

# Appendix K

## Visual and landscape report







# WERRINGTON ARTERIAL ROAD - STAGE 1 URBAN DESIGN CONCEPT REPORT

Final Report

prepared for:



prepared by:



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This report has been prepared for

RMS

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| Issue | Date of Issue | Submission               | Author | Review |
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# 01 INTRODUCTION

## 1.1 BACKGROUND

Werrington Arterial Road is a proposed long term arterial road along the Kent Road/Gipps Street and Werrington Road/Christie Street corridors linking the M4 Motorway and the Castlereagh Freeway corridor.

Roads and Maritime Services (RMS), formerly Roads and Traffic Authority are planning to deliver the overall project in two stages. Stage 1 would encompass the section between the M4 Motorway and the Great Western Highway and the remaining section between the Great Western Highway and Castlereagh Freeway corridor would form Stage 2 of the proposal.

RMS is currently planning for Stage 1 of the proposal which includes road widening to four lanes of Kent Road/Gipps Street corridor between the M4 Motorway and the Great Western Highway with east facing ramps on the M4 Motorway.

The road corridor is situated within the local government area of Penrith City Council, which is currently rezoning areas surrounding the project, including Werrington Enterprise Living and Learning (WELL) for urban development, which includes Claremont Meadows Stage 2 and lands within the University of Western Sydney, Werrington Campus. The Werrington Enterprise Living and Learning (WELL) Precinct is the name given to key lands both encompassing and located around the University of Western Sydney (UWS).

Council has identified the need for the construction of this first section of the Werrington Arterial Road to enhance connectivity to these new urban areas and to reduce congestion on other major north/south arterial roads, specifically Mamre Road and The Northern Road.

This short section of road between the M4 Motorway and the Great Western Highway is to be conceived as part of a major arterial road potentially linking to the Castlereagh Freeway Corridor. This report covers Stage 1 and is located in a fairly flat topography with an open character with few tree pockets.

## 1.2 PURPOSE OF THIS REPORT

KI Studio Pty Ltd has been commissioned by the Roads and Maritime Services (RMS) to provide urban and landscape design input into the project development, whilst simultaneously undertaking a visual and landscape character impact assessment.

The visual and landscape character impact assessment would inform the design process by identifying potential visual impacts that the proposal would have on the surrounding project area, identify strategies to improve the design and propose mitigation measures for the identified impacts.

The resulting urban and landscape strategy, combined with the visual and landscape character assessment, would inform the project approval authority, other agencies and the community about the overall design and expected visual impacts of the proposal.

The visual and landscape character impact assessment combined with the urban and landscape strategy would feed into the REF (Review of Environmental Factors) and form one of the specialist studies of the document.

The integrated urban and landscape design input for this project will assist in the development and presentation of an integrated engineering and urban design outcome that:

- Fits sensitively into the built, natural and community environments through which it is located;
- contributes to the accessibility and connectivity of people within the area and local communities; and
- contributes to the overall quality of the public domain for the community and all road users.

KI Studio's follows previous preliminary design that was undertaken by the RMS/RTA and the scope of our involvement, as outlined in this report, includes:

- Urban Design Objectives and Principles;
- an integrated landscape and urban design concept design developed in collaboration with Hyder Engineers; including key aspects of the design such as the sections, plans and renderings to be integrated into the REF process;
- a landscape character assessment and visual impact assessment and the development of mitigating strategies that were fed into the concept design development; and
- urban design details to be integrated with the engineering concept.

### 1.3 STRUCTURE OF THE REPORT

The structure of the report is closely linked with the study methodology and articulated in the following chapters:

- 1.0 Introduction
  - 1.1 Project Overview
  - 1.2 Purpose of the report
  - 1.3 Structure of Report
  - 1.4 Urban Design process
  - 1.5 The Project
- 2.0 Site Analysis
  - 2.1 Land Use & Movement
  - 2.2 Connectivity /Gipps St Masterplan
  - 2.3 Scenic and Landscape value
  - 2.4 Environmental
  - 2.5 Landscape Character Zones
  - 2.6 Landscape Character Impacts
  - 2.7 Visual Impact Analysis
  - 2.8 Key Opportunities and Constraints

### 3.0 Objectives & Principles

#### 4.0 Concept Design

- 4.1 Integrated Plans
- 4.2 Landscape Elements
- 4.3 Urban Design Elements

#### 5.0 Visual Impact Assessment

#### 6.0 Landscape Character and Visual Impact Mitigation Strategy

#### 7.0 Conclusion

### 1.4 URBAN DESIGN PROCESS

The urban and landscape design concept has been developed through an iterative process taking into consideration potential visual impacts and how mitigation measures would feed back into the design. This process is based on a thorough contextual analysis taking into consideration environmental impacts, road functionalities and identifying strengths, opportunities, weaknesses and constraints.

