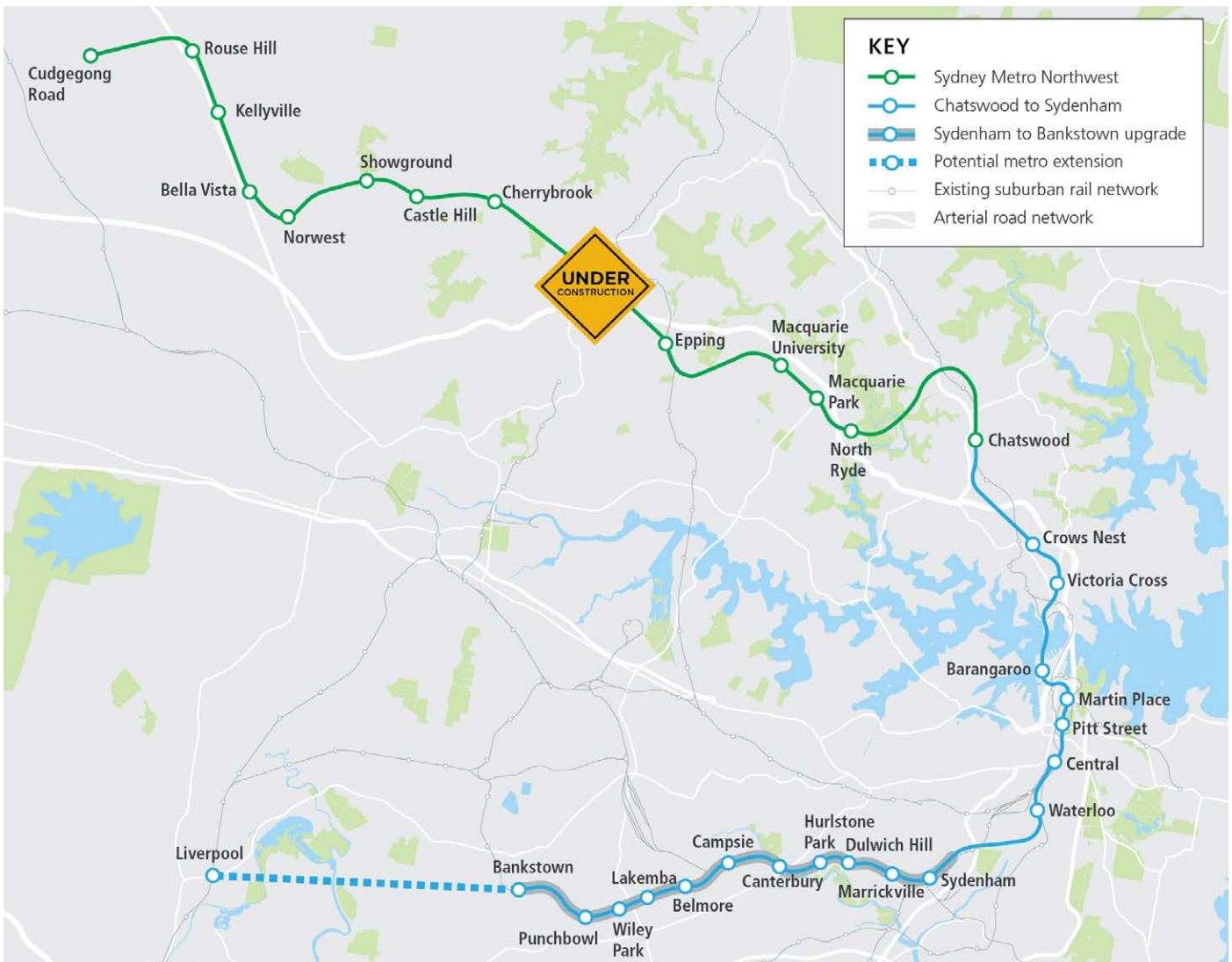
1.2.1 Location

The Sydney Metro Chatswood to Sydenham project (the project) involves the construction and operation of a metro rail line. The project would be mainly located underground in twin tunnels extending from Chatswood on Sydney's north shore, crossing under Sydney Harbour, and continue to Sydenham Station.

1.2.2 Key features

The proposed alignment and key operational features of the project are shown in Figure 1 2 and would include:

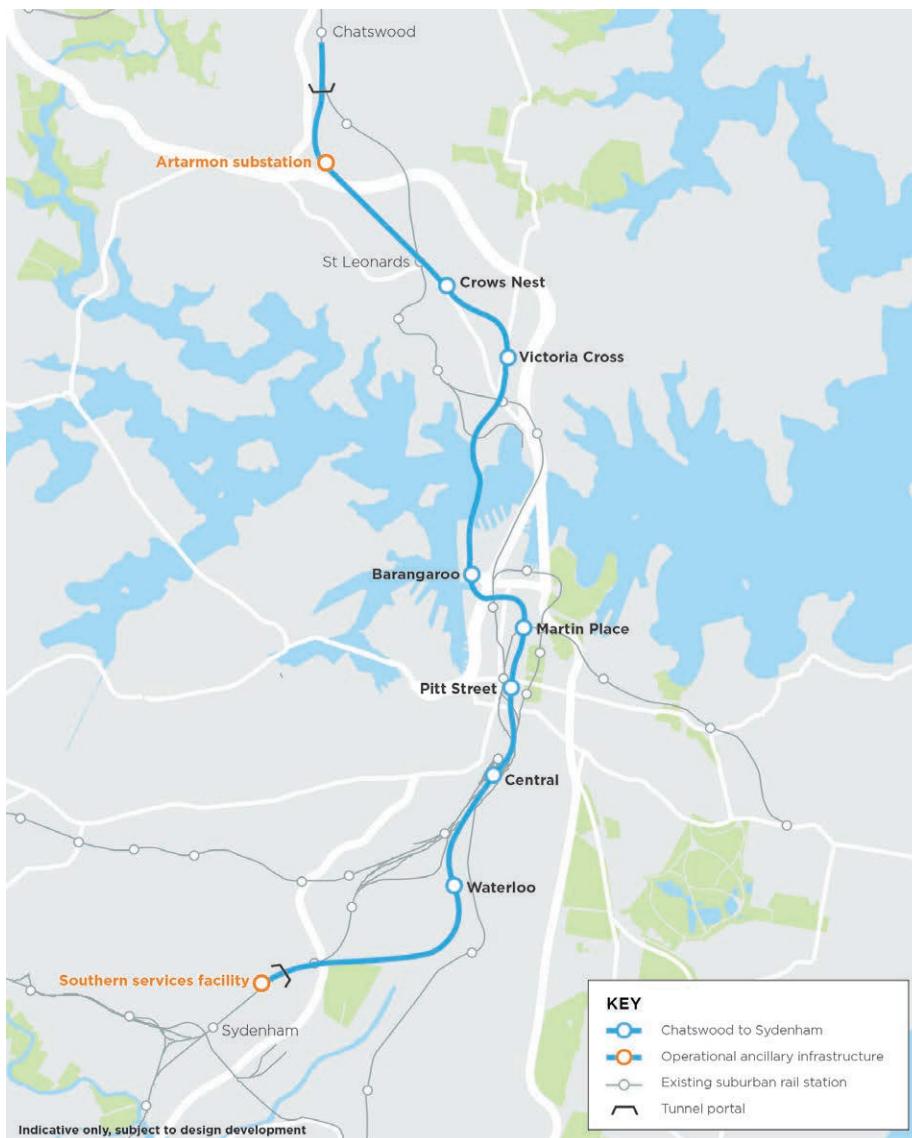
- Realignment of T1 North Shore Line surface track within the existing rail corridor between Chatswood Station and Brand Street, Artarmon, including a new bridge for a section of the 'down' (northbound) track to pass over the proposed northern dive structure
- About 250 metres of aboveground metro tracks between Chatswood Station and the Chatswood dive structure
- A dive structure (about 400 metres long) and tunnel portal south of Chatswood Station and north of Mowbray Road, Chatswood (the Chatswood dive structure)
- About 15.5 kilometres of twin rail tunnels (that is, two tunnels located side-by-side) between Mowbray Road, Chatswood and Bedwin Road, Marrickville. The tunnel corridor would extend about 30 metres either side of each tunnel centre line and around all stations



- A substation (for traction power supply) in Artarmon, next to the Gore Hill Freeway, between the proposed Crows Nest Station and the Chatswood tunnel portal
 - Metro stations at Crows Nest, Victoria Cross, Barangaroo, Martin Place, Pitt Street and Waterloo; and new underground platforms at Central Station
 - A dive structure (about 400 metres long) and tunnel portal between Sydenham Station and Bedwin Road, Marrickville (the Marrickville dive structure)
- 1-1 THE SYDNEY METRO NETWORK

01 INTRODUCTION

The project



1-2 THE PROJECT

- A services facility beside the Marrickville dive structure and tunnel portal, including a tunnel water treatment plant and a substation (for traction power supply).

The project would also include:

- Permanent closure of the road bridge at Nelson Street, Chatswood, and provision of double right-turn lanes from the Pacific Highway (southbound) into Mowbray Road (westbound)

- Changes to arrangements for maintenance access from Hopetoun Avenue and Albert Avenue, Chatswood as well as a new access point from Brand Street, Artarmon
- Underground pedestrian links at some stations and connections to other modes of transport (such as the existing suburban rail network) and surrounding land uses
- Alterations to pedestrian and traffic arrangements and public transport infrastructure (where required) around the new stations and surrounding Central Station
- Installation and modification of existing Sydney Trains rail systems including overhead wiring, signalling, rail corridor fencing and noise walls, within surface sections at the northern end of the project
- Noise walls (where required) and other environmental protection measures.

The proposed construction activities for the project broadly include:

- Demolishing buildings and structures at the station sites and other construction sites
- Constructing tunnels, dive structures and tunnel portals
- Excavating, constructing and fitting out metro stations, fitting out tunnel rail systems and testing and commissioning of stations, tunnels, ancillary infrastructure, rail systems and trains
- Excavating shafts, carrying out structural work and fitting out ancillary infrastructure at Artarmon and Marrickville.

A number of construction sites would be required to construct the project. These include locations for tunnel equipment and tunnel boring machine support at Chatswood, Barangaroo and Marrickville as well as at station sites; a casting yard and segment storage facility at Marrickville and

Purpose and scope
of this report

Secretary's environmental
assessment requirements

a temporary tunnel boring machine retrieval site at Blues Point.

1.3 Purpose and scope of this report

The project has been declared State significant infrastructure and critical State significant infrastructure and therefore requires assessment and approval by the Minister for Planning under Part 5.1 of the EP&A Act, including preparation of an environmental impact statement (EIS).

This technical paper, Technical Paper 6: Landscape and Visual Impact Assessment, is one of a number of technical documents that forms part of the EIS. The purpose of this technical paper is to identify and assess the Urban Design and Visual impact of the project during both construction and operation. In doing so it responds directly to the Secretary's Environmental Assessment Requirements (SEARs) outlined in Section 1.4.

The Urban Design requirements in the SEARS relate to 'visual amenity', 'character' and 'quality' of the surrounding environment as well as 'accessibility' and 'connectivity' of communities. These requirements will be addressed in a 'Landscape assessment' which incorporates all of these considerations and uses terminology which is consistent with the relevant industry assessment guidelines. (Refer section 02 Methodology)

This technical paper considers the construction and operational impact of the project on the urban landscape and visual setting of the project, and includes:

- A review of the relevant planning context
- Identification of the existing environmental conditions
- Identification of the landscape and visual sensitivity of key receptors
- An assessment of landscape impact during construction and operation
- An assessment of the daytime visual

impact during construction and operation

- A general assessment of night time visual impact during construction and operation
- Identification of mitigation measures.

1.4 Secretary's environmental assessment requirements

The Secretary's environmental assessment requirements relating to Urban Design and Visual Amenity, and where these requirements are addressed in this technical paper, are outlined in Table 1 1.

TABLE 1.1 SECRETARY'S ENVIRONMENTAL ASSESSMENT REQUIREMENTS

Secretary's environmental assessment requirements	Where addressed
<p>14. Urban design</p> <p>The project design complements the visual amenity, character and quality of the surrounding environment.</p> <p>The project contributes to the accessibility and connectivity of communities.</p> <p>1. The Proponent must:</p> <p>(a) identify the urban design and landscaping aspects of the project and its components;</p> <p>(b) include consideration of urban design principles adopted by each council or within each station precinct;</p> <p>(c) assess the impact of the project on the urban, rural and natural fabric;</p> <p>(d) explore the use of Crime Prevention Through Environmental Design (CPTED) principles during the design development process, including natural surveillance, lighting, walkways, signage and landscape; and</p> <p>(e) identify urban design strategies and opportunities to enhance healthy, cohesive and inclusive communities.</p>	<p>(a), (b), (c) are addressed in sections 03 - 16</p> <p>(d) and (e) are addressed in the EIS Chapter 6 Project Description - Operation</p>
<p>15. Visual Amenity</p> <p>The project minimises adverse impact on the visual amenity of the built and natural environment (including public open space) and capitalises on opportunities to improve visual amenity.</p> <p>1. The Proponent must assess the visual impact of the project and any ancillary infrastructure on:</p> <p>(a) views and vistas;</p> <p>(b) streetscapes, key sites and buildings;</p> <p>(c) the local community.</p> <p>2. The Proponent must provide artist impressions and perspective drawings of the project to illustrate how the project has responded to the visual impact through urban design and landscaping.</p>	<p>Sections 03 - 16</p>

02 METHODOLOGY

Guidance for landscape and visual impact assessment

Methodology

Guidance for landscape and visual impact assessment

A range of guidance is available for the assessment of landscape and visual impact. In New South Wales the following are typically referred to:

- RMS Guidance note EIA-N04 Guidelines for Landscape Character and Visual Impact Assessment, 2013.
- The Guidance for Landscape and Visual Impact Assessment, Third Edition, prepared by the Landscape Institute and Institute of Environmental Management & Assessment, UK, 2013.
- The US Forestry Service, Scenic Management System as described in the publication 'Landscape Aesthetics: A Handbook of Scenery Management', US Forestry Service, 1996.

The methodology used for this project is described in Section 2, and conforms generally with the direction offered by these documents.

Methodology

The following Landscape and Visual Impact Assessment includes for each site:

- A review of the relevant planning context
- Identification of the existing environmental conditions
- Identification of the landscape and visual sensitivity of key receptors
- An assessment of landscape impact during construction and operation
- An assessment of the daytime visual impact during construction and operation
- A general assessment of night time visual impact during construction and operation
- Identification of mitigation measures

Planning context

The planning context for each site has been outlined by detailing relevant clauses that identify the value of the landscape and visual conditions of the project site.

This includes International Agency, Federal, State, and Local Government planning guidance for the landscape and visual values of the project site. Additionally, where master plans and guidance documents identify the ambitions for the site or study area, the relevant clauses have been recorded and their relevance to this assessment explained.

Existing environment

The existing environment has been described in terms of the key landscape and visual features of each site and study area. Site visits were undertaken and the existing character, landscape elements and views were recorded through observations and photographs.

Where relevant, the future character and conditions of each site have been anticipated. As landscape and visual conditions evolve and change over time some future projects may redefine land use, development density and the character of the study area. This includes projects which are under construction, and projects with development approval. It is likely that these projects will contribute to the character and conditions of the site when construction and operation of this project would occur. Examples of future relevant projects include: Central Barangaroo which is being planned for the areas surrounding the proposed Barangaroo Station site; '177 Pacific' an office building currently under construction in North Sydney to the west of the station site; and the CBD and South East Light Rail project which is likely to be constructed alongside this project in the vicinity of Central Station.

To a lesser extent, the intent of master plans and precinct strategies has also been considered in the baseline condition, where there is a level of certainty that these plans will be implemented over time.

Landscape impact assessment

Landscape in the urban context refers to the overall character and function of a place; it includes all elements within the public realm and the interrelationship between these elements and the people who use it. This landscape impact assessment will address the issues identified in the SEARS at 14. Urban Design.

There are a range of landscape elements that may be directly or indirectly impacted by the project. In order to address these impact, an assessment was undertaken by identifying the sensitivity of the element, magnitude of change expected as a result of the project, and then making an overall assessment of the level of impact.

The elements that were assessed in each precinct typically include public plazas, parks and streetscapes. The assessment of modification was based on the extent of change expected and considered a range of urban design factors including those found in the guidance from the National Urban Design Protocol, Designing Places for People (2011), which has been endorsed by the NSW Government.

Landscape sensitivity

Landscape sensitivity refers to the value placed on a landscape element or urban place, and the level of service it provides to the community. The sensitivity of a landscape may reflect the frequency and volume of users in a CBD location, but may also be valued for other characteristics such as tranquility, visual relief, and contribution to microclimate. The value of landscapes is often described in council and state government master plans and planning guidance documents, reflecting the importance of landscape resources to the local, regional and the state-wide community.

The sensitivity of landscape features is therefore considered in the broadest context of possible landscapes, from those of national importance through to those considered to have a neighbourhood landscape importance (Table 2-1).

In this table, the terms 'state' and 'regional' landscape sensitivity are intended to describe the value placed on the landscape by the community. Any landscape features which are afforded legislative protection will be specifically identified in the policy context section of the assessment.

TABLE 2-1 LANDSCAPE SENSITIVITY LEVELS

Landscape sensitivity	Description
National	Landscape feature protected with national or international legislation, e.g. the Sydney Opera House World Heritage Listed Building and its surrounding public realm.
State	Landscape feature or urban place that is heavily used and is iconic to the State, e.g. Martin Place and Hyde Park.
Regional	Landscape feature that is heavily used and valued by residents of a major portion of a city or a non-metropolitan region, e.g. Blues Point Reserve and the foreshores of Barangaroo.
Local	Landscape feature valued and experienced by concentrations of residents, and/or local recreational users. Provides a considerable service to the community. For example, it provides a place for local gathering, recreation, sport, street use by cafes and / or shade and shelter in an exposed environment e.g. Richard Johnson Square on Hunter Street and Willoughby Road in Crows Nest.
Neighbourhood	Landscape feature valued and appreciated primarily by a small number of local residents e.g. street trees in a local street. Provides a noticeable service to the community. For example, it provides a seat or resting place, passive recreation, and / or some shade and shelter in a local street e.g. Unwins Bridge Road in Marrickville and Drake Street in Chatswood.

