

Appendix D

Urban design, landscape character and visual impact assessment



Transport for NSW
Townson Road Upgrade Stage 2
Between Jersey and Burdekin Road
Urban Design Report and Landscape Character and Visual
Impact Assessment

May 2022

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Terminology

Terminology	Definition
Aesthetics	Relating to a sense of beauty and taste; giving visual pleasure, adhering to scientific and artistic principles; and providing sensory, emotional, or intellectual contemplation.
Batter	The uniform side slope of a cutting or an embankment.
Impact	The effect of a proposal, which can be adverse or beneficial, when measured against an existing condition.
Landscape	All aspects of a tract of land, including landform, vegetation, buildings, villages, towns, cities and infrastructure.
Landscape character	The combined quality of built, natural and cultural aspects which make up an area and provide its unique sense of place.
Landscape character zone	An area of landscape with similar properties or strongly defined spatial qualities, distinct from areas immediately nearby.
Landscape effects	Effects on the landscape as a resource in its own right.
Landscape value	The relative value that is attached to different landscapes by society. A landscape may be valued by different stakeholders for a whole variety of reasons.
Magnitude	The measurement of the scale, form and character of a development proposal when compared to the existing condition. In the case of visual assessment this also relates to how far the proposal is from the viewer. Combines with sensitivity, magnitude provides a measurement of impact.
Sensitivity	The sensitivity of a landscape character zone or view and its capacity to absorb change of the nature of the proposal. In the case of visual impact this also relates to the type of viewer and number of viewers. Combined with magnitude, sensitivity provides a measurement of impact.
Sense of place	The feelings or perceptions people have for a place, often in relation to the characteristics that make a place special or unique.
Significance	A measure of the importance or gravity of the environmental effect, defined by significance criteria specific to the environmental topic.
Significant	In the context of EIA, after analysing the extent (type, size, scope, intensity and duration) and nature (predictability, resilience of the environment, reversibility, ability to manage/mitigate, level of public interest) of a proposal, an expected level of impact of a proposal which requires an EIS to be undertaken. The term should be avoided in landscape character and visual impact assessments if the expected level of impacts is below the threshold (refer to TfNSW Environmental impact assessment practice note EIA-N04).
Study area	Consists of land in the vicinity of, and including, the proposal site. The study area is a wider area surrounding the proposal site as defined in this assessment, including land that has the potential to be indirectly impacted by the proposal.
View	The sight or prospect of a landscape or scene.
Viewshed / Visual Envelope Map	A portion of the landscape that can be seen from one or more observer positions. The extent of area that can be viewed is normally limited by landform, built form, vegetation and distance.
Visibility	The state or fact of being visible or seen.
Visual effects	Effects on specific views and on the general visual amenity experienced by people.
Visual amenity	The overall pleasantness of the views people enjoy of their surroundings, which provides an attractive visual setting or backdrop for the enjoyment of activities of the people living, working, recreating, visiting or travelling through an area.

Terminology	Definition
Visual impact	The impact on the views from residences, workplaces and public places.
Visual receivers	Individuals and/or defined groups of people who have the potential to be affected by a proposal.

Abbreviations

Abbreviations	Definition
3D	Three dimensional
BCC	Blacktown City Council
CEMP	Construction Environmental Management Plan
CHAR	Cultural Heritage Assessment Report
DCP	Development Control Plan
GIS	Geographic Information System
GPS	Global Positioning System
Km	Kilometre
ELVIS	Elevation Information System
LCVIA	Landscape character and visual impact assessment
LCZ	Landscape character zone
LEP	Local Environmental Plan
LGA	Local Government Authority
m	Metre
PACHCI	Procedure for Aboriginal Cultural Heritage Consultation and Investigation
REF	Review of Environmental Factors
RFI	Request for Information
RSW	Reinforced soil retaining wall
TfNSW	Transport for NSW
VP	Viewpoint
WSUD	Water Sensitive Urban Design

1. Introduction

1.1 Overview

A four-lane divided road is proposed along the Townson Road/Burdekin Road corridor linking Richmond Road, Marsden Park in the west with Burdekin Road, Schofields in the east. The length of the overall program of work is about 3.6 kilometres.

The overall program of work consists of two stages:

- Stage 1 involves an upgrade of about 1.6 kilometres of road extending from Richmond Road to south of Jersey Road. This stage is being delivered within an interim and final phase, subject to a separate planning approval
- Stage 2 is about two kilometres in length involving the construction of a new road between the Stage 1 tie-in and Burdekin Road (referred to as 'the proposal' for the purposes of this assessment).

The proposal is located within the North West Growth Area which is about 37 kilometres north-west of the Sydney central business district and three kilometres west of Schofields. The proposal is situated between the Marsden Park Industrial and West Schofields precincts (see Figure 1.1).

The roads authority is the proponent of the proposal, and an environmental assessment in the form of a review of environmental factors (REF) is being prepared in accordance with the requirements of Division 5.1 of the *NSW Environmental Planning and Assessment Act 1979* (EP&A Act). Transport for NSW has prepared the concept design and BCC will prepare the detailed design and will construct the proposal.

This report assesses the landscape character and visual impacts (LCVIA) of the proposal, then integrates the finding with the urban design considerations, providing design guidance and impact mitigation opportunities to inform the detailed design phase.

1.2 Proposal outline

The key features of the proposal are shown in Figure 1.2 and include:

- Constructing a new median separated dual carriageway around two kilometres in length connecting Stage 1 in the west with Burdekin Road in the east
- Providing a signalised intersection at Aerodrome Drive (Veron Road) with pedestrian crossing facilities
- Providing a 2.5 metre wide shared path for pedestrians and cyclists on the southern side of the carriageway up to Aerodrome Drive (Veron Road), then 1.5 metre footpath to Burdekin Road
- Providing a 1.5 metre wide footpath on the northern side of the carriageway along the length of the proposal
- Railway Terrace would be terminated with a cul-de-sac
- Constructing a 300 metre long viaduct over Eastern Creek
- Constructing a vehicular and pedestrian bridge over the T1 Western Line to tie into Burdekin Road.

1.3 Scope of this assessment

The purpose of this report is to assess the potential landscape character and visual impacts of the operation and construction of the proposal. This report supports the REF for the proposal and incorporates the urban and landscape concept design for Stage 2 of the Townson-Burdekin Road upgrade. This report provides a consolidated overview for the urban design and LCVIA and will inform the detailed design phase. The proposal area is two kilometres in length, from west of Jersey Road to the Burdekin Road and Pelican Road intersection, as shown in Figure 1.1.

The scope of assessment included:

- Identification of the existing landscape character areas in the proposal area
- Identification of the existing sensitive receivers in the proposal area
- Assess the potential operational phase visual impacts of the proposal on sensitive receivers, at opening and 10 years after opening
- Assess the potential construction phase visual impacts of the proposal on sensitive receivers, based on the approved project description
- Determine suitable mitigation measures
- Prepare a report summarising the findings of the study.

This urban design and LCVIA report has been prepared for the REF. This report incorporates the following:

- Urban design objectives and principles
- Mitigation measures developed by the LCVIA
- Planting typologies and methodologies
- Urban design and landscape treatments for the proposal.

1.4 Report structure

This report is comprised of the following sections:

Section 2 – Methodology: describes the methodology used for the purposes of this report.

Section 3 – Existing environment: summarises the existing landscape character and visual environment in terms of landscape character zones and sensitive visual receivers.

Section 4 – Policy and legislative context: provides an analysis of the relevant policies in the context of the proposal.

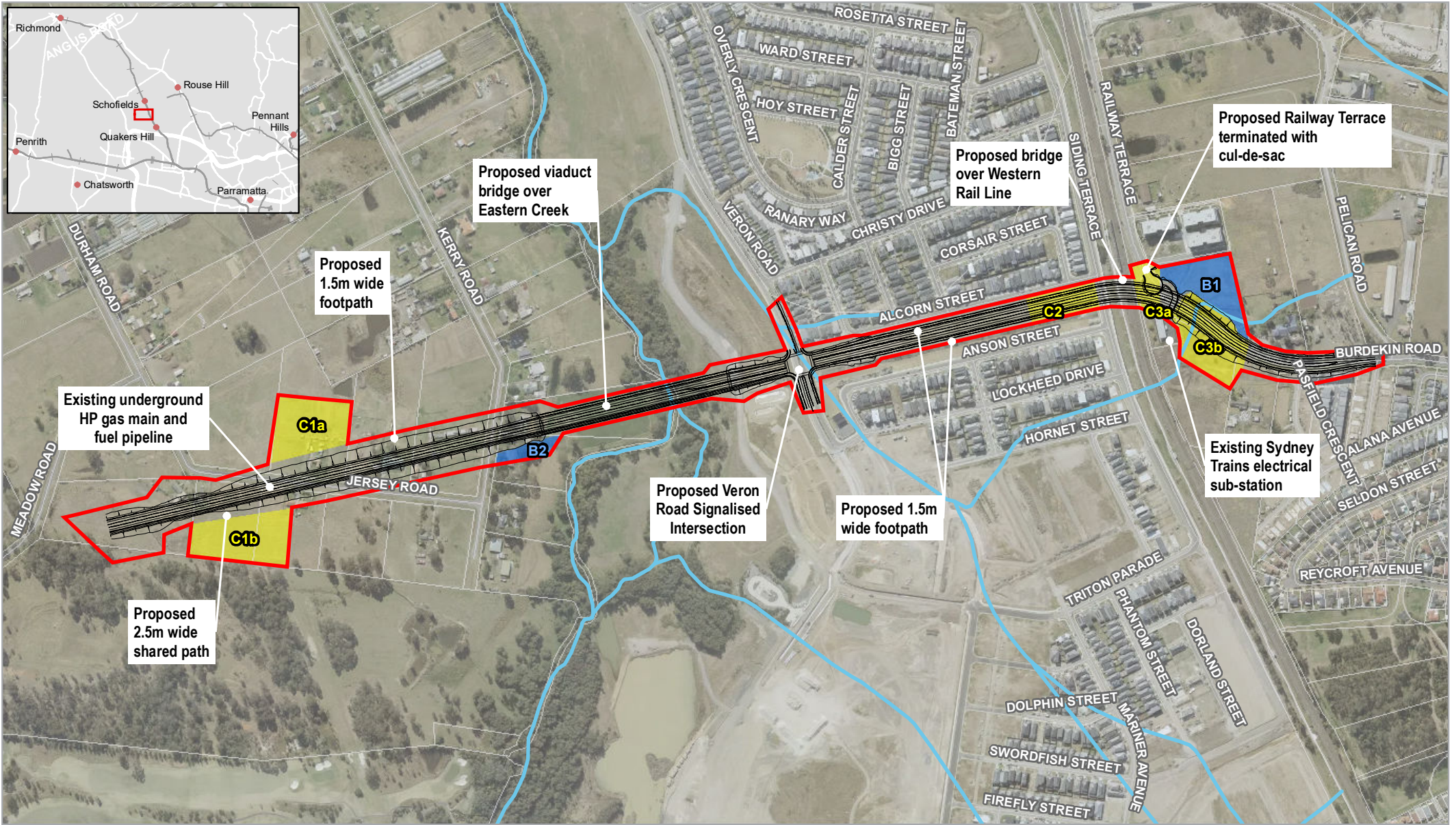
Section 5 – Urban design Strategy: provides the urban design objectives, principles, concept design and illustrations of the proposal components most relevant to this assessment.

Section 6 – Landscape character assessment: Landscape character zones are assessed and impacts to landscape character are provided.

Section 7 – Visual impact assessment: Assesses the visual impact of the proposal on the key sensitive visual receivers that have been identified.

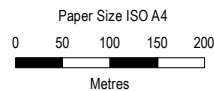
Section 8 – Landscape character and visual impact mitigation measures: recommends mitigation measures in response to issues arising in the assessment during construction and operation phases of the proposal. Includes key urban design mitigation strategies.

Section 9 – Conclusion: presents a summary of the urban design and LCVIA.



LEGEND

- The proposal **Subject to detailed design*
- Construction footprint
- Compound site
- Drainage basin
- Cadastre
- Watercourse



Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

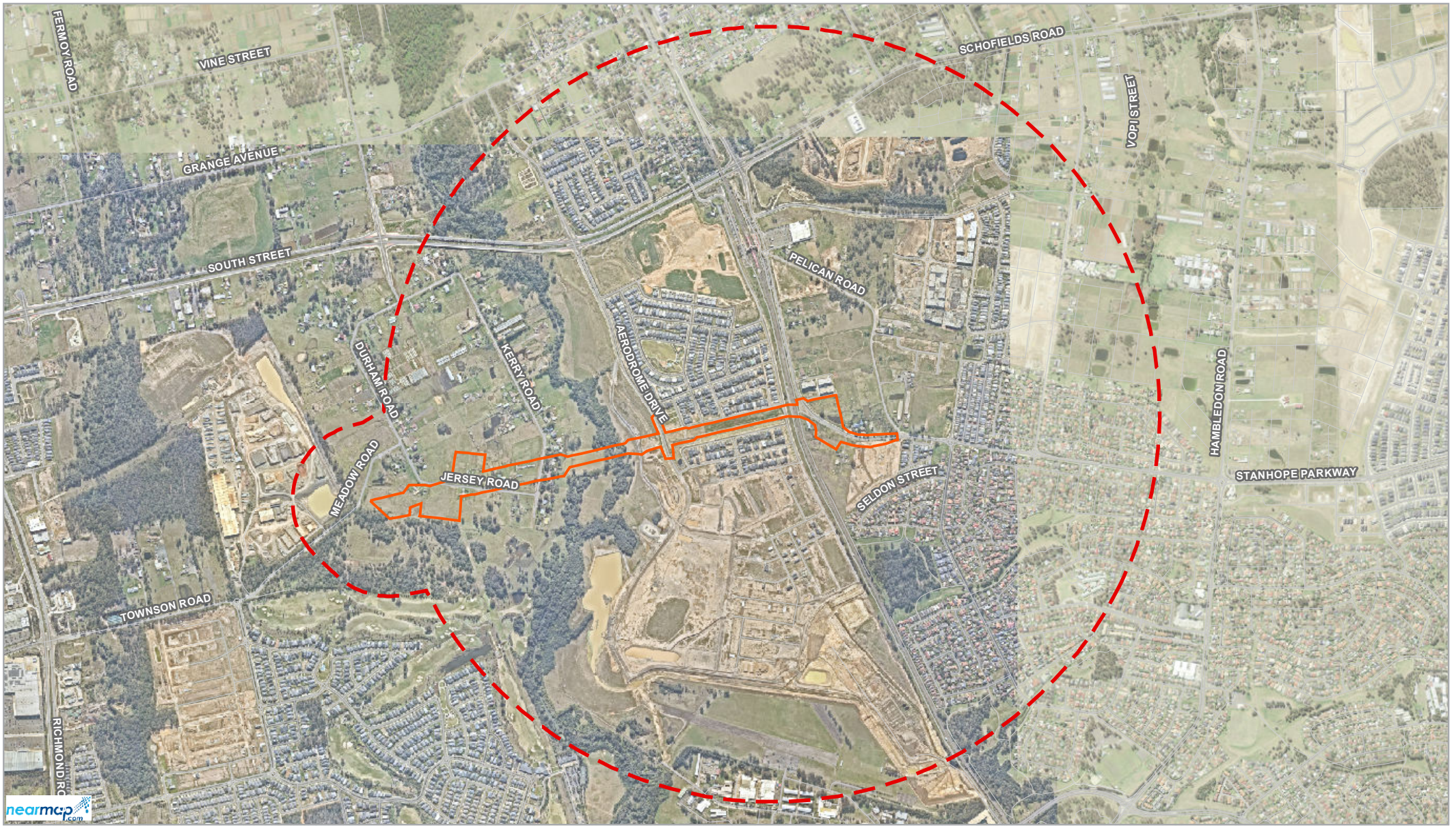


Transport for NSW
Townson Road Upgrade Stage 2
Burdekin Road

The Stage 2
Proposal

Project No. 21-12511195
Revision No. -
Date 28/10/2021

FIGURE 1-1



LEGEND
 Study area
 Construction footprint

Paper Size ISO A4
 0 90 180 270 360
 Metres



Transport for NSW
Townson Road Upgrade Stage 2
Burdekin Road

Project No. **21-12511195**
 Revision No. **-**
 Date **20/08/2021**

Map Projection: Transverse Mercator
 Horizontal Datum: GDA 1994
 Grid: GDA 1994 MGA Zone 56

Study area

FIGURE 1.2

2. Methodology

2.1 Standards and guidance

Transport for NSW (TfNSW) have produced a comprehensive list of design guideline documents aimed at achieving good urban design outcomes, and for the assessment of landscape character and visual impacts. This report has been undertaken with reference to the following published documents:

- *Guideline for landscape character and visual impact assessment: Environmental impact assessment practice note EIA-N04 Version 2.2 (TfNSW 2020)*
- *Beyond the Pavement: Urban design approach and procedures for road and maritime infrastructure planning, design and construction, (TfNSW 2020)*
- *Design guideline to improve the appearance of noise walls in NSW, (TfNSW 2021)*
- *Bridge Aesthetics (TfNSW 2019)*
- *Shotcrete Design Guideline (TfNSW 2016)*
- *Landscape Design Guideline (TfNSW 2018)*
- *Water Sensitive Urban Design Guideline (TfNSW 2017)*
- Relevant BCC council guidelines including Blacktown Local Environmental Plan and Blacktown City Council Growth Centre Precincts Development Control Plan 2010
- *Noise wall design guideline: Design guideline to improve the appearance of noise walls in NSW, (TfNSW, March 2021).*

2.2 Urban design objectives and principles

In accordance with *Beyond the Pavement: Urban design approach and procedures for road and maritime infrastructure planning, design and construction (TfNSW 2020)*, the proposed urban design objectives and principles were defined by the urban design team and identified within this report (refer Section 5).

2.3 Context analysis

2.3.1 Review of legislation and policy

A review of key planning designations, policies and guidance was undertaken in relation to the landscape and visual environment within the urban design and LCVIA study area. The study area has been defined in section 2.3.3. A review was also undertaken of relevant planned projects within the study area.

2.3.2 Desktop analysis of the proposal, urban, landscape and visual resources

Existing data was gathered and reviewed, including proposal design information, topography, land use, and vegetation data, aerial imagery, and previous site photographs by others. Using this data, a preliminary assessment of the landscape and visual environment was undertaken to inform the site inspection. Further information regarding mobility and land use plans were collated.

2.3.3 Study area

The study area for the urban design and LCVIA is generally confined to the viewshed of the proposal. This has resulted in an indicative study area of approximately 300 metres from the at-grade section of the road corridor, based on a desktop study examining aerial photographs and topographic maps; a site inspection considering the existing visual catchment; and previous studies of a similar nature. A wider study area of one kilometre has been determined around the proposed grade separated road bridge over the railway, due to the height and visual prominence of the proposed infrastructure.

2.3.4 Site inspection

A site inspection was undertaken by a Landscape Architect and Visual Impact Specialist on 30 November 2020. The purpose of the inspection was to:

- Inspect the site and appreciate views to / from sensitive visual receivers
- Inspect publicly accessible locations identified in the desktop study as likely to provide views of the proposal, including roads, footpaths and public open spaces
- Identify sensitive visual receiver locations
- Assess the landscape character of the study area and identify landscape sensitivities
- Undertake site photography.

The Global Positioning System (GPS) coordinates of each viewpoint were recorded during the site inspection.

2.4 Landscape character and visual impact assessment

2.4.1 Definition of existing landscape and visual environment

A landscape baseline assessment was undertaken to determine the existing natural and cultural features within the study area. This includes determination of key landscape and spatial elements, features, and values. Aspects considered include land use, built form, landform, topography, hydrology, vegetation, historical features, and mobility and access.

A visual baseline assessment was also undertaken to establish the key views, the proposal viewshed, and other visual features within the study area. This was based on a desktop review and visual appraisal of the study area during the site inspection.

The existing landscape and visual environment has been discussed in section 3.

2.4.2 Identification of landscape character zones

Landscape character refers to a distinct and recognisable pattern of elements that occur consistently in a particular type of landscape. Particular combinations of geology, landform, soils, vegetation, land use and human settlement create character, which makes each part of the landscape distinct and gives each its particular sense of place.

Landscape character zones (LCZ) define common landscape types defined by typical features and characteristics identified during the desktop assessment and site inspection. Defining LCZ's identifies areas sharing the same homogenous environmental or cultural qualities or pattern as described in the preceding paragraph.