The design has been developed in accordance with RMS/RTA policy and guidelines including Beyond the Pavement: RMS/RTA Urban Design Policy, Procedures and Design Principles (2009) and other related urban design documents including:

- Guidelines for landscape character and visual impact assessment No. EIA-N04, Version 1.0 Issue Date 24 March 2009; consideration of the RMS' latest revision to this document.;
- Noise Wall Design Guideline;
- Landscape Guideline;
- Transit Boulevard Road Type - Planning and Design Discussion Paper; and
- RTA Growth Centres Road Framework

### 1.5 THE PROJECT

The project is located in the west of Sydney, just east of Penrith, approximately 40km from Sydney's CBD north of the M4 Motorway. The proposal is approximately 2km long and considers widening the existing local road from two lanes to four lanes from the M4 motorway to the Great Western Highway (see adjacent figure 1.1).

The proposal would involve following key elements:

- M4 Motorway/ Kent Road east facing off ramp including a new signalised intersection at Kent Road;

- M4 Motorway/Gipps Street east facing on ramp including a new signalised intersection at Kent Road;
- road widening to four lanes between the M4 Motorway and Gipps Street/Sunflower Drive;
- two 4-way signalised intersections – at Caddens Road and Sunflower Drive South respectively;
- introduction of bus stops including shelters;
- introduction of a shared path between the M4 Motorway and Great Western Highway;
- re line marking on the bridge over the motorway to create two lanes in the north bound direction and one lane in the south bound direction;
- construction of a new bridge as part of the shared path across the M4 Motorway; and
- landscaped corridor to visually integrate the proposed works and enhance the streetscape.

In addition, it is anticipated that noise barriers may be required and preliminary concepts have been included in this urban design report.

The road corridor runs adjacent to existing residential development of Claremont Meadows to the west, and on the other side, to the east, future residential development, along with a major future park/sporting complex. Whilst some landscaped verges would be impacted, the majority of the road corridor area has few constraints except for some areas of Cumberland Plains Vegetation, and the cuttings and ramps, as proposed to the south of the corridor, where there will be impacts, that have been addressed in this report.