02 METHODOLOGY

Landscape impact assessment

TABLE 2-2 LANDSCAPE MODIFICATION LEVELS

Landscape modification	Description
Considerable reduction or improvement	<p>Substantial portion of the landscape is changed.</p> <p>This may include substantial changes to parkland function, footpath continuity, building access, permeability of local streets, and / or street tree cover for example.</p> <p>Substantial changes to the level of comfort, vibrancy, safety and walkability, enhancement, connectivity, diversity, and enduring legacy of the public realm.</p>
Noticeable reduction or improvement	<p>A portion of the landscape is changed.</p> <p>This may include the alteration of parkland function, footpath continuity, building access, permeability of local streets, and / or street tree cover for example.</p> <p>Some alteration to the level of comfort, vibrancy, safety and walkability, enhancement, connectivity, diversity, and enduring legacy of the public realm.</p>
No perceived reduction or improvement	<p>Either the landscape quality is unchanged or if it is, it is largely mitigated by proposed public realm improvements.</p> <p>Does not alter or not noticeably alter the level of comfort, vibrancy, safety and walkability, enhancement, connectivity, diversity, and enduring legacy of the public realm.</p>

Landscape modification

Landscape modification refers to the change to the landscape that would occur as a result of the project. This includes direct impact such as the removal of trees or parkland, but also indirect impact, such as the functional change of an area of open space due to changing land use and access for example. Landscape modification can be adverse or beneficial. Table 2-2 lists the terminology used to describe the level of landscape modification.

The levels described in Table 2-2 have been informed by the National Urban Design Protocol (2011) principles of good urban places, which include: enhancing; connected; diverse; enduring; comfortable; vibrant; safe; and walkable. In addition, specific note has been made of considerations such as the functioning of footpaths; built edges; feature trees and avenues; visual and physical connections; and the types of activities supported in the public realm.

Visual impact assessment

This visual impact assessment considers visual amenity as experienced by the users of the site and surrounds. It aims to identify the range of views to the site which may be impacted, including views from residential, offices, parks and streets. This visual impact assessment will address the issues identified in the SEARS at 15. Visual Amenity.

In order to address impact on visual amenity, an assessment was undertaken by identifying the existing visual conditions, views that are representative of these conditions, the sensitivity of the view, magnitude of change expected as a result of the project, and then making an overall assessment of the level of impact.

Identification of existing visual conditions

A number of viewpoints have been selected to illustrate the visual influence of the site. These views represent publicly accessible viewpoints from a range of locations and viewing situations. Particular attention was paid to views from places where viewers are expected to congregate such as plazas, parks, public transport nodes and commercial areas, as well as views to and from heritage items.

Visual sensitivity

Visual sensitivity refers to the nature and duration of views. Locations from which a view would potentially be seen for a longer duration, where there are higher numbers of potential viewers and where visual amenity is important to viewers can be regarded as having a higher visual sensitivity. In addition, any views recognised by local, state or federal planning regulations would, by nature of their recognition in these documents, increase the sensitivity level of the view.

The sensitivity of a viewpoint is considered in the broadest context of possible views, from those of national importance through to those considered to have a neighbourhood visual importance (Table 2-3).

02 METHODOLOGY

Landscape impact assessment

TABLE 2-2 LANDSCAPE MODIFICATION LEVELS

Landscape modification	Description
Considerable reduction or improvement	<p>Substantial portion of the landscape is changed.</p> <p>This may include substantial changes to parkland function, footpath continuity, building access, permeability of local streets, and / or street tree cover for example.</p> <p>Substantial changes to the level of comfort, vibrancy, safety and walkability, enhancement, connectivity, diversity, and enduring legacy of the public realm.</p>
Noticeable reduction or improvement	<p>A portion of the landscape is changed.</p> <p>This may include the alteration of parkland function, footpath continuity, building access, permeability of local streets, and / or street tree cover for example.</p> <p>Some alteration to the level of comfort, vibrancy, safety and walkability, enhancement, connectivity, diversity, and enduring legacy of the public realm.</p>
No perceived reduction or improvement	<p>Either the landscape quality is unchanged or if it is, it is largely mitigated by proposed public realm improvements.</p> <p>Does not alter or not noticeably alter the level of comfort, vibrancy, safety and walkability, enhancement, connectivity, diversity, and enduring legacy of the public realm.</p>

Landscape modification

Landscape modification refers to the change to the landscape that would occur as a result of the project. This includes direct impact such as the removal of trees or parkland, but also indirect impact, such as the functional change of an area of open space due to changing land use and access for example. Landscape modification can be adverse or beneficial. Table 2-2 lists the terminology used to describe the level of landscape modification.

The levels described in Table 2-2 have been informed by the National Urban Design Protocol (2011) principles of good urban places, which include: enhancing; connected; diverse; enduring; comfortable; vibrant; safe; and walkable. In addition, specific note has been made of considerations such as the functioning of footpaths; built edges; feature trees and avenues; visual and physical connections; and the types of activities supported in the public realm.

Visual impact assessment

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In order to address impact on visual amenity, an assessment was undertaken by identifying the existing visual conditions, views that are representative of these conditions, the sensitivity of the view, magnitude of change expected as a result of the project, and then making an overall assessment of the level of impact.

Identification of existing visual conditions

A number of viewpoints have been selected to illustrate the visual influence of the site. These views represent publicly accessible viewpoints from a range of locations and viewing situations. Particular attention was paid to views from places where viewers are expected to congregate such as plazas, parks, public transport nodes and commercial areas, as well as views to and from heritage items.

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Visual sensitivity refers to the nature and duration of views. Locations from which a view would potentially be seen for a longer duration, where there are higher numbers of potential viewers and where visual amenity is important to viewers can be regarded as having a higher visual sensitivity. In addition, any views recognised by local, state or federal planning regulations would, by nature of their recognition in these documents, increase the sensitivity level of the view.

The sensitivity of a viewpoint is considered in the broadest context of possible views, from those of national importance through to those considered to have a neighbourhood visual importance (Table 2-3).

Visual modification

Visual modification describes the extent of change resulting from the project and the visual compatibility of these new elements with the surrounding landscape. There are some general principles which determine the level of visual modification; these include elements relating to the view itself such as distance, landform, backdrop, enclosure and contrast. There are also characteristics of the project itself which are: scale, form, line and alignment. Visual modification can result in an improvement or reduction in visual amenity.

A high degree of visual modification would result if the project contrasts strongly with the existing landscape. A low degree of visual modification occurs if there is minimal visual contrast and a high level of integration of form, line, shape, pattern, colour or texture between the development and the environment in which it is located.

In some circumstances there may be a visible change to a view which does not alter the amenity of the view. This would be due to the visual absorption capacity of the surrounding landscape and / or the compatibility of the project with the surrounding visual context. Table 2-4 lists the terminology used to describe the level of visual modification.

TABLE 2-3 VISUAL SENSITIVITY LEVELS

Visual sensitivity	Description
National	Heavily experienced view to a national icon, e.g. view to Sydney Opera House from Circular Quay or Lady Macquarie's Chair, or a view to Parliament House Canberra along Anzac Parade.
State	Heavily experienced view to a feature or landscape that is iconic to the State, e.g. view along the main avenue in Hyde Park, or a view to Sydney Harbour from Observatory Hill.
Regional	Heavily experienced view to a feature or landscape that is iconic to a major portion of a city or a non-metropolitan region, or an important view from an area of regional open space, e.g. Views to the Sydney Town Hall from George Street, a Sydney CBD skyline view from Centennial Park, or views from Blues Point Reserve to Sydney Harbour.
Local	High quality view experienced by concentrations of residents and / or local recreational users, local commercial areas, and / or large numbers of road or rail users e.g. view from Chatswood Park or Chifley Square.
Neighbourhood	Views where visual amenity is not particularly valued by the wider community such as views from local streets, pocket parks and small groups of residences.

TABLE 2-4 VISUAL MODIFICATION LEVELS

Visual modification	Description
Considerable reduction or improvement	Substantial part of the view is altered. The project contrasts substantially with surrounding landscape.
Noticeable reduction or improvement	Alteration to the view is clearly visible. The project contrasts with surrounding landscape.
No perceived reduction or improvement	Either the view is unchanged or if it is, the change in the view is generally unlikely to be perceived by viewers. The project does not contrast with the surrounding landscape.

02 METHODOLOGY

Visual impact assessment

Assessment of night time visual impact

The assessment of night time impact has been undertaken with a similar methodology to the daytime assessment. However, this assessment draws upon the guidance of the Institution of Lighting Engineers (UK), and their *Guidance for the reduction of obtrusive light* (2005) and with reference to AS4282 Control of the obtrusive effects of outdoor lighting (1997).

AS4282 excludes ‘public lighting’, which is defined as ‘lighting for the provision of all-night safety and security on public roads, cycle paths, footpaths, and pedestrian movement areas’. However, this Standard offers some useful terminology and principles

that have been incorporated into this method. Firstly, it identifies three potential effects of lighting, at 2.4 Potential effects of outdoor lighting, including:

“(i) *Changes to the amenity of an area due to the intrusion of spill light into otherwise dark areas, both outdoors and indoors, and to the direct view of bright luminaires.*

(ii) *A reduction in the ability of transport system users to see essential details of the route ahead, including signalling systems, due to glare from bright luminaires.*

(iii) *Changes to night time viewing conditions due to a general luminous glow, i.e. skyglow, caused by the scattering of light in the atmosphere.”*

This study will address potential effect (i), changes to the amenity of an area, with a focus on the outdoors. This standard also notes the potential visual intrusion caused by the daytime appearance of outdoor lighting systems. This potential impact has been addressed in the daytime assessment of this assessment.

AS4282 refers public spaces to AS1158 Lighting for Roads and Public Spaces which is a design guide that prioritises safety for vehicle and pedestrian users within the public realm.

The Guidance from the Institution of Lighting Engineers (UK) identifies environmental zones, useful for the categorising of night time landscape settings. This broader approach to the assessment of obtrusive light is consistent with the detail available at planning approval application stage of the project and is therefore the basis for the method applied to the night time visual assessment contained within this report.

This guidance document defines a number of features of these environmental zones at night, including sky glow, glare and light trespass. The method for night time visual assessment is as follows.

TABLE 2-5 ENVIRONMENTAL ZONE SENSITIVITY - NIGHT TIME

Environmental Zone	Description of Sensitivity
E1: Intrinsically dark landscapes	Very high sensitivity visual settings at night including national parks, state forests etc.
E2: Low district brightness areas	Highly sensitive visual settings at night including rural, small village, or relatively dark urban locations.
E3: Medium district brightness area	Moderately sensitive visual settings at night including small town centres or urban locations.
E4: High district brightness areas	Low sensitivity visual settings at night including town/city centres with high levels of nighttime activity.

TABLE 2-6 VISUAL MODIFICATION LEVELS - NIGHT TIME

Visual modification	Description
Considerable reduction or improvement	Substantial change to the level of skyglow, glare or light trespass would be expected. The lighting of the project contrasts substantially with surrounding landscape at night.
Noticeable reduction or improvement	Alteration to the level of skyglow, glare or light trespass would be clearly visible. The lighting of the project contrasts with surrounding landscape at night.
No perceived reduction or improvement	Either the level of skyglow, glare and light trespass is unchanged or if it is altered, the change is generally unlikely to be perceived by viewers. The project does not contrast with the surrounding landscape at night.

Visual sensitivity - night time

The environmental zone which best describes the existing night time visual condition for each site would be selected. These zones are typical night time settings and reflect the predominant light levels of each site. Each environmental zone has an inherent level of sensitivity as described in Table 2-5.

Visual modification - night time

The level of modification that would be expected within the setting of the project site is then identified. These changes are described, as relevant, in terms of:

- Sky glow – the brightening of the night sky above our towns, cities and countryside.
- Glare – the uncomfortable brightness of a light source when viewed against a dark background.
- Light trespass – the spilling of light beyond the boundary of the property or area being lit.

Table 2-6 lists the terminology used to describe the level of visual modification at night.

Assigning impact levels

Assessment of landscape impact has been made by combining the landscape sensitivity and landscape modification levels for a landscape element and assigning an impact level (Table 2-7).

Assessment of day time visual impact has been made by combining the visual sensitivity and visual modification levels for an individual view and assigning an impact level (Table 2-8).

Assessment of night time visual impact has been made by combining the visual sensitivity of the environmental zone with the night time visual modification for each site generally and assigning an impact level (Table 2-9).

TABLE 2-7 LANDSCAPE IMPACT LEVELS

		Landscape sensitivity				
		National	State	Regional	Local	Neighbourhood
Landscape modification	Considerable reduction	Very high adverse	Very high adverse	High adverse	Moderate adverse	Minor adverse
	Noticeable reduction	Very high adverse	High adverse	Moderate adverse	Minor adverse	Negligible
	No perceived change	Negligible	Negligible	Negligible	Negligible	Negligible
	Noticeable improvement	Very high beneficial	High beneficial	Moderate beneficial	Minor beneficial	Negligible
	Considerable improvement	Very high beneficial	Very high beneficial	High beneficial	Moderate beneficial	Minor beneficial

TABLE 2-8 DAY TIME VISUAL IMPACT LEVELS

		Visual sensitivity				
		National	State	Regional	Local	Neighbourhood
Visual modification	Considerable reduction	Very high adverse	Very high adverse	High adverse	Moderate adverse	Minor adverse
	Noticeable reduction	Very high adverse	High adverse	Moderate adverse	Minor adverse	Negligible
	No perceived change	Negligible	Negligible	Negligible	Negligible	Negligible
	Noticeable improvement	Very high beneficial	High beneficial	Moderate beneficial	Minor beneficial	Negligible
	Considerable improvement	Very high beneficial	Very high beneficial	High beneficial	Moderate beneficial	Minor beneficial

TABLE 2-9 NIGHT TIME VISUAL IMPACT LEVELS

		Visual sensitivity			
		E1: Intrinsically dark landscapes	E2: Low district brightness	E3: Medium district brightness	E4: High district brightness
Visual modification	Considerable reduction	Very high adverse	High adverse	Moderate adverse	Minor adverse
	Noticeable reduction	High adverse	Moderate adverse	Minor adverse	Negligible
	No perceived change	Negligible	Negligible	Negligible	Negligible
	Noticeable improvement	High beneficial	Moderate beneficial	Minor beneficial	Negligible
	Considerable improvement	Very high beneficial	High beneficial	Moderate beneficial	Minor beneficial

02 METHODOLOGY

Mitigation Measures

Limitations and assumptions

Mitigation measures

Through the assessment there has been an acknowledgment of the inherent mitigation and the integrating effects of urban design treatments contained within the design.

Following the assessment of landscape and visual impact, measures to further mitigate these impact have been identified. These measures include opportunities for mitigation on and off site, during construction and operation of the project, day and night.

Limitations and assumptions

The following technical limitations were experienced in the course of undertaking this study.

In relation to methodology:

- Numerous site visits were undertaken between May and December of 2015, during which key landscape features and views were photographed. This assessment is based on the landscape and visual conditions at this time.
- The night time assessment is based on assumptions from daytime field work.

In relation to design:

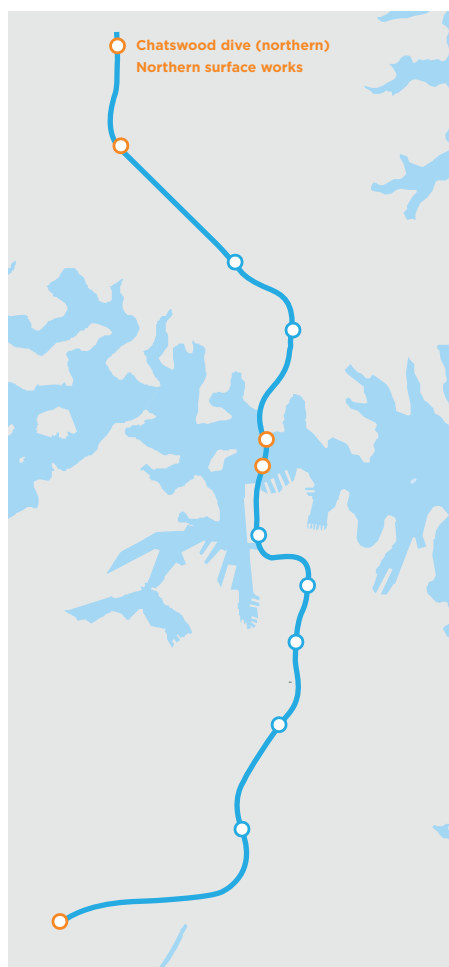
- This assessment has been based on the following assumptions in relation to Station Architecture:
 - Stations would have an architectural style which reflects their importance as public transport nodes, and reinforce the system wide identity. Depending upon the location, station entries would either be integrated into above station development (not part of this project), a freestanding building, or accessed via a vertical transport portal set within the surrounding public realm (street, park or plaza).
 - **Station entry, integrated into above station development** – would typically include decorative glazing and canopy structures to identify it from the street, the entry would include identifying signage, ticket gates, ticket offices, vending machines, lifts and escalator entries.
 - **Station entry, freestanding building** - would typically include decorative glazing and canopy structures to identify it from the street, the entry would include identifying signage, ticket gates, ticket offices, and vending machines, lifts and escalators.

- **Station entry, vertical transport portal** – would typically include decorative glazing and canopy structures to identify it from the street, the entry would include identifying signage, lift structures and escalators.
- **Active frontage** - integrated and freestanding stations may have areas identified as active frontage. An active frontage would typically be a commercial frontage such as a café, retail or concession stand which creates some permeability to the built edge, and variety in the treatment of the ground floor building frontage.
- **Services** – Stations may also include mechanical, electrical, ventilation, signalling and communications systems contained within plant rooms and cabinets and may be visible at street level. These services would typically be located out of the main pedestrian thoroughfare and be a 'back of house' element. Services facilities require secure enclosures and limit public access. They may be cabinets or locked rooms. If located on the street they would typically have a utilitarian and blank façade.
- Construction site layouts are indicative only. The layout, scale and combination of equipment would be refined during detailed design.
- Vegetation located fully or partly within the project construction site footprint is likely to be removed.