This approach has been used to establish the existing landscape character around the proposal site and to provide a framework for measuring the impact of the proposal. This assists in:

- Defining landscape elements that contribute to defining character

- Defining landscape character attributes
- Identifying landscape value

The assessment of the existing environment also considers factors which have influenced landscape change in the past and those that are likely to do so in the future.

LCZ's are discussed in section 3.1.

2.4.3 Visual Envelope Map

The Visual Envelope Map (refer Figure 3.8) was based on desktop studies and visual information from a site visit. An understanding of the intervisibility of the site and its surroundings, including landform, built form and vegetation informed the indicative visual extents. These visual extents are illustrated in the map and used as an indicative tool to help understand the visual conditions and select viewpoints.

2.4.4 Viewpoint selection

The assessment of visual impacts deals with the effects of change and development on the views available to people and their visual amenity. It assesses how the surroundings of individuals or groups of people may be specifically affected by changes in the context and character of views as a result of the change or loss of existing elements of the landscape and/or the introduction of new elements.

Visual receivers have been considered in terms of the views they are likely to obtain from within the study area including consideration of any key vantage points, such as lookouts, where there is particular interest in the view. Visual receivers are identified based on:

- Proximity of the receivers to the proposal, as the most affected visual receivers are anticipated to be located closest to the proposal, unless located at an elevated vantage point
- Type of receiver, as different viewer types would have different perceptions of the change.

Based on the analysis of the existing landscape and visual environment, sensitive visual receivers were identified and viewpoint locations selected as representative locations for assessment.

Viewpoint selection has been described in section 3.3.

2.4.5 Landscape effects

The assessment of landscape effects deals with the effect of change and development on the landscape as a resource. The concern is with how the proposal would affect the elements that make up the landscape, the aesthetic and perceptual aspects of the landscape and its distinctive character.

The consideration of potential impacts on landscape character is determined based on the sensitivity of the existing landscape to change and the magnitude of change that is likely to occur. The sensitivity of a landscape is judged on the extent to which it can accept change of a particular type and scale without adverse effects on existing landscape character. The level of sensitivity is determined on the basis of:

- The landscape's inherent values and any specific values that may apply such as landscape planning designations
- The landscape's ability to absorb changes associated with the proposal.

The magnitude of change to landscape character depends on the nature, scale and duration of the change expected to occur. The magnitude of change also depends on the loss, change or

addition of any feature to the existing landscape. It is based on that part of the LCZ which is likely to be impacted to the greatest extent by the proposal.

The sensitivity and magnitude of landscape effects address the following specific criteria:

- Sensitivity of landscape to proposed change, based on the susceptibility to change, and the value of landscape
- Magnitude of landscape effect, based on the size or scale of change, the geographical extent of effects, and the duration and reversibility of effects.

A judgement is made on the overall level of significance of the landscape effect in relation to the existing conditions.

Table 2.1 provides the criteria for the sensitivity of the landscape to proposed changes.

Table 2.2 provides the criteria for the magnitude of change. Landscape effects have been discussed in section 6.1.

Table 2.1 Sensitivity criteria (landscape)

Rating	Criteria
High	Landscape character elements in good or above average condition and/or that make a strong positive contribution to the landscape character. May include nationally important features. The type of development proposed could have a detrimental effect on the landscape character, condition or value. Mitigation measures are unlikely to reduce the impacts of the change.
Moderate	Landscape character elements in reasonably good condition and/or that make an average contribution to the local character, which may include locally important features. Any change caused by the proposed development would be unlikely to have a significant adverse effect on the landscape character, condition or value that could not be mitigated.
Low	Landscape character elements in average condition and/or that are not particularly distinctive local features. Development of this type is unlikely to have an adverse effect on the landscape character, condition or value. Mitigation measures would be effective in neutralising adverse effects.
Negligible	Elements in below average condition and/or that are not distinctive local features. Development of this type is very unlikely to have an adverse effect on the urban landscape character, condition or value. Mitigation measures would be effective in neutralising adverse effects and/or improve the urban landscape character.

Table 2.2 Magnitude of change criteria (landscape)

Rating	Criteria
High	A substantial/obvious change to the landscape character due to total loss of, or change to, elements, features or characteristics of the landscape. Would cause a landscape to be permanently changed and its quality diminished.
Moderate	Discernible changes in the landscape character due to partial loss of, or change to elements, features or characteristics of the landscape, however has potential to be partly mitigated. The change would be out of scale with the landscape character, and at odds with the local pattern and landform and would leave an adverse impact on the landscape character.
Low	Minor loss or alteration to one or more key landscape character elements, features or characteristics, or the introduction of components that may be new but may not be uncharacteristic within the existing landscape character.
Negligible	Almost imperceptible or no change in the landscape character as there is little or no loss of/or change to the elements, features or characteristics of the landscape.

2.4.6 Visual effects

The evaluation of potential impacts on visual amenity is based on the sensitivity of the viewpoint (and the visual receiver it represents) to change, and the magnitude of change that is likely to occur.

The sensitivity of each viewpoint is considered to be dependent on the:

- Importance of the view, its existing scenic qualities and the presence of other existing man-made elements in the view
- Type of visual receiver and their likely interest in the view.

The magnitude of change to views and visual amenity depends on the nature, scale and duration of the change that is expected to occur. The magnitude of a change also depends on the loss, change or addition of any feature in the field of view of the receiver including an assessment of the level to which the change contrasts with the existing view or expected view of the landscape. This includes the degree of any change to the backdrop to, or outlook from a viewpoint.

The assessment considers the likely impacts of the proposal. The level of effects on a view depends on factors such as the extent of visibility, degree of obstruction of existing features, degree of contrast with the existing view, angle of view, duration of view and distance from the proposal.

Steps undertaken to assess visual effects include an assessment of visual effects, comprising:

- Sensitivity of visual receivers to proposed change, based on: susceptibility of visual receivers to change, and value attached to views
- Magnitude of visual effect, based on: size or scale of change; geographical extent of effects, and duration and reversibility of effects.

An assessment is undertaken of the overall level of significance of the visual effects in relation to the existing view.

Table 2.3 describes the sensitivity criteria for visual effects.

Table 2.4 describes the magnitude of change criteria for visual effects.

Table 2.3 Sensitivity criteria (visual)

Rating	Criteria
High	Occupiers of residential properties, at home or going to or from, with long viewing periods, within close proximity to the proposed development; Communities that place value upon the urban landscape and enjoyment of views of their setting.
Moderate	Outdoor workers who have a key focus on their work who may also have intermittent views of the study area; Viewers at schools, or similar, when outdoor play and recreation areas are located within close proximity but viewing periods are limited; Occupiers of residential properties with long viewing periods, at a distance from or screened from the study area.
Low	Road users in motor vehicles, trains or on transport routes that are passing through or adjacent to the study area and therefore have short term views; Viewers indoor at their place of work, schools or similar.
Negligible	Viewers from locations where there is screening by vegetation or structures where only occasional screened views are available and viewing times are short; Road users in motor vehicles, trains or on transport routes that are passing through/adjacent to the study area and have partially screened views and short viewing times.

Table 2.4 Magnitude of change criteria (visual)

Rating	Criteria
High	A substantial/obvious change to the existing view due to total loss of, or change to, elements, features or characteristics of the view. Would cause a view to be permanently changed and its quality diminished.
Moderate	Discernible changes in the existing view due to partial loss of, or change to elements, features or characteristics of the view, however has potential to be partly mitigated. The change would be out of scale with the existing view, and would leave an adverse impact on the view.
Low	Minor loss or alteration to one or more key view elements, features or characteristics, or the introduction of components that may be visible but may not be uncharacteristic within the existing view.
Negligible	Almost imperceptible or no change in the view as there is little or no loss of/or change to the elements, features or characteristics of the view.

2.4.7 Significance of impacts

The combination of sensitivity and magnitude determines the significance of the impact on the landscape character or representative viewpoint. Refer Table 2.5 for the matrix used to determine the significance of impact. The matrix has been extracted from *Environmental impact assessment practice note EIA-N04 - Guideline for landscape character and visual impact assessment, Version 2.2* (TfNSW 2020). The assessment of visual effects has been undertaken in section 6.2.

Table 2.5 Significance of impact matrix

	Magnitude of impact				
		High	Moderate	Low	Negligible
Sensitivity	High	High	High-Moderate	Moderate	Negligible
	Moderate	High-Moderate	Moderate	Moderate-Low	Negligible
	Low	Moderate	Moderate-Low	Low	Negligible
	Negligible	Negligible	Negligible	Negligible	Negligible
		Negligible	Negligible	Negligible	Negligible

2.4.8 Photos

All photographic images were captured using a 50 millimetre fixed focal length lens on a 35 millimetre full frame format camera at a camera height of 1.6 metres. All photograph locations were recorded and mapped.

A series of eight viewpoint locations were chosen and existing views represented.

2.4.9 Views showing indicative proposal

The proposed views have been shown within section 6.2 with representative arrows and a dashed red outlines, indicating the approximate location of the proposal. This is to give a general indication of the location and scale of the proposal from each viewing location and is indicative only. These images were created without 3D model information and are intended to be representative only.

2.5 Mitigation measures

Potential mitigation measures have been developed to minimise the landscape character and visual impact of the proposal and may include:

- Adopting alternative designs or revisions to the basic engineering and design to prevent and/or minimise negative impacts
- Remedial measures such as colour and textural treatment of structural features
- Compensatory measures such as landscape design to compensate for unavoidable negative impacts and to attempt to generate long-term positive impacts.

These measures are in addition to those already included within the concept design.

Further details on mitigation measures have been provided in section 6.2.

2.6 Assumptions and limitations

The assessment aims to be objective and describe any changes factually. While potential changes resulting from the proposal are defined, the significance of these changes requires qualitative (subjective) judgements. This assessment's conclusion therefore combines objective measurement and professional interpretation. While this assessment aims to be objective, it is recognised that visual impact assessment can be subjective, and individuals are likely to associate different visual experiences to the study area.

At the time of writing, the noise wall design had not been finalised. Indicative options are discussed in the urban design chapter 5.2.4 with acrylic panel option being favourable in terms of visual permeability. Therefore this report assumed selection of this option. If an alternative option is selected, there would be potentially additional visual impacts above and beyond those identified in this report.

3. Existing environment

A landscape character assessment for the Townson Road and Burdekin Road Stage 1 was prepared by GHD in July 2020. This assessment described the landscape character in West Schofields, the Eastern Creek floodplains and the associated riparian and rural lands.

Taking this previous work into consideration and the site observations undertaken as part of this report, the existing environment has been described in the following section.

3.1 Site Context

Figure 3.1 to Figure 3.6 communicate the site's local context, including environmental, hydrological, topographical, vegetation, open space, soils and land use. These have been used to inform the landscape character areas described in section 3.2 and illustrated in Figure 3.7.

3.1.1 Topography and Hydrology

The proposal area is located on gently undulating topography with land falling towards Eastern Creek from the east and the west. Eastern Creek is a Fourth order stream that runs perpendicular through the central portion of the study area.

Land uses have impacted the quality of the of the water in the Eastern Creek catchment. Much of the proposal area and construction footprint has been modified in the past through vegetation clearing for agriculture, and the establishment of residential and industrial areas, and associated roads and infrastructure construction.

The construction footprint is located around 20 kilometres from the headwaters of Eastern Creek. Upstream from the proposal, Eastern Creek exists as a meandering largely urbanised creekline, with occasional deeper pools.

North of the construction footprint the topography rises to a high point at 'Altrove Hilltop Park' which is within the centre of the new 'Altrove' residential estate.

3.1.2 Local Context and Land Use

The proposal is located in an area of transition that is continually changing from rural uses to increasing residential development. Ongoing residential development in the area is extending the existing low density residential development around the proposal and currently contains residential lots for future development as part of the Akuna Vista Development.

Eastern Creek currently divides the more Rural small lot (RU4) areas to the west and the Environmental Living (E4) and Low density Residential (R2) Akuna Vista development to the south where the proposal is located on land reserved as part of the Infrastructure (SP2) designation.

Further east, the proposal traverses the trainline (Cumberland and North Shore & Western Lines), before connecting with Burdekin Road at Pelican Road.

3.1.3 Vegetation and Open Space

Much of the land around the construction footprint and wider study area has previously been cleared for infrastructure, residential and industrial development. Remaining native vegetation in the local area occurs in scattered patches that are largely restricted to the lands associated with the Eastern Creek riparian corridor. The riparian zone associated with Eastern Creek supports modified stands of native vegetation that occur in a patchy mosaic throughout the locality, frequently bisected by roads, infrastructure, and residential development.

Regional vegetation mapping of the study area indicates occurrences of Shale Plains Woodland and Alluvial Woodland (NPWS 2002a; 2002b; DPIE 2015). Field surveys confirmed the presence of two native plant community types (PCTs) within the study area:

- Grey Box - Forest Red Gum grassy woodland on flats of the Cumberland Plain. This community occurs on clay/loam soils derived from Wianamatta Shales on gently undulating low hills and flats. This vegetation zone occurs in the west of the study area to the south of Jersey Road and at the eastern end of the study area.
- Forest Red Gum – Rough-barked Apple grassy woodland. This community occurs on clay/loam soils derived from Wianamatta Shales on gently undulating low hills and flats. There is one occurrence of this vegetation zone within the study area: south of Jersey Road outside of the construction footprint.

Although the study area does not include any significant vegetation communities, retention of existing vegetation and weed management will be particularly important within the Eastern Creek corridor to minimise adverse development impacts on these important remnant natural areas.

3.1.4 Public and Active Transport

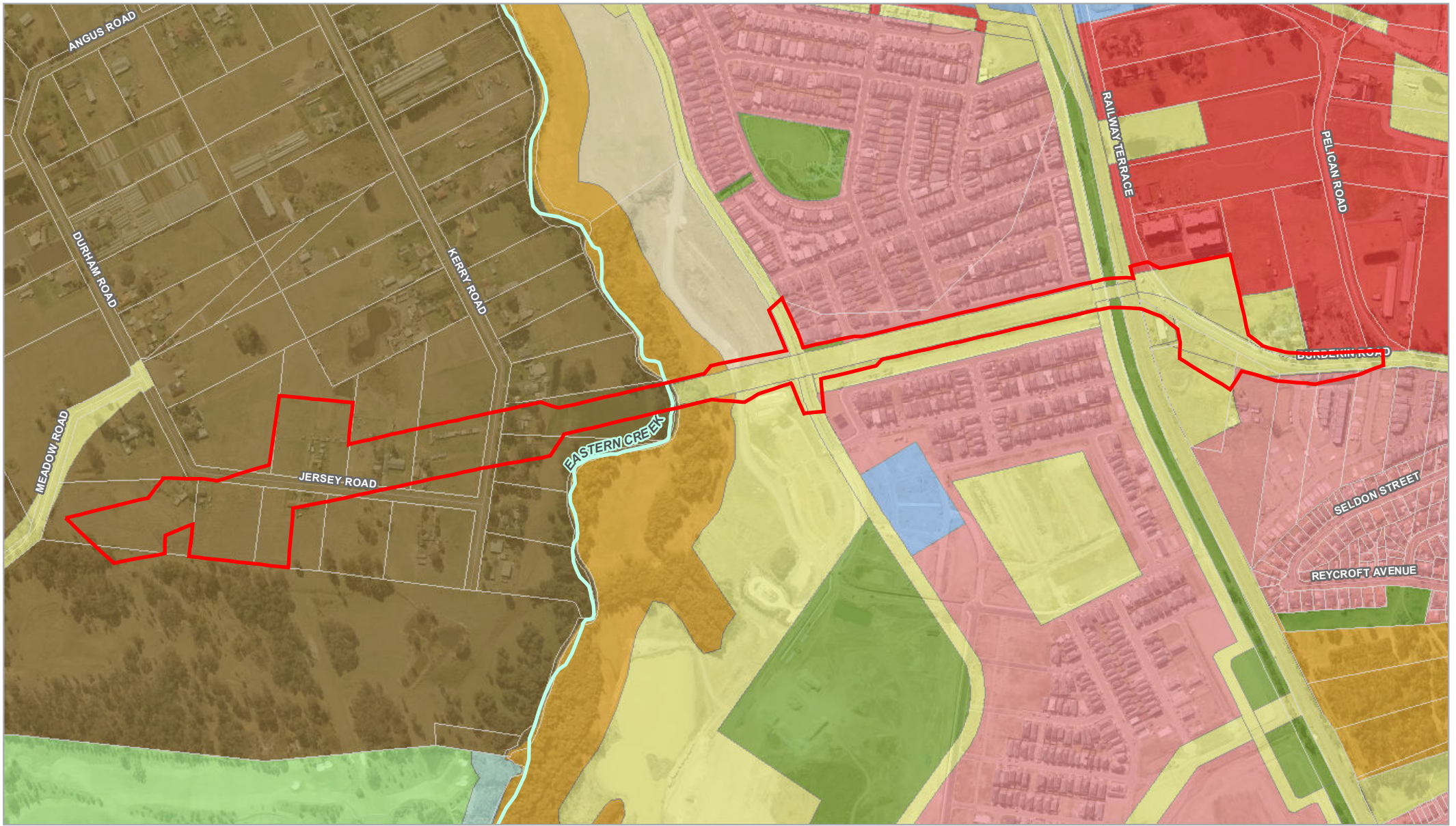
There is currently provision of Public and Active Transport in the surrounding areas. An existing shared path along the northern and eastern sides of Burdekin Road connects with Railway Terrace and the Schofields Train Station at the eastern end of the proposal. Schofields Train Station services the Richmond Line and is located approximately 500 metres north of the proposal near Burdekin Road.

Existing shared paths are located on the northbound and southbound carriageways along Richmond Road. These paths will connect to the proposal via the Stage 1 Townson Road upgrade project, Figure 3.3. Therefore, there is an opportunity to provide a direct east-west shared path connection between Richmond Road and Schofields Train Station and the surrounding areas. Urban design proposals therefore need to ensure connection with both local and the wider surrounding pedestrian and cycle network is promoted and encouraged.

3.1.5 Soils

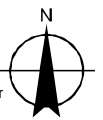
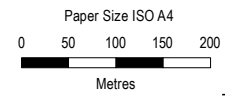
The proposal falls within the Blacktown and South Creek soil landscapes (DPIE, 2021e). The South Creek landscape comprises the valley flats and drainage areas of the channels of the Cumberland Plain. The geology is alluvial, derived from Wianamatta Group shales and Hawkesbury Sandstone. The Blacktown soil landscape is based on Wianamatta Group shales and features gently undulating topography within the Cumberland lowlands.

Plant selection will focus on utilising native species that are well-adapted to these soil types. Detailed design of structural elements must also respond to the inherent soil conditions and geological profiles found within the proposal area.