# WERRINGTON ARTERIAL ROAD - STAGE 1

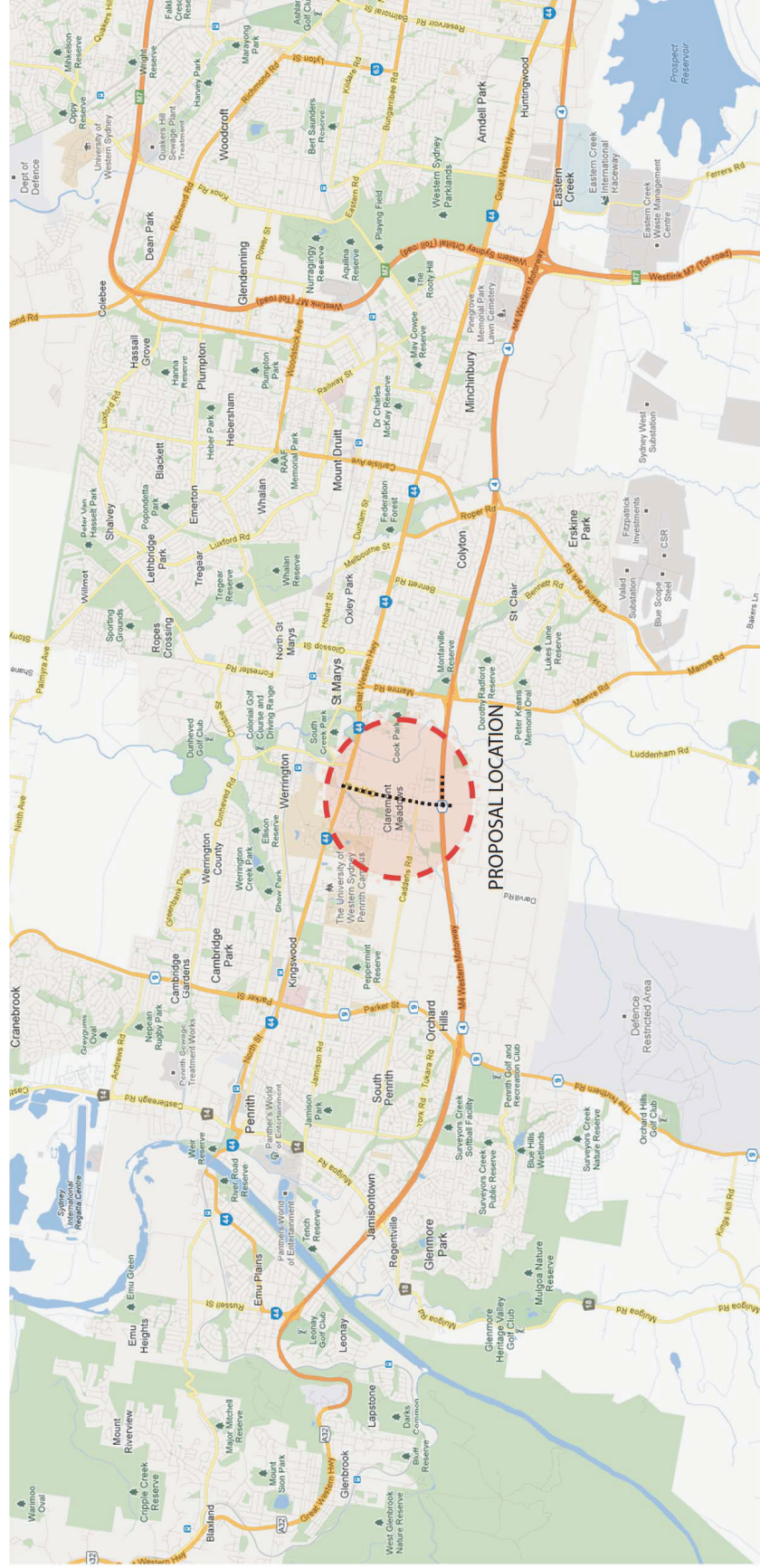


Figure 1.1 - Proposal Location

## 02 SITE ANALYSIS

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### 2.1 LAND USE

The majority of surrounding land use is residential as identified in PITLUS (Penrith Integrated Transport and Land Use Strategy). The eastern verge predominantly interfaces with parklands (PITLUS) and public recreation based on the local (LEP). Towards the south of the project rural land use dominates south of the M4 Motorway.

The adjacent plan provides an overlay of land uses sourced from the LEP and PITLUS.



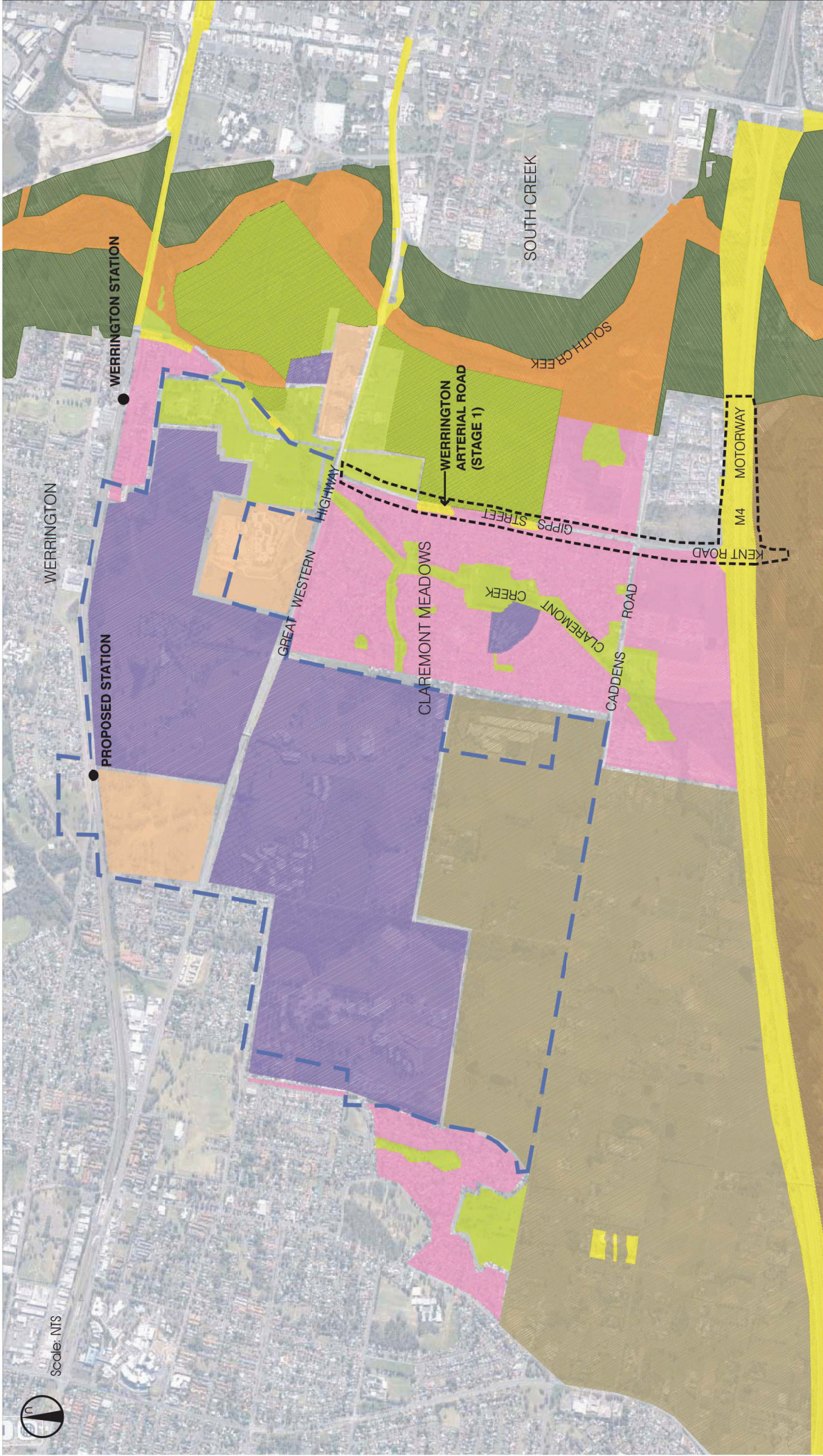


Figure 2.1 - Land Use, showing Proposal Location



## 2.2 CONNECTIVITY/GIPPS STREET MASTER PLAN

The general area has limited pedestrian and cycle facilities. However, the Penrith Integrated Transport and Land Use Strategy has identified key pedestrian and cycleway links to compliment the existing network (see adjacent figure). Within this context, the proposal would provide a key cycleway link in a north-south axis servicing the residential are of Claremont Meadows and the new residential developments east of Gipps Street. Further, the proposal would greatly compliment connectivity to the development of the Gipps Street Master Plan as a major regional recreational facility.