03 CHATSWOOD DIVE SITE (NORTHERN) & NORTHERN SURFACE WORKS

Planning context

The Chatswood dive site (northern) and Northern surface works is located within and adjacent to the T1 North Shore Line between Albert Avenue in the north, and Brand Street in the south. It extends west to the Pacific Highway between Nelson Street in the north, and Mowbray Road in the south. The site is currently occupied by Ausgrid and the Sydney Trains Network.



SITE LOCATION

Planning context

The following review identifies key documents which provide the planning context for the landscape and visual impact assessment of the Chatswood dive site (northern) and Northern surface works.

Willoughby Local Environmental Plan Willoughby City Council, 2012 (WLEP)

This plan identifies a number of aims that are relevant to the landscape and visual amenity values of the site. In particular:

For urban design (Part 1, Clause 1.2 d):

- “(i) to ensure development embraces the principles of quality urban design ... and
- (iv) to preserve, enhance or reinforce specific areas of high visual quality, ridgelines and landmark locations, including significant gateways, views and vistas”

For amenity (Part 1, Clause 1.2 d):

- “(i) to maintain and enhance the existing amenity of the local community, and
- (ii) to reduce adverse impact from development on adjoining or nearby residential properties”

The site includes areas within a number of Land Use Zones. The relevant objectives of each of these zones are as follows:

Zone R2 – Low Density Residential: “To accommodate development that is compatible with the scale and character of the surrounding residential development.

To retain and enhance residential amenity, including views, solar access, aural and visual privacy, and landscape quality.”

Zone R3 – Medium Density Residential: “to accommodate development that is compatible with the scale and character of the surrounding residential development ... [and] To encourage innovative design in providing a comfortable and sustainable living environment that also has regard to solar access, privacy, noise, views, vehicular access, parking and landscaping”.

Zone RE1- Public Recreation Zone: “To maintain and provide visual open space links to a diversity of public and private spaces and facilities as an integral part of the open space system”.

Zone RE2 - Private Recreation: “to minimise the potential for adverse effects from new development on the amenity of the locality”. (Part 2, Clause 2.3)

Relevant objectives of Clause 4.3 (Heights of Buildings) include:

- “(a) to ensure that new development is in harmony with the bulk and scale of surrounding buildings and the streetscape,
- (b) to minimise the impact of new development on adjoining or nearby properties from disruption of views, loss of privacy, overshadowing or visual intrusion,
- (c) to ensure a high visual quality of the development when viewed from adjoining properties, the street, waterways, public reserves or foreshores,
- (d) to minimise disruption to existing views or to achieve reasonable view sharing from adjacent developments or from public open spaces with the height and bulk of the development”.

This range of objectives have been used to inform the assessment of both landscape and visual impact.

Within the context of the proposed site of the Northern Dive there are several listed Heritage items as follows: (I96) Mowbray House (339 Mowbray Road), (I4) Chatswood Zone Substation No 80 (348 Mowbray Road, (I15 x 2) Chatswood Reservoirs (348 Mowbray Road), (I105) House (2 Orchard Road), and (I68) House (4 Chapman Avenue). The Garden of Remembrance also has a local landscape heritage listing.

There are two conservation areas within the vicinity of the site. The Chatswood South Conservation Area is located to the east

of the site, extending across Chatswood Park and Mowbray Road in the south. The Artarmon Conservation Area extends south from Mowbray Road to include Raleigh Street, east of the project site, and the Artarmon Station area to the south of the project site, as well as areas further to the east.

The WLEP includes the objective *“to conserve the heritage significance of heritage items and heritage conservation areas, including associated fabric, settings and views”* (Clause 5.10 (b)).

These heritage values have been considered in relation to the landscape and visual sensitivity of landscapes and views.

Willoughby Development Control Plan Willoughby City Council, 2006

This Development Control Plan (DCP) encourages development that is *“compatible with the urban scale and character of adjoining neighbourhoods... [and] contributes positively to the streetscape”*. It also aims to *“preserve and enhance the character and amenity of the residential zones and to ensure that future development within those zones is compatible in scale and character with existing development”*.

In addition, Clause F.3.6 (Landscaping) of the DCP requires that the *“visual impact of large expanses of walls must be reduced in scale by architectural treatment.”* These requirements have been considered in the mitigation section of this landscape character and visual assessment.

These requirements have been considered in the mitigation section of this landscape character and visual assessment.

Existing environment

The project site comprises a length of railway corridor extending approximately 800m from Brand Street at Artarmon to Albert Avenue in Chatswood. The landform of the project site is largely undulating with a ridgeline running generally across the corridor in the vicinity of Mowbray Road and Nelson Streets.

In the south, the existing rail corridor is elevated as it passes over Brand Street, and then begins to descend so that it meets the surrounding ground level, and then dives into a deep cutting in the vicinity of Mowbray Road and Nelson Streets. Continuing north, the existing rail corridor becomes elevated again as it passes Chatswood Park and approaches the Chatswood Station and town centre. The high-rise skyline of Chatswood is prominent in northerly views along the corridor, framed by the steep cuttings and surrounding vegetation.

The edges of the corridor include a mix of treatments including rocky, vegetated cuttings adjacent to the Mowbray Road bridge, and between Mowbray Road to Nelson Street. To the north of Nelson Street, the corridor is bounded by concrete-lined cuttings and walls. Traveling north, the railway infrastructure widens from two parallel sets of tracks to four sets of tracks near Albert Avenue. The tracks are set on ballast, with overhead lines and supporting frames.

To the west of the rail corridor, the landform rises towards Mowbray Road which runs generally east west. Between the rail corridor and Hampden Road, is a predominantly residential precinct with a mix of brick detached houses and two to three storey unit blocks. A television tower sits prominently on an elevated location at Hampden Road on the corner of Mowbray Road. This tower is a local visual landmark, and seen from surrounding residential and commercial areas.

Between Mowbray Road and Nelson Street, and west of the rail corridor towards the Pacific Highway, is an Ausgrid compound with a larger grain of built form including a mix of light industrial buildings and institutional style office buildings. The area between Nelson Street and Albert Avenue, is a residential precinct characterised by a mix of two and three storey brick unit complexes, six to eight storey mid-rise residential towers, and stepping up to high-rise along



01 HAWKINS STREET FROM ELIZABETH STREET
02 MOWBRAY ROAD

03 CHATSWOOD DIVE SITE (NORTHERN) & NORTHERN SURFACE WORKS

Character and components of the project



01 CHATSWOOD OVAL

02 DETACHED HOUSING ON ORCHARD ROAD

the Pacific Highway. Within this precinct is the Chatswood Bowls Club and the 'Frank Channon Walk', a wide multi-use footpath which runs alongside the railway corridor. This pathway connects the Chatswood Station precinct at Albert Avenue with Nelson Street.

To the east of the corridor, the land rises towards Elizabeth Street, and forms a ridgeline generally at Nelson Street. Between the railway corridor, Elizabeth Street and Orchard Road is a residential precinct defined by a fine grain low scale residential area including mainly early 20th century single and double storey detached brick houses, with a consistent palette of materials and details. A number of narrow cul-de-sacs terminate at the railway corridor, lined by low garden fences, mature street trees, lawns and narrow footpaths. Views to the site are typically glimpsed through vegetation, along local streets, and from properties directly adjacent to the corridor. The level differences in the vicinity of Mowbray Road and Nelson Street result in a limited visibility of the corridor from within the adjacent residential precinct. Views towards the Chatswood town centre high-rises are prominent in views along Orchard Road and glimpsed from within the surrounding areas.

At the northernmost end of Orchard Road, Chatswood Park and Oval, is located within the setting of multi-storey residential and high-rise commercial buildings at the Chatswood town centre. This parkland includes a mature framework of trees and a manicured sports oval with formal gardens and a number of small scale recreational buildings. Views to the railway corridor, which is elevated above the park, are filtered through trees which line the corridor. The Chatswood Station, rail bridge over Albert Avenue, and adjacent Garden of Remembrance, create a gateway into the Chatswood CBD precinct.

Character and components of the project

The following describes the construction and operation phases of the project.

Construction phase

The following structures, equipment and activities are likely to be experienced during construction:

- Demolition of the following buildings:
 - 337 Mowbray Road and 14 Nelson Street (Ausgrid)
 - 591 Pacific Highway
 - 5-7 Bryson Street
 - 357 Mowbray Road
 - 4 Bryson Street
 - 575 Pacific Highway
 - 8 Bryson Street
 - 569-571 Pacific Highway
 - 3-6 Mowbray Road
- Demolition of the Nelson Street bridge including footpath connection between Nelson Street and Orchard Road
- Clearing of all vegetation within the site which includes the rail corridor between Nelson Street and Brand Street
- Clearing of vegetation adjacent to Chatswood Park to accommodate the rail corridor widening and access from Albert Avenue
- Removal of street trees impacted by the site and for site access including approximately:
 - 6 trees on the Pacific Highway
 - 1 tree on Nelson Street
 - 2 trees on Mowbray Road
- Open trench construction within the existing road reserve along Hampden and Mowbray Roads (Approximately 100m) for a power supply upgrade

- Establishment of the site compound including site fencing and hoarding, site offices, amenities, workshops, material and plant storage areas, laydown area, tunnel and segment storage and dive works facility area
 - Temporary closure of Frank Channon Walk (the shared path linking Chatswood Station to Nelson Street)
 - Widening of the rail corridor for upside tracks and construction of a retaining wall (approx. 3-5m high)
 - A new viaduct structure to accommodate the existing T1 North Shore Line northbound track to allow access between the support site and the TBM launch area
 - Re-alignment of existing tracks and laying of two new tracks with associated cross-overs
 - Provision of dual right-turn lanes from Pacific Highway (southbound) to Mowbray Road (westbound), including local widening of the Pacific Highway to the east and into the construction site
 - Provision of traffic signals at Mowbray Road and Hampden Road
 - Metal clad acoustic enclosure (approximately 15m in height)
 - Car parking area
 - Oversize deliveries supporting TBM launch and support works
 - Mobile cranes, excavators, concrete pumps, piling rigs and other construction equipment
 - Construction vehicle movement and access via Pacific Highway, Mowbray Road, and Nelson Street, Drake and Brand Streets
 - New Sydney Trains access to be provided to the west of the rail corridor at Brand Street
 - Existing Hopetoun access would be closed
 - Equipment and materials storage within the rail corridor between Chatswood and Artarmon.
- The duration of the construction at this location would be approximately 2 years.
- It is expected that construction at this site would require spoil haulage and heavy plant deliveries to be undertaken outside of standard working hours.
- Operation phase
- The following elements and activities are likely to be experienced during operation:
- 250 metres of widened rail corridor, accommodating the new Metro line, north of Mowbray Road including tracks, side walls and associated operational infrastructure
 - 400 metres of dive structure and tunnel portal between Nelson Street and Mowbray Road
 - The existing T1 North Shore Line northbound track further to the west on a new viaduct structure
 - Traffic signals at Mowbray Road and Hampden Road
 - Increased frequency of trains viewed within the above ground section of the Metro line
 - Safety fences along Mowbray Road and along the rail corridor
 - Fencing and noise walls at Nelson Street in the location of the former bridge
 - An increase in the height (to four metres) of the noise wall:
 - between Chapman Avenue and Nelson Street on the eastern side of the rail line
 - between the Frank Channon Walk pedestrian underpass and Albert Avenue on the western side the rail line
 - between Nelson Street and Gordon Avenue on the western side the rail line
 - A two metre high noise wall to the south of Mowbray Road on the western side of the rail line.
 - Modification (including protection) of the road bridge at Mowbray Road to accommodate the reconfigured T1 North Shore Line track arrangement
 - Reconfiguration of the Mowbray Road and Pacific Highway intersection
 - Reinstated footpaths, roadways and street trees along streets impacted by construction.

03 CHATSWOOD DIVE SITE (NORTHERN) & NORTHERN SURFACE WORKS

Sensitivity levels



GARDEN OF REMEMBRANCE

Sensitivity levels

The following list summarises the landscape and visual sensitivity associated with this site.

Hampden Road, Mowbray Roads and Brand Street

Hampden Road is the main route between St Leonards and Chatswood, and provides access to Artarmon Station and the local high street via Brand Street. Mowbray Road is the main route between Willoughby and Lane Cove and provides access to commercial and residential areas across this precinct. Both streets are used by concentrations of residents from the local area. Due to the number of road users and the key facilities along these routes, the landscape and views from these streets are considered to be of **local sensitivity**.

Orchard Road, Nelson, Gilham, Raleigh, Drake, and Hawkins Streets

These local residential streets provide access to a small number of homes and units. These areas are included within the Chatswood South and Artarmon heritage Conservation Areas. Due to the small number of local users and residences, the landscape and views from these streets are considered to be of **neighbourhood sensitivity**.

Pacific Highway

The Pacific Highway is a major traffic and pedestrian artery. In the vicinity of the site it includes some locally important heritage buildings including the Great Northern Hotel and reservoirs on Mowbray Road, which increase the value placed on this streetscape. The Pacific Highway also provides access to commercial and retail centres from Chatswood to St Leonards. The landscape and views from the Highway are therefore considered to be of **local sensitivity**.

Chatswood Park and Oval

Chatswood Park and Oval is a large open space containing sportsgrounds and passive recreational facilities and sits wholly within the Chatswood South Conservation Area. It offers both passive and active recreational

areas and includes many built and landscape elements including a fenced playground, grandstand, public toilets, mature shade trees, sandstone entry pillars and pathways.

The park and facilities are well used by local residents and workers from nearby offices. The landscape and views from the Chatswood Park and Oval are therefore considered to be of **local sensitivity**.

Garden of Remembrance

This garden and memorial area is situated directly adjacent the Chatswood Station on Albert Avenue. It has a local heritage listing and contains war veteran memorials, commemorative gardens, paths, walls and stairways access to adjacent residential and office towers. It is used by large concentrations of local workers and the community. This landscape and views from it are highly valued by the community of Chatswood. The landscape and views of the Garden of Remembrance have **local sensitivity**.

Chatswood Bowls Club and Chatswood Croquet Club

These two membership based sporting club facilities are located between the Pacific Highway and the T1 North Shore Line corridor. They function as local meeting places, sport and recreation areas and are used by concentrations of local residents. These landscapes and their views are therefore of **local sensitivity**.

Frank Channon Walk

Frank Channon Walk is a wide pedestrian and cycle path connecting Albert Avenue at Chatswood Railway Station in the north, to Nelson Street in the south, providing access to Chatswood Park and Oval, the croquet and bowling greens. Named to commemorate a local WW1 Veteran, it is a direct route for some 300-400m and is well used by local residents. The landscape and views of the Frank Channon Walk are therefore considered to be of **local sensitivity**.

Rail corridor

The T1 North Shore Line corridor in this area connects the urban centres of St Leonards and Chatswood, and is used by trains containing large concentrations of commuters from across the city. The experience of traveling along the rail corridor includes open and filtered views to surrounding areas as well as rail related infrastructure. This landscape, and views from it, are valued by the community as an important entry route to Artarmon and Chatswood. The landscape and views of the rail corridor therefore are of **local sensitivity**.

Assessment of landscape impact

In the vicinity of the project, the following places have been identified as potentially being impacted by the project:

- Chatswood Park and Oval, and
- Frank Channon Walk.

The following section summarises the impact identified by the assessment and site observations. This includes impact during construction and operation.

Chatswood Park and Oval

Construction: The rail corridor cuttings would be cleared of vegetation in areas adjacent to the park. A Sydney Trains access road would be constructed to the east of the rail corridor and connecting to Albert Avenue. Some trees would be trimmed and vegetation cleared to accommodate this access, altering the character of this corner of the park somewhat. This work would require the temporary diversion of footpaths within the park at times. However, overall the pedestrian connectivity and legibility within the park would not be noticeably reduced.

It is expected that there would not be a perceived change in the landscape quality of this park which is of local sensitivity. This results in a **negligible landscape impact** during construction.



FRANK CHANNON WALK

Operation: The project site access, off Albert Avenue, would create an additional vehicle crossing of the footpath along the northern boundary of the park, adjacent to the existing park service vehicle access. This would not impact noticeably upon the functioning of this parkland. It is expected that there would not be a perceived change in the landscape quality of this parkland which is of local sensitivity. This results in a **negligible landscape impact** during operation.

Frank Channon Walk

Construction: The Frank Channon Walk would be required as part of the construction site and would be temporarily closed for some time during the construction program. This work would include the removal of vegetation along the rail corridor, and replacement of the rail corridor retaining wall, which would rise to the full height of the corridor. The temporary closure of this footpath, and the underpass connection to Chatswood Oval, would impact adversely upon pedestrian connectivity within this precinct, reducing the walkability, connectivity and legibility of the local area.

It is expected that there would be a considerable reduction in the landscape

quality of the Frank Channon Walk which is of local sensitivity. This results in a **moderate adverse landscape impact** during construction.