LEGEND

- Construction footprint
- E2, Environmental Conservation
- R3, Medium Density Residential
- RU4, Primary Production Small Lots
- E4, Environmental Living
- RE1, Public Recreation
- SP2, Infrastructure
- B2, Local Centre
- R2, Low Density Residential
- RE2, Private Recreation
- W1, Natural Waterways



Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56



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Land use plan

FIGURE 3.1

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Print date: 05 Nov 2021 - 14:43
Whilst every care has been taken to prepare this map, GHD make no representations or warranties about its accuracy, reliability, completeness or suitability for any particular purpose and cannot accept liability and responsibility of any kind (whether in contract, tort or otherwise) for any expenses, losses, damages and/or costs (including indirect or consequential damage) which are or may be incurred by any party as a result of the map being inaccurate, incomplete or unsuitable in any way and for any

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Data source: MetroMap - Imagery (date extracted: 5/11/2021), Land zoning - OEH/LP1 2018... Created by: albertson

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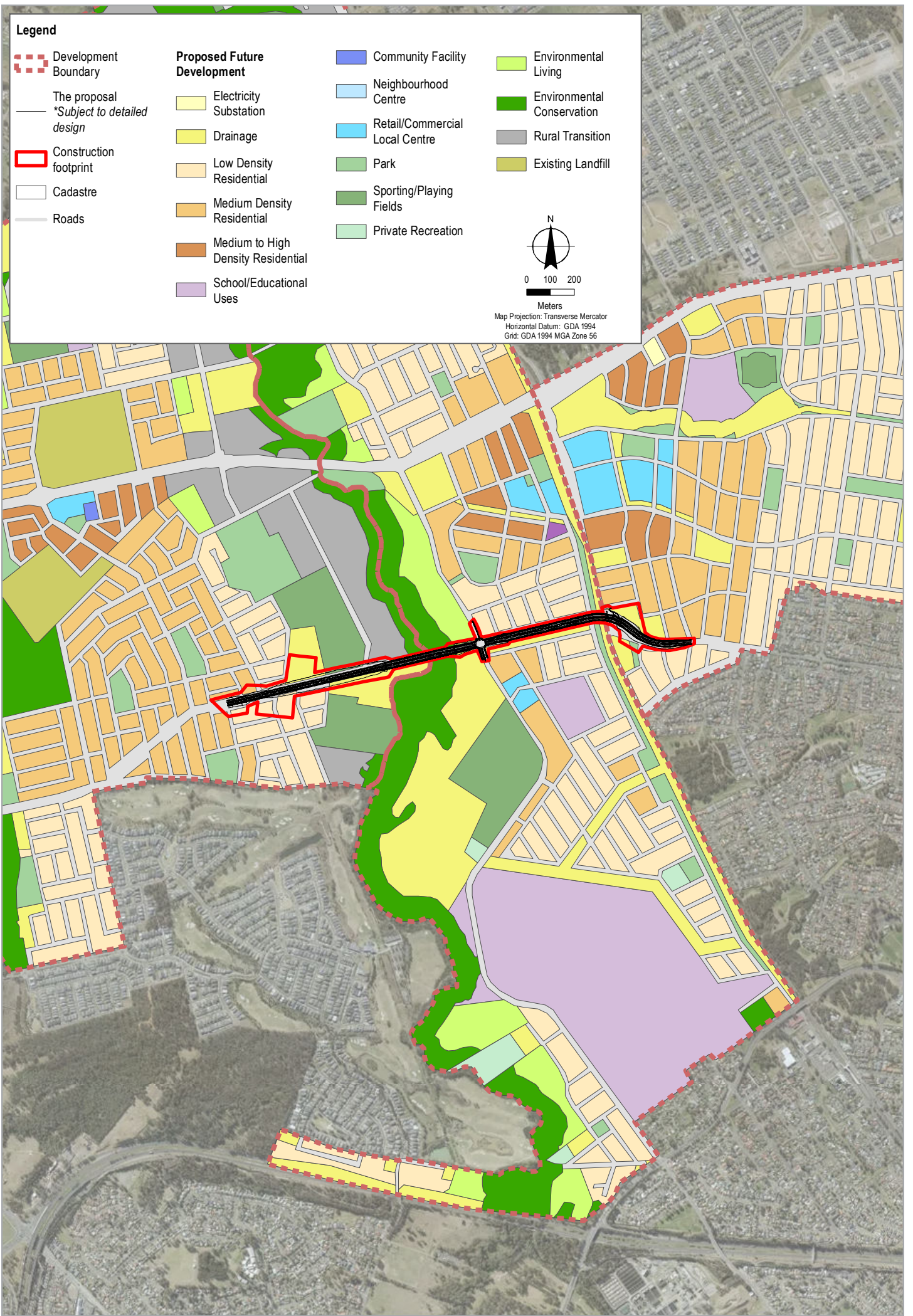
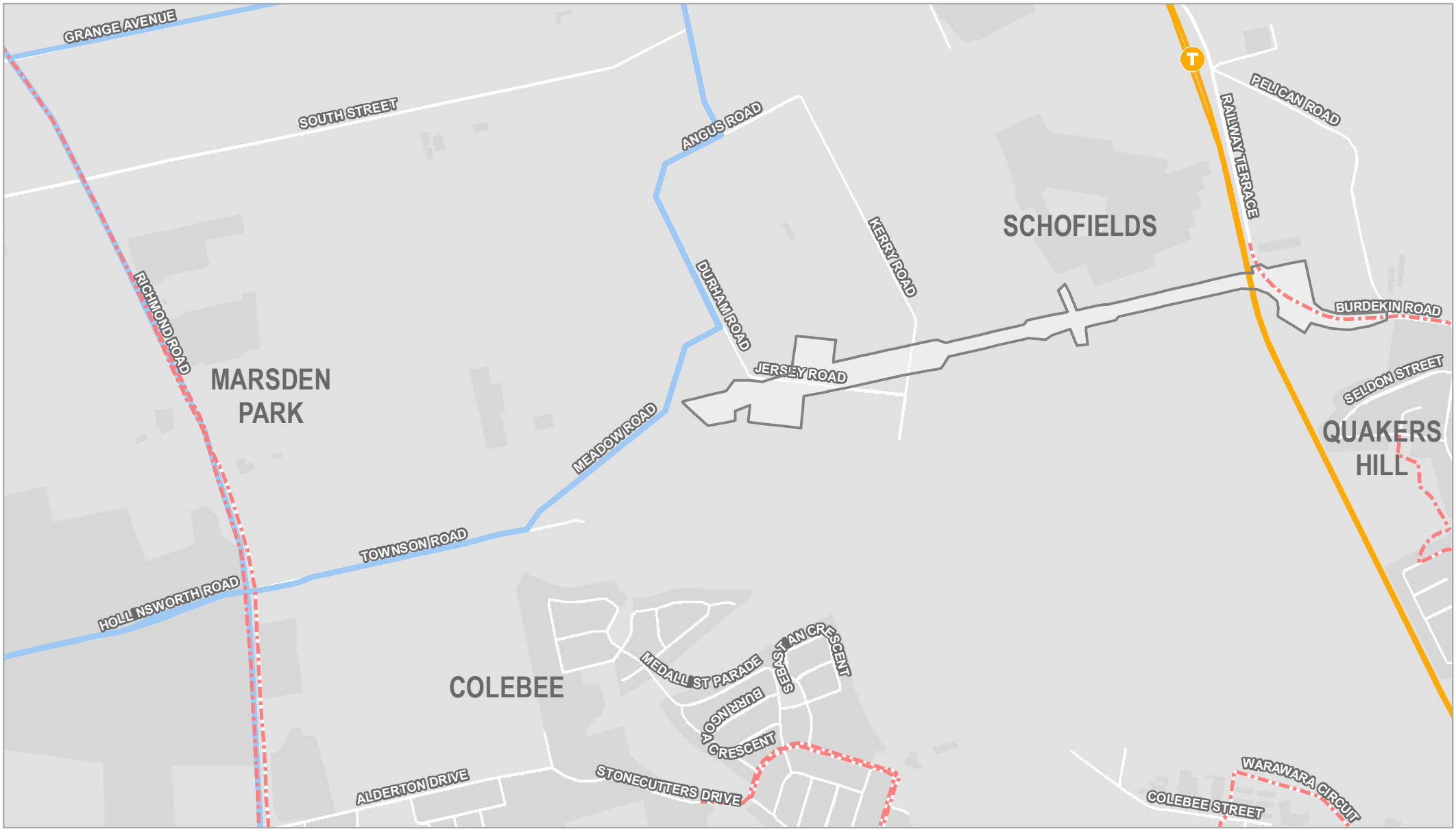


Figure 3.2 Proposal North West Growth Area Precincts - Schofield, West Schofields, Alex Avenue

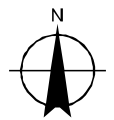


LEGEND

- Train Station
- Bus routes
- Construction footprint
- Rail Corridor
- Cycleway

Paper Size ISO A4
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 Metres

Map Projection: Transverse Mercator
 Horizontal Datum: GDA 1994
 Grid: GDA 1994 MGA Zone 56



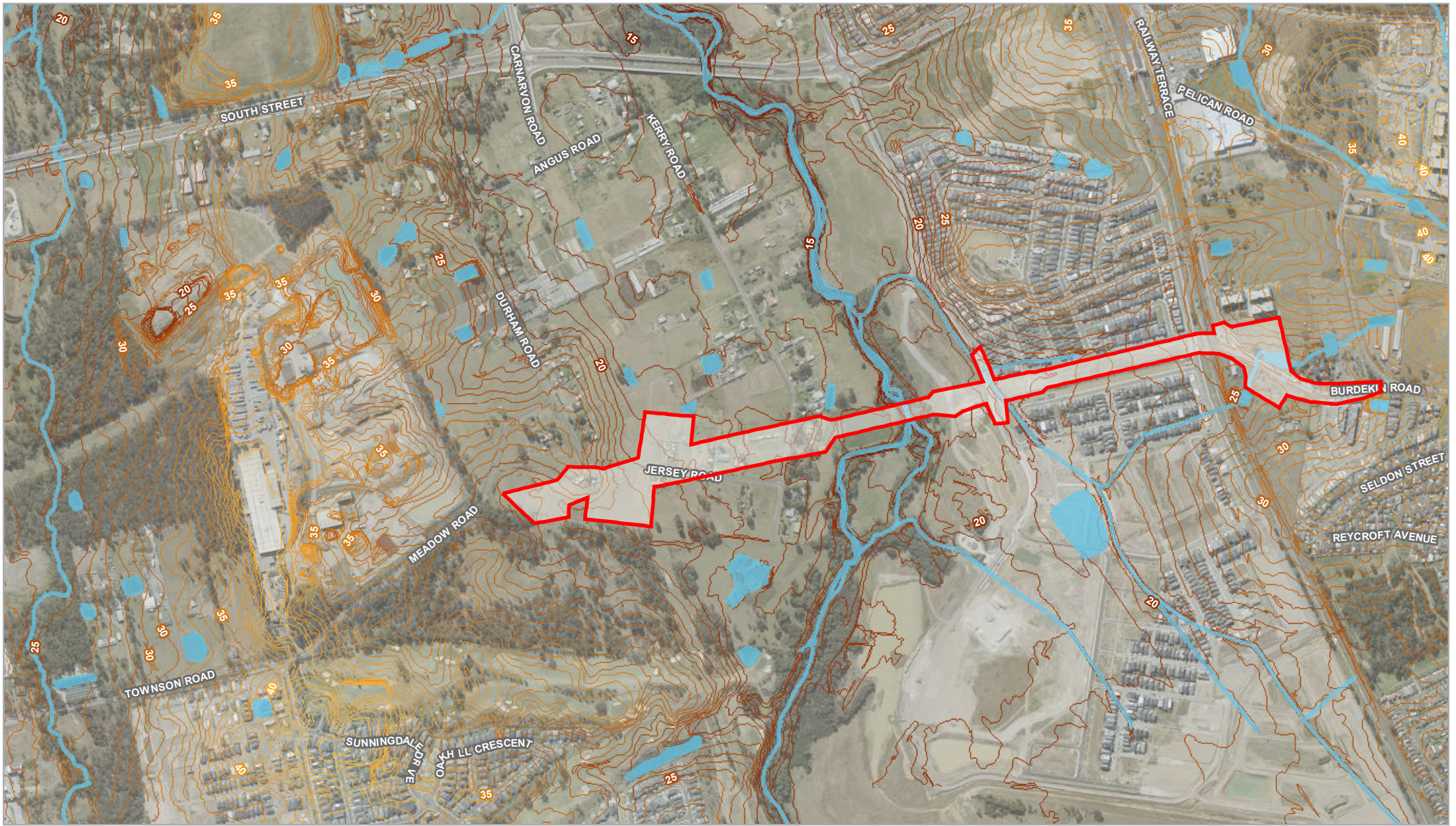
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Public and Active Transport











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FIGURE 3.3

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 Data source: Aerial Imagery - Nearmap 2019 (image date 12/09/2019, image extracted 21/09/2019) and NSW Six Maps, 2019 - Created by: elbertson

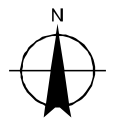


LEGEND

 Construction footprint	Contour (1m)	 36 - 40	 21 - 25	 Water feature
	 46 - 50	 31 - 35	 16 - 20	
	 41 - 45	 26 - 30	 11 - 15	

Paper Size ISO A4
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 Metres

Map Projection: Transverse Mercator
 Horizontal Datum: GDA 1994
 Grid: GDA 1994 MGA Zone 56

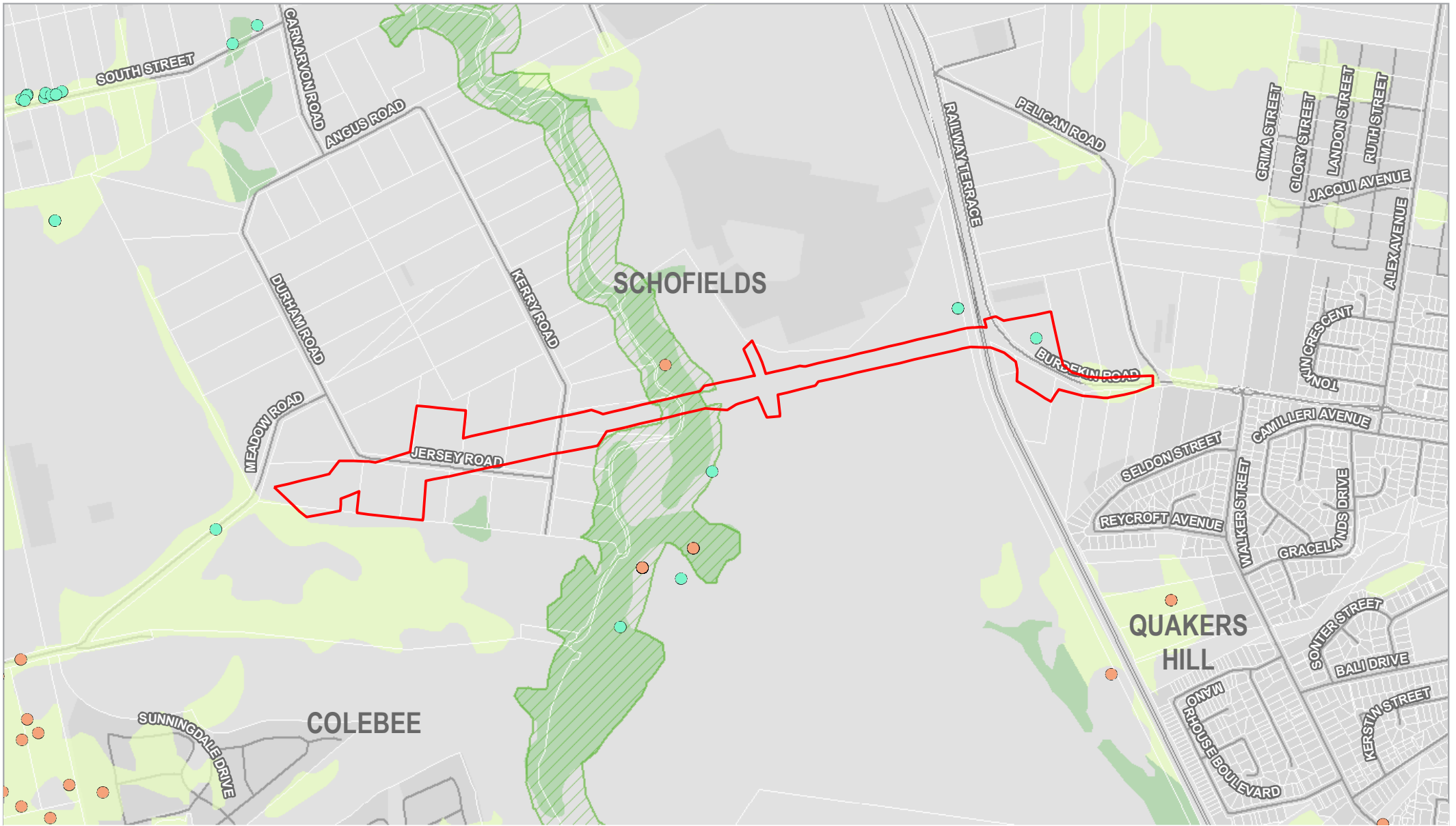


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Topography and Hydrology

FIGURE 3.4



LEGEND

- Construction footprint
- Threatened flora
- Threatened fauna
- Regional biodiversity corridor
- Vegetation**
- Shale Plains Woodland
- Shale/Gravel Transition Forest
- Alluvial Woodland

Paper Size ISO A4
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 Metres

Map Projection: Transverse Mercator
 Horizontal Datum: GDA 1994
 Grid: GDA 1994 MGA Zone 56



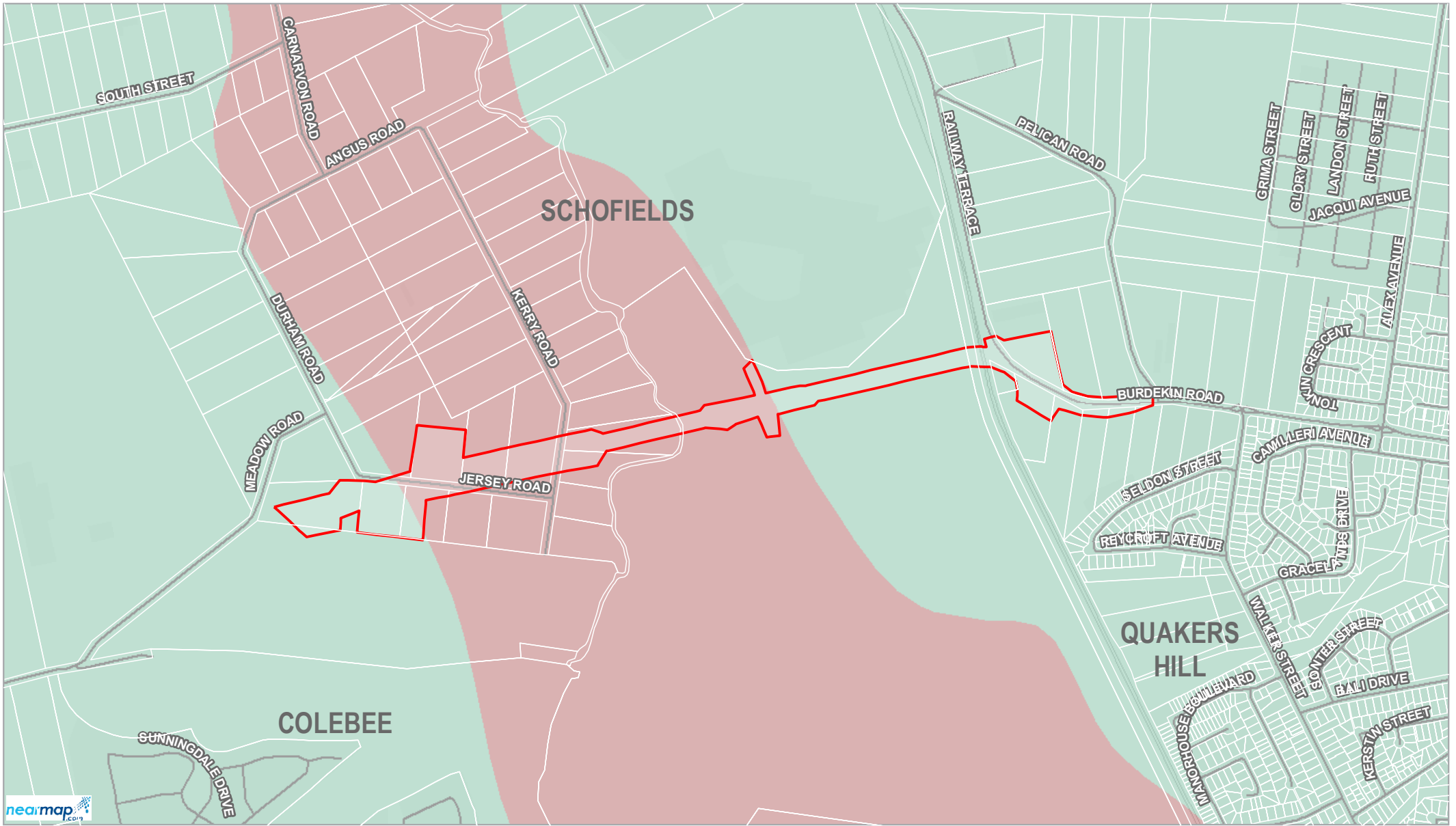
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Vegetation and Open Space




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 Date 5/11/2021

FIGURE 3.5

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 Data source: General topography - LPI 2015. Created by: ebbertson



LEGEND

 Construction footprint	Soils
	 Blacktown
	 South Creek

Paper Size ISO A4
 0 50 100 150 200
 Metres

Map Projection: Transverse Mercator
 Horizontal Datum: GDA 1994
 Grid: GDA 1994 MGA Zone 56