The proposal would locate the shared path along the western verge to provide easy access from Claremont Meadows through the local street network. This approach compliments the PILLUS proposal and key crossing points to the recreational facility that would be provided at Fowler and Gipps Streets. Locating the shared path along the western verge would also enhance future connectivity to Werrington Station once the Werrington Arterial Road project is expanded to the north.

Towards the south of the project, the western alignment minimizes any conflicts with the motorway on/off-load ramps. At this location, the shared path slightly diverges west to cross the motorway via a new dedicated bridge. The diversion allows the potential expansion of the Werrington Arterial southwards.

There are two existing pedestrian links which would be retained to ensure urban permeability, one at San Diego Street and the other off from Falcon Crescent.



# WERRINGTON ARTERIAL ROAD - STAGE 1



## legend

- █ Bikeways (PITLUS)
- █ Footpath Proposed (PITLUS)
- █ Footpath Existing (PITLUS)
- █ Key link



Gipps Street Site Masterplan

Figure 2.2 - Pedestrian and Cycle Connectivity

### 2.3 SCENIC AND LANDSCAPE VALUE

The adjacent Scenic and Landscape Value Map from Penrith's 2010 LEP identifies the area of the Gipps Street Masterplan as significant. In addition, the area to the south of the proposal that interfaces with the M4 Motorway has been identified as a green corridor.



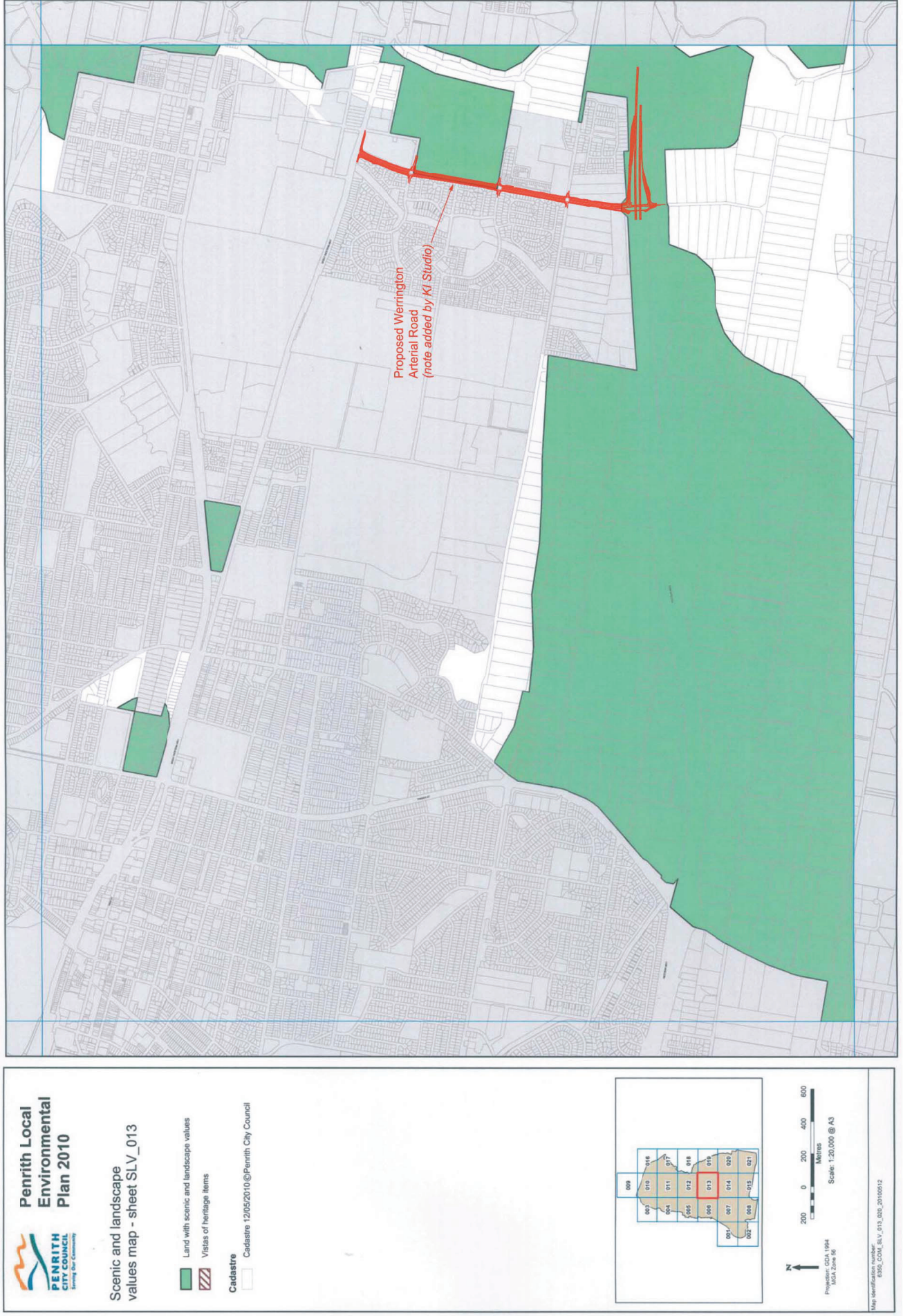


Figure 2.3 - Scenic and Landscape Value Map



## 2.4 SOIL LANDSCAPES, LANDFORM AND VEGETATION

This adjacent plan identifies the Soil Landscapes, topography, major ridgelines, drainage lines and prominent landforms. These elements influence the design in the following way:

**Soil landscapes-** i.e. the indigenous landscapes on natural soils, should drive the species selection for planting design, to ensure a sustainable landscape evolves, with low maintenance and appropriate for local fauna/bird species. However, the larger scaled indigenous trees can only be planted where space permits.

As per "Soil landscapes of the Penrith 1:100000 Sheet", the soil landscape of the road corridor, along the ridge is Blacktown.

**Blacktown Soil Landscape-** this represents gently undulating Wianamatta Shale areas, which originally were covered in woodland and open forest. Local relief 10-30m and slope generally gentler than 5% but up to 10%. The topography is broad rounded crests and ridges with gently inclined slopes. Whilst these areas are now almost completely cleared open-forest, there is opportunity to reinforce the original vegetation mixes where space permits.

Key tree species from the original woodland and open-forest were dominated by forest red gum (*Eucalyptus tereticornis*), narrow-leaved ironbark (*Eucalyptus crebra*), grey box (*Eucalyptus moluccana*) and spotted gum (*Eucalyptus maculata*).

### **Vegetation communities on site**

The existing vegetation communities on site have been mapped by Ecobiological, as illustrated overleaf. This qualifies the vegetation according to ecological significance. However, as we are dealing with visual impacts and landscape design, there are groups of trees that we would actually classify as high quality, such as the group shown as "low" quality, closest to the Great Western Highway.

The Ecobiological report recommends fencing all native vegetation on site to protect it from construction interference. There is one area of significantly high value Cumberland Plains Woodland to the south east of the road corridor, at the intersection of the arterial road and M4, on higher ground. This vegetation group will be largely undisturbed, and the low shrubs layer is of high quality.

Species recorded on site (Ecobiological) include:

*Angophora hispida*  
*Eucalyptus crebra*  
*Eucalyptus moluccana*  
*Eucalyptus tereticornis*  
*Melaleuca stypheloides*  
*Acacia implexa*  
*Acacia binervia*  
*Acacia fimbriata*  
*Kunzea ambigua*

Two trees with potential habitat are shown, and will unfortunately need to be removed due to the roadworks.

**Topography and Elevation** indicates the moulding of the landscape- the slopes, the ridgelines, saddles, valley forms, and drainage lines as shown. The road follows the ridgeline of existing Kent Rd. and Gipps Street; the site falls east towards South Creek, and west towards Claremont Creek.