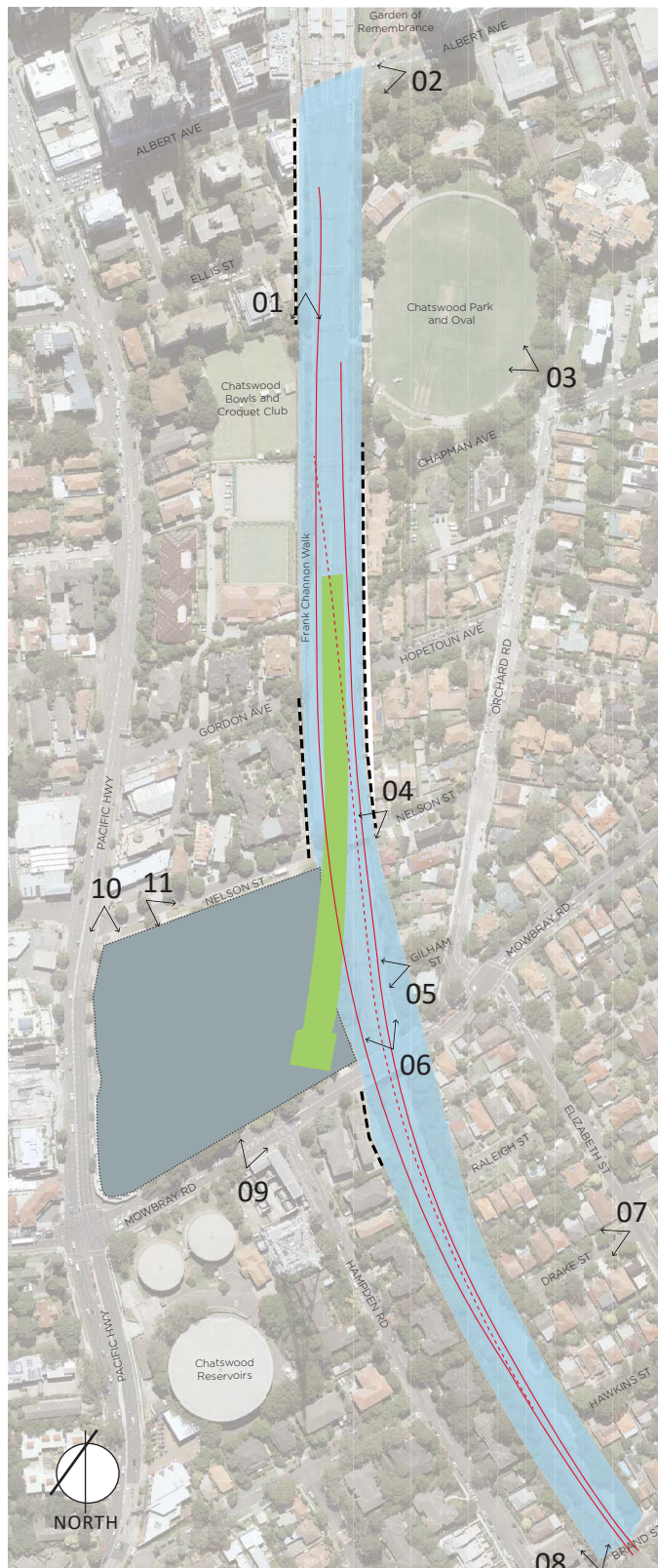
Operation: The Frank Channon Walk would be reinstated, restoring north south pedestrian connectivity along the corridor. There would, however, be adverse impact as the path would lead to the location of the Nelson Street Bridge which would now be closed, and the path would lead exclusively to pathways linking west to the Pacific Highway, reducing its catchment from areas in the south. This change would reduce the walkability, connectivity and legibility of the local area.

Furthermore, the removal of trees adjacent to the pathway, would reduce the shade cover and alter the character and comfort for users. The increase in the wall height would also create overshadowing of the path, and create a less pedestrian scale corridor.

It is expected that there would be a noticeable reduction in the landscape quality of the Frank Channon Walk, which is of local sensitivity. This results in a **minor adverse landscape impact** during operation.

03 CHATSWOOD DIVE SITE (NORTHERN) & NORTHERN SURFACE WORKS

Assessment of daytime visual impact



Assessment of daytime visual impact

The following viewing locations were selected as representative of the range of views to the site and the project.

- Viewpoint 1: View south along Frank Channon Walk
- Residential areas to the west of Frank Channon Walk
- Viewpoint 2: View southwest along Albert Avenue
- Viewpoint 3: View northwest across Chatswood Oval
- Residential areas between Chapman Avenue and Nelson Street
- Viewpoint 4: View southwest along Nelson Street
- Viewpoint 5: View west from Gilham Street
- Viewpoint 6: View north from Mowbray Road bridge
- Viewpoint 7: View southwest along Drake Street
- Viewpoint 8: View north from Brand Street
- Viewpoint 9: View northeast along Mowbray Road
- Views from residential properties on Mowbray Road
- Viewpoint 10: View south along the Pacific Highway
- Viewpoint 11: View southeast from Nelson Street
- Views from the rail corridor

VIEWPOINT LOCATION PLAN

KEY

- Viewpoint location
- Proposed up MSW/down MNW
- Proposed up/down shores
- Dive structure
- Proposed augmented / new noise wall
- Rail corridor construction
- Construction area

The following sections summarise the daytime visual impact identified in the representative viewpoint assessment and site visit observations.

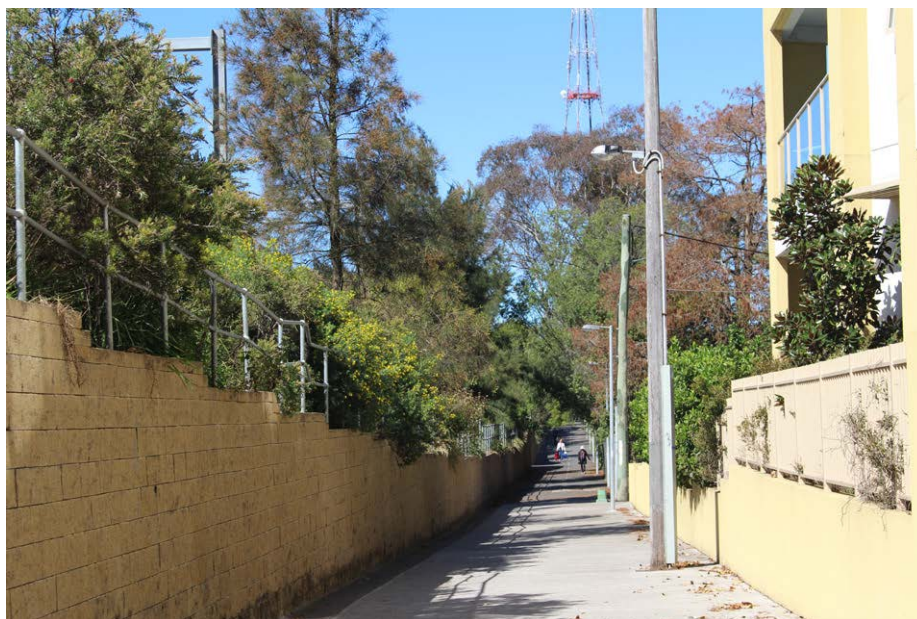
Viewpoint 1: View south along Frank Channon Walk

This viewpoint provides a direct view south along the Frank Channon Walk. The Frank Channon Walk is a wide footpath heavily enclosed to the east (left of view) by a retaining wall and with vegetation within the rail corridor shading the path. To the west (right of view) mid-rise residential units overlook the path and railway corridor, and green space of the Chatswood Bowls Club beyond.

Construction: This view would be fully obstructed at times as the path is closed so that construction on the adjacent rail corridor can occur. Times when the footpath remains open, the view would change considerably as the rail corridor is expanded to occupy the full width of the Sydney Trains land and vegetation is removed to the east (left of view).

It is expected that the project would create a considerable reduction in the amenity of this view, which is of local sensitivity, resulting in a **moderate adverse visual impact** during construction.

Operation: In this view the footpath itself would be reinstated, however, to the east (left of view) there would be a tall retaining structure creating a strong vertical edge to the corridor. There would be a less leafy character to this view overall. It is expected that the project would create a noticeable reduction in the amenity of this view, resulting in a **minor adverse visual impact** during operation.



01 Existing view south along Frank Channon Walk

01

Residential areas to the west of Frank Channon Walk

From elevated windows and balconies in residential areas, to the west of Frank Channon Walk, there are direct views east and southeast across the Frank Channon Walk to the existing rail corridor. The proposed noise walls along the rail corridor would be seen clearly and largely unfiltered by vegetation along the western embankment of the rail corridor.

Construction: Views to the railway corridor would be opened up as the vegetation is removed from the western embankment and works are undertaken to construct the retaining structure along the Frank Channon Walk. The works required to add the Metro track to the existing corridor, on the newly created platform, would also be seen unfiltered by vegetation.

It is expected that the project would create a considerable reduction in the visual amenity of views from these residential areas, which are of neighbourhood visual sensitivity, resulting in a **minor adverse visual impact** during construction.

Operation: Similarly, during operation there would be an overall less leafy character to views from these elevated residential properties. Views would be unfiltered to noise walls, and from elevated locations, over these walls to the existing and operational Metro lines infrastructure. It is expected that the project would create a considerable reduction in the amenity of these views, resulting in a **minor adverse visual impact** during operation.

03 CHATSWOOD DIVE SITE (NORTHERN) & NORTHERN SURFACE WORKS

Assessment of daytime
visual impact



Viewpoint 2: View southwest along Albert Avenue

This view is from the footpath on Albert Avenue, west towards the existing rail corridor. In the foreground of the view, the decorative curved brick walls of the park entry can be seen, as can the vehicular access route connecting the service areas of the grandstand to Albert Avenue. The rail corridor is visible in the middle ground of this view, filtered by intervening mature trees.

Construction: The removal of vegetation, trimming of trees and the construction of the site access would be seen in the middle ground of the view. It is expected that some mature trees would remain between the site and viewer, filtering the view to these works.

The project would create a noticeable reduction in the visual amenity of this view which is of local visual sensitivity, resulting in a **minor adverse visual impact** during construction.

Operation: There would be a widened area of the rail corridor visible in the middle ground of the view, somewhat filtered by intervening vegetation. The character of this site access would be consistent with the adjacent rail corridor, and be seen alongside the service entry to the park. It is expected that the project would create a noticeable reduction in the amenity of this view, resulting in a **minor adverse visual impact** during operation.

Viewpoint 3: View northwest across Chatswood Oval

This view across the oval shows the rail corridor in the background of the view, with vegetation along its eastern embankment largely obstructing views to the existing rail infrastructure. Parts of the corridor are also obstructed by the grandstands which are aligned along the western edge of the oval.

Construction: The removal of vegetation within the rail corridor would open up views to the existing infrastructure as well as works to widen the rail corridor platform in the background of the view. This would

02



03

02 EXISTING VIEW SOUTHWEST ALONG ALBERT AVENUE

03 VIEW NORTHWEST ACROSS CHATSWOOD PARK AND OVAL

include elements rising above the corridor to construct the retaining structure.

It is expected that the project would create a noticeable reduction in the visual amenity of views from this open space, which is of local visual sensitivity, resulting in a **minor adverse visual impact** during construction.

Operation: There would be a widened area of the rail corridor seen in the background of the view, partly obstructed by the grandstands but otherwise visible, with moving trains seen on the corridor.

It is expected that the project would create a noticeable reduction in the amenity of this view, resulting in a **minor adverse visual impact** during operation.

Residential areas between Chapman Avenue and Nelson Street

From properties directly adjacent to the rail corridor, noise walls would be upgraded to include an increased in height. These noise walls would obstruct most views to the existing rail corridor and proposed Metro lines infrastructure from adjacent properties.

Construction: Views to the removal of existing noise walls, associated vegetation, and the construction of new noise walls would be seen from adjacent properties.

It is expected that the project would create a noticeable reduction in the visual amenity of views from these residential areas, which are of neighbourhood visual sensitivity, resulting in a **negligible visual impact** during construction.

Operation: During operation the establishment of noise walls of approximately four metres in height would be prominent in views from adjacent residences and create some overshadowing. It is expected that the project would therefore create a considerable reduction in the amenity of these views, resulting in a **minor adverse visual impact** during operation.



04 VIEW SOUTHWEST ALONG NELSON STREET

Viewpoint 4: View southwest along Nelson Street

This view shows the Nelson Street bridge in the middle ground of the view, as seen from the northern pedestrian footpath. The bridge is a two lane street with handrails, tall throw screens and fences returning along the rail corridor. This view is framed by residential properties. The vegetated rail corridor cuttings and site create a leafy background to the view with glimpses to development beyond.

Construction: The removal of the bridge and trees within the rail corridor and on the Ausgrid site would be seen. This would open up views into the existing rail corridor and to the northbound T1 North Shore Line track that would be relocated onto a new viaduct structure. An acoustic enclosure would be located on the site, set back from the existing rail corridor, and would rise to approximately 15m or equivalent to a 5-6 storey building.

Due to the scale of works, it is expected that the project would create a considerable

reduction in the amenity of views from this location, which is of neighbourhood sensitivity, resulting in a **minor adverse visual impact** during construction.

Operation: There would be an open view across the rail corridor, including views to the T1 North Shore Line track, on a new viaduct structure, as well as glimpses to the additional Metro line with dive structure walls and tunnel entry.

It is expected that the project would create a considerable reduction in the amenity of this view, resulting in a **minor adverse visual impact** during operation.

03 CHATSWOOD DIVE SITE (NORTHERN) & NORTHERN SURFACE WORKS

Assessment of daytime
visual impact



05

05 VIEW WEST FROM GILHAM STREET

Viewpoint 5: View west from Gilham Street

This view from a local street, shows the existing rail corridor in the middle ground of the view, and the Ausgrid site beyond. The western most track, with overhead lines, can be seen unobstructed. A vegetated cutting rises steeply and the buildings on the Ausgrid site are glimpsed through trees.

This view represents the views expected from residential properties between Nelson Street and Mowbray Road to the west of the corridor.

Construction: The removal of the vegetation on the cutting and within the Ausgrid site would be clearly seen. The relocation of the T1 North Shore Line onto viaduct would be visible at a higher level than the existing tracks, crossing the view. Beyond this would be the excavation, soldier pile works, TBM launch and support works within an acoustic enclosure rising approximately 15m above the level of the site, and extending across much of this view.

Due to the scale and extent of works visible, it is expected that the project would create a considerable reduction in the visual amenity of views from this location, which is of neighbourhood visual sensitivity, resulting in a **minor adverse visual impact** during construction.

Operation: There would be an open view across the rail corridor, including views to the T1 North Shore Line track, on a new viaduct structure, as well as the new Metro line moving away from the view, and descending into the dive structure, with dive structure walls and tunnel entry.

It is expected that the project would create a considerable reduction in the amenity of this view, resulting in a **minor adverse visual impact** during operation.

Viewpoint 6: View north from Mowbray Road bridge

This view, from the northern footpath on the Mowbray Road bridge, shows the railway corridor leading north, directed towards the skyline of Chatswood which is a visual feature and focal point in this view. The view is framed by the steep and vegetated cuttings which screen views to the Ausgrid site to the west (left of view) and residential properties to the east (right of view). The rail corridor includes two tracks with overhead lines and supporting structures.

Construction: The removal of the vegetation on the cuttings and widening of the corridor, would open up views to the Ausgrid site in the west (left of view) with features including a deep excavation and an acoustic enclosure extending along much of the visible length of the site, set back from the rail corridor and rising to approximately 15m above the existing ground level. The relocation of the T1 North Shore Line onto viaduct would be seen rising above the surrounding tracks, and the Metro tracks would be visible in the distance and approaching the view, constructed to the west of the corridor. In the middle ground of the view, the Nelson Street bridge would be removed.

Due to the scale of works, and extent visible, it is expected that the project would create a considerable reduction in the visual amenity of views from this location, which is of local visual sensitivity. This would result in a **moderate adverse visual impact** during construction.

Operation: There would be an open view across the rail corridor, including a widened corridor with little remaining vegetation, the T1 North Shore Line track would be seen on a new viaduct structure, and the new Metro line would be seen disappearing into a dive structure, with deep dive structure walls.

It is expected that the project would create a considerable reduction in the amenity of this view, resulting in a **moderate adverse visual impact** during operation.



06 VIEW NORTH FROM MOWBRAY ROAD BRIDGE

06

03 CHATSWOOD DIVE SITE (NORTHERN) & NORTHERN SURFACE WORKS

Assessment of daytime
visual impact



07

07 EXISTING VIEW SOUTHWEST ALONG
DRAKE STREET

Viewpoint 7: View southwest along Drake Street

This view from a local street, shows the existing rail corridor in the background of the view with an access gate, security fence and public footpath along the perimeter of the corridor. Existing trees within the corridor, filter views to the track, trains and overhead lines. A vegetated embankment rises up slightly in the distance, and glimpses to residential properties on Hampden Street can be seen beyond the track.

This view represents the views expected from residential properties between Raleigh, Drake and Hawkins Street to the east of the corridor.

Construction: The removal of the vegetation within the corridor would open up views to the corridor. In the background of the view, the relocation of T1 North Shore Line onto viaduct would be seen being constructed to the west of the corridor. In the middle ground of the view, the area to the east of the existing the rail corridor would be used for storage and visible filtered through trees.

It is expected that the project would create a considerable reduction in the visual amenity of views from this location, which is of neighbourhood visual sensitivity, resulting in a **minor adverse visual impact** during construction.

Operation: There would be more views across the rail corridor, including to the relocated the T1 North Shore Line track, which rises up towards a new viaduct structure, and new Metro within the existing corridor.

It is expected that the project would create a considerable reduction in the amenity of this view, resulting in a **minor adverse visual impact** during operation.

Viewpoint 08: View north from Brand Street

This view is oriented towards the existing rail corridor, and rail bridge over Brand Street. The rail land to the west of the rail corridor is currently densely vegetated with mature eucalypts, an advertising billboard is set within the site and it is enclosed by security fencing. The Brand Street overbridge has an enclosed bridge structure, with brick-lined underpass and advertising panels. The rail corridor is elevated on embankment in this view. To the west (left of view) the rear gardens of residential properties and unit developments can be seen with the television tower on Hampden and Mowbray Roads, visible in the background.

Construction: The vegetation to the west of the rail corridor (left of view) would be removed and a new Sydney Trains corridor access would be constructed in the centre, middle ground of this view. The access road would run parallel to the rail corridor and away from the view, opening up views to the existing rail corridor and reducing the leafy character of the Brand Street.

The project would therefore create a noticeable reduction in the visual amenity of views from this location, which is of local visual sensitivity, resulting in a **minor adverse visual impact** during construction.

Operation: The Sydney Trains access road would remain during operation of the project for maintenance access. There would continue to be a noticeable reduction in the amenity of this view, which is of local visual sensitivity, resulting in a **minor adverse visual impact** during operation.