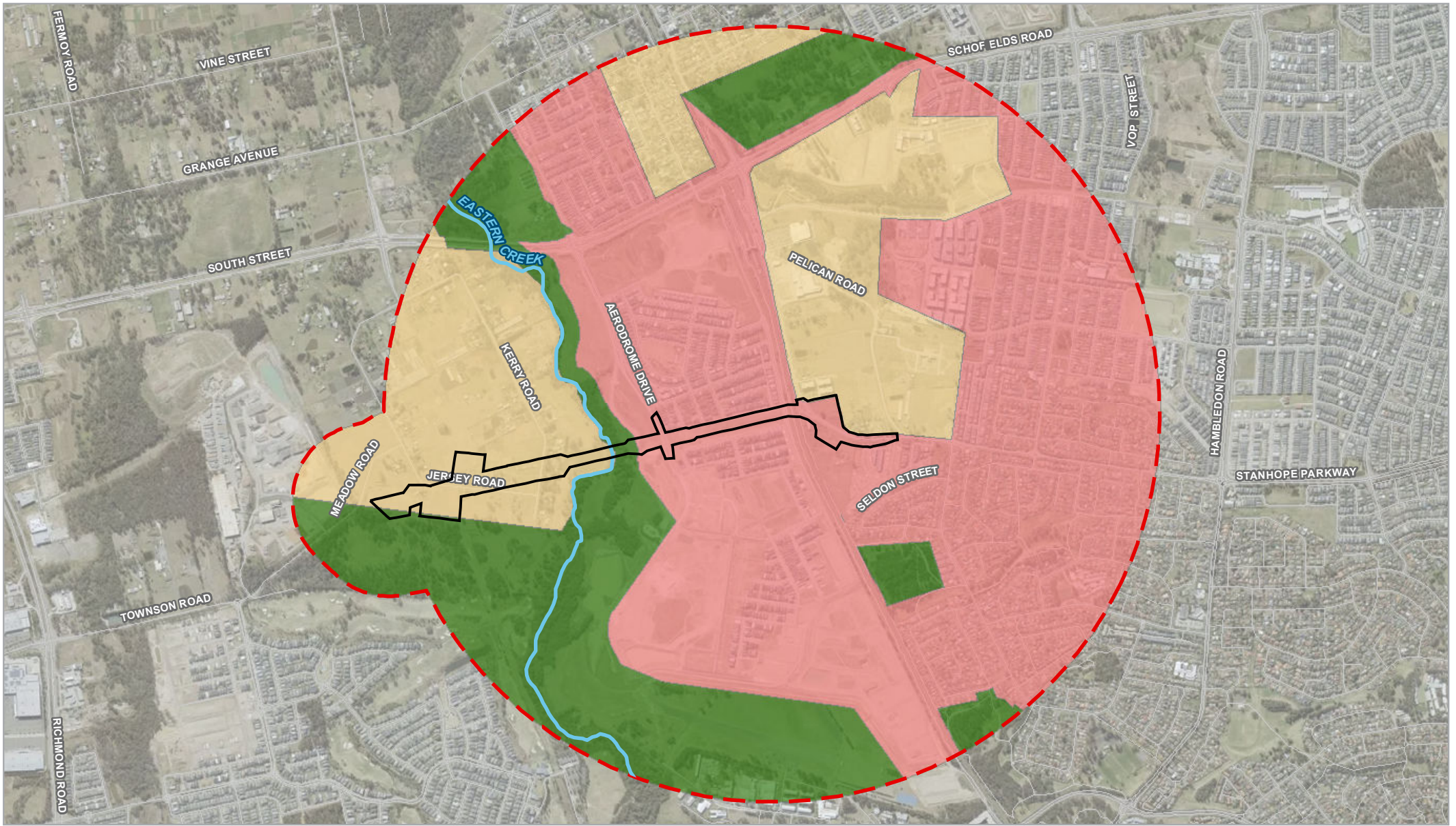


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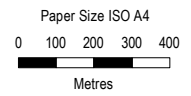
Soils

FIGURE 3.6



LEGEND

- Study area
- Construction footprint
- Watercourse
- Landscape zone**
- LCZ1: Semi-rural / residential
- LCZ2: Residential and Transport Infrastructure
- LCZ3: Bushland, open space and Eastern Creek wetlands



Map Projection: Transverse Mercator
 Horizontal Datum: GDA 1994
 Grid: GDA 1994 MGA Zone 56



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Landscape character

FIGURE 3.7

3.2 Landscape character zones

Landscape character zones were defined based on the existing natural and cultural influences on the urban landscape as described in the methodology in Section 2.4. These represent broadly homogenous landscape characteristics and urban patterns, and their determination has been influenced by characteristics identified in section 3.1 including topography, hydrology, local context, land use, vegetation, open space and soils. LCZ's are described in sections 3.2.1 to 3.2.3 and shown in Figure 3.7.

Impacts to landscape character zones have been assessed in section 6.1.

3.2.1 LCZ 1 Semi Rural / Residential

LCZ 1, Semi Rural / Residential consists of large rural residential land parcels, within an open landscape with long views across paddocks, towards a rural backdrop of mature trees. Land is typically used for small-scale agricultural businesses and rural residential living. The landscape is low lying, flat or gently undulating and is prone to flooding (being adjacent to Eastern Creek). Farm structures such as sheds or water storage tanks are generally located around a large main dwelling. Other visual elements typically include fences, hedgerows, stables, dams, farming equipment, polytunnels, vehicles, livestock and other elements associated with a rural residential landscape. Photo 1 shows a view south-east towards LCZ 1 and Jersey Road from Durham Road.



Photo 1 View south-east towards LCZ 1 Jersey Road from Durham Road

3.2.2 LCZ 2 Residential and transport infrastructure

This part of Western Sydney is undergoing a process of rapid development with areas of bushland and farmland making way for residential development. LCZ 2, Residential and transport infrastructure comprises areas that have been subdivided and developed into residential allotments with single and double storey detached dwellings. Associated transport infrastructure includes the existing road network as well as the visually prominent rail corridor. The rail corridor is typically at-grade or raised on small embankment of up to three metres, is fenced off from public access and includes overhead infrastructure, gantries, power lines and power poles. The residential areas closest to the proposal are located on Alcorn Street. Residential areas are typically sensitive to changes in the surrounding landscape. Photo 2 shows a view south along Calder Street through LCZ 2, towards the proposal easement, which can be seen at the end of the street.



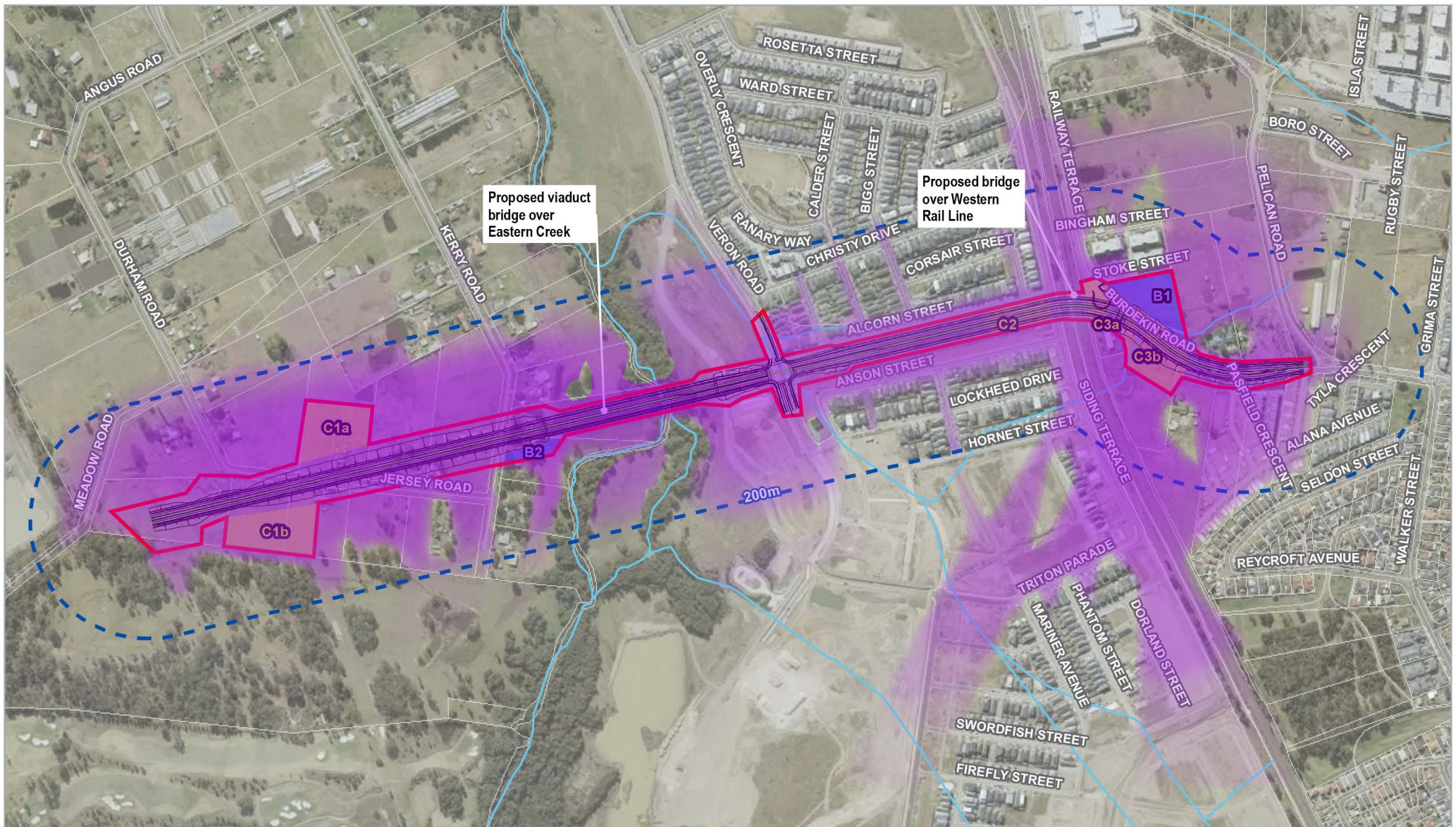
Photo 2 View south along Calder Street through LCZ 2, towards the proposal

3.2.3 LCZ 3 Bushland / Open Space

LCZ 3, Bushland / Open Space, is typified by areas of dense, tall native vegetation or open grassy fields that are not developed with built form. Visibility in and out of these areas is usually filtered by vegetation. LCZ 3 is located along the Eastern Creek corridor and is important for habitat connectivity along the Western Sydney Parklands corridor. Photo 3 shows a view north-east towards LCZ 3, Bushland / Open Space from Jersey Road. The dense vegetation of the Eastern Creek corridor can be seen in the distance.

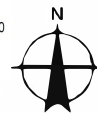
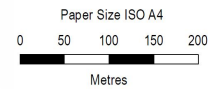


Photo 3 View north-east towards LCZ 3, Bushland / Open Space from Jersey Road



LEGEND

- The proposal **Subject to detailed design*
- Visual envelope of proposal
- Compound site
- Watercourse
- Construction footprint
- Distance from centre of proposal
- Drainage basin
- Cadastre



Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

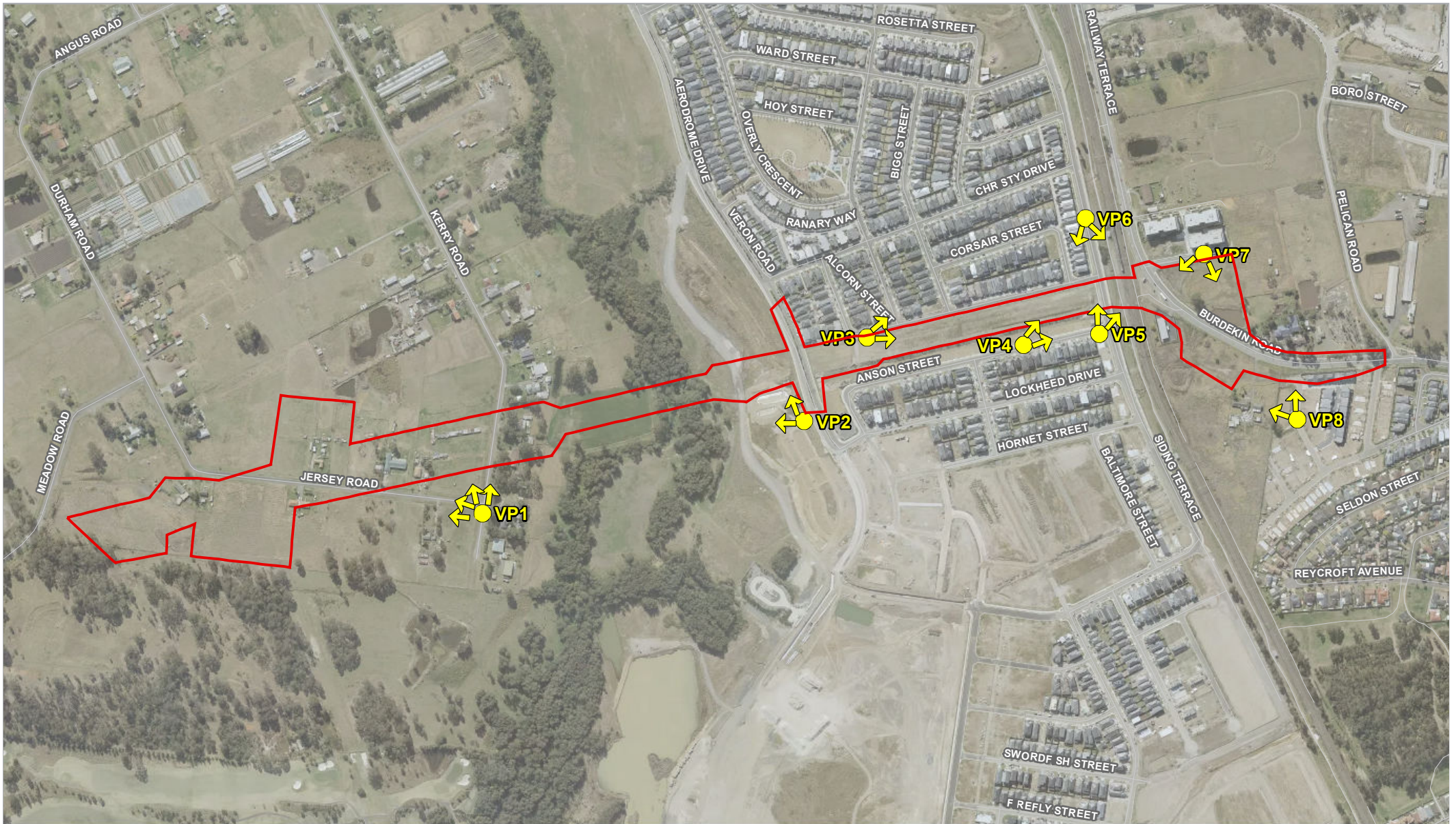


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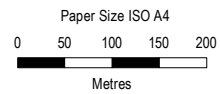
Stage 2
Visual Envelope Map

Project No. 21-1251195
Revision No. -
Date 29/10/2021

FIGURE 3-8



- LEGEND**
- Viewpoint location
 - Construction footprint



Map Projection: Transverse Mercator
 Horizontal Datum: GDA 1994
 Grid: GDA 1994 MGA Zone 56



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Viewpoint locations

FIGURE 3.9

3.3 Visual baseline assessment

3.3.1 Visual Envelope Map

The indicative area the proposal would be visible from is illustrated in Figure 3.8. This Visual Envelope Map illustrates the likely visual catchment of the proposal with relation to the existing landform, built form and vegetation. The visibility mapping determines potential intervisibility of the site and assists in the viewpoint selection process.

On the eastern side, the construction footprint is mostly surrounded by townhouses to the north and the south. This provides visual enclosure and defines the viewing corridor. In the central area, the vegetation of the Eastern creek corridor defines the visual envelope and to the western side, the visual experience is characterised by longer views across rural lands and open paddocks to the road corridor. From areas of higher elevation in the northeast of the study area, more distant views can be experienced to the south over lower topography.

When the proposal is at-grade (or close to the existing landform levels), the viewing envelope is smaller and generally confined to a 200 metre visual catchment distance. Where the proposed road is elevated over the rail corridor at a height of approximately 15 metres, longer more open views can be experienced within the wider area.

3.3.2 Viewpoints

The following sections 3.3.3 to 3.3.10 describe eight viewpoints that represent different visual receivers that were identified based on:

- The extent of visibility mapping (Visual Envelope Map)
- Proximity of the receivers to the proposal
- Different type of receiver, as different viewer types would have different perceptions of the change.

Sensitive visual receivers within the study area comprise residential areas, road users and visitors to public recreation areas.

Based on the context analysis, representative viewpoint locations were selected for assessment with a focus on publicly accessible locations representative of the most sensitive receivers.

Refer to Table 3.1 and Figure 3.9 for locations.

Table 3.1 Viewpoint locations

Viewpoint	Location	Description
VP 01	Kerry Road	VP 01 is located on Kerry Road, at the intersection of Jersey Road, looking north and west.
VP 02	Aerodrome Drive (Veron Road)	VP 02 is located 10 metres west of Aerodrome Drive (Veron Road), near the intersection with Lockheed Drive, looking west.
VP 03	Alcorn Street	VP 03 is located on the south of Alcorn Street near the intersection with the construction footprint, looking south and east.
VP 04	Anson Street	VP 04 is located on Anson Street near the intersection with Mariner Avenue and the construction footprint, looking north and east.
VP 05	Anson Street	VP 05 is located on Anson Street near the intersection of Siding Terrace, looking north and east.
VP 06	Siding Terrace	VP 06 is located on Siding Terrace, about 60 metres north of Alcorn Street, looking south.
VP 07	Stoke Street	VP 07 is located on Stoke Street, about 80 metres north-east of Burdekin Road/Railway Terrace, looking south and west.
VP 08	West of Alana Ave	VP 08 is located 150 north west of Alana Avenue, looking north and west.

3.3.3 Viewpoint location 01: Kerry Road intersection with Jersey Road



Photo 4 View from Kerry Road looking north-west, toward the proposal



Photo 5 View from Kerry Road looking north, toward the proposal

Criteria	Comments
Location and view direction	VP 01 is located on Kerry Road, at the intersection of Jersey Road. Photo 4 and Photo 5 shows views looking north-west and north towards the proposal.
Visual receivers	VP 01 is representative of residents on Jersey Road and Kerry Road. It is also representative of road users travelling along Jersey Road and Kerry Road.
Description of existing view	<p>VP 01 is a view of two local roads through a semi-rural environment with grassy paddocks, trees, agricultural fencing and driveways to large rural residential blocks. Roads are sealed with informal edges, no footpaths, unmarked single carriageway lanes and grassy verges.</p> <p>Although this is a rural semi-natural environment, it also includes a number of unnatural elements and structures such as dwellings, sheds, fences and electricity poles.</p> <p>The centre of the view shows the intersection of Jersey Road and Kerry Road, with grassy verges and paddocks to the left, and residential driveways and vegetated property boundaries to the right of the view. The background shows paddocks, dwellings, ancillary agricultural buildings, overhead powerlines, and vegetation.</p>

3.3.4 Viewpoint location 02: Aerodrome Drive (Veron Road)



Photo 6 View from Aerodrome Drive (Veron Road) looking north-west



Photo 7 View from Aerodrome Drive (Veron Road) looking north

Criteria	Comments
Location and view direction	VP 02 is located 10 metres west of Aerodrome Drive (Veron Road), near the intersection with Lockheed Drive. Photo 6 and Photo 7 show views looking north and north-west, towards the proposal.
Visual receivers	VP 02 is representative of open space users as well as pedestrians and road users travelling north along Aerodrome Drive (Veron Road).
Description of existing view	<p>VP 02 is a view of a modified environment. To the left of the view is a large open area surrounded by construction site fencing. Also visible to the left and the far centre of the view is a corridor of mature native riparian vegetation along Eastern Creek.</p> <p>In the centre of the view is a new large concrete drain outlet, surrounded by black metal railings.</p> <p>To the right of the view is the newly constructed Altrove residential development, with two storey dwellings, a two-lane road, a vegetated central median with semi mature avenue trees and footpaths surrounded by grassed verges and new tree planting.</p> <p>Although this is a highly modified environment, there is a large amount of green 'natural' looking areas within this view, however it should be noted that is viewpoint shows a construction compound and an area of change.</p> <p>It is anticipated there will be some imminent changes to this view as the Schofields Precinct Indicative Layout Plan indicates the area north of the proposal will be 'Environmental Living', the area to south to be a place for 'drainage and infrastructure', the densely vegetated riparian corridor to the west of the view (Eastern Creek) is intended to be become a 'Conservation Area' and the fenced off easement to be a future road (the Proposal).</p>

3.3.5 Viewpoint location 03: Alcorn Street South



Photo 8 View along Alcorn Street, looking north-east

Criteria	Comments
Location and view direction	VP 03 is located on the footpath, south of Alcorn Street, adjacent to the construction footprint. Photo 8 shows the view looking north-east along Alcorn Street towards the proposal.
Visual receivers	VP 03 is representative of views that would be obtained by pedestrians travelling east along Alcorn Street. It is also representative of road users and residents on the north-west of Alcorn Street.
Description of existing view	VP 03 shows newly constructed double story dwellings fronting onto a new local road to the left of the view. The centre of the view shows a grassy road reservation with a linear footpath and a new avenue of native trees. To the right of the view is a large open area of land (the proposal construction footprint) demarked by black timber bollards. This view is characterised by strong geometry and a visual balance between the grey, built form to the left and the open area with green vegetation and visual open space to the right.