# WERRINGTON ARTERIAL ROAD - STAGE 1

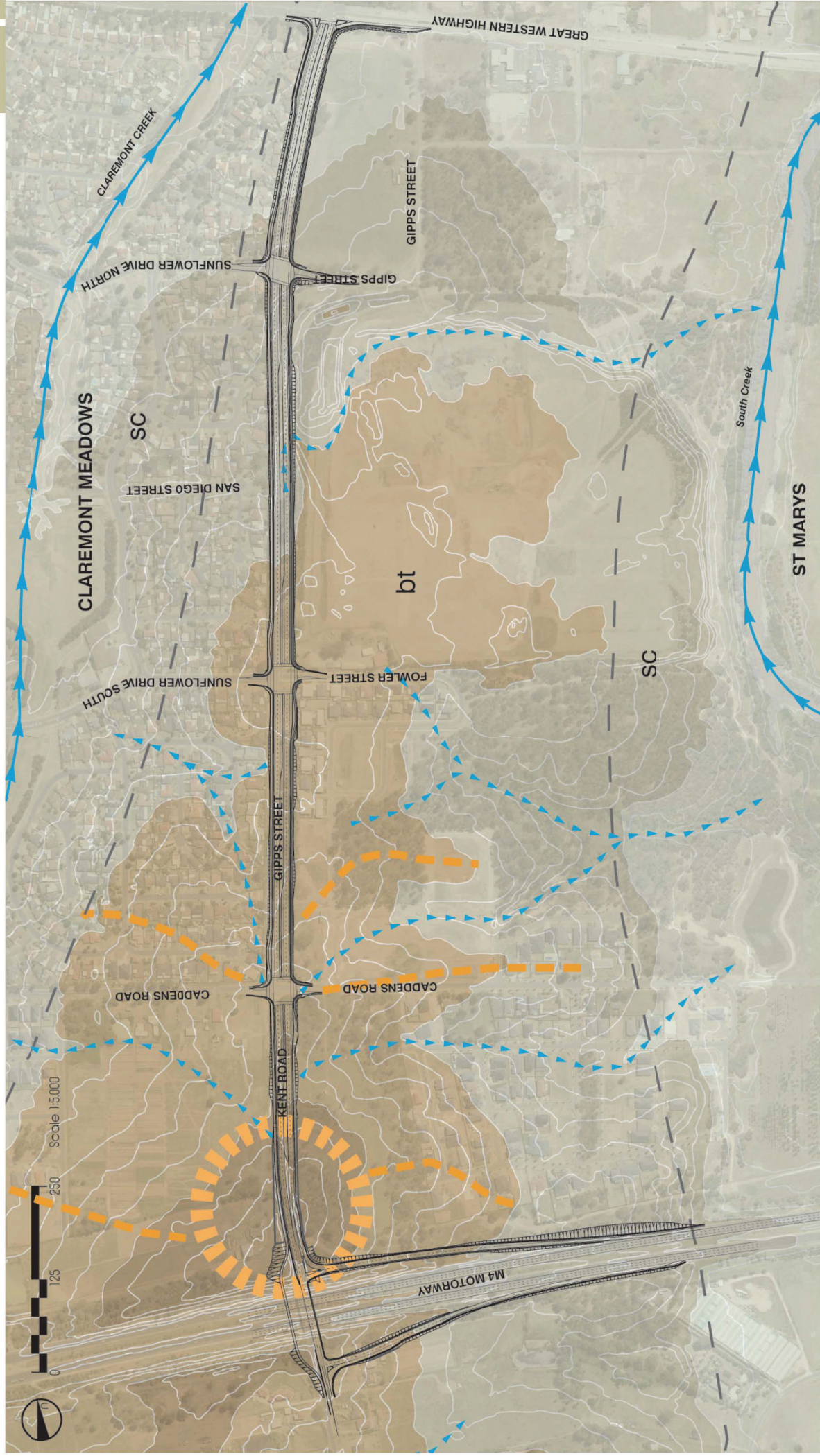
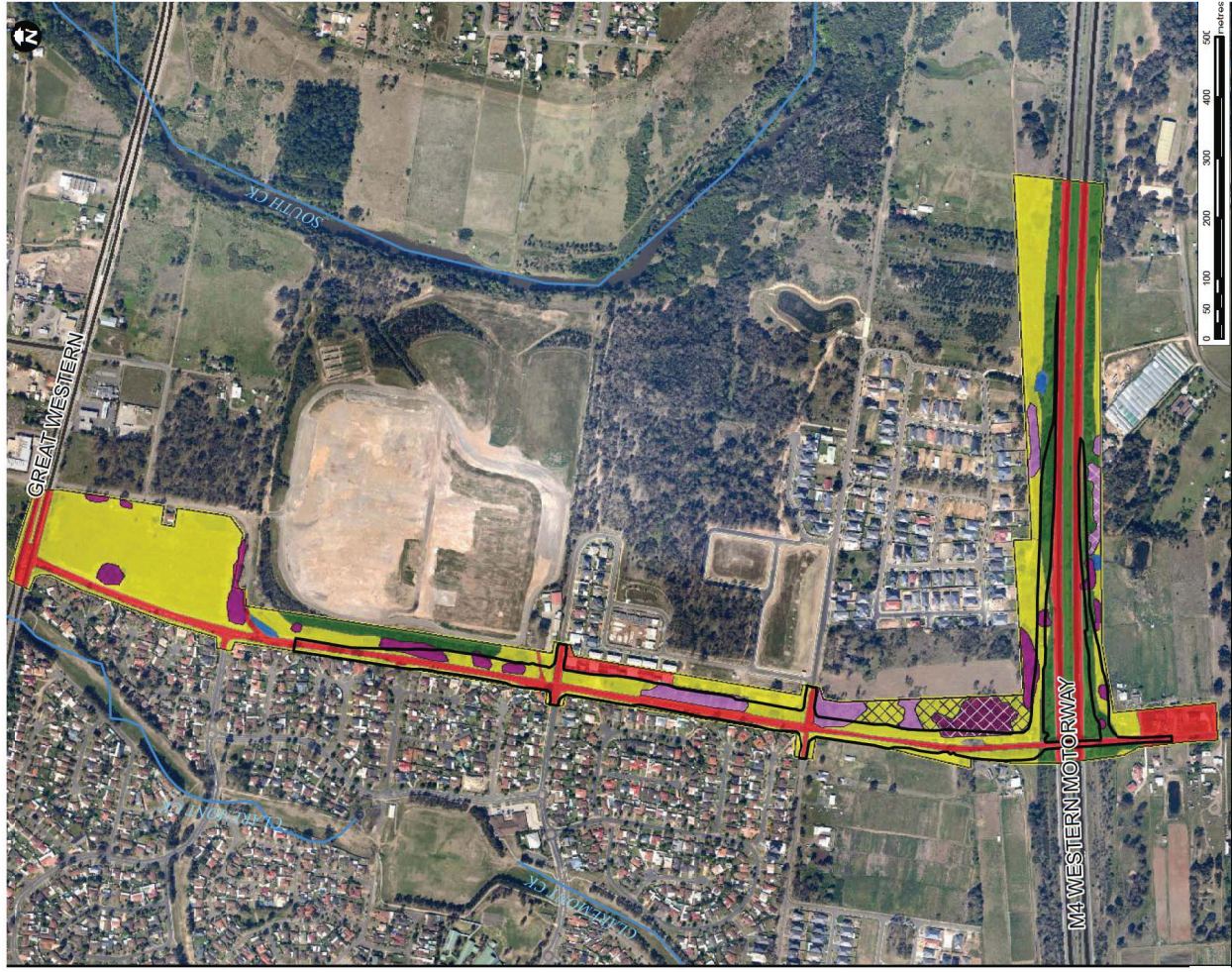


Figure 2.4 - Soil and Landform Map





**Vegetation communities- condition**

This map was prepared by Ecobiological and categorises the Cumberland Shale Plains Woodland vegetation according to high/medium/moderate of low condition.