08 EXISTING VIEW NORTH FROM BRAND STREET

08

03 CHATSWOOD DIVE SITE (NORTHERN) & NORTHERN SURFACE WORKS

Assessment of daytime visual impact



Viewpoint 9: View northeast along Mowbray Road

This view, from the southern footpath on Mowbray Road, shows the Ausgrid site with the heritage listed Mowbray House in the centre of the view and Mowbray Road rail bridge beyond. This is a leafy view, and views to the large brick buildings of the Ausgrid site are filtered by street trees and vegetation within the site.

This view also represents northerly views from residential properties on Mowbray Road, between the bridge and Hampden Road, which overlook the site. These residential properties are generally three storeys in height.

Construction: The vegetation and buildings within the site, excluding the heritage listed Mowbray House, would be removed. This would open up views to the construction site which would be enclosed by safety fencing and hoarding and include an acoustic enclosure rising to 15m above street level. In the mid to foreground of the view, the construction site would be visible with features including workshops and site offices and surrounded by safety fencing and hoarding as required. Power supply upgrade activities, including the excavation of trenches would be seen within the road reserve with lane and footpath closures as required. Construction vehicles would be seen exiting the site and traveling along Mowbray Road in the foreground of the view at a new signalised intersection. This change would alter the setting of the historic Mowbray House.

It is expected that the project would create a considerable reduction in the visual amenity of views from this location, which is of local visual sensitivity, resulting in a **moderate adverse visual impact** during construction.

Operation: The dive, rail corridor and works would be hidden from view, as the remaining street trees would filter views to the heritage listed Mowbray House, and future development (not within the scope of this assessment) on Mowbray Road. The

09



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- 09 VIEW EAST ALONG MOWBRAY ROAD
- 10 EXISTING VIEW ALONG THE PACIFIC HIGHWAY

signalised intersection would remain and be visible in the centre of this view.

Due to the visual absorption capacity of this townscape, it is expected that the project would not create a perceived change in the amenity of this view, resulting in a **negligible visual impact** during operation.

Views from residential properties on Mowbray Road

Construction: In views from residential properties on Mowbray Road, which include elevated views from the second and third floors, there would be increased visibility across the construction site and views would be obstructed by the visual mass of the of the acoustic enclosure.

Open trench construction, for a power supply upgrade, would be seen for a short duration within the existing road reserve along Hampden and Mowbray Roads.

It is expected that the project would create a considerable reduction in the visual amenity of views from this location, which is of neighbourhood visual sensitivity, resulting in a **minor adverse visual impact** during construction.

Operation: In views from residential properties on Mowbray Road, which include elevated views from the second and third floors, there would be increased visibility across the site. However, it is expected that the dive, rail corridor and works would be largely hidden from view, obstructed by the heritage listed Mowbray House and future development (not within the scope of this assessment) on Mowbray Road.

Noise walls extending south from Mowbray Road would obstruct lower level views to the east and across the existing rail corridor.

It is expected that the project would create no perceived change in the amenity of this view, resulting in a **negligible visual impact** during operation.

Viewpoint 10: View south along the Pacific Highway

This view along the six lane Pacific Highway includes the intersection of Nelson Street and the project site in the middle ground of the view. The view is dominated by the broad highway and traffic. A number of small street trees can be seen in the middle ground of the view, filtering views to the high-rise buildings in the background of the view.

Construction: Two additional lanes would be constructed to the east (left of view) requiring the removal of street trees and extending the highway character over a larger portion of this view. Beyond Nelson Street, in the middle ground of the view, a construction site would be established, including workshops and large plant. Construction vehicles would be seen entering Nelson Street in the foreground of the view.

It is expected that the project would create a noticeable reduction in the amenity of views from this location, which is of local sensitivity, resulting in a **minor adverse visual impact** during construction.

Operation: The highway would remain widened in this area, and the street trees would be restored to the east (left of view). The construction site would be redeveloped (not subject to this approval).

Due to the consistency of the project with the existing character of this view, the project would not create a perceived change in the amenity of views from this location, which is of local visual sensitivity, resulting in a **negligible visual impact** during operation.

03 CHATSWOOD DIVE SITE (NORTHERN) & NORTHERN SURFACE WORKS

Assessment of daytime visual impact



Viewpoint 11: View southeast from Nelson Street

This view shows the Ausgrid site in the middle ground of the view, enclosed by a tall masonry boundary wall and fencing, and containing a number of two storey brick and masonry buildings, filtered by small trees and gardens. In the centre of the view a gated service entry and site parking can be seen, extending into the site.

This view represents the outlook expected from the residential units located opposite the site, on the northern side of Nelson Street. Views from these predominantly three storey units would be filtered by intervening street trees.

Construction: The removal of buildings and vegetation within the Ausgrid site would be clearly seen in the middle ground of the view. The site boundary fencing and hoarding would be established, and an acoustic enclosure would be seen, set back from the road and rising to approximately 15m in height. The bulk and scale of this enclosure would be larger than the existing industrial use visible on the site and contrast with the finer grain built form of the surrounding residential area. Construction vehicles would be seen entering the site and traveling along Nelson Street in the foreground of the view.

Due to the proximity, scale and extent of works visible, it is expected that the project would create a considerable reduction in the visual amenity of views from this location, which is of neighbourhood visual sensitivity. This would result in a **minor adverse visual impact** during construction.

Operation: The Metro would not be seen from this location. The dive structure, rail corridor and works would be located below the level of Nelson Street, and views across the site would include future development (not within the scope of this assessment) along Nelson Street. It is expected that the project would not create a perceived change in the amenity of this view, which is of neighbourhood sensitivity, resulting in a **negligible visual impact** during operation.

11



11A

- 11 VIEW SOUTH ALONG NELSON STREET
- 11A ARTIST'S IMPRESSION SHOWING PROJECT DURING CONSTRUCTION

Views from the rail corridor

Views north and southbound along the rail corridor include a largely vegetated corridor to the south, with glimpses to residential properties to the south of Mowbray Road. Concrete-lined cuttings enclose the view between Mowbray Road and north of Nelson Street, and then as the embankment reduces and the corridor becomes elevated compared to the surrounding landscape, there are filtered views through trees to residential properties to the west. To the north of the corridor there are filtered views across the Chatswood Park to the east.

Construction: The removal of the vegetation within the corridor would open up views to surrounding residential development to the south of the site. There may be views to construction material and equipment storage to the east of the corridor and construction of the T1 North Shore Line viaduct to the west of the corridor. The Nelson Street Bridge would be seen being demolished, and construction on the Ausgrid site would be seen to the west of the corridor including an acoustic enclosure rising from the level of excavation to approximately 15m above the adjacent existing street level. North of Nelson Street, construction of the corridor widening would be visible to the west of the corridor. To the north of the site, views to the Chatswood Park would be opened up.

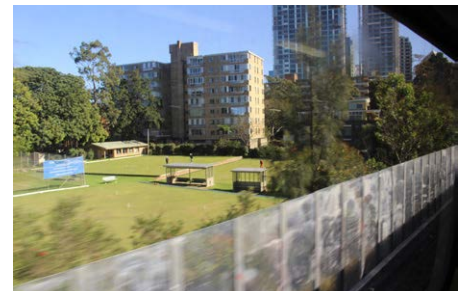
It is expected that the project would create a noticeable reduction in the amenity of views from trains using this corridor, which is of local visual sensitivity, resulting in a **minor adverse visual impact** during construction.

Operation: There would be an intensification of rail activity seen on the corridor, including an elevated portion of the T1 North Shore Line track on a new viaduct structure, and the new Metro line. There would also be views to noise walls of up to four metres, creating visual enclosure and obstructing views from the rail corridor to the west in vicinity of Frank Channon Walk.

It is expected that the project would create a noticeable reduction in the amenity of



12 VIEWS NORTH FROM THE RAIL CORRIDOR



12

views from the rail corridor as local views are obscured, resulting in a **minor adverse visual impact** during operation.

Assessment of night time visual impact

The setting of the Chatswood dive site (northern) and northern surface works is considered to be an area of **E3: Medium district brightness** in the vicinity of the site. This is due to its moderately well-lit location where there is 24 hour activity and lighting from surrounding residential buildings and streets, local and main roads including the Pacific Highway. These places create both direct light sources and a general skyglow around the project site.

Construction: It is likely that there would be night works required at this location during construction, including 24 hour deliveries and spoil haulage accompanied by traffic control crews with lit truck mounted crash attenuator vehicles and lighting on Mowbray Road in particular. There would be an acoustic enclosure on the site that would contain much of the light to within the construction site, however, associated offices and workshops would be lit increasing the

03 CHATSWOOD DIVE SITE (NORTHERN) & NORTHERN SURFACE WORKS

Summary of impact

general skyglow around the site. Overall, this would be more brightly lit than the existing setting.

This lighting would create a noticeable reduction in the amenity of views from surrounding streets and potentially from adjacent residential houses and units on Nelson Street and Mowbray Road. It is therefore expected that the project would result in a **moderate adverse visual impact** during evening hours.

Operation: The functioning railway would be set well below the surrounding residential development, visually containing much of the lighting associated with the railway use. This lighting would be consistent with the adjacent existing railway corridor, and surrounding medium district brightness environment. It is expected that there would be no direct light trespass onto adjacent private property.

It is expected that during operation the lighting of the project would not create a perceived change in visual amenity, resulting in a **negligible visual impact** for this area during evening hours.

Summary of impact

Landscape impact

Construction of the project would result in a **moderate adverse landscape impact** on the Frank Channon Walk. This would be primarily due to the direct impact of construction upon the path, and its closure during some stages of construction. Although the Frank Channon Walk would be reopened during project operation, the loss of trees, scale of adjacent retaining structure and noise walls, and overshadowing impact would result in a **minor adverse landscape impact**.

There would be indirect impact on Chatswood Park during the construction and operation of the project, however, this would result in a **negligible landscape impact**.

Visual impact

There would be **minor** and **moderate adverse visual impact** created by the project during construction. These impact are primarily due to the scale and extent of the works, including the removal of vegetation along the rail corridor between Nelson Street and Mowbray Road, introduction of larger noise walls, and the scale of works occurring at the dive site. These impact are experienced in particular from Nelson Street, Gilham Street, Mowbray Road and the residential properties to the east of the existing rail corridor.

There would also be **minor adverse visual impact** experienced from elevated residences to the west of the Frank Channon Walk. In these views, the removal of vegetation within the rail corridor, and the introduction and augmentation of noise walls, would open up views to the existing corridor as well as change the character of views to include the rail corridor and construction of the new Metro line.

During operation, there would be **minor to moderate adverse visual impact** experienced in views to the site from residential properties to the west of Frank Channon Walk, residential properties and streets between Nelson Street and Mowbray Road, and residential properties between Mowbray and Hawkins Street. The removal of vegetation within the rail corridor would result in some unfiltered views of the corridor works and dive structure. Adverse effects to adjacent residential areas would also be caused by the provision of additional, relocated, and increasing the height of noise walls in some locations along the rail corridor.

At night there would be a **moderate adverse visual impact** during construction due to the requirement for vehicle deliveries and haulage after hours. During operation, however, there would be a **negligible visual impact** as the works would be visually absorbed into the existing character of the rail corridor and surrounding area of E3: Medium district brightness.

The following tables summarise the impact of the project.

Landscape impact

			Construction		Operations	
No	Location	Sensitivity	Modification	Impact	Modification	Impact
1	Chatswood Park	Local	No perceived change	Negligible	No perceived change	Negligible
2	Frank Channon Walk	Local	Considerable reduction	Moderate adverse	Noticeable reduction	Minor adverse

Day time visual impact

			Construction		Operations	
No	Location	Sensitivity	Modification	Impact	Modification	Impact
1	View south along Frank Channon Walk	Local	Considerable reduction	Moderate adverse	Noticeable reduction	Minor adverse
	Residential areas to the west of Frank Channon Walk	Neighbourhood	Considerable reduction	Minor adverse	Considerable reduction	Minor adverse
2	View southwest along Albert Avenue	Local	Noticeable reduction	Minor adverse	Noticeable reduction	Minor adverse
3	View northwest across Chatswood Oval	Local	Noticeable reduction	Minor adverse	Noticeable reduction	Minor adverse
	Residential areas between Chapman Avenue and Nelson Street	Neighbourhood	Noticeable reduction	Negligible	Considerable reduction	Minor adverse
4	View southwest along Nelson Street	Neighbourhood	Considerable reduction	Minor adverse	Considerable reduction	Minor adverse
5	View west from Gilham Street	Neighbourhood	Considerable reduction	Minor adverse	Considerable reduction	Minor adverse
6	View north from Mowbray Road bridge	Local	Considerable reduction	Moderate adverse	Considerable reduction	Moderate adverse
7	View southwest along Drake Street	Neighbourhood	Considerable reduction	Minor adverse	Considerable reduction	Minor adverse
8	View north from Brand Street	Local	Noticeable reduction	Minor adverse	Noticeable reduction	Minor adverse
9	View northeast along Mowbray Road	Local	Considerable reduction	Moderate adverse	No perceived change	Negligible
	Views from residential properties on Mowbray Road	Neighbourhood	Considerable reduction	Minor adverse	No perceived change	Negligible
10	View south along the Pacific Highway	Local	Noticeable reduction	Minor adverse	No perceived change	Negligible
11	View southeast from Nelson Street	Neighbourhood	Considerable reduction	Minor adverse	Noticeable reduction	Negligible
	View from the rail corridor	Local	Noticeable reduction	Minor adverse	Noticeable reduction	Minor adverse

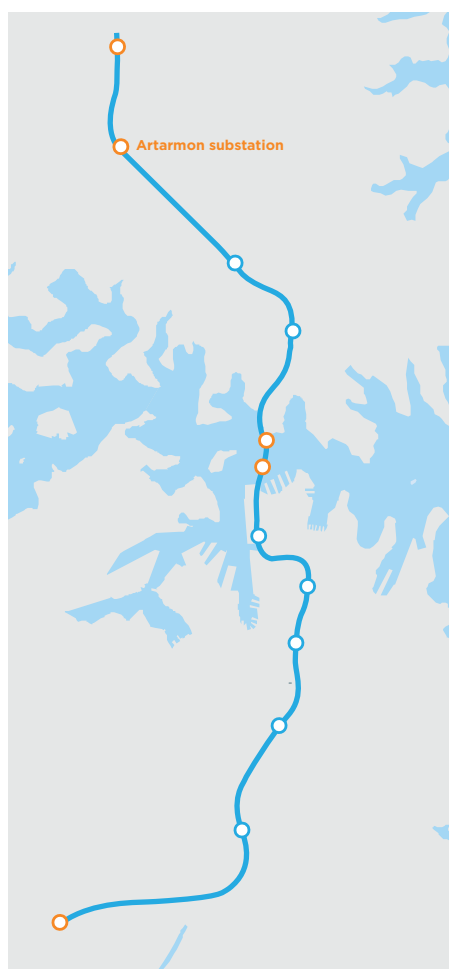
Night time visual impact

			Construction		Operations	
No	Location	Sensitivity	Modification	Impact	Modification	Impact
1	Project site	E3: Medium district brightness	Noticeable reduction	Moderate adverse	No perceived change	Negligible

04 ARTARMON SUBSTATION

Planning context

The Artarmon substation site is located in an area bounded by the Gore Hill Freeway, Barton Street and Milner Road, Artarmon.



SITE LOCATION

Planning context

The following review identifies key documents which provide the planning context for the landscape and visual impact assessment of the Artarmon substation site.

Willoughby Local Environmental Plan Willoughby City Council, 2012

This plan identifies a number of aims that are relevant to the landscape and visual amenity values of the site. In particular, for urban design (Part 1, Clause 1.2 d):

- “(i) to ensure development embraces the principles of quality urban design” ... and*
- “(iv) to preserve, enhance or reinforce specific areas of high visual quality, ridgelines and landmark locations, including significant gateways, views and vistas”.*

For amenity (Part 1, Clause 1.2 d):

- “(i) to maintain and enhance the existing amenity of the local community, and*
- (ii) to reduce adverse impact from development on adjoining or nearby residential properties”*

The site is situated within a Medium Density Residential R3 Land Use Zone and directly adjacent the Gore Hill Freeway, zoned SP2 - Infrastructure. The relevant objectives for to the R3 Medium Density Residential zone are: *“to accommodate development that is compatible with the scale and character of the surrounding residential development ... [and] To encourage innovative design in providing a comfortable and sustainable living environment that also has regard to solar access, privacy, noise, views, vehicular access, parking and landscaping.”.*

Relevant objectives of Clause 4.3 (Height of Buildings) include:

- “(a) to ensure that new development is in harmony with the bulk and scale of surrounding buildings and the streetscape,*
- (b) to minimise the impact of new development on adjoining or nearby properties from disruption of views, loss of privacy, overshadowing or visual intrusion,*
- (c) to ensure a high visual quality of the development when viewed from adjoining properties, the street, waterways, public reserves or foreshores,*
- (d) to minimise disruption to existing views or to achieve reasonable view sharing from adjacent developments or from public open spaces with the height and bulk of the development”.*

Within the context of the project site there are no heritage items and no Conservation Areas to be considered for this assessment.

Willoughby Development Control Plan Willoughby City Council, 2006

The DCP encourages development that is *“compatible with the urban scale and character of adjoining neighbourhoods... [and] contributes positively to the streetscape”.* It also aims to *“preserve and enhance the character and amenity of the residential zones and to ensure that future development within those zones is compatible in scale and character with existing development”.*

In addition, Clause F.3.6 (Landscaping) of the DCP requires that the *“visual impact of large expanses of walls must be reduced in scale by architectural treatment.”* These requirements have been considered in the mitigation section of this landscape character and visual assessment.

Existing Conditions

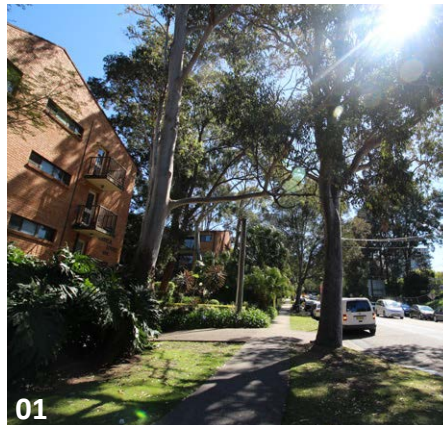
The project site is located within the suburb of Artarmon, and sits within a triangle of land between the Gore Hill Freeway, and a number of residential streets. It is accessed from Barton Road and shares a boundary with Butchers Lane, which is currently an unsurfaced cul-de-sac, and the Gore Hill Freeway.