3.3.6 Viewpoint location 04: Anson Street



Photo 9 View along Anson Street, looking north-east

Criteria	Comments
Location and view direction	VP 04 is located on Anson Street near the intersection with Mariner Ave. Photo 9 shows a view along Anson Street, looking north and east towards the open drain cutting, with the proposal behind.
Visual receivers	VP 04 is representative of views from residents living on Anson Street and road users travelling along Anson Street.
Description of existing view	VP 04 is characterised by strong linear geometry. On the left, newly constructed two storey dwellings overlook a large, grassed easement (the proposal construction footprint) and a large open drain cutting. In the centre of the view, a newly constructed concrete footpath and grassed verge is visible, with a double row of young native trees. To the right of the view, double story houses front onto the street and overlook the road, footpath, drain and the construction footprint.

3.3.7 Viewpoint location 05: Anson Street and Siding Terrace Intersection



Photo 10 View from Anson Street east, looking north-east

Criteria	Comments
Location and view direction	VP 05 is located on Anson Street near the intersection of Siding Terrace. Photo 10 shows a view looking north and north-east toward Siding Terrace, the railway corridor, and the proposal.
Visual receivers	VP 05 is representative of the views of residents and road users on Anson Street.
Description of existing view	<p>To the left of the view, Anson Street is visible in the foreground. Behind the footpath and verge is landscape buffer planting with newly planted strappy grasses adjacent to a large open drain.</p> <p>The surface water drain has been newly landscaped with a sandstone rock embankment and behind the embankment, a footpath is adjacent to large rectangular sandstone benches. These benches mark the boundary with the construction footprint beyond.</p> <p>Siding Terrace can be seen in the centre of the view with a footpath adjacent to a retaining wall. The retaining wall is 1-1.5 metres high, painted yellow and it forms the edge between the road corridor and the rail corridor. The rail corridor is elevated by 2-3 metres on embankment and steel rails on ballast are visible, with overhead powerlines and gantries.</p> <p>To the right of the view is the junction of Siding Terrace and Anson Street, and in the background, a 5-story high residential apartment block can be seen behind the railway corridor (refer to Photo 12) for views from the apartment block).</p>

3.3.8 Viewpoint location 06: Siding Terrace



Photo 11 View from Siding Terrace, looking south

Criteria	Comments
Location and view direction	VP 06 is located on Siding Terrace, approximately 60 metres north of the intersection with Alcorn Street. Photo 11 shows a view looking south along Siding Terrace.
Visual receivers	VP 06 is representative of views from pedestrians and road users travelling south on Siding Terrace. It is also representative of views from residents along Siding Terrace.
Description of existing view	<p>To the left of the view, the elevated rail corridor is visible behind a chainmesh fence. The rail corridor is on a low embankment, with of long grass and some shrubs. Within the rail corridor overhead powerlines, a small building and metal gantries are visible.</p> <p>A small yellow retaining wall forms the edge between the rail and road corridors and a linear footpath with a linear grass verge can be seen in the centre of the view.</p> <p>To the right is Siding Terrace with parked cars, grass verges, a footpath and two-storey townhouses fronting onto the street.</p> <p>In the far central background, a blue portaloo indicates the junction of Siding Terrace and Alcorn Street, where the proposal would be elevated over the road and railway.</p>

3.3.9 Viewpoint location 07: Stoke Street



Photo 12 View from Stoke Street, looking south-west

Criteria	Comments
Location and view direction	VP 07 is located on Stoke Street. Photo 12 shows a view, looking south-west towards the proposal.
Visual receivers	VP 07 is representative of views from residents within the dwellings on Stoke Street. It should be noted that this view only represents views from ground floor dwellings. Some apartments are 5-storeys high and have balconies with elevated views looking out onto the proposal.
Description of existing view	<p>VP 07 is characterised by a Stoke Street in the foreground and a fenced off grassed easement in the left of the view.</p> <p>Burdekin Road (Railway Terrace) can be seen on the middle of the view from left and right, with a single-story building beyond (a railway substation).</p> <p>Parallel to and on the far side of Burdekin Road, the railway corridor can be seen, with gantries, powerlines and associated infrastructure.</p> <p>Beyond the rail corridor is the newly built residential community of 'Akuna Vista', with some areas still undergoing construction.</p> <p>To the far right of the view, a large grassy area is visible. This is the future road easement.</p>

3.3.10 Viewpoint location 08: Alana Avenue



Photo 13 View north-west of Alana Ave

Criteria	Comments
Location and view direction	VP 08 is located north-west of Alana Avenue and Photo 13 shows a view looking north-west towards the proposal.
Visual receivers	VP 08 is representative of views from future road users and future residents; however, it is likely that future development will alter this view.
Description of existing view	VP 08 is characterised by a newly constructed road in the foreground, surrounded by future residential subdivision and construction compounds. To the centre left is a derelict dwelling, a mature native tree with the rail corridor and the Akuna Vista residential community beyond. To the far centre of the view is Burdekin Road the 5-storey apartment building on Stoke Street, mature roadside trees, and the veterinary hospital to the right of the view.

4. Policy and legislative context

The following section describes the existing policy context of the proposal relevant to urban design, landscape character and visual amenity. This has been used to inform the definition of landscape character zones, as well as provide an understanding of the visual character of the area.

4.1 Regional policy and legislation

4.1.1 North West Growth Area

The proposal is located in the North West Growth Area, an area designated to supply greenfield land for urban development in Sydney. This area is to accommodate 33,000 new homes by 2026, with new schools, parks, community facilities, public transport and services to support the proposed growth.

Precincts are released in stages by the State Government to allow the proper planning and coordination of infrastructure delivery. Each released precinct has a Precinct Plan. The proposal is located within the West Schofields and Schofields Precincts (with Stage 1 also being in the Marsden Park Industrial precinct).

4.1.2 Sydney Regional Environmental Plan No 20 – Hawkesbury-Nepean River (No 2-1997)

Within this plan, the Eastern Creek riparian corridor has local-level scenic protection.

The aim of this plan is to protect the environment of the Hawkesbury-Nepean River system by ensuring that the impacts of future land uses are considered in a regional context. Relevant strategies within this plan includes those relating to riverine scenic quality. This includes the following:

- Maintain areas of extensive, prominent or significant vegetation to protect the character of the river
- Ensure proposed development is consistent with the landscape character as described in the Scenic Quality Study
- Consider the siting, setback, orientation, size, bulk and scale of and the use of unobtrusive, non-reflective material on any proposed building or work, the need to retain existing vegetation, especially along riverbanks, slopes visible from the river and its banks and along the skyline, and the need to carry out new planting of trees, and shrubs, particularly locally indigenous plants
- Consider opportunities to improve riverine scenic quality

4.2 Local policy and legislation

4.2.1 Blacktown Local Environmental Plan

The study area is located within the Blacktown local government area and therefore the *Blacktown Local Environmental Plan 2015* (LEP) applies. Relevant aims of the Blacktown LEP include:

- To provide for infrastructure to maintain and meet demands arising from housing and employment growth
- To conserve and enhance Blacktown's built, natural and cultural heritage

- To conserve, restore and enhance biological diversity and ecosystem health, particularly threatened species, populations and communities

Land use zones

Land uses within the context of the proposal are shown in Figure 3.1. Relevant objectives include the following:

Table 4.1 Land use zones and objectives

Land Use Zone	Objectives
RU4: Primary Production Small Lots	To ensure that development is sympathetic to the ecological attributes of the area.
E2: Environmental Conservation	To protect, manage and restore areas of high ecological, scientific, cultural or aesthetic values. To prevent development that could destroy, damage or otherwise have an adverse effect on those values. To provide for passive recreational activities that are compatible with the land's environmental constraints.
E4: Environmental Living	To provide for low-impact residential development in areas with special aesthetic values and to ensure that such development does not adversely affect those values.
R2: Low Density Residential	To enable certain activities to be carried out within the zone that do not adversely affect the amenity of the neighbourhood.
R3: Medium Density Residential	To enable certain activities to be carried out within the zone that do not adversely affect the amenity of the neighbourhood.
SP2 Infrastructure	To ensure that development does not have an adverse impact on the form and scale of the surrounding neighbourhood.
RE1: Public Recreation	To provide a range of recreational settings and activities and compatible land uses. To protect and enhance the natural environment for recreational purposes.
B2: Local Centre	To maximise public transport patronage and encourage walking and cycling. To encourage the development of an active centre that is commensurate with the nature of the surrounding area.

4.2.2 Blacktown City Council Growth Centre Precincts Development Control Plan 2010

This plan is to communicate the planning, design and environmental objectives and controls for the Growth Centre Precincts, and to promote high quality urban design outcomes within the context of environmental, social and economic sustainability. Objectives and controls are provided, applying to all development in the Growth Centre Precincts. An indicative layout plan is also provided specific to each precinct.

The proposal crosses three growth are precincts:

- Schedule 5 – Schofields Precinct
- Schedule 7 – West Schofields (Townson Road) Precinct
- Schedule 1 – Alex Avenue precinct.

Refer to Table 4.2 for relevant objective controls of the DCP.

Table 4.2 Development control and objectives

Development Control	Objectives
5.2.4 Acoustic and visual privacy	<ul style="list-style-type: none"> To ensure that appropriate standards of amenity and privacy are maintained for residents
5.2.6 Site servicing	<ul style="list-style-type: none"> Structures shall be painted according to the required standards of the relevant service authority, in colours that limit their visual impact.
6.3 Landscape design	<ul style="list-style-type: none"> To ensure a balance between built form and landscaped elements. To encourage landscaping as a means of screening industrial development. To encourage a high standard of landscape design that enhances the streetscape and amenity of the zone.
6.4.3 External building materials and colours	<ul style="list-style-type: none"> To enhance the visual quality of development through the selection of appropriate materials and colours. To ensure that any reflective materials are used with sensitivity to neighbouring development, vehicular traffic and public domain areas.

5. Urban design strategy

The urban design was developed iteratively alongside the engineering design and is further informed by BCC requirements as well as feedback from the TfNSW urban design team.

Urban design principles and objectives were developed to guide the concept design and to inform the future detail design phase of the proposal. These principles and objectives take into account the existing natural and physical context and the anticipated future growth of the NWGA.

5.1 Principles and objectives

The following urban design principles, from *Beyond the Pavement*, have been considered in the development of the objectives and design proposals;

Principle 1 – *Contributing to urban structure, urban quality and the economy*

Principle 2 – *Fitting with the built fabric*

Principle 3 – *Connecting modes and communities and promoting active transport*

Principle 4 – *Fitting with the landform*

Principle 5 – *Contributing to green infrastructure and responding to natural systems*

Principle 7 – *Designing an experience in movement*

Principle 8 – *Designing self explaining roads that safely respond to their role and context*

Principle 9 – *Achieving integrated and minimal maintenance design*

The urban design principles and objectives for the proposal that inform the concept design are:

Objective 1

Reinforce the existing landscape character along the road alignment to create a distinctive and legible journey

- Reflect the design approach of the Townson Road Stage 1 upgrade project while responding to the local context to provide an overall corridor 'language'.
- Retain existing vegetation where practicable within the road corridor and supplement with local endemic species.
- Provide landscape finishes that complement existing developments along the corridor.
- Develop a planting palette that responds to changing urban form and site conditions.
- Ensure broad, open views across open areas through the adjacent tree planting arrangement and incorporation of low plant materials.
- Ensure riparian corridors are protected and enhanced through use of appropriate scour protection and revegetation.

Objective 2

Ensure connectivity along and across the road alignment

- Ensure continuous, safe and convenient connections to, from and across the road corridor.
- Integrate walking, cycling and connections to public transport modes.
- Create an appealing experience for shared path users that responds to local character as well as existing and future active transport infrastructure.

Objective 3

Provide a unified suite of road and roadside elements that respond to the local setting

- Ensure scale and location of elements are appropriate and consider not only road users but adjacent properties.
- Integrate urban elements that, minimise the impacts of the road on the surrounding areas, reduce clutter and enhance the road user experience.
- Utilise materials that address both the rural and suburban local context.

Objective 4

Establish Townson Road's importance as a connector within the existing and future road hierarchy

- Help to define Townson Road as an important connector that provides logical connections to the local network.
- Establish a continuous theme through appropriate treatments of walls and bridges that relate to their local context.
- Provide landscape treatments in medians and verges consistent with the wider road network and help to define the road geometry.

Objective 5

Provide a landscape design that is low maintenance and delivers a sustainable solution for the future

- Utilise robust, hard-wearing materials that require little or no maintenance, are resistant to vandalism and will not require frequent replacement.
- Incorporate water sensitive urban design (WSUD) measures within the landscape to help reduce surface run-off and increase infiltration.
- Include material selections that have little or no carbon 'footprint'.
- Maximise the re-use of site topsoils and endemic plant species that are best suited to the local climate and setting.

5.2 Urban Design Concept

This section of the report describes the urban design approach. Due to its length, the proposal is divided into the eastern and western areas.

5.2.1 Urban Design of the eastern part of the proposal (concept area 1) key features

Key design features of Concept Area 1 include:

- Batter landscape treatments
- Rail overbridge and associated urban elements
- Reinforced soil retaining wall (RSW) façade and screening.

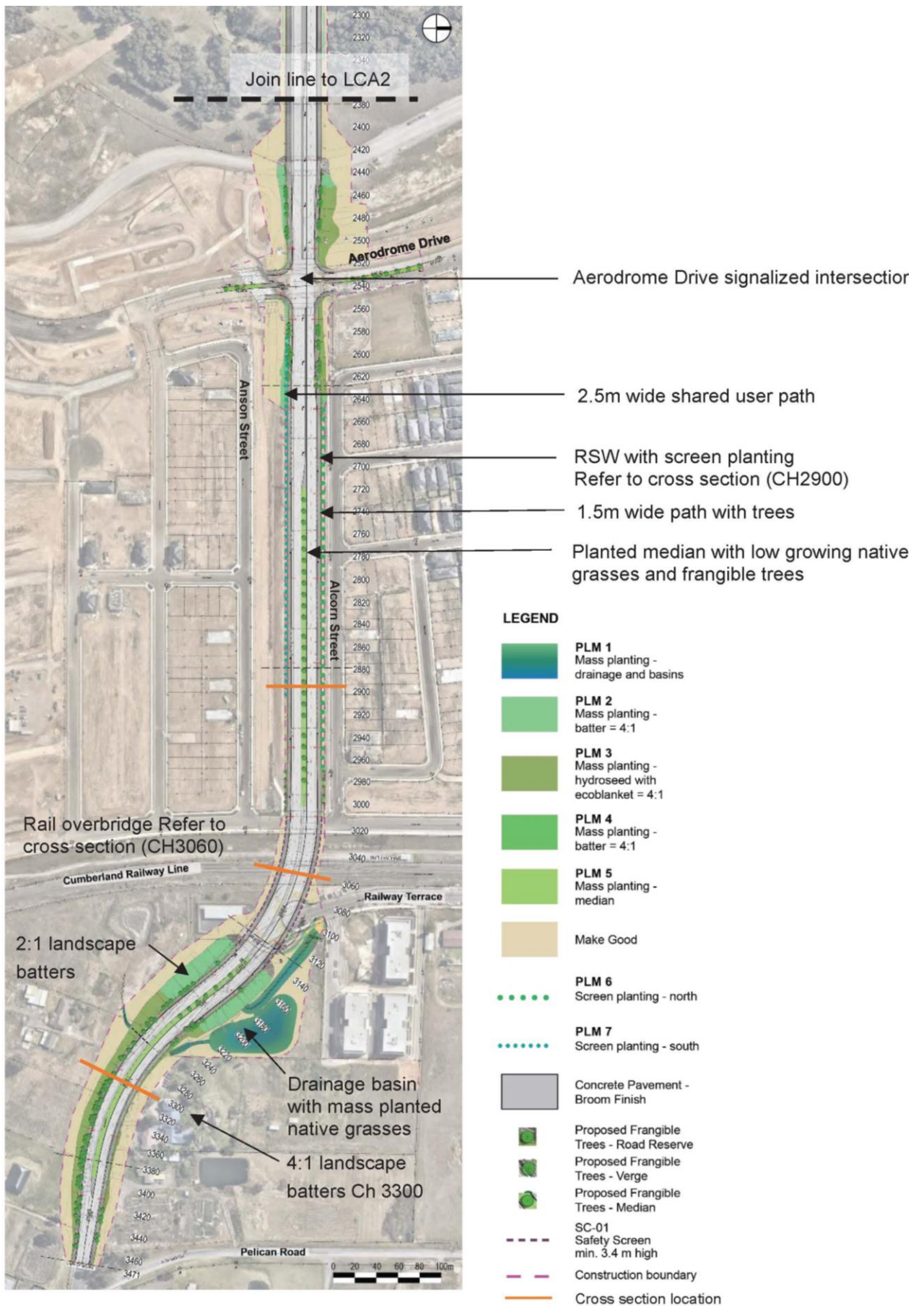


Figure 5.1 Urban Design Concept Area 1 (East) plan

5.2.2 Batter landscape treatments

Batters resulting from earthworks in the eastern area have a slope profile of between 4:1 and 2:1 and will be treated in accordance with TfNSW's *Guideline for Batter Surface Stabilisation using vegetation*.

Batters between 2:1 to 4:1 are hydroseeded with a low growing, native plant mix and include an organic erosion control blanket, Figure 5.2.

Batters shallower than 4:1 Hydroseeded with a mix of native grasses and shrubs.

Batters steeper than 2:1 only occur at the rail overbridge eastern abutment. An engineered solution will protect and maintain unplanted slopes from surface erosion using stone blocks or similar retention method.