It also illustrates the extent of exotic grasslands, exotic grasslands with potential habitat and native rehabilitation areas. They also mapped two potential habitat trees, which both will need to be removed for the project works to be undertaken.

These ratings of low/moderate to high are based on ecological values. As landscape architects, and in undertaking visual assessments, the trees or tree groups' contribution to visual amenity and sense of place also need to be considered as part of the design process.

**2.5 PHOTO JOURNEY**

The following plans (opposite and overleaf), provide an overview of the landscape character along and around the proposal site. The southern section has a stronger semi-rural character, whilst the northern section tends to be more suburban.

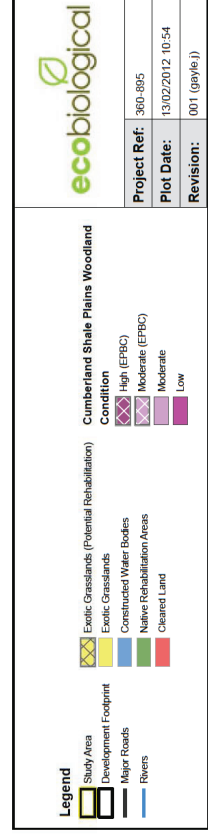
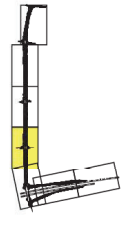
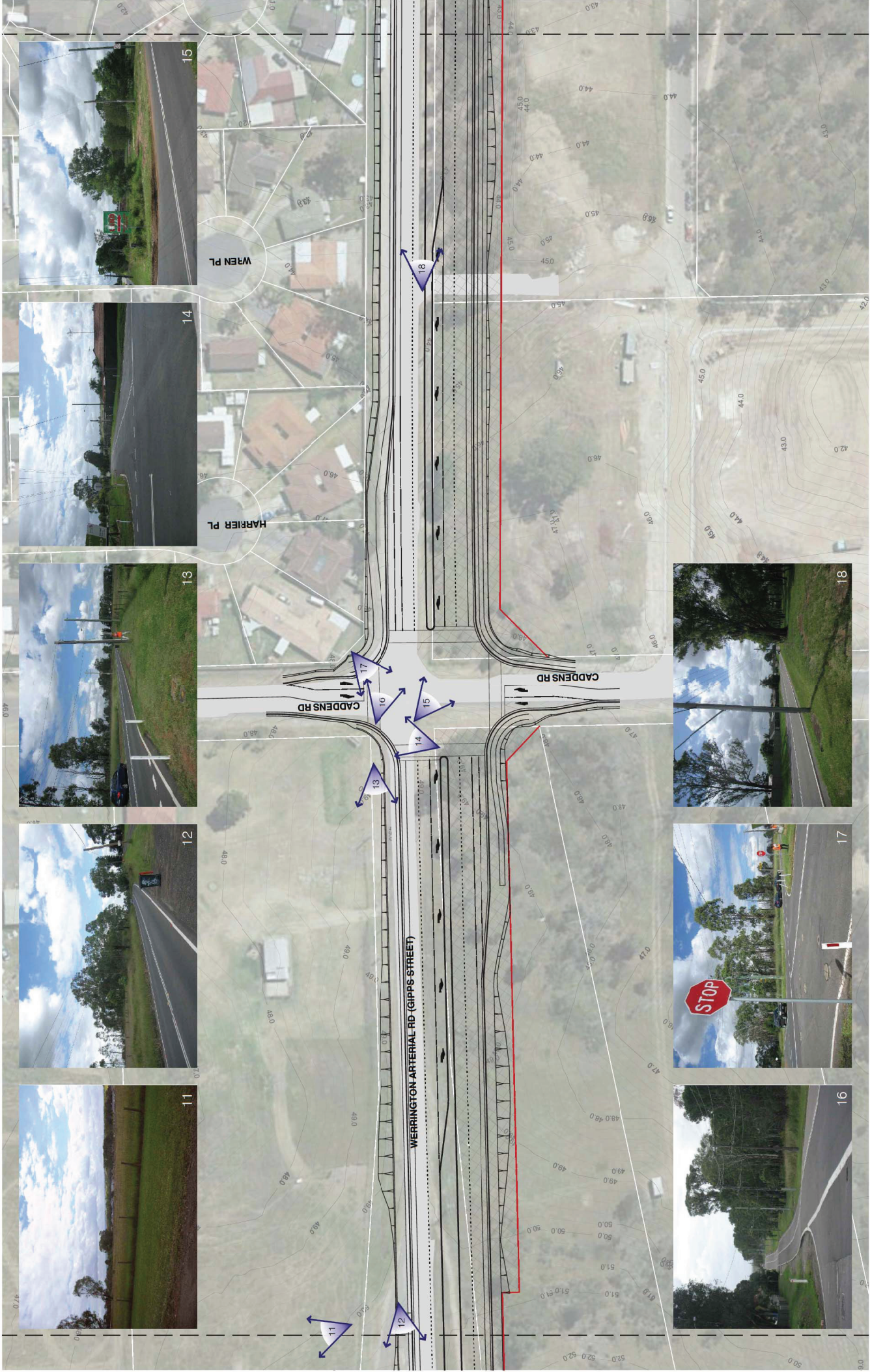