The Gore Hill Freeway is approximately 13 lanes wide in this area, and includes the beginnings of the Lane Cove Tunnel dive structure. The Freeway is vertically separated from the site, as it is located in a deep cut in this location. This change in level limits views to the site from the Freeway and from areas to the southwest.

The site is currently occupied by temporary school buildings associated with the nearby Artarmon Public School. A residential area of Artarmon is located to the north, east and south of the site. Its character is defined by a mix of low scale residential, including early 20th century single storey brick houses, and 2-4 storey brick unit blocks.

This site is seen at close proximity, through trees, from the rear of a neighbouring complex of three storey units on Butchers Lane, to the east; and from a three to four storey unit block to the southeast on Barton Road. A two storey unit complex on Barton Road also has filtered views across the site. From these locations there may be elevated views across the site and over the Freeway to the suburbs beyond. The level changes and a tall concrete noise attenuation wall block views to the nearby Freeway from the site and surrounding areas.

There may also be views from properties on Milner Road which have rear gardens directly opposite the project site. The site and temporary school buildings cannot be seen from Milner Road.



- 01 RESERVE ROAD
- 02 MILNER ROAD
- 03 TEMPORARY SCHOOL BUILDINGS ON THE PROJECT SITE
- 04 BUTCHERS LANE

04 ARTARMON SUBSTATION

Character and components of the project

Assessment of landscape impact

Character and components of the project

This summary describes the construction and operation phases of the project.

Construction

The following structures, equipment and activities are likely to be experienced during construction:

- Establishment of the site compound, including hoardings and site fencing, site offices, parking area, amenities, workshops, material and plant storage areas, water treatment plant
- Construction vehicle access via Barton Road
- Excavators, concrete pumps, piling rigs and other construction equipment

The duration of works at this location would be approximately 2 years.

Construction is expected to be undertaken during standard working hours.

Operation

The following elements and activities are likely to be experienced during operation:

- An above ground building containing a traction substation and ancillary equipment (approximately 10 x 40m footprint and approximately 5m in height) and including a loading dock
- Car parking.

Landscape and visual sensitivity levels

The following summarises the landscape and visual sensitivity of the site and main viewing areas across the study area.

Butchers Lane and Barton Road

Butchers Lane and Barton Road are local residential streets, providing access to a small number of homes and units. Due to the small number of local users and residences, the landscape and views from these streets are considered to be of **neighbourhood sensitivity**.

Assessment of landscape impact

In the vicinity of the site, the following places have been identified as potentially being impacted by the project.

- Butchers Lane and Barton Road

The following section summarises the impact identified by the assessment and site observations. This includes impact during construction and operation.

Butchers Lane and Barton Road

Construction: Barton Road would be used by construction vehicles accessing the site. Although this would be a relatively low volume of construction vehicles, it is expected that the increase in heavy vehicle movement on the site would have an impact on the comfort of the small number of pedestrians using Barton Road. These footpaths and street trees are not expected to be impacted. Overall, there would not be a perceived change in the landscape quality of these streets which are of neighbourhood sensitivity. This results in a **negligible landscape impact** during construction.

Operation: The functioning of this precinct during operation would be restored as construction is completed and site access would be reduced to vehicles associated with servicing the facility. It is therefore expected that there would not be a perceived change in the landscape quality of these streets which are of neighbourhood sensitivity. This results in a **negligible landscape impact** during operation.

Assessment of daytime visual impact

The following viewpoints were selected as representative of the range of views to the site and the project:

- Viewpoint 1: View southeast from Milner Road
- Viewpoint 2: View southwest along Butchers Lane
- Views southwest from residential units between Barton Road and Butchers Lane
- Viewpoint 3: View west from Barton Road

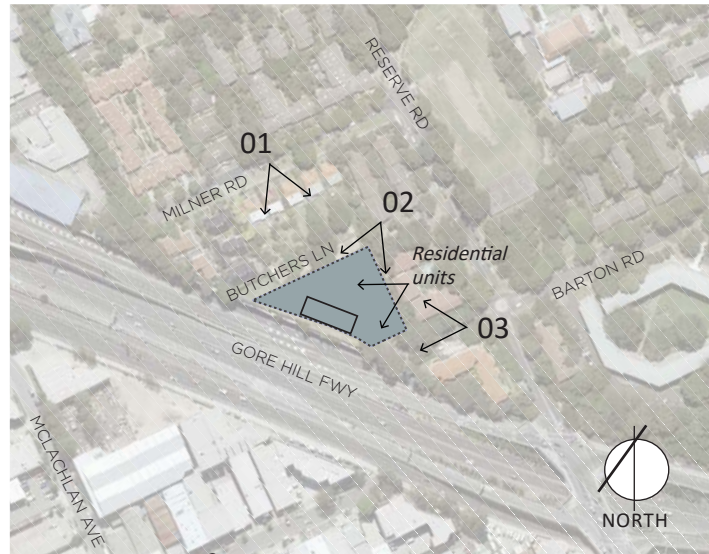
The following sections summarise the daytime visual impact identified in the representative viewpoint assessment and site visit observations.

Viewpoint 1: View southeast from Milner Road

Milner Road is lined by residential houses and units, and has a leafy character with some character homes and distant views across Artarmon. The site is located to the rear of the residential properties in the middle ground of this view, not visible due to the landform which slopes away from the view towards the site.

Construction: The site is not visible from this location, however some processes would require large plant and equipment that may rise above the intervening residential properties and be seen rising above the site. The project would therefore not create a perceived change in the amenity of this view, which is of neighbourhood visual sensitivity, resulting in a **negligible visual impact** during construction.

Operation: The traction substation building and shaft entry is not expected to rise above the residential properties seen in the foreground of this view. Therefore the project would not result in a perceived change in the amenity of this view, which is of neighbourhood visual sensitivity, resulting in a **negligible visual impact** during operation.



KEY

- Viewpoint location
- Construction area

VIEWPOINT LOCATION PLAN

04 ARTARMON SUBSTATION

Assessment of daytime
visual impact



01



02

- 01 EXISTING VIEW SOUTHEAST FROM MILNER ROAD
- 02 EXISTING VIEW SOUTHWEST ALONG BUTCHERS LANE

Viewpoint 2: View southwest along Butchers Lane

In this view the temporary school buildings are seen extending along the lane, unobstructed for much of the length of the northern site boundary. Butchers Lane is an unsurfaced lane with informal parallel parking on the grassy slopes. Rear access is provided to a number of residential properties from this lane, and a wide grassed verge visually softens the laneway. Residential houses and units are located to the north of this viewing location, elevated slightly above the site. This represents the views that may be possible from the rear of these properties on Milner Road.

Construction: A number of structures and activities would be established along Butchers Lane, including workshops and a water treatment plant, and would be seen unfiltered in this view along the south of the lane. Site offices would be located in the centre of the view, at the end of the lane, and adjacent to the rear of properties on Milner Road. Some processes would require large plant and equipment that would be seen within the site, unobstructed from this location. Construction vehicles may be seen within the site but would not use Butchers Lane. Overall, it is expected that the project would create a noticeable change in the amenity of this view, which is of neighbourhood visual sensitivity, resulting in a **negligible visual impact** during construction.

Operation: In this view the construction site would be replaced with the traction substation building and shaft entry that would be open to view, unfiltered by vegetation. These elements would not be consistent in scale with the surrounding urban grain, but would be set back from the lane reducing its prominence in the view. It is expected that the project would not create a perceived change in the amenity of this view, which is of neighbourhood visual sensitivity, resulting in a **negligible visual impact** during operation.

Views southwest from residential units between Butchers Lane and Barton Road

It is expected that there would be views from the windows and balconies of the units located adjacent to the eastern boundary of the site between Butchers Lane and Barton Road. Currently these views are filtered by a strip of vegetation including a number of mature eucalypts. The site is currently largely developed with temporary school buildings covering much of the site, and blocking views to the Gore Hill Freeway.

Construction: The existing strip of vegetation between these units and the site would be retained. This vegetation would continue to filter views to the site. There would be construction activity located along Butchers Lane and a number of processes that would require large plant, vehicles and equipment. It is therefore expected that the project would create a noticeable reduction in the amenity of this view, which is of neighbourhood visual sensitivity, resulting in a **negligible visual impact** during construction.

Operation: In this view the construction site would be replaced with the traction substation building and shaft entry that would be seen filtered by existing mature vegetation. These elements would contrast with the character and scale of development within the surrounding residential landscape. They would, however, be set back towards the Freeway, reducing their prominence of the substation in the view. It is therefore expected that the project would not create a perceived change in the amenity of this view, which is of neighbourhood visual sensitivity, resulting in a **negligible visual impact** during operation.

Viewpoint 3: View northwest from Barton Road

This view shows the site in the background of the view, including a number of temporary school buildings which were under construction at the time assessment. The site is enclosed by fencing along the boundary, and a site entry extends from Barton Road



03 EXISTING VIEW NORTHWEST FROM
BARTON ROAD

03

providing access for vehicles and pedestrians. In this location, residential units are located to the north (right) of the view, elevated slightly above the site. A strip of vegetation, including a number of mature eucalypts, is located between the site and these units, filtering views to the northern portion of the site.

Construction: This view would again be transformed by construction, however most of the work would be set back from the residential properties on Barton Road. A number of processes would require large plant and equipment that would be visible on the site. Construction vehicles would also be seen in the middle ground of the view accessing the site via Barton Road. Overall, it is expected that the project would create a noticeable reduction in the amenity of this view, which is of neighbourhood visual sensitivity, resulting in a **negligible visual impact** during construction.

Operation: The traction substation building and shaft entry would be located in the

background of this view, aligned along the rear site boundary, adjacent to the existing noise walls. These elements would contrast somewhat with the character of the surrounding leafy residential landscape, due to the scale and light industrial character of the substation building. It would, however, be set back from the residential properties reducing the prominence of this building in this view. It is expected that the project would not create a perceived change in the amenity of this view, which is of neighbourhood visual sensitivity, resulting in a **negligible visual impact** during operation.

04 ARTARMON SUBSTATION

Assessment of night time impact

Summary of impact

Assessment of night time visual impact

The setting of the Artarmon site is considered to be an area of **E3: Medium district brightness**. This is due to the moderate lighting levels created by surrounding residential streets and development, sky glow created by the Gore Hill Freeway and brightly lit background of streets to the southwest in the commercial areas of Artarmon.

Construction: It is not expected that there would be night works required at this location. There would, however, be some minor security lighting associated with the site offices and workshops for example. Overall there is expected to be no perceived change in the amenity of views in this area at night. This would result in a **negligible visual impact** during evening hours.

Operation: It is expected that there would be some minor security lighting associated with the traction substation and shaft facility. This lighting would be designed so that no direct light would be experienced on adjacent residential properties. This lighting would be visually absorbed into the surrounding area of E3: Medium district brightness, and there would be no perceived change in the amenity of views to the site at night. This would result in a **negligible visual impact** during evening hours.

Summary of impact

Landscape impact

The landscape impact of the project both during construction and operation are expected to be **negligible** at the Artarmon substation site. This is due to the containment of works within the project site, and minor requirement for haulage and deliveries.

Visual impact

Views to this the are predominantly neighbourhood sensitivity views from adjacent residential streets and properties. There are expected to be **negligible visual impact** experienced in views to the project during both construction and operation. This is due to the change from views of a temporary school buildings, to less visually intensive activities.

After-hours works are not required for the construction of the project at this site.

At night, during operation, there would be **negligible visual impact** during both construction and operation of the project. This is due to the surrounding E3: Medium district brightness area and minimal lighting required to undertake the works and operate the facility.

The following tables summarise the impact of the project.

Landscape impact

			Construction		Operations	
No	Location	Sensitivity	Modification	Impact	Modification	Impact
1	Butchers Lane and Barton Road	Neighbourhood	No perceived change	Negligible	No perceived change	Negligible

Day time visual impact

			Construction		Operations	
No	Location	Sensitivity	Modification	Impact	Modification	Impact
1	View southeast from Milner Road	Neighbourhood	No perceived change	Negligible	No perceived change	Negligible
2	View southwest along Butchers Lane	Neighbourhood	Noticeable reduction	Negligible	No perceived change	Negligible
	Views southwest from residential units between Barton Road and Butchers Lane	Neighbourhood	Noticeable reduction	Negligible	No perceived change	Negligible
3	View northwest from Barton Road	Neighbourhood	Noticeable reduction	Negligible	No perceived change	Negligible

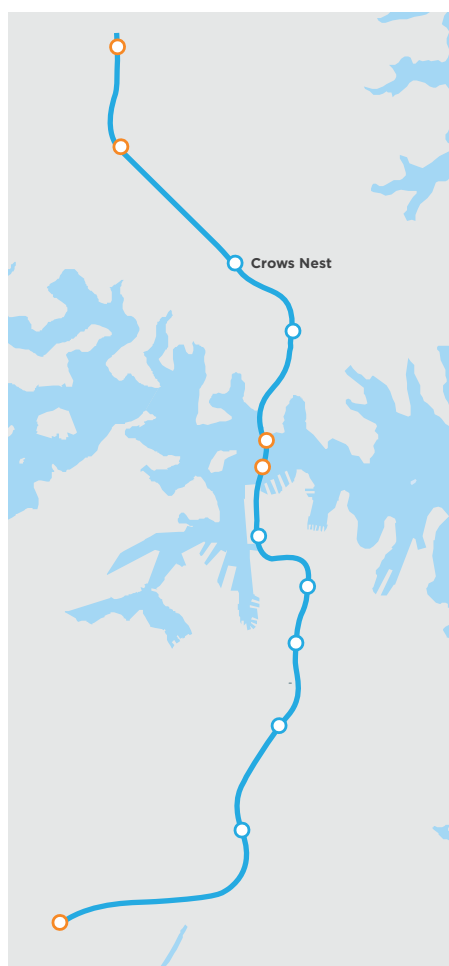
Night time visual impact

			Construction		Operations	
No	Location	Sensitivity	Modification	Impact	Modification	Impact
1	Project site	E3: Medium district brightness	No perceived change	Negligible	No perceived change	Negligible

05 CROWS NEST STATION

Planning context

The project would occupy a site between the Pacific Highway and Clarke Lane, extending from Oxley Street in the north and across Hume Street in the south. The site also extends to the east of Clarke Lane to include a site on the corner of Hume and Clarke Streets.



SITE LOCATION

Planning context

The following review identifies key documents which provide the planning context for the landscape and visual impact assessment of the proposed Crows Nest station precinct.

North Sydney Local Environmental Plan, North Sydney Council, 2013

The particular aims of this plan in relation to this assessment is: *“to promote development that is appropriate to its context and enhances the amenity of the North Sydney community and environment”*.

The Plan also requires new non-residential development to conserve the *“amenity of residential properties and public places”*, in terms of *“visual... privacy”* and *“view sharing”*.

The project site is in close proximity to several heritage sites including the St Leonards Centre (at 28–34 Clarke Street), Electricity Powerhouse No 187 (23 Albany Street, corner Oxley Street), the Former Marco Building (583 Pacific Highway), Northside Baptist Church (63 Willoughby Road) and the Higgins Buildings (366– 376 Pacific Highway). This assessment will therefore need to consider the *“settings and views”* of these heritage items under the Heritage conservation clause (5.10).

Clause 6.2 (Building heights and massing) promotes scale and massing of new development that provides for *“pedestrian comfort”* in relation to protection *“human scale and visual dominance”*.

The site sits within the B4 - High Density Residential Land Use Zone. The relevant objectives of this zone is as follows:

Zone B4 – High Density Residential: *“To encourage the development of sites for high density housing if such development does not compromise the amenity of the surrounding area or the natural or cultural heritage of the area.”*

Relevant objectives of Clause 4.3 (Heights of Buildings) include:

- “(a) to promote development that conforms to and reflects natural landforms, by stepping development on sloping land to follow the natural gradient,*
- (b) to promote the retention and, if appropriate, sharing of existing views,*
- (c) to maintain solar access to existing dwellings, public reserves and streets, and to promote solar access for future development,*
- (d) to maintain privacy for residents of existing dwellings and to promote privacy for residents of new buildings,*
- (e) to ensure compatibility between development, particularly at zone boundaries,*
- (f) to encourage an appropriate scale and density of development that is in accordance with, and promotes the character of, an area.*

North Sydney Development Control Plan, North Sydney Council, 2012

The North Sydney DCP identifies a number of Character Areas across the precinct and includes locality statements for areas located within these character areas. In this precinct, the Crows Nest Town Centre Locality Area and St Leonards Town Centre Locality Area, within the St Leonards / Crows Nest Character Area are relevant. The desired future character and relevant supporting principles identified for these localities are summarised in the following paragraphs.

St Leonards Town Centre Locality Area

St Leonards is considered to be a *“busy”* and *“highly urbanised”* centre. The DCP recognises The Forum development and plaza, St Leonards Station and Pacific Highway as key icons in this area. This assessment will consider any views to these icons.

The DCP promotes the preservation and enhancement of *“slot views to the sky and between higher buildings”*.

The desired future character of the area includes *“predominantly medium-high rise, mixed commercial and residential development”* with a variety of outdoor and indoor community spaces (e.g. urban plazas, gardens, outdoor and indoor dining areas) and entertainment facilities.

Crows Nest Town Centre Locality

Crows Nest Town Centre is smaller in scale, with 19th Century two storey shopfront facades along Willoughby Road and the Pacific Highway. Key icons in this area include The Crows Nest five ways intersection, formalised outdoor dining areas (on Willoughby Road, Burlington, Ernest and Holtermann Streets), and the Pacific Highway and Falcon Streets. This assessment will consider any views to these icons.

The DCP promotes the preservation and enhancement of the following views and vistas in the Crows Nest Town Centre and St Leonards Town Centre Locality Area:

- Vista north along Willoughby Road and Pacific Highway.
- District views from the upper levels of taller buildings.