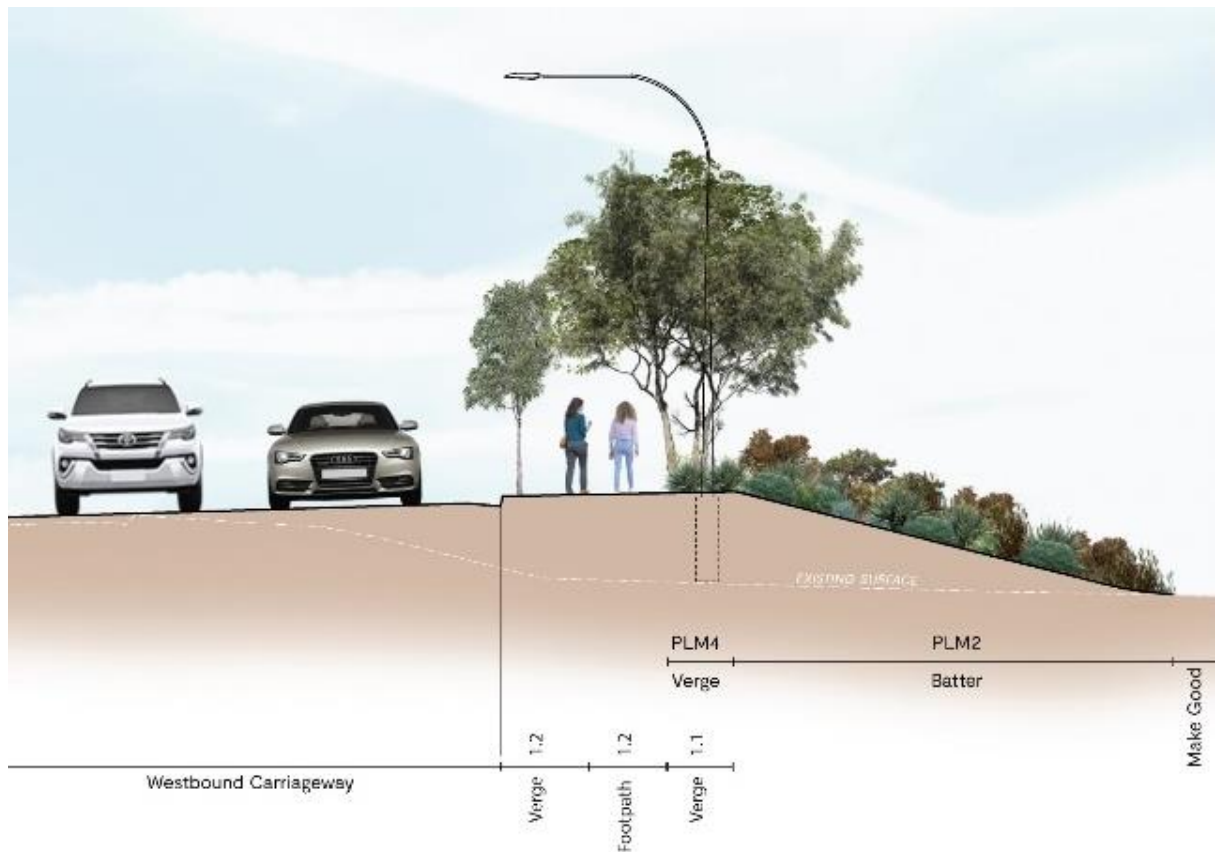


Figure 5.2 Typical section through fill batters at CH 3300

5.2.3 Rail overbridge

The new rail overbridge design includes safety elements including safety screens and precast concrete safety barriers, refer Figure 5.3.

Vertical safety “anti-throw” screens are to be visually integrated with the bridge structure and have a high degree of permeability that helps to minimise the scale and bulk of the overbridge structure. Wire mesh screening or clear perspex would be supported by vertical steel supports fixed neatly to the bridge superstructure. Solid, opaque panels and bright colours are to be avoided to better integrate the screens with the bridge structure.

The design of safety elements is to be developed to minimise the impact on views from nearby residents according to the following principles:

- The screen would be a peripheral component to the bridge function and would avoid obscuring the superstructure
- Support posts would be integrated and, wherever possible, align perpendicular with the bridge
- Provide a neat transition between the safety screen and safety fencing through gradual tapering as opposed to stepping
- All fencing and safety elements are to be minimal and elegant as expressed in their materiality and appearance and coordinated with other structure and materials
- Incorporate anti-vandalism and anti-graffiti measures where needed to minimise maintenance.

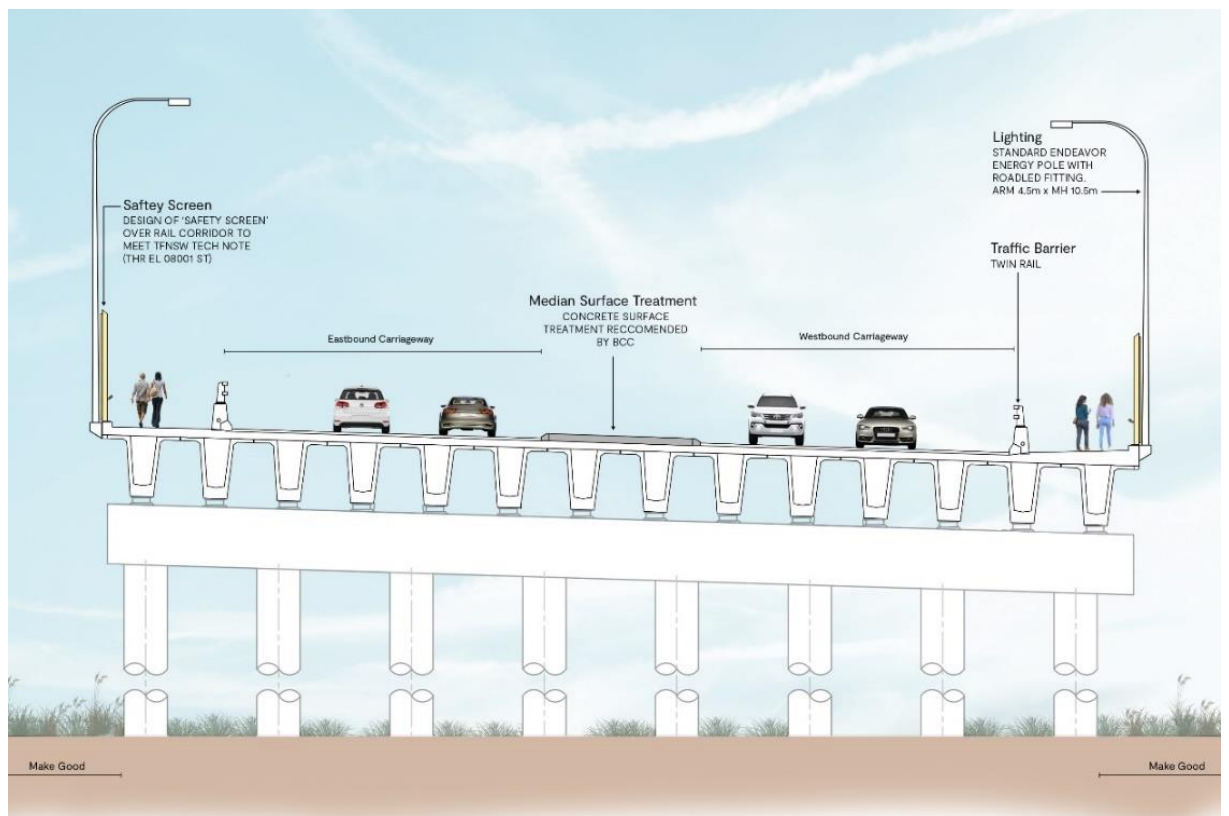


Figure 5.3 Cross section through rail overbridge CH 3060

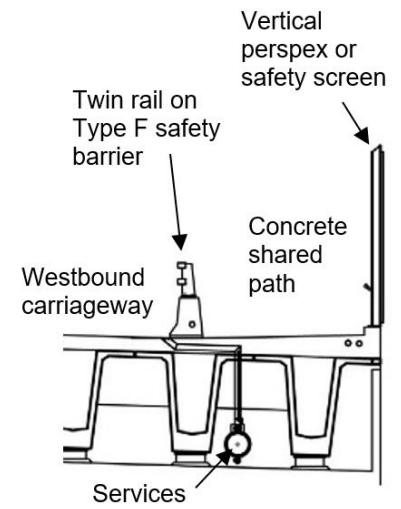


Figure 5.4 Image of vertical safety screen with highly visual permeability and indicative cross section



Figure 5.5 Image of acrylic safety screen with highly visual permeability (image also suitable for noise wall on the soil-wall section of bridge)

Pavements include a raised, central, concrete median that divides east and westbound traffic carriageways. The westbound side of the bridge includes a 2.5m wide, concrete paved shared path while the eastbound (north) side includes a 1.5m wide path. A broom finish has been identified by BCC as the preferred finish for the concrete pavements.

Utilities are proposed to be located underneath the bridge deck so that services are visually concealed within the deck structure.

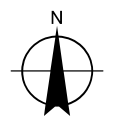
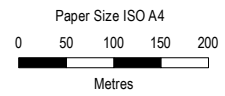


LEGEND

— The proposal *Subject to detailed design

Proposed noise barrier locations

- Barrier 1
- Barrier 2



Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56



Transport for NSW
Townson Road Upgrade Stage 2
Burdekin Road

Project No. **21-12511195**
Revision No. **-**
Date **14/12/2021**

Proposed noise barrier locations

FIGURE 5-6

5.2.4 Noise walls

With the location of the proposal adjacent and in proximity of residential housing, the requirement for sound mitigation has been identified. The installation of sound walls along the raised bridge approach as well as the bridge itself has been proposed to suppress noise levels. These walls would be used to ensure there is minimal disruption to the ambient noise levels currently experienced by the residents and surrounding community. The proposed location for the noise walls are shown on Figure 5.6.

Although the detailed design of the noise walls is not finalised at this stage, the extent of the proposed noise walls may be in excess of 800 metres length and may form a large visual element of the proposal. It is important that the visual amenity of the noise walls be in keeping with the local context of the area, while still performing as intended (further details are provided in the REF Section 3.2).

A selection of materials has been reviewed as options for the use of sound walls; with some solutions incorporating mixes of materials to offer a balance between visual amenity, sound suppression performance and cost. Options proposed are as follows, with acrylic panel noise walls being the preferred option in terms of minimising visual impacts:

- Acrylic panel noise walls (refer Figure 5.7)
- Timber panel noise walls (refer Figure 5.8)
- Panel noise walls (refer Figure 5.9).

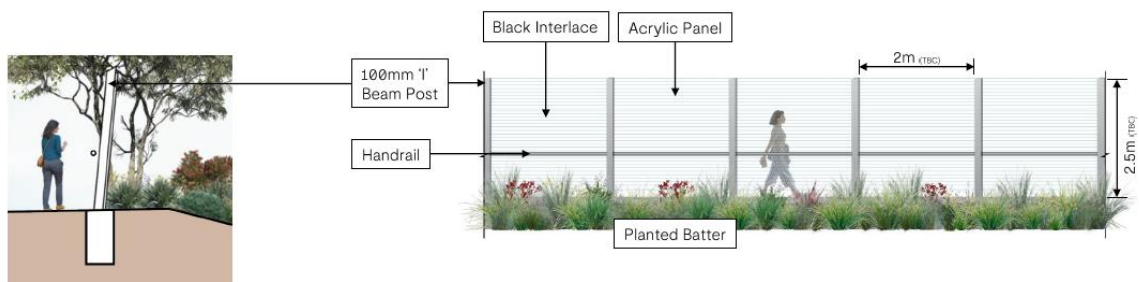


Figure 5.7 Acrylic panel noise wall

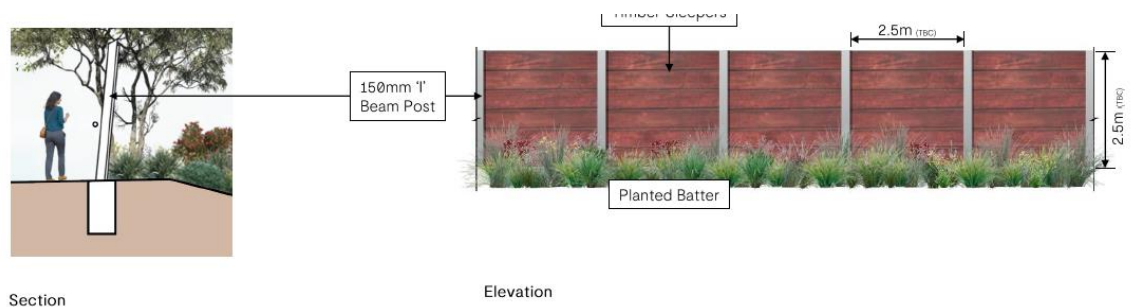


Figure 5.8 Timber panel noise wall



Figure 5.9 Concrete panel noise wall

5.2.5 Reinforced Soil Wall façade and screening

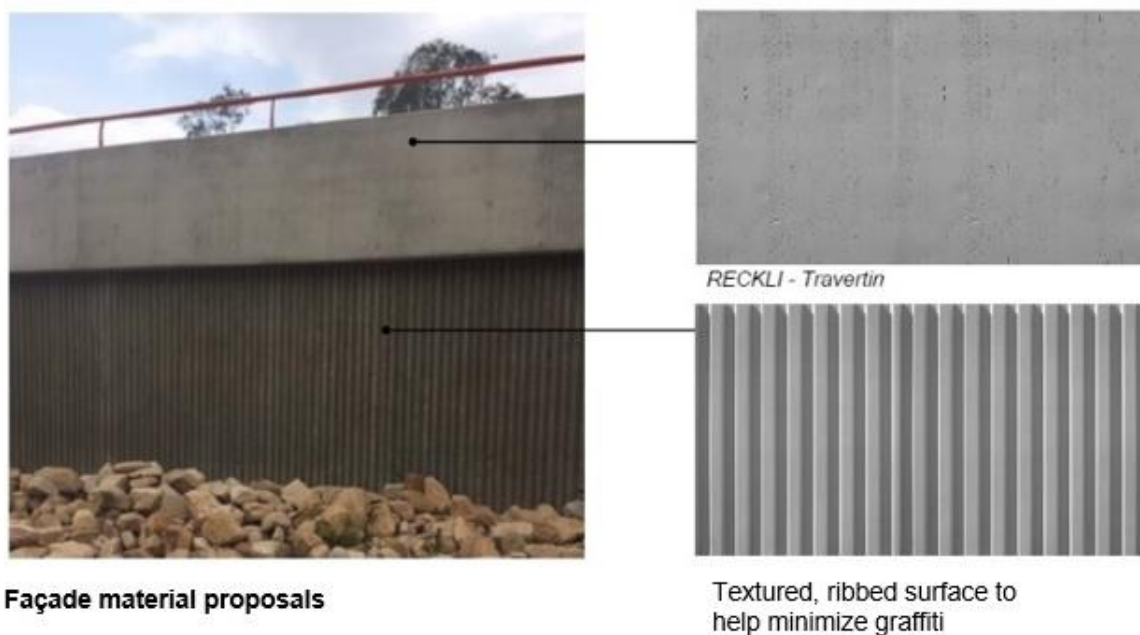
Design for the reinforced soil wall (RSW) includes measures that assist with the integration of the structure in the surrounding environment, are low maintenance, incorporate robust materials and discourage or would inhibit vandalism.

Proposed façade treatments include the use of warm colours on precast concrete panels. Different finishes are proposed for the upper and wall areas to help visually reduce the wall height. The upper wall area incorporates a light texture or smooth finish whereas the lower half of the wall is proposed as a vertical groove pattern and a darker colour, Figure 5.11.

Screen planting is also proposed for both the northern and southern facades to further soften the appearance of the overall mass of the structure and reduce visual glare. Separate planting types have been developed for the shadier south facing RSW and the more exposed north RSW façade. Vertical picket pedestrian safety fences are to be designed to allow maximum visual permeability while maintaining safety.



Figure 5.10 Elevation of the RSW design proposal at the rail overbridge (NTS)



Façade material proposals

Textured, ribbed surface to help minimize graffiti

Figure 5.11 Details of the RSW material



Figure 5.12 RSW façade potential for art integration (NTS)

The RSW also presents the opportunity to incorporate mural art as part of the façade treatments. Artworks do not form part of this proposal however could be undertaken by BCC as part of their community art strategy.

Figure 5.14 illustrates the relationship of the RSW at the rail overbridge with the surrounding residential areas to the north and the existing drainage swale and residential areas to the south. Planting for screening of the RSWs and the central road median is also proposed and shown.

Planting of the existing drainage swale to the south would also assist in mitigating the impacts from the RSW on the residential areas to the south however is not currently included in the design proposal as it is managed by BCC.



Figure 5.13 Artistic impression showing the rail overbridge from Stoke Street, looking south-west (NTS)



Figure 5.14 Artistic impression showing the rail overbridge from Anson Street, looking north-east (NTS)

Figure 5.4 provides an indicative artistic impression of screen planting of the south facing RSW. Screen planting is proposed to assist in the integration of the elevated road, rail overbridge and embankments within the landscape.

5.2.6 key features of the proposed urban design of the area around Eastern Creek (concept area 2)

The key features of the proposed urban design of the area around Eastern Creek (concept area 2) are shown on Figure 5.15 and comprise:

- Batter landscape treatments
- Eastern Creek viaduct.

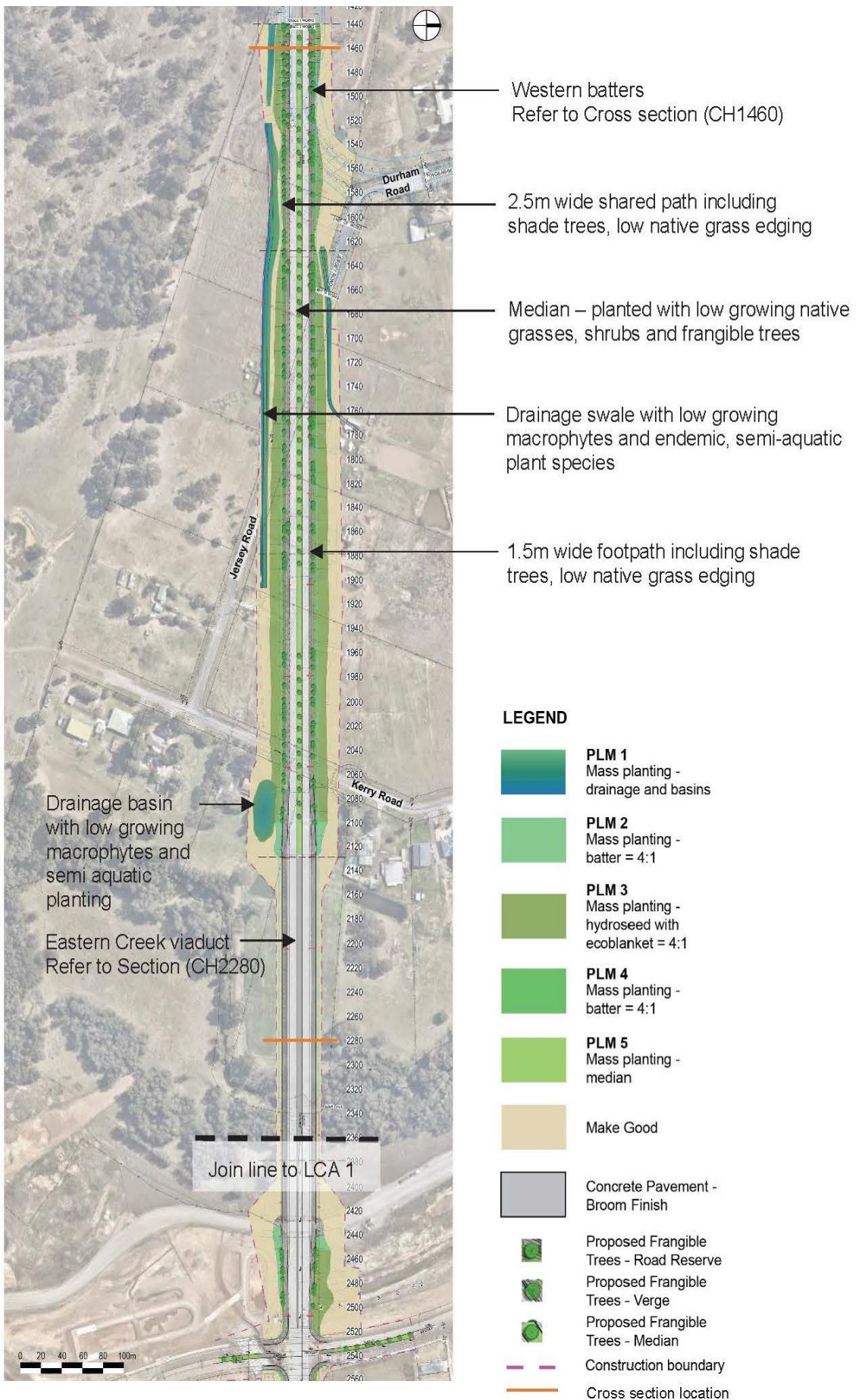


Figure 5.15 Urban design Concept Area 2 (West) plan

5.2.7 Western batters

Batters in the eastern area typically have a slope profile of 4:1 or less. These batters will be hydroseeded with a mix of native grasses and shrubs. Frangible trees are proposed in the verge areas and at the top of the embankment to provide shade and amenity. The 4.8 metres wide central median is planted with low, native grasses, ground covers and frangible trees, refer to Figure 5.16, except on the Eastern Creek viaduct where the central median is paved.

Drainage swales planted with native grasses are located along both sides of the carriageway and discharge to existing channels and/or permanent, planted drainage basins.

Footpaths are located on both sides of the road with a 2.5 metres wide shared user footpath along the westbound carriageway and a 1.5 metres wide concrete footpath along the eastbound carriageway.