The desired future character of the area includes *“medium rise, mixed use development... [with] shops at ground level, non-residential/residential on first floor, residential above”*.

St Leonards / Crows Nest Planning Study, North Sydney Council, 2011-2014

This study is being prepared in stages; the project site is located within ‘Precinct 1’, which was prepared and adopted in 2012. The study outcome has several options for future development within the precinct, including provisions for preferred built form, pedestrian circulation and amenity, open space and views.

Clarke Place Park is located along Clarke Street, opposite the project site, and is considered to be the *“most significant piece of open space”* in Precinct 1.

Principle 2 of the Study (Pedestrian Circulation) identifies the following key opportunities near the project:

- Improved pedestrian flow and amenity along the Pacific Highway, Hume Street and Oxley Street
- Laneway activation along Clarke Lane
- Through site pedestrian link between Clarke Lane and Pacific Highway

Principle 6 of the Study (Views) requires the following management of the views in and around the project area:

- Maintain southerly district views from Clarke Lane to the Pacific Highway;
- Improve views from future *“redevelopment strip”* at corner of Oxley Street, Clarke Lane, and the Pacific Highway.

The St Leonards Centre site, Kelly’s Place childcare and Beaurepaires site are identified in this study as potential locations for new open space due to their close proximity to Clarke Place Park, thus potentially allowing for an expansion of the park.

This assessment will consider the desired outcomes for this Precinct in relation to the project.

St Leonards Public Domain Strategy, North Sydney Council, 2003

This Strategy provides a concept to enhance the public places of St. Leonards, including the project site. The desired future character and function of St Leonards will be a *“vibrant and prosperous landmark public transport oriented urban village”* ... [providing a] ... *“sheltered, comfortable, interesting and attractive streetscape at ground level”*.

The strategy provides a three-stage approach for upgrading and enhancing public domain places throughout St. Leonards. Key elements of the Stage 3 strategy that relate to the project site include new paving and streetscape planting along Clarke and Oxley Streets, and streetscape upgrade of Clarke Lane.

05 CROWS NEST STATION

Existing environment



Existing environment

This precinct has a mixture of built form typologies of varying ages, heights, styles, uses and setbacks, and is influenced by a recent influx of high-rise and mid-rise office and residential tower developments. Low scale highway oriented showroom developments are located along the Pacific Highway, alongside a concentration of 19th century two storey shopfront facades to the south of Hume Street.

Oxley, Hume and Clarke Streets are lined with a mixture of office and apartment buildings (up to ten storeys), as well as other uses such as an indoor sports complex, child care centre, community centre, post office and a historic substation. As Clarke Street rises to Willoughby Road, the street narrows, and is lined with double storey Victorian terraces with ground level retail.

The St Leonards Centre, located adjacent to the project site at the corner of Oxley and Clarke Streets, is a local visual landmark. Council's heritage data sheet describes the Centre as a *'dramatically assertive building... a well-made and crafted building designed in the late twentieth century brutalist style'*.

The mature London planetrees along the Pacific Highway, Oxley Street and Clarke Street soften views and provide a unifying element along an otherwise eclectic and architecturally disjointed urban streetscape.



- 01 CLARKE LANE
- 02 OXLEY STREET

Willoughby Road is a nearby retail and restaurant precinct, and the heart of the Crows Nest village. It includes over 400m of single and double storey, mostly Victorian, shopfronts functioning as a 'high street' between the Pacific Highway in the south and Albany Street in the north. The streetscape is narrow and prioritises pedestrian movement. London planetrees, podium planting and planter boxes soften the street and create a sheltered environment for alfresco dining. Views north along Willoughby Road feature the spire of St Leonards Catholic Church as a quaint local focal point.

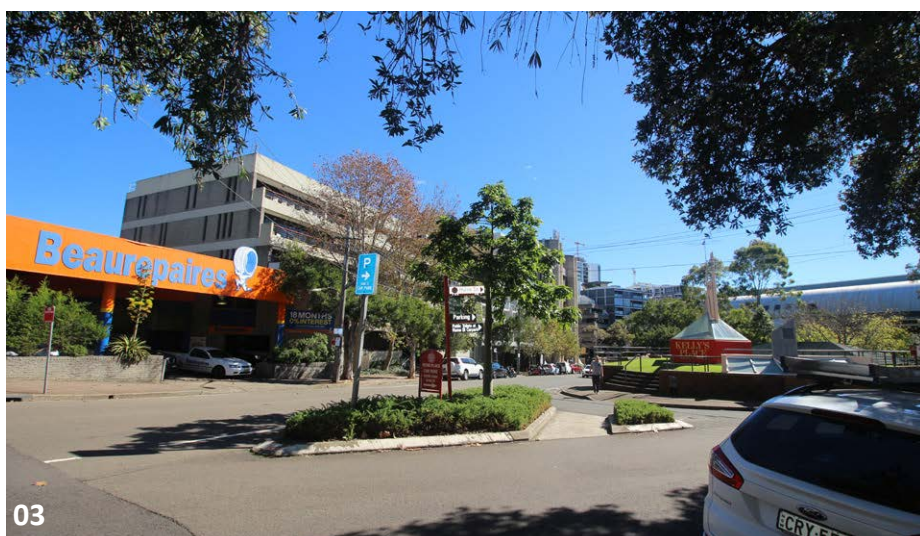
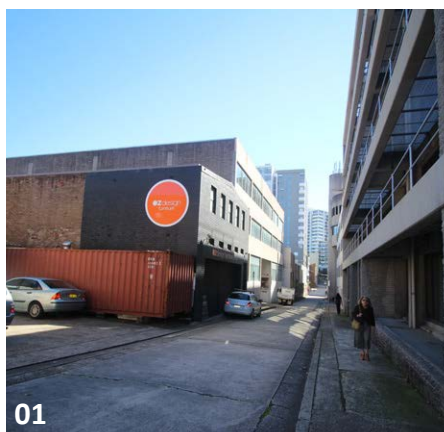
The St Leonards station precinct, and Crows Nest town centre, including the Willoughby Road retail and restaurant precinct, are the two main sources of pedestrian movement in the immediate surrounds of the project. The long unbroken street block on the western side of Willoughby Road prevents more direct movement between St Leonards Station and Willoughby Road, resulting in a pedestrian desire line between Clarke Place Park and Willoughby Road, to the east of the project.

Laneways such as Clarke Lane facilitate vehicular movement and provide rear lane access to commercial properties along the Pacific Highway and Clarke Street. These lanes have a 'back-of-house' character and are not largely used by pedestrians.

Clarke Place Park provides the only local green space in the vicinity of the project site. It is located opposite the project on Clarke Street and consists of a mounded grassy area with shade trees and paved pathways. Paths provide access to both the North Sydney Indoor Sports Centre and Kelly's Place childcare centre. The location of these facilities separates the park from the surrounding area which makes direct access difficult. The steeply sloping lawns and level change across the park results in *"limited utility to the community"* (St Leonards / Crows Nest Planning Study).

Several high-rise apartment buildings have been recently built and are being constructed in the vicinity, to support the growing population and emerging role of St Leonards Town Centre as a 'Specialist Centre' in the LEP. This includes the building currently under construction on the corner of Oxley and Albany Streets. There is also a Development Application in place to increase the maximum allowable height to 42m so as to allow an 11 storey apartment building on the northern part of the project site, at the corner of Oxley Street and the Pacific Highway (521 Pacific Highway), which is currently vacant.

Important views within this precinct include local views from Clarke Street to the Pacific Highway, vistas north along the Pacific Highway, and district views from the upper levels of taller buildings.



- 01 CLARKE LANE
- 02 WILLOUGHBY ROAD RESTAURANT PRECINCT
- 03 BEAUREPAIRES, CLARKE STREET AND THE CLARKE PLACE PARK
- 04 HERITAGE LISTED 'ST LEONARDS CENTRE' BUILDING

05 CROWS NEST STATION

Character and components of the project

Character and components of the project

This summary describes the construction and operation phases of the project.

Construction

The following structures, equipment and activities are likely to be experienced during construction:

- Establishment of construction compound including demolition of:
 - 539-477 Pacific Highway through to Clarke Lane (including the Post Office on the corner of Hume Street and the Pacific Highway)
 - 14-16 Clarke Street (corner of Hume and Clarke Streets)
- Removal of street trees impacted by the site and for site access including approximately:
 - 10 trees on the Pacific Highway
 - 6 trees on Hume Street
 - 1 tree on Clarke Street
 - 2 trees on Oxley Street
- Open trench construction within the existing road reserve along Clarke Lane (Approximately 30m) for a power supply upgrade
- Metal clad acoustic enclosures (approximately 15m in height) located:
 - Corner Hume and the Pacific Highway
 - Pacific Highway located centrally between Hume and Oxley Streets
- Hoardings and site fencing surrounding the remaining areas of the construction site
- Establishment of site offices, parking area, amenities, workshops, material / plant storage areas, and water treatment plant
- Temporary closure of Hume Street with pedestrian access maintained by temporary structures on working platforms

- Footpaths on Hume Street and the Pacific Highway adjacent to hoarding would be reduced in width
- Closure of southern end of Clarke Lane
- Vehicle access during construction via Pacific Highway, Oxley, Clarke and Hume Streets
- Traffic and pedestrian management signage and structures around the perimeter of site as required
- Cranes and large plant (e.g. excavators) working on street and above ground level construction platforms

The duration of construction works at this location would be approximately 5-6 years.

It is expected that the construction of this site would require spoil haulage and heavy plant deliveries to be undertaken outside of standard working hours.

Operation

The following elements and activities are likely to be experienced during operation:

- Station entry at the northern corner of Hume and Clarke Streets, and at the corner of Pacific Highway and Oxley Street.
- Location of an active street frontage along the Pacific Highway and Hume Street, between the Highway and Clarke Lane
- Metro services located on Clarke Lane to the north of the site, and between Clarke Lane and the Pacific Highway at the southeast corner of the site
- Reinstated areas of Clarke and Hume Streets impacted by construction
- Reinstated street trees on Clarke Street and Hume Street
- New pedestrian crossings across Clarke Street to the northeast and Hume Street to the south
- Signalized pedestrian crossing of the Pacific Highway and Oxley Street.

Sensitivity levels

The following list summarises the landscape and visual sensitivity for the project and main viewing areas across the study area.

Pacific Highway

The Pacific Highway is a major traffic and pedestrian artery through the northern suburbs of Sydney. This streetscape attracts large numbers of vehicles and pedestrians, and includes some locally important heritage buildings, including the State heritage listed former Marco Building at 583 and the Higgins building group at 366 to 377 Pacific Highway, which increase the value placed on this streetscape. The landscape and views from the Pacific Highway are therefore considered to be of **local sensitivity**.

Oxley, Hume and Clarke Streets

Oxley, Hume and Clarke Streets are well used by residents, acting as a thoroughfare between the St Leonards Station, the Pacific Highway and the Willoughby Road restaurant precinct. These landscapes and views are therefore considered to be of **local sensitivity**.

Willoughby Road Restaurant Precinct

Willoughby Road is an important street for the Crows Nest community. It is the local 'high street' with shopping, restaurants and cafes that attract visitors from across the North Shore. The landscape and views of Willoughby Road high street are considered to be of **local sensitivity**.

Clarke Place Park

Although Clarke Place Park is a small and awkward public park, with limited connectivity to Willoughby Road (a key attractor in the local area), it is considered to be the "*most significant piece of open space*" in the Crows Nest area (St Leonards / Crows Nest Planning Study, 2012). It functions as a local meeting place and therefore the landscape and views are of **local sensitivity**.



- 01 WILLOUGHBY ROAD RESTAURANT PRECINCT
- 02 PACIFIC HIGHWAY
- 03 CLARKE PLACE PARK

05 CROWS NEST STATION

Assessment of landscape impact

Assessment of landscape impact

In the vicinity of the project, the following places have been identified as potentially being impacted by the project:

- Willoughby Road restaurant precinct
- Oxley, Hume and Clarke Streets
- Pacific Highway
- Clarke Place Park

The following section summarises the impact identified by the assessment and site observations. This includes impact during construction and operation.

Willoughby Road restaurant precinct

Construction: There would be no direct impact on the Willoughby Road restaurant precinct during construction. However, there is likely to be some minor changes in the availability of parking and pedestrian accessibility on nearby streets. Overall, the project would not create a perceived change in the landscape quality of the Willoughby Road restaurant precinct during project construction. As this precinct is of local sensitivity this would result in a **negligible landscape impact**.

Operation: There would be no direct changes to the Willoughby Road restaurant precinct. However, the location of a new station a short walk to the heart of Crows Nest, replacing a less complementary commercial activity, and improvements to the pedestrian environment would increase the accessibility of Willoughby Road. This complements the planned improvements to the connections between residential areas to the west, and this precinct.

Overall it is expected that there would not be a perceived change in the landscape quality of The Willoughby Road restaurant precinct, which is of local sensitivity, resulting in a **negligible landscape impact** during operation.

Oxley, Hume and Clarke Streets

Construction: Parts of Oxley, Hume and Clarke Street would be required as part of the construction site and for construction vehicle access. This work would include the reduction of footpath width and the diversion of footpaths, particularly Hume Street, during some periods of construction. It is likely that pedestrian connectivity within this precinct would be reduced at times and local connectivity and legibility may be impacted. A number of street trees on Oxley, Clarke and Hume Streets would be removed, reducing the shade cover and altering the amenity of these streets somewhat.

It is expected that there would be a noticeable reduction in the landscape quality of this streetscape which is of local sensitivity. This results in a **minor adverse landscape impact** during construction.

Operation: The functioning of this precinct during operation, however, would be improved at street level as footpaths on Clarke and Hume Streets would be reinstated and a broad station entry forecourt would be created on the corner of Clarke and Hume Streets and at the corner of Oxley Street and the Pacific Highway. There would also be a number of additional pedestrian crossings.

It is expected that there would be a noticeable improvement in the landscape quality of these streetscapes which are of local sensitivity. This results in a **minor beneficial landscape impact** during operation.

Pacific Highway

Construction: Parts of the Pacific Highway would be required for the construction site. This work would include the reduction of footpath width and the diversion of footpaths during some periods of construction. It is likely that pedestrian movement along the Pacific Highway would be restricted at times and connectivity and legibility in this area would be impacted. A number of street trees would be removed, reducing the shade cover and altering the amenity of this section of the Highway somewhat.

Assessment of daytime visual impact

It is expected that there would be a noticeable reduction in the landscape quality of this streetscape which is of local sensitivity. This results in a **minor adverse landscape impact** during construction.

Operation: The functioning of this precinct during operation would be restored as footpaths and street trees are reinstated. This section of the Highway would be improved with upgraded active street frontages and a station entry located on the corner of Oxley Street and the Pacific Highway. It is expected that there would be a noticeable improvement in the landscape quality of the Pacific Highway which is of local sensitivity. This results in a **minor beneficial landscape impact** during operation.

Clarke Place Park

Construction: There would be no direct impact on Clarke Place Park during construction of the project. However, the impact on footpaths adjacent to the construction site on Clarke Street and Hume Streets, would alter the movement patterns of pedestrians and potentially reduce the accessibility of this park.

Due to the small scale of these indirect changes, however, it is expected that this would not result in a perceived change in the landscape quality of the Clarke Place Park. This park is of local sensitivity and therefore this would result in a **negligible landscape impact** during construction.

Operation: There would be no direct changes to Clarke Place Park. However, the location of a new station opposite to the park, replacing a less complementary commercial activity, and new pedestrian crossings across Clarke Street, would improve the pedestrian environment and increase the accessibility of the park.

Overall it is expected that there would be a noticeable improvement in the landscape quality of Clarke Place Park, resulting in a **minor beneficial landscape impact** during operation.



Assessment of daytime visual impact

The following viewpoints were selected as representative of the range of views to the site and the proposed development:

- Viewpoint 1: View east along the Pacific Highway
- Viewpoint 2: View south along Oxley Street
- Viewpoint 3: View west from Clarke Street
- Viewpoint 4: View northwest along Clarke Lane
- Viewpoint 5: View east from corner of Hume Street and Pacific Highway

The following sections summarise the daytime visual impact identified in the representative viewpoint assessment and site visit observations.

KEY

- Viewpoint location
- Site footprint at street level
- Pedestrian plaza/station lobby
- Proposed signalised pedestrian crossing
- Proposed on road marked cycle route
- Pedestrian crossing
- Metro entry
- Proposed cycle parking
- Services
- Proposed taxi rank
- Proposed kiss-and-ride

VIEWPOINT LOCATION PLAN

05 CROWS NEST STATION

Assessment of daytime
visual impact



01



01A

- 01 EXISTING VIEW EAST ALONG AND THE PACIFIC HIGHWAY
- 01A ARTIST'S IMPRESSION SHOWING PROJECT DURING OPERATION

Viewpoint 1: View east along the Pacific Highway

This viewpoint provides a direct view to the site in context with the Pacific Highway, a busy six-lane road linking to the North and Central Sydney CBDs. From this point, the heritage listed, 5 storey brutalist style concrete 'St Leonards Centre' (a local landmark) is a prominent feature seen beyond the project site, at the corner of Oxley and Clarke Streets. Beyond this building, the shed-like North Sydney Indoor Sports Centre, is also visible. On the site, in the centre of the view, is a surface car park, raised above a wall which retains an underground car park level, accessed via Clarke Lane, and adjacent 2-3 storey showroom developments which diverge from the predominant building line seen on the Highway further to the south. Mature London planetrees line the Pacific Highway and Oxley Street, softening this view and providing a unifying element in an otherwise eclectic and architecturally disjointed urban streetscape.

This view is representative of views that would be seen from elevated residential apartments to the south and northeast of this location.

Construction: The removal of buildings between Oxley and Hume Street and mature street trees on Oxley Street and the Pacific Highway would be seen. An acoustic enclosure would be established on the site to the south of the intersection (right of view), rising approximately 15m (five storeys). Construction vehicles would be seen on the Highway and Oxley Street. The construction site comprising much of the middle ground of this view would create a noticeable reduction in the visual amenity of this view, which is of local visual sensitivity, resulting in a **minor adverse visual impact** during construction.