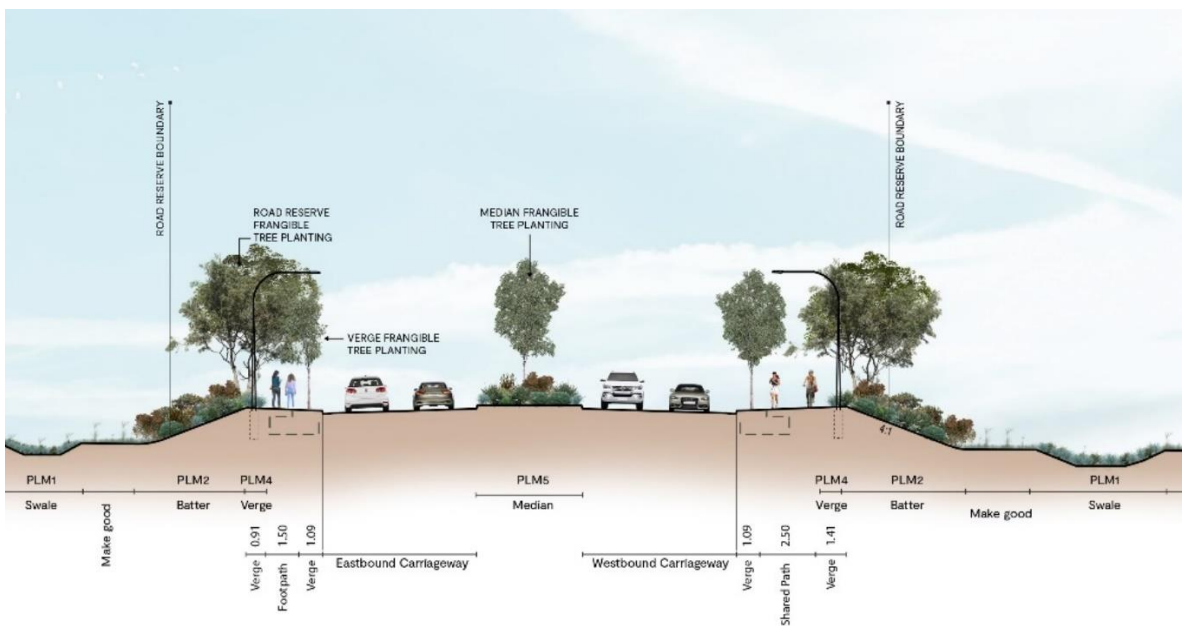


Figure 5.16 Typical section through Townson Road fill batters at CH 1460

5.2.8 Eastern Creek Viaduct

To provide for the passage of floodwaters across the Townson Road corridor, a viaduct structure is proposed across the Eastern Creek waterway. The urban design for the viaduct bridge deck includes similar road furniture treatments as the rail overbridge including pre-cast concrete safety barriers with twin rails, a raised concrete paved central median and mountable kerbs that separate the carriageways and footpaths, refer Figure 5.17.

The westbound side of the bridge includes a 2.5 metres wide shared path while the eastbound (north) side includes a 1.5 metres wide path. Utilities are proposed to be located underneath the bridge deck so that services are visually concealed within the deck structure.

Figure 5.18 illustrates the relationships of the road furniture, paths, lighting with the road carriageways.

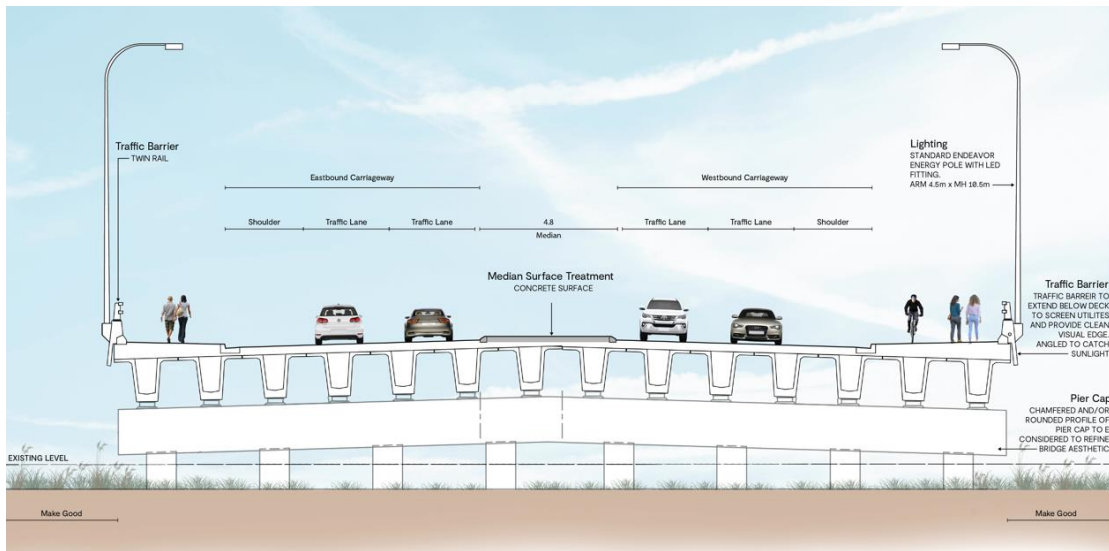


Figure 5.17 Typical section through bridge over Eastern Creek viaduct at CH 2280

5.3 Common design elements

Key features common to both the eastern and western areas include;

- Median and road reserve areas
- Drainage swales and detention ponds
- Road lighting
- Landscape planting

5.3.1 Median and road reserve areas

Verge and median landscape treatments continue themes established in the Townson Road Stage 1 design including both planted and paved medians. Planted medians consist of frangible trees, grasses and groundcovers as identified in Planting Mix 5. Paved central medians are proposed at the Eastern Creek viaduct, the Aerodrome Drive (Veron Road) intersection and at the rail overbridge.

As the median falls within the clear zone, these trees will require removal once they do not meet the frangible planting requirements. Proposed trees located within the safety clear zone are selected as frangible species. Trees within clear zones have been selected from BCC's Preferred Street Tree list. The design also incorporates Blacktown City Council's request for tree planting on both sides of the road reserve to frame the roadway, provide shade and landscape amenity.

5.3.2 Lighting

Lighting of the road corridor is simple and functional and is designed to meet regulatory requirements. Road lighting consists of standard Endeavor Energy poles with LED light fittings consistent with existing road lighting in the surrounding areas, refer image below. Safety lighting may be incorporated within the proposal, which will need to be reviewed at detailed design phase.



Figure 5.18 Existing LED lighting

5.4 Landscape planting

Planting mixes have been developed based on soil landscapes within the corridor, the plant communities identified in the Biodiversity Assessment report and consultation with BCC.

The overall approach includes both formal planting of the road reserve and median with frangible species trees from container nursery stock as well as natural revegetation areas using hydroseed and tubestock. Trees are proposed along the entire corridor to provide shade and a formal rhythm along the corridor. Native grasses and shrubs are used for revegetation of batters and in drainage swales and basins to restore habitat, provide amenity and help to minimise erosion.

A combination of trees, shrubs and grasses are used to help screen the northern and southern RSW facades. The arrangement of the planting species in detailed design will need to respond to the wall heights as they rise from east to west. Tree canopies must remain below the parapet to avoid potential safety conflicts with the adjacent road corridor above.

Planting types were developed for the varying landscape scenarios along the road corridor to revegetate including fill batters, the road reserve, drainage swales and basins, verge, and median plantings using Australian native plant species. These areas will need to be developed in detailed design so that they respond to specific local conditions but are expected to include either native hydroseeded or turfed areas. All turf species are to be Zoysia 'Empire' or as per BCC requirements.

Refer to Appendix B for the planting mixes proposed for the design.

6. Impact assessment

6.1 Landscape character assessment

In sections 6.1.1 to 6.1.3, the impacts of the proposal to the landscape character are assessed. The existing environment for each of the LCZ's has been previously identified and described in section 3.2.

6.1.1 Landscape character zone 1: Semi Rural Residential

The existing environment of LCZ 1 has been described in section 3.2. Refer to Table 6.1 for LCZ 1 impact assessment.

Table 6.1 LCZ 1 assessment

Landscape character zone 1	
Description and location of LCZ	LCZ 1 Semi Rural Residential consists of large rural residential land parcels, within an open landscape with long views across paddocks, towards a rural backdrop of mature trees. Land is typically used for small-scale agricultural businesses and rural residential living. The landscape is low lying, flat or gently undulating and is prone to flooding (being adjacent to Eastern Creek). Farmyard structures such as sheds or water storage tanks are generally located around a large main dwelling. Other visual elements typically include fences, hedgerows, stables, dams, farming equipment, polytunnels, vehicles, livestock and other elements associated with a rural residential landscape.
Anticipated change	The anticipated change in this area would include a new road alignment and the acquisition of some of the semi-rural residential properties in the vicinity of Jersey Road and Kerry Road.
Sensitivity to change	Semi-rural residential LCZ has a High sensitivity to change due to the long open views across the rural character area. This character is of high aesthetic value and change caused by the proposed development would be likely to have an adverse effect on the landscape character, condition or value that could not be mitigated.
Magnitude of change	The magnitude of change would be Medium . The introduction of the road corridor components would not be uncharacteristic within the existing landscape character, however the width and scale of them would be uncharacteristic.
Significance of impact	The significance of impact would be High-Medium .

6.1.2 Landscape character zone 2: Residential and Transport Infrastructure

The existing environment of LCZ 2 has been described in section 3.2.2. Refer to Table 6.2 for LCZ 2 impact assessment.

Table 6.2 LCZ 2 assessment

Landscape character zone 2	
Description and location of LCZ	LCZ 2, Residential and transport infrastructure comprises areas that have been subdivided and developed into residential allotments with traditional single and double storey detached dwellings. Associated transport infrastructure includes the existing road network as well as the visually prominent rail corridor. The rail corridor is typically at-grade or raised on small embankment of up to three metres, is fenced off from public access and includes overhead infrastructure, including gantries, power lines and power poles. The residential areas closest to the proposal are located on Alcorn Street, approximately 20 metres from the elevated structure.
Anticipated change	Development within LCZ 2 includes the proposal at-grade to the west, rising to an elevated road structure over the railway, approximately 15 metres above ground level and within 20 metres of dwellings. Dwellings on Alcorn street face onto the proposal corridor and views from within the character area will be impacted. The anticipated change to the eastern end of Alcorn Street will be the most significant change.
Sensitivity to change	Residential areas are typically sensitive to changes in the surrounding landscape. LCZ 2 has a High sensitivity to change due to the proximity of the proposal to the residential area, particularly the elevated section over the railway adjacent to Alcorn Street.
Magnitude of change	The magnitude of change would be High .
Significance of impact	The significance of impact would be High .

6.1.3 Landscape character zone 3: Bushland / Open Space

The existing environment of LCZ 3 has been described in section 3.2.3. Refer to Table 6.3 for LCZ 3 impact assessment.

Table 6.3 LCZ 3 assessment

Landscape character zone 3	
Description and location of LCZ	LCZ 3, Bushland / Open Space, is typified by areas of dense, tall native vegetation or open grassy fields that are not developed with built form. Visibility in and out of these areas is usually filtered by vegetation. LCZ 3 includes riparian woodland areas located along the Eastern Creek corridor which are important for habitat connectivity along the Western Sydney Parklands corridor.
Anticipated change	Areas of riparian vegetation will need to be removed where the elevated bridge structure goes over Eastern Creek.
Sensitivity to change	This LCZ would have a High sensitivity to change given the relative scarcity of bushland (particularly riparian bushland) within this part of Western Sydney.
Magnitude of change	The magnitude of change is relatively High given that a large section of bushland would be removed to construct the new road bridge, which is built element within this natural landscape character.
Significance of impact	High

6.2 Visual impact assessment

The following section assesses the visual impact of the proposal from the following selected representative viewpoint locations. The existing environment for each of the viewpoint locations is described in section 3. The proposed viewpoints are shown with a red dashed line, indicating the general location and scale of the finished proposal. It is indicative only and not based on 3D modelling. At the time of writing, the materiality and the location of possible noise walls has not been identified and therefore not directly assessed. Appendix A shows artistic impressions of the proposal. It is possible that the noise walls will also be acrylic and of a similar visual scale and quality. From a visual impact perspective, an acrylic panel option is favourable in terms of visual permeability. Refer to section 5.2.4 for noise wall options.

6.2.1 Viewpoint location 01: Kerry Road

The existing environment of VP 01 has been described in section 3.3.3. Refer to Table 6.4 for VP 01 assessment.



Photo 14 View from Kerry Road looking north-west, with indicative proposal



Photo 15 View from Kerry Road looking north, with indicative proposal

Table 6.4 VP 01 assessment

Criteria	Comments
Location and View Direction	VP 01 is located on Kerry Road, at the intersection of Jersey Road, looking north and west.
Anticipated Change to View	Changes to the view would include the construction of a new section of road about 300 metres long across the middle of the view. The new road is likely to be constructed on an embankment, to the elevated Eastern Creek bridge. Some dwellings, buildings, structures and vegetation are likely to be removed. The new road would dissect the existing road network south-east of the junction of Durham Road and Jersey Road, and north of the junction of Jersey road and Kerry Road. It is anticipated that a new linking road will connect Jersey road to the south (to be constructed via another project).

Criteria	Comments
	Noise walls of approximately 2.5 metres high may also be present on both sides of the alignment in this location (subject to detailed design and acoustic modelling).
Sensitivity to change	High , as the adjacent residential property occupants would view the development within close proximity and when going to or from the property, with long viewing periods.
Magnitude of change	Moderate , as there would be a discernible change in the existing view due to the addition of the new road alignment and the likely removal of some existing vegetation and buildings, however this could be partially mitigated through revegetation.
Significance of impact	High - Moderate

6.2.2 Viewpoint location 02: Aerodrome Drive (Veron Road)

The existing environment of VP 02 has been described in section 3.3.4. Refer to Table 6.5 for VP 02 assessment. Artistic impressions from this viewpoint are shown in Appendix A.



Photo 16 View from Aerodrome Drive (Veron Road) looking north-west, with indicative proposal



Photo 17 View from Aerodrome Drive (Veron Road) looking north, with indicative proposal

Table 6.5 VP 02 assessment

Criteria	Comments
Location and View Direction	VP 02 is located 10 metres west of Aerodrome Drive (Veron Road), near the intersection with Lockheed Drive, looking west.
Anticipated Change to View	Changes to the view would include the construction of a new section of road about 200 metres long across the middle of the view. The new road will connect to Aerodrome Drive (Veron Road), at grade, with a signalised intersection. The new road is likely to be constructed on an embankment near the Eastern Creek bridge and long views to the creek line and its riparian vegetation will be obstructed. An area of creek vegetation will also be removed. Noise walls of approximately 2.5 metres high may also be present on both sides of the alignment in this location (subject to detailed design and acoustic modelling).
Sensitivity to change	High , as the open space users as well as pedestrians and road users travelling north along Aerodrome Drive (Veron Road) would view the development within close proximity, with long viewing periods. Also, linear bushland creek vegetation is rare in this part of Western Sydney and its removal would be visually sensitive. Future residents to dwellings on Aerodrome Drive (Veron Road) would also view the development within close proximity, with long viewing periods.
Magnitude of change	Moderate , as there would be a discernible change in the existing view due to the addition of the new road alignment and the removal of creek vegetation, however this could be partially mitigated through revegetation. Also, this area contains a construction site and is in an area undergoing constant change.
Significance of impact	High - Moderate

6.2.3 Viewpoint location 03: Alcorn Street

The existing environment of VP 03 has been described in section 3.3.5. Refer to Table 6.6 for VP 03 assessment. Artistic impressions from this viewpoint are shown in Appendix A.



Photo 18 View along Alcorn Street, looking north-east, with indicative proposal

Table 6.6 VP 03 assessment

Criteria	Comments
Location and View Direction	VP 03 is located on the south of Alcorn Street near the intersection with the construction footprint, looking south and east.
Anticipated Change to View	Changes to the view would include the construction of a new section of road about 200 metres long across the middle of the view. There would be 1.2 metre wide footpaths on the northern and southern sides and the roadway would be mostly at-grade in the foreground, rising up to an elevated bridge in the far distance (near Siding Terrace and the rail line). Noise walls of approximately 2.5 metres high may also be present on both sides of the alignment in this location (subject to detailed design and acoustic modelling).
Sensitivity to change	High , as the receivers within this area are residents with dwellings facing onto the proposal and have long term views
Magnitude of change	High The construction footprint is about 20 metres from dwellings in this location. Currently the future road easement allows 100 metres long views across open green space, to other residential areas. It is currently perceived as green open space and therefore the construction of a road will be a significant visual change.
Significance of impact	High

6.2.4 Viewpoint location 04: Anson Street

The existing environment of VP 04 has been described in section 3.3.6. Refer to Table 6.7 for VP 04 assessment. Artistic impressions from this viewpoint are shown in Appendix A.



Photo 19 View along Anson Street, looking north-east, with indicative proposal

Table 6.7 VP 04 assessment

Criteria	Comments
Location and View Direction	VP 04 is located on Anson Street near the intersection with Mariner Avenue and the construction footprint, looking north and east.
Anticipated Change to View	Changes to the view would include the construction of a new section of road across the middle of the view. There would be 1.2 metre wide footpaths on the northern and southern sides and the roadway would be on embankment, rising up to an elevated bridge in the far distance (near Siding Terrace and the rail line). Noise walls of approximately 2.5 metres high may also be present on both sides of the alignment in this location (subject to detailed design and acoustic modelling).
Sensitivity to change	High , as the receivers within this area are residents with dwellings facing onto the proposal and have long term views
Magnitude of change	Moderate the proposal is about 50 metres away, with the drain easement and road reservation vegetation in the foreground. Therefore, views will be partially screened.
Significance of impact	High-Moderate

6.2.5 Viewpoint location 05: Anson Street East

The existing environment of VP 05 has been described in section 3.3.7. Refer to Table 6.8 for VP 05 assessment. Artistic impressions from this viewpoint are shown in Appendix A.



Photo 20 View from Anson Street east, looking north-east, with indicative proposal

Table 6.8 VP 05 assessment

Criteria	Comments
Location and View Direction	VP 05 is located on Anson Street near the intersection of Siding Terrace, looking north and east.
Anticipated Change to View	Changes to the view would include the construction of a new section of road about 200 metres long across the middle of the view. There would be 1.2 metre wide footpaths on the northern and southern sides and the roadway would be rising up to an elevated bridge in the distance (near Siding Terrace and the rail line). Noise walls of approximately 2.5 metres high may also be present on both sides of the alignment in this location (subject to detailed design and acoustic modelling).
Sensitivity to change	High , as the receivers within this area are residents with dwellings facing onto the proposal and have long term views
Magnitude of change	High the proposal is about 50 metres away, with the drain easement and road reservation avenue vegetation in the foreground. Therefore, views will be partially screened, however as the proposal is elevated in this location over the rail line, it will be a high change to existing visual conditions.
Significance of impact	High

6.2.6 Viewpoint location 06: Siding Terrace

The existing environment of VP 06 has been described in section 3.3.8. Refer to Table 6.9 for VP 06 assessment. Artistic impressions from this viewpoint are shown in Appendix A.



Photo 21 View from Siding Terrace, looking south, with indicative proposal

Table 6.9 VP 06 assessment

Criteria	Comments
Location and View Direction	VP 06 is located on Siding Terrace, about 60 metres north of Alcorn Street, looking south.
Anticipated Change to View	Changes to the view would include the construction of a new road bridge structure elevated over the rail line. The bridge would be approximately 15 metres high with large retaining walls within 20 metres proximity to dwellings on Alcorn Street. Noise walls of approximately 2.5 metres high may also be present on both sides of the alignment in this location.
Sensitivity to change	High , as occupiers of residential properties along Alcorn Street and Siding Terrace would have long viewing periods at close proximity to the proposal.
Magnitude of change	High , as the new road bridge structure and retaining walls of about 15 metres high will block long views from dwellings on Alcorn Street and Siding Terrace.
Significance of impact	High

6.2.7 Viewpoint location 07: Stoke Street

The existing environment of VP 07 has been described in section 3.3.9. Refer to Table 6.10 for VP 07 assessment. Artistic impressions from this viewpoint are shown in Appendix A.



Photo 22 View from Stoke Street, looking south-west, with indicative proposal

Table 6.10 VP 07 assessment

Criteria	Comments
Location and View Direction	VP 07 is located on Stoke Street, about 80 metres north-east of Burdekin Road/Railway Terrace, looking south- west.
Anticipated Change to View	Changes to the view would include the construction of a new elevated road about 300 metres long, on a bridge going over the rail line. The new road would connect into Burdekin Road and Railway terrace would culminate in a cul-de-sac. There would be 1.5 metre wide footpaths on both sides of the elevated new road. Due to the proposed drainage basin adjacent to Stoke Street, there may be insufficient land for mitigation planting to screen the proposal from the residents at this location. Noise walls of approximately 2.5 metres high may also be present on both sides of the alignment in this location (subject to detailed design and acoustic modelling).
Sensitivity to change	High , as the five storey apartments on Stoke Street have balconies that overlook the elevated section of road over rail line. These residents would view the proposal within close proximity and with long viewing periods.
Magnitude of change	High , as there would be a significant change in the existing view due to the addition of a new elevated road bridge, which being elevated, cannot be mitigated through revegetation.
Significance of impact	High

6.2.8 Viewpoint location 08: North-west of Alana Avenue

The existing environment of VP 08 has been described in section 3.3.10. Refer to Table 6.11 for VP 08 assessment.



Photo 23 View north-west of Alana Ave, with indicative proposal

Table 6.11 VP 08 assessment

Criteria	Comments
Location and View Direction	VP 08 is located 150 north west of Alana Avenue, looking north and west.
Anticipated Change to View	Changes to the view would include the construction of a new section of elevated road in the background of the view. The roadway would be rising up to an elevated bridge in the distance (over the rail line). Noise walls of approximately 2.5 metres high may also be present on both sides of the alignment in this location (subject to detailed design and acoustic modelling).
Sensitivity to change	Low , future residents would view the development from afar, for long viewing periods, however these views may be blocked by future development.
Magnitude of change	Moderate , as there would be a discernible change in the existing view due to the addition of the new elevated road alignment and the likely removal of some existing vegetation, however this could be partially mitigated through revegetation.
Significance of impact	Low - Moderate

6.3 Impacts during construction

The visual impact associated with construction may include the following:

- During construction, a work crew, vehicles and machinery would be seen moving along the alignment as they construct the new widened section of road
- There may be additional dust generated as a result of construction works
- The presence of vehicles and machinery would be temporary as construction crews work to complete the new road surface
- The presence of large cranes would be temporary as construction crews work to complete elevated bridge structures
- The presence of site compounds, particularly where they are adjacent to the main road may result in a temporary landscape and visual impact during the construction phase of the proposal
- Clearing of vegetation may also be required for construction laydown areas, temporary access tracks and other construction related activities.

7. Mitigation measures

The following section recommends mitigation measures that respond to issues arising within the assessment that have potential to adversely impact on:

- The character of the landscape within which the proposal is located
- Existing views from sensitive receiver locations.

Mitigation measures address the most visual elements of the proposal as well as referencing any relevant considerations drawn from the legislation and policy review.

Urban design principles and objectives have been developed for the proposal, which translate to project specific design strategies and initiatives, outlined in section 5.

Mitigation measures already included within the concept design include:

- Visually permeable safety screens; Vegetation planted along the road alignment including trees to both edges of the alignment, planted medians and verges and embankments; the inclusion of neutral colours; the use of stone at the over-rail bridge abutment and visually integrated safety fencing.

Other design considerations should be further investigated during future design stages , including:

- Noise walls and throw screens to be sensitively designed, particularly on elevated structures (consider visual permeability). Solid panels to be avoided and permeable visually lightweight safety screens to be used, for example wire mesh for safety screens, with acrylic panel option being favourable in terms of visual permeability.
- Ensure the wall façade or reinforced soil wall is designed in a way to minimise visual impact through the use of different materials/colours/textures.
- Consider wall treatment opportunities such as public art to improve aesthetic quality of the structure and discourage vandalism and graffiti.
- Plant avenue trees and appropriate vegetation along the proposal, where possible, particularly along the shared use path, around sensitive receptors and along the LCZ3 landscape.
- Utilise neutral colours that are in keeping with surrounding visual environment and landscape in the design of safety barriers and other road furniture.
- Position signs in a non-visually obtrusive way and sensitively locate to consider views from residential areas, where possible.
- Throw screens to be sensitively designed and integrated with the superstructure with a high level of visual permeability to help reduce the scale and bulk of the overbridge. Solid panels are to be avoided and permeable visually lightweight safety screens are to be used.
- Minimise removal of Eastern Creek linear vegetation corridor, revegetate where practicable.
- Visually significant large trees in construction compounds to be retained, where possible.
- Vegetation buffers will be maintained between site compounds and public roads wherever practicable.
- Consider use of glare shields and sensitively angle luminaires on elevated structures to direct light spill away from residential areas.

- Light generated during construction will be managed in general accordance with the requirements in Australian Standard AS 4282-2019 Control of the Obtrusive Effects of Outdoor Lighting. Generally, lighting would be designed to minimise off-site light spill.

The above assessment and mitigation measures are based on the current road design however impacts from the bridge substructure could be further minimised through consideration of a continuous bridge structure on piers, with minimal rammed earth walls, to mitigate the proposed visual barrier the walls would create between two residential areas, and allow for the retention of long views under the road bridge, reducing the visual impact to residents on Alcorn Street, Siding Terrace and Anson Street. Opening the bridge structure and undercroft could also generate opportunities for open space for community benefit.

7.1 Construction phase mitigation measures

- Contractor to minimise tree and vegetation removal
- Contractor to provide appropriate construction hoarding for visual screening
- Contractor to provide mitigation planting and consider early planting
- Contractor to consider short term and long-term mitigation measures
- The hoarding of construction materials will be minimised as far as practical.

8. Conclusion

8.1 Summary of landscape character and visual impact assessment

Refer to Table 8.1 and Table 8.2 for a summary of landscape character and visual impacts for the proposal.

Table 8.1 Summary of landscape character assessment

LCZ	Description	Sensitivity to change	Magnitude of change	Overall Rating
LCZ 1	Semi Rural Residential	High	Medium	High-Medium
LCZ 2	Residential	High	High	High
LCZ 3	Bushland / Open Space	High	High	High

Table 8.2 Summary of visual impacts

Viewpoint	Location	Sensitivity to change	Magnitude of change	Overall Rating
VP 01	Kerry Road	High	Moderate	High-Moderate
VP 02	Aerodrome Drive (Veron Road)	High	Moderate	High-Moderate
VP 03	Alcorn Street	High	High	High Impact
VP 04	Anson Street	High	Moderate	High-Moderate
VP 05	Anson Street	High	High	High Impact
VP 06	Siding Terrace	High	High	High Impact
VP 07	Stoke Street	High	High	High Impact
VP 08	West of Alana Ave	Low	Moderate	Low-Moderate

The landscape within the study area of proposal is less developed than Stage 1, going through areas of natural bushland, riparian corridor and future residential development. The key sensitivities are associated with the bushland and where the proposal would be located within close proximity to residential areas.

The urban design treatments have been designed to respond to the major landscape character and visual impact by preserving or reinstating roadside vegetation which is consistent with tall tree species and other vegetation that is endemic to the area.

The proposal is mostly an entirely new section of road from Stage 1 tie-in, over the railway corridor to Burdekin Road. To minimise the effects of the development, the ecological attributes of the area would be reinforced through revegetation of species based on existing plant communities.

Where proposed roadside vegetation would be cleared to accommodate the future road widening works, a mix of pasture grasses and low-lying groundcovers are proposed to accommodate this expansion. Canopy trees are also proposed along the northern batters to ensure canopy cover is provided to footpaths and road pavement once the future road widening works are complete.

The proposal is entirely a new section of road, some of which is in close proximity to dwellings. For this reason, the landscape character and visual impact of the proposal is greater than if it were constructed along an existing road corridor and away from dwellings.

The greatest visual impact of the proposal would occur along Alcorn Street when the proposal is elevated over the rail line, 20 metres from residential dwellings. This is because of the proximity of the new structure to the existing dwellings, the height and scale of the new structure and the lack of space to plant screening vegetation to mitigate the visual impacts.

Noise walls of approximately 2.5 metres high may also be present on both sides of the alignment in some locations (subject to detailed design and acoustic modelling). In terms of reducing visual impacts, visually permeable panels (such as acrylic) are preferred to concrete or timber panels.

Other areas of visual impact include the construction footprint area between Anson Street and Alcorn Street, which is currently open, green and publicly accessible. There will be a loss of views across to green open areas and residential beyond, as well as a loss of perceived public open space, however this can be mitigated through careful design of the road bridge and opening up the structure and exposing the substructure undercroft area, to provide long views through and an opportunity for social infrastructure and community benefit.

This part of Western Sydney is undergoing a process of rapid development with areas of bushland and farmland making way for residential development. Therefore, a level of change is generally anticipated and accepted from within and around new residential areas.

9. References

TfNSW (2020), *Environmental impact assessment practice note EIA-N04 - Guideline for landscape character and visual impact assessment, Version 2.2*

TfNSW (2018), *Landscape design guideline: Design guideline to improve the quality, safety and cost effectiveness of green infrastructure in road corridors*

TfNSW (2020), *Beyond the Pavement: Urban design approach and procedures for road and maritime infrastructure planning, design and construction*

NSW Government, *Blacktown City Council Growth Centre Precincts Development Control Plan (2018)*, Department of Planning and Environment

Blacktown Local Environmental Plan 2015 (LEP)

NSW Government, *Sydney Regional Environmental Plan No 20 – Hawkesbury-Nepean River (No 2 – 1997)*

TfNSW (2019), *Bridge Aesthetics: Design guideline to improve the appearance of bridges in NSW*

TfNSW (2021), *Design guideline to improve the appearance of noise walls in NSW*

TfNSW (2016), *Shotcrete design guidelines: Design guideline to improve the appearance of shotcrete in NSW*

TfNSW (2017), *Water sensitive urban design guideline: Applying water sensitive urban design principles to NSW transport projects*

West Schofields Landscape and Visual Appraisal Report (Urbis, 2018)

TfNSW's (2015), *Guideline for Batter Surface Stabilisation using vegetation*

Appendix A

Artistic Impressions

The following six artistic impressions have been prepared by Unsigned Studios and Aurecon, for Transport for NSW.

GHD do not take responsibility for the accuracy of the artistic impression shown, the artistic impression methodology or the final output. The following should be noted:

- The following artistic impressions represent concept design stage and will be subject to detailed design.
- These representations show safety screens (rather than noise walls).
- The preferred noise wall design for the RSW section is '*Opaque Acrylic 2.5m high barrier*' (further to acoustic studies), however other visually solid noise wall options like timber or concrete could potentially also be considered during detailed design.

The artistic impression production methodology, as provided by Unsigned Studios on 8/03/2022, is outlined below:

"The position of the lens of the camera for photographs used to prepare the photomontages were based on predefined locations identified by GHD. A typical human eye height of 1.5m from ground surface was used on the day of photography. A lens length of 27mm was used with a Canon 7D (crop sensor).

Aurecon used existing feature survey and recorded photograph positions to capture and match fixed features shown in view. In this way the location of the camera's lens can be replicated virtually (camera position and lens length) in software used by Aurecon and the 3D designed elements 'photoshopped' into view accurately. Modelling of the proposed design, including material finishes, landscape planting and urban design was based on information supplied and underwent two rounds of review with TfNSW for final signoff".

Artistic Impression from VP02 - Aerodrome Drive (Veron Road) looking north-west, with indicative proposal



Note: Artistic impression provided by TfNSW. This illustration is representative of concept design and subject to change and detailed design (including noise wall design).

Artistic Impression from VP03 – Alcorn Street looking north-east, with indicative proposal



Note: Artistic impression provided by TfNSW. This illustration is representative of concept design and subject to change and detailed design (including noise wall design).

Artistic Impression from VP04 - Anson Street, looking north-east, with indicative proposal



Note: Artistic impression provided by TfNSW. This illustration is representative of concept design and subject to change and detailed design (including noise wall design).

Artistic Impression from VP05 - Anson Street east, looking north-east, with indicative proposal



Note: Artistic impression provided by TfNSW. This illustration is representative of concept design and subject to change and detailed design (including noise wall design).

Artistic Impression from VP06 - Siding Terrace, looking south, with indicative proposal



Note: Artistic impression provided by TfNSW. This illustration is representative of concept design and subject to change and detailed design (including noise wall design).

Artistic Impression from VP07 - Stoke Street, looking south-east, with indicative proposal



Note: Artistic impression provided by TfNSW. This illustration is representative of concept design and subject to change and detailed design (including noise wall design).

Appendix B

Landscape planning mixes

Landscaping planting mixes and proposed planting methodology.

Botanical Name	Common Name	Application Rate / Density	Planting Mix Rationale	Planting Methodology	Location
Street Streets - Verge					
<i>Waterhousia floribunda</i>	Weeping Lilly Pilly	-	Suitable frangible native. 1.8m of clear stem to be maintained for sightline requirements	Container planting (25L max.)	Road verges
Native Trees – Road Reserve					
<i>Angophora subvelutina</i>	Broad-Leaved Apple	-	Native tree planting mix derived from soil landscapes and Cumberland plain plant communities	A mixture of semi-mature and tubestock planting to provide initial cover	Road reserve areas
<i>Eucalyptus amplifolia</i>	Cabbage Gum	-			
<i>Casuarina glauca</i>	Swamp Oak	-			
<i>Eucalyptus maculata</i>	Spotted Gum	-			
<i>Eucalyptus moluccana</i>	Grey Box	-			
<i>Eucalyptus crebra</i>	Narrow-Leaved Ironbark	-			
<i>Eucalyptus punctata</i>	Grey Gum	-			
<i>Eucalyptus tereticornis</i>	Forest Red Gum	-			
<i>Eucalyptus longifolia</i>	Woollybutt	-			
<i>Melaleuca linariifolia</i>	Narrow-Leaved Paperbark	-			
<i>Melaleuca quinquenervia</i>	Broad-Leaved Paperbark	-			
Planting Mix 1 – Drainage and Basins					
<i>Carex appressa</i>	Tall Sedge	6/m ²	Native planting mix for use in drainage swales, basins, and batters	Tubestock planting	Drainage infrastructure
<i>Dianella caerulea</i>	Blue Flax Lily	6/m ²			
<i>Eleocharis sphacelata</i>	Tall Spike Rush	4/m ²			
<i>Ficinia nodosa</i>	Knobby club-sedge	6/m ²			
<i>Imperata cylindrica</i>	Blady Grass	4/m ²			
<i>Lomandra longifolia</i>	Spiny Mat Rush	2/m ²			
<i>Juncus usitatus</i>	Common Rush	6/m ²			
Planting Mix 2 – Batter Planting					
Native Grasses					
<i>Dianella longifolia</i>	Blueberry Lily	2.0 kg/ha	Native planting mix for use on roadside batters and verges	Hydroseeding	Batters 4h:1v
<i>Cymbopogon refractus</i>	Barbed Wire Grass	1.0 kg/ha			
<i>Goodenia hederacea</i> subsp. <i>hederacea</i>	Forest Goodenia	1.5 kg/ha			
<i>Lomandra longifolia</i>	Spiny Mat Rush	2.5 kg/ha			
<i>Lomandra multiflora</i> subsp. <i>Multiflora</i>	Many Flowered Mat-Rush	1.0 kg/ha			
<i>Hardenbergia violacea</i>	Native Sarsparilla	0.5 kg/ha			
<i>Themeda australis</i>	Kangaroo Grass	1.5 kg/ha			
Native Shrubs					
<i>Bursaria spinosa</i>	Blackhorn	0.5 kg/ha	Native planting mix for use on roadside batters and verges	Hydroseeding	Batters 4h:1v
<i>Leptospermum petersonii</i>	Lemon Scented Teatree	0.5 kg/ha			
<i>Callistemon white anzac</i>	White Anzac Calistemon	0.5 kg/ha			

Botanical Name	Common Name	Application Rate / Density	Planting Mix Rationale	Planting Methodology	Location
<i>Westringia 'jervis gem'</i>	Jervis Gem	0.5 kg/ha			
Planting Mix 3 – Hydroseed with Organics Blanket					
Native Grasses					
<i>Dianella longifolia</i>	Blueberry Lily	2.0 kg/ha	Native understorey planting mix for steep cut batters	Hydroseeding with Organics blanket or Ecoblanket	Steep batters = 2h:1v
<i>Cymbopogon refractus</i>	Barbed Wire Grass	1.0 kg/ha			
<i>Goodenia hederacea subsp. hederacea</i>	Forest Goodenia	1.5 kg/ha			
<i>Lomandra longifolia</i>	Spiny Mat Rush	2.5 kg/ha			
<i>Lomandra multiflora subsp. Multiflora</i>	Many Flowered Mat-Rush	1.0 kg/ha			
<i>Hardenbergia violacea</i>	Native Sarsparilla	0.5 kg/ha			
<i>Themeda australis</i>	Kangaroo Grass	1.5 kg/ha			
Planting Mix 4 – Grass Planting Between Footpath and Batter					
Native Grasses					
<i>Dianella longifolia</i>	Blueberry Lily	2/m ²	Native low grass mix to prevent obstruction of footpath	Tubestock planting	Between footpath and batters
<i>Cymbopogon refractus</i>	Barbed Wire Grass	4/m ²			
<i>Goodenia hederacea subsp. hederacea</i>	Forest Goodenia	4/m ²			
<i>Lomandra longifolia</i>	Spiny Mat Rush	4/m ²			
<i>Lomandra multiflora subsp. Multiflora</i>	Many Flowered Mat-Rush	4/m ²			
<i>Hardenbergia violacea</i>	Native Sarsparilla	4/m ²			
<i>Themeda australis</i>	Kangaroo Grass	6/m ²			
Planting Mix 5 – Median Planting Mix					
Trees					
<i>Waterhousia floribunda</i>	Weeping Lilly Pilly	-	Suitable frangible native. 1.8m of clear stem to be maintained for sightline requirements	Container Planting (25L max.)	Median / Central reserve
Grasses and Groundcovers					
<i>Austromyrtus dulcis</i>	Midgen Berry	4/m ²	Low maintenance native species providing safe sight distances	Tubestock Planting	Median / Central reserve
<i>Bothriochloa bladhii</i>	Australian Bluestem	4/m ²			
<i>Carex appressa</i>	Tall Sedge	4/m ²			
<i>Dichanthium sericeum</i>	Queensland Bluegrass	4/m ²			
<i>Lomandra longifolia 'Tanika'</i>	Tanika Spiny Head mat-rush	4/m ²			
<i>Myoporum ellipticum</i>	Costal Boobialla	4/m ²			
<i>Pennisetum alopecuroides 'Nafray'</i>	Foxtail Grass	6/m ²			
Planting Mix 6 – Northern Screening					
Trees					
<i>Callistemon viminalis 'Hannah Ray'</i>	Weeping Bottlebrush	-	Small, hardy native tree for screening wall	Container planting (100L size)	Northern RE Wall

Botanical Name	Common Name	Application Rate / Density	Planting Mix Rationale	Planting Methodology	Location
			sections over 5m height.		
Shrubs, Grasses and Groundcovers					
<i>Callistemon 'Little John'</i>	Dwarf Bottlebrush	4/m ²	Mix of low maintenance, hardy native species of varying heights and textures to screen lower wall areas up to 2m.	Container planting (150mm pot size)	Northern RSW
<i>Ceratopetalum gummiferum</i>	NSW Christmas Bush	-			
<i>Doryanthes excelsa</i>	Gynea Lily	1/m ²			
<i>Lomandra longifolia 'Tanika'</i>	Tanika Spiny Head mat-rush	4/m ²			
<i>Poa poiformis 'PP500' PBR</i>	Kingsdale™ Poa	4/m ²			
<i>Westringia hybrid 'WES08'</i>	Aussie Box® Westringia	4/m ²			
Planting Mix 7 – Southern Screening					
Shrubs, Grasses and Groundcovers					
<i>Acmena Smithii 'Minor'</i>	Dwarf Lilly Pilly	1/m ²	Native, mid-level screening shrub. Mix of low maintenance, hardy, shade tolerant native species of varying heights and textures to screen lower wall areas up to 2m.	Container planting (75L size) Container planting (150mm pot size)	Southern RSW
<i>Chorizema cordatum</i>	Heart Leaf Flame Pea	4/m ²			
<i>Dianella caerulea 'JOHN316' PBR</i>	King Alfred™ Dianella	4/m ²			
<i>Doryanthes excelsa</i>	Gynea Lily	1/m ²			
<i>Viola hederacea</i>	Australian Native Violet	4/m ²			

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