Operation: A station entry would be created on the corner of the Pacific Highway and Oxley Street in the centre of the view. The station would comprise a street level structure which is broad, light and open.

Active frontages would be seen to the south (right of view) addressing the Pacific Highway. The predominant alignment of the existing facades would be restored along the Highway, and street trees reinstated. It is expected that the project would create a noticeable improvement in the amenity of this view, resulting in a **minor beneficial visual impact** during operation.

Viewpoint 2: View south along Oxley Street

This view illustrates the extent of the project site along Oxley Street. The site is framed by the heritage listed, brutalist style concrete 'St Leonards Centre' whose distinctive form creates a prominent local visual feature at the corner of Oxley and Clarke Streets. The site itself includes an underground parking level with a surface car park above. Beyond this, the 4-5 storey glazed and stepped residential apartment building can be seen.

Construction: In this view, the removal of the existing block-work walls and fencing, basement car parking, and street trees along Oxley Street would be seen. An acoustic enclosure would be established on the site, to the south (left of view) and construction vehicles would be seen along Oxley Street and entering Clarke Lane. This activity would be seen in the context of several high-rise apartment building construction sites. It is expected that the project would create a noticeable reduction in the amenity of this view, which is of local visual sensitivity, resulting in a **minor adverse visual impact**.

Operation: A station entry point would be visible at the corner of Oxley Street and the Pacific Highway. The station would comprise a street level structure which is broad, light and open. The built form would restore the former alignment of buildings along Oxley Street, enclosing Clarke Lane; and street trees would be reinstated. The project would therefore result in a noticeable improvement in the amenity of this view, which is of local sensitivity, resulting in a **minor beneficial visual impact** during operation.



02



02A

02 EXISTING VIEW SOUTH ALONG OXLEY STREET

02A INDICATIVE EXTENT OF DEMOLITION

05 CROWS NEST STATION

Assessment of daytime
visual impact



03



03A

03 EXISTING VIEW WEST FROM CLARKE STREET

03A INDICATIVE EXTENT OF DEMOLITION

Viewpoint 3: View west along Hume Street from Clarke Street

In this view the site is framed by a seven storey commercial buildings with retail street frontages to the south, and six storey office block to the north. The site itself sits prominently on the corner of Hume and Clarke Streets, and is currently occupied by a light industrial land use (Beaurepaires) with associated vehicle circulation areas and single storey commercial frontage. This built form steps down sharply from the surrounding predominant building height of 6-7 storeys. Clarke and Hume streets are visually softened by an informal mix of mature street trees of different ages and species. In the background of this view, the site can be seen extending across Clarke Lane to the Highway as two storey retail showrooms.

Construction: A large extent of this view would change as buildings along the northern side of Hume Street, between Clarke Lane and the Pacific Highway (including the visually prominent Beaurepaires site) are demolished. A number of streets adjacent to the project site on Clarke and Hume Streets would also be removed. Construction traffic would be seen on Clarke Street and at times using Hume Street. The temporary closure and diversion of Hume Street would also be prominent in this view. An acoustic enclosure would be established on the site adjacent to the Pacific Highway, and may be visible to the north west in the background (right of view). Site perimeter hoarding and fencing would be seen enclosing the remainder of the site.

It is expected that the project would create a noticeable reduction in the visual amenity of this view, which is of local visual sensitivity, resulting in a **minor adverse visual impact** during construction.

Operation: This view would be transformed as a station entry is created on the corner of Hume and Clarke Streets in the centre of the view. The station would comprise a street level structure which is broad, light and open. Footpaths and street trees on Clarke and Hume Streets would be reinstated, creating

a refreshed public realm and softening the view. Beyond the station entry, Clarke Lane would be reinstated and active frontages established between the lane and the Pacific Highway. This would restore the predominant alignment of the existing buildings, and restore the visual enclosure of Clarke Lane.

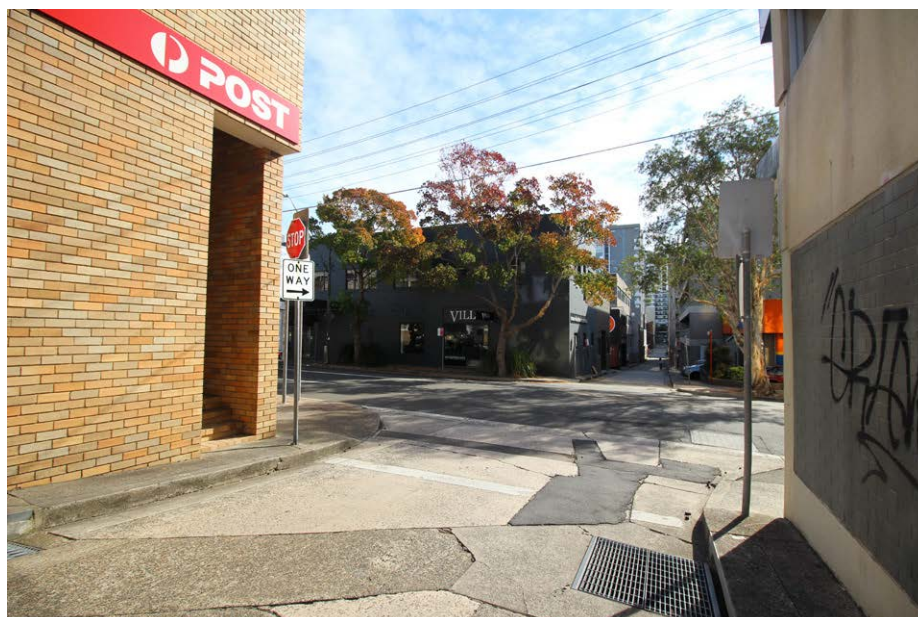
The project would result in a noticeable improvement in the amenity of this view resulting in a **minor beneficial visual impact** during operation.

Viewpoint 4: View northwest along Clarke Lane

This view along Clarke Lane has a 'back-of-house' character with tall blank walls in the foreground, and a mix of service entries in the background of the view. Clarke Lane is a narrow one-way vehicular laneway, without street trees or defined footpath. Buildings step up from single storey light industrial and two storey showrooms and retail buildings on Hume Street, to high-rise developments in the background, creating a strong sense of visual enclosure to the lane. In the middle ground of the view, the lane is traversed by Hume Street, which includes a mix of street trees, that soften this otherwise highly urban view.

Construction: This view would change considerably due to the removal of an entire block of buildings stretching along Clarke Lane, between Hume Street and Oxley Lane, as well as the Crows Nest post office building, to the west of this view. Trees on Hume Street would be removed. Trenching work for the power upgrade would be seen in Clarke Lane. Construction vehicles would be seen on Clarke Lane and Hume Street visible in the foreground of this view. The site of the Post Office would be replaced with an acoustic enclosure. To the north of the view, between the Pacific Highway and Clarke Lane a second enclosure would be visible rising above the site in the background of the view. Hoarding, fencing and traffic management activities would also be seen across much of this view.

It is expected that the project would create a considerable reduction in the amenity of



04



04A

04 EXISTING VIEW NORTHWEST ALONG CLARKE STREET

04A INDICATIVE EXTENT OF DEMOLITION

05 CROWS NEST STATION

Assessment of daytime visual impact



05



05A

- 05 EXISTING VIEW EAST FROM CORNER OF
THE PACIFIC HIGHWAY AND HUME STREET
- 05A INDICATIVE EXTENT OF DEMOLITION

this view, which is of local visual sensitivity, resulting in a **moderate adverse visual impact** during construction.

Operation: Clarke Lane would be reinstated and would incorporate active frontages between the lane and the Pacific Highway, reinstating the predominant alignment of the existing buildings, and creating a sense of enclosure to Clarke Lane. The footpaths on Hume Street and street trees would be reinstated, creating a refreshed public realm and softening the view.

The project would therefore not result in a perceived change in the amenity of this view during operation, resulting in a **negligible visual impact**.

Viewpoint 5: View northeast from corner of Hume Street and Pacific Highway

This view illustrates the single and double storey commercial buildings, apartment blocks and modern showroom development typical along the Pacific Highway, south of Oxley Street. In the centre of the view is the Crows Nest post office, a low-rise brick and stained glass building. The architecture in this view is unified by a consistent building line with similar building heights, stepping down the sloping highway. This view captures the strong influence of the Pacific Highway on the streetscape; it is a heavily trafficked six-lane road that separates activities on either side of the street. Mature London planetrees line the Pacific Highway, and street trees on Hume Street soften this urban view.

Construction: Buildings stretching along the Pacific Highway, between Hume Street and Oxley Lane, including the Crows Nest post office building would be demolished, as would number of street trees adjacent to the project site. An acoustic enclosure would be established on the site of the post office, extending along the Pacific Highway (right of view). Construction traffic would be seen on the Highway and at times using Hume Street. The temporary closure and diversion of Hume Street would be prominent in this view. Site perimeter hoarding and fencing,

would be seen across much of this view.

It is expected that the project would create a considerable reduction in the visual amenity of this view, which is of local visual sensitivity, resulting in a **moderate adverse visual impact** during construction.

Operation: Active street frontage would be seen along the Pacific Highway, restoring the predominant alignment of the existing facades, and street trees would be reinstated. Despite the removal of the visually distinctive post office building, it is expected that the project would not create a perceived change in the amenity of this view, resulting in a **negligible visual impact** during operation.

Assessment of night time visual impact

The setting of the Crows Nest Station is considered to be an area of **E4: High district brightness**. This is due to its brightly lit location on the Pacific Highway, where there is 24 hour activity and lighting from surrounding buildings and streets creating both direct light sources and a general skyglow around the project site.

Construction: It is likely that there would be night works required at this location during construction, including 24 hour deliveries and spoil haulage accompanied by traffic control crews with lit truck mounted crash attenuator vehicles and lighting. This would result in the site, as well as adjacent areas extending along Hume and Oxley Streets, being more brightly lit than the existing setting.

This lighting would create a noticeable reduction in the amenity of views in this area of high district brightness, from surrounding streets and potentially from adjacent residential towers on Oxley Street and the Pacific Highway. It is therefore expected that the project would result in a **negligible visual impact** during evening hours.

Operation: The station entry on the corner of Clarke and Hume Streets would be brightly lit 24 hours a day to accommodate station activities and for security after hours. This lighting would be consistent with the surrounding high district brightness environment.

It is expected that during operation the lighting of the project would not create a perceived change in visual amenity, resulting in a **negligible visual impact** for this area during evening hours.

05 CROWS NEST STATION

Summary of impact

Summary of impact

Landscape impact

During construction the project would result in a **minor adverse landscape impact** on the surrounding streets of Oxley, Hume and Clarke Streets and the Pacific Highway in the vicinity of the project site. This is primarily due to the direct impact on pedestrian movement and the loss of mature street trees.

During operation, there would be **minor beneficial landscape impact** experienced on these surrounding streets and Clarke Place Park. These benefits relate to the improved access to public transport and additional pedestrian crossings which would improve overall accessibility and permeability of the entire precinct.

Visual impact

There would be a range of adverse visual impact created by the project during construction including **minor** and **moderate adverse visual impact**. These impact are primarily due to the extent of demolition works, and the scale of the acoustic enclosures and construction sites. The range of impact levels reflect the scale and proximity of the works to the viewing location. Generally impact are more substantial in the vicinity of Hume Street where the construction site works would be more complex and have a larger footprint.

There would be a **negligible visual impact** experienced in views to the site during operation of the project. In particular, the views would be restored and somewhat improved at the corner of Hume and Clarke Street where the new station entry and streetscape upgrades would be seen.

At night there would be **negligible visual impact** during construction due to the context of **E4: High district brightness area**. During operation there would also be a **negligible** visual impact as the station and associated development would be visually absorbed into the surrounding brightly lit context.

The following tables summarise the impact of the project.

Landscape impact

			Construction		Operations	
No	Location	Sensitivity	Modification	Impact	Modification	Impact
1	Willoughby Road restaurant precinct	Local	No perceived change	Negligible	No perceived change	Negligible
2	Oxley, Hume and Clarke Streets	Local	Noticeable reduction	Minor adverse	Noticeable improvement	Minor benefit
3	Pacific Highway	Local	Noticeable reduction	Minor adverse	Noticeable improvement	Minor benefit
4	Clarke Place Park	Local	No perceived change	Negligible	Noticeable improvement	Minor benefit

Day time visual impact

			Construction		Operations	
No	Location	Sensitivity	Modification	Impact	Modification	Impact
1	View southeast along the Pacific Highway	Local	Noticeable reduction	Minor adverse	Noticeable improvement	Minor benefit
2	View south along Oxley Street	Local	Noticeable reduction	Minor adverse	Noticeable improvement	Minor benefit
3	View southwest from Clarke Street	Local	Noticeable reduction	Minor adverse	Noticeable improvement	Minor benefit
4	View northwest along Clarke Lane	Local	Considerable reduction	Moderate adverse	No perceived change	Negligible
5	View east from corner of Hume Street and Pacific Highway	Local	Considerable reduction	Moderate adverse	No perceived change	Negligible

Night time visual impact

			Construction		Operations	
No	Location	Sensitivity	Modification	Impact	Modification	Impact
1	Project site	E4: High district brightness	Noticeable reduction	Negligible	No perceived change	Negligible

06 VICTORIA CROSS STATION

Planning context

The project includes two sites for the Victoria Cross Station, both located on Miller Street. The northern site would be located on the western side of Miller Street near the corner of McLaren Street, and the southern site would be located on an 'L' shaped site south of Berry Street between Miller and Denison Streets.



SITE LOCATION

Planning context

The following review identifies key documents which provide the planning context for the landscape and visual impact assessment of the proposed Victoria Cross station precinct.

North Sydney Local Environmental Plan, North Sydney Council, 2013

The particular aim of this plan, in relation to this assessment, is: *“to promote development that is appropriate to its context and enhances the amenity of the North Sydney community and environment”*.

The Plan also requires new non-residential development to conserve the *“amenity of residential properties and public places”*, in terms of *“visual... privacy”* and *“view sharing”*.

The project site includes the heritage listed Victorian shopfront at 187 Miller Street. It is also in proximity to a number of other heritage sites, including several buildings within Monte Sant’ Angelo Mercy College, ‘Montrose’ (196 Miller Street) which is currently a restaurant, the ‘Rag & Famish Hotel’ (at 199 Miller Street) and the ‘O’Regan’ building (at 192 Miller Street). This assessment will therefore need to consider the *“settings and views”* of these heritage items under the Heritage conservation clause (5.10).

The northern site falls within the B4 Mixed Use, and adjacent to R3 Medium Density Residential, and the southern site is located within the B3 Commercial Core Land Use Zone. The relevant objectives of each of these zones are as follows:

Zone B4 – Mixed Use:

- *“To integrate suitable business, office, residential, retail and other development in accessible locations so as to maximise public transport patronage and encourage walking and cycling.”*
- *To create interesting and vibrant mixed use centres with safe, high quality urban environments with residential amenity.*

- *accommodate development that is compatible with the scale and character of the surrounding residential development.”*

Zone R3 – Medium Density Residential:

- *“To encourage the development of sites for medium density housing if such development does not compromise the amenity of the surrounding area or the natural or cultural heritage of the area.”*
- *To provide for a suitable visual transition between high density residential areas and lower density residential areas.*
- *To ensure that a high level of residential amenity is achieved and maintained.”.*

Zone B3 – Commercial Core:

- *“To encourage appropriate employment opportunities in accessible locations.”*
- *To maximise public transport patronage and encourage walking and cycling. ... [and]*
- *To minimise the adverse effects of development on residents and occupiers of existing and new development.”*

Relevant objectives of Clause 6.2 (Building heights and massing) promotes scale and massing of new development that provides for *“pedestrian comfort”* in relation to protection *“human scale and visual dominance”*.

North Sydney Development Control Plan, North Sydney Council, 2012

The North Sydney DCP identifies a number of Character Areas across the study area and includes locality statements for areas located within these character areas. The project is located within the Central Business District Locality Area, within the North Sydney Character Area. The desired future character and relevant supporting principles identified for this locality are summarized in the following paragraphs.

North Sydney Character Area, Central Business District

The DCP promotes the preservation and enhancement of the following views and vistas in the Central Business District Locality Area:

- *“Views to between buildings on east side of Miller Street, between Berry and McLaren Streets. ...*
- *Views along the Pacific Highway to the Post Office on Mount Street from the south-east.*
- *Views along the Pacific Highway to Sydney Harbour from the intersection with Mount Street.”*

The streetscape of the area is characterised by wide, fully paved footpaths, active street frontages, irregular awnings and street trees.

Key icons in this area include: Greenwood Plaza, the Post Office and Court House, the MLC Building, Don Bank Museum, Brett Whiteley Place and Monte Sant’ Angelo Mercy College. This assessment will consider any views to these icons which may be impacted.

North Sydney Public Domain Strategy, North Sydney Council, 2004

This Strategy provides a framework for upgrading public domain areas to accommodate the increased population growth expected over the next 15 years. The Strategy consists of plans, actions and design principles to guide the future upgrade of the public domain in the North Sydney Centre.

Council has since commissioned a ‘Public Domain Review’ study which will audit North Sydney Centre’s public domain and include advice and recommendations for improving the physical environment and pedestrian experience in the Centre.

North Sydney Centre Traffic and Pedestrian Study, 2014

As part of the *North Sydney Centre Review*, Council commissioned the *North Sydney Centre Traffic and Pedestrian Study*, which reviews the existing pedestrian, cycling, traffic and bus network in central North Sydney. A key objective of the study is to promote pedestrian activity within the centre of North Sydney through improved linkages and amenity, particularly along major streets such as Berry Street, the Pacific Highway, Miller Street and Walker Street.

A key proposition is the creation of a laneway connection through Northpoint to connect the Pacific Highway and Miller Street with retail hub uses. This supports the strong desire line of pedestrians moving between the commercial and education uses west of Pacific Highway and the bus stops on Miller Street. There is also an opportunity to widen the footpath on Denison Street, to improve pedestrian amenity and safety.