Figure 2.5 - Vegetation Communities







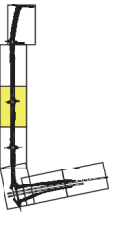
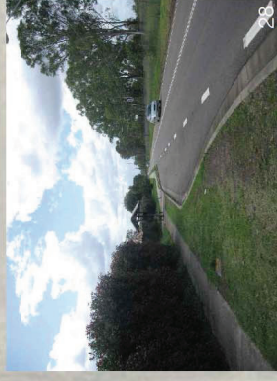
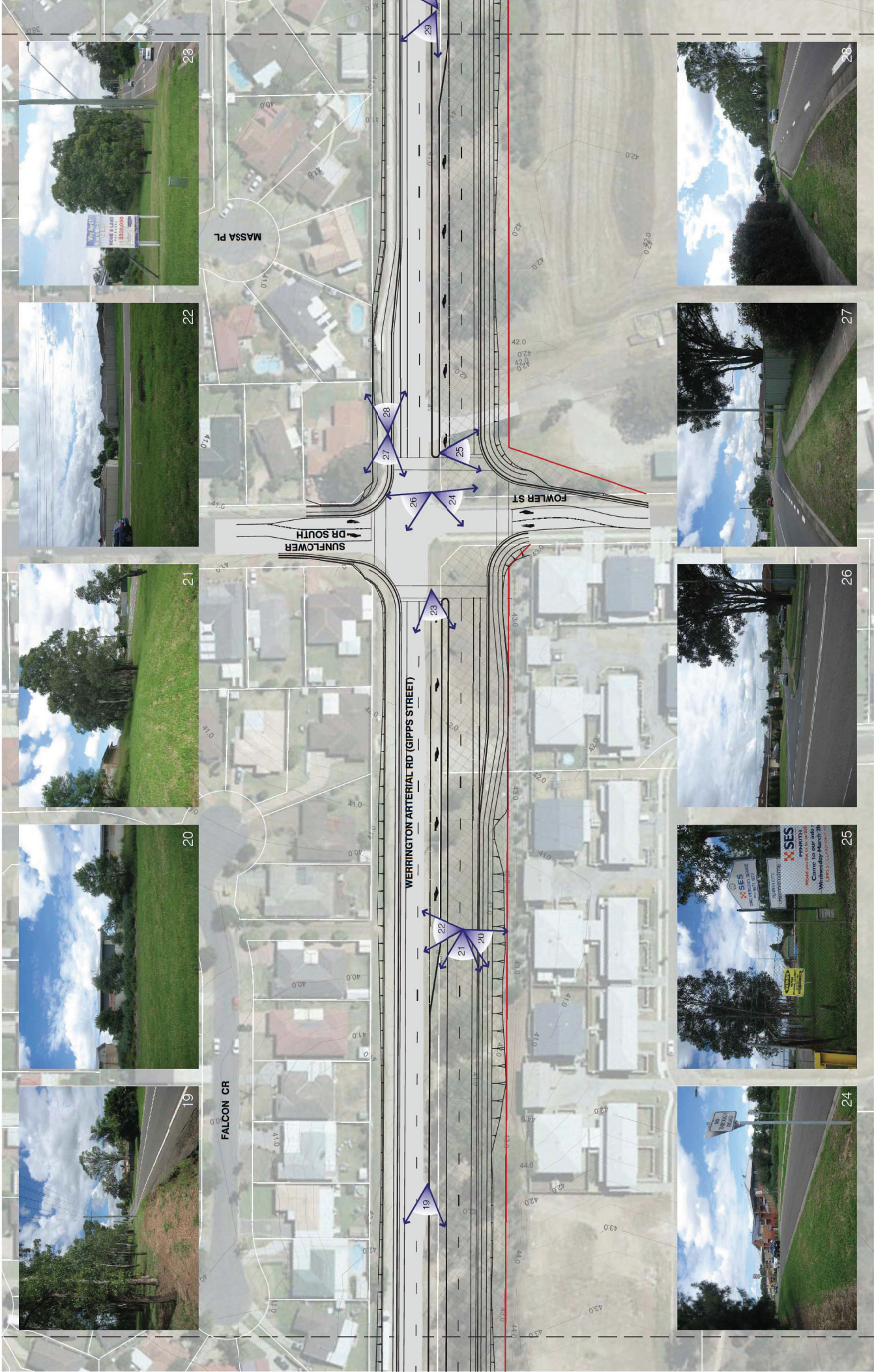


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SHEET 2





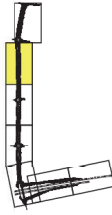
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SHEET 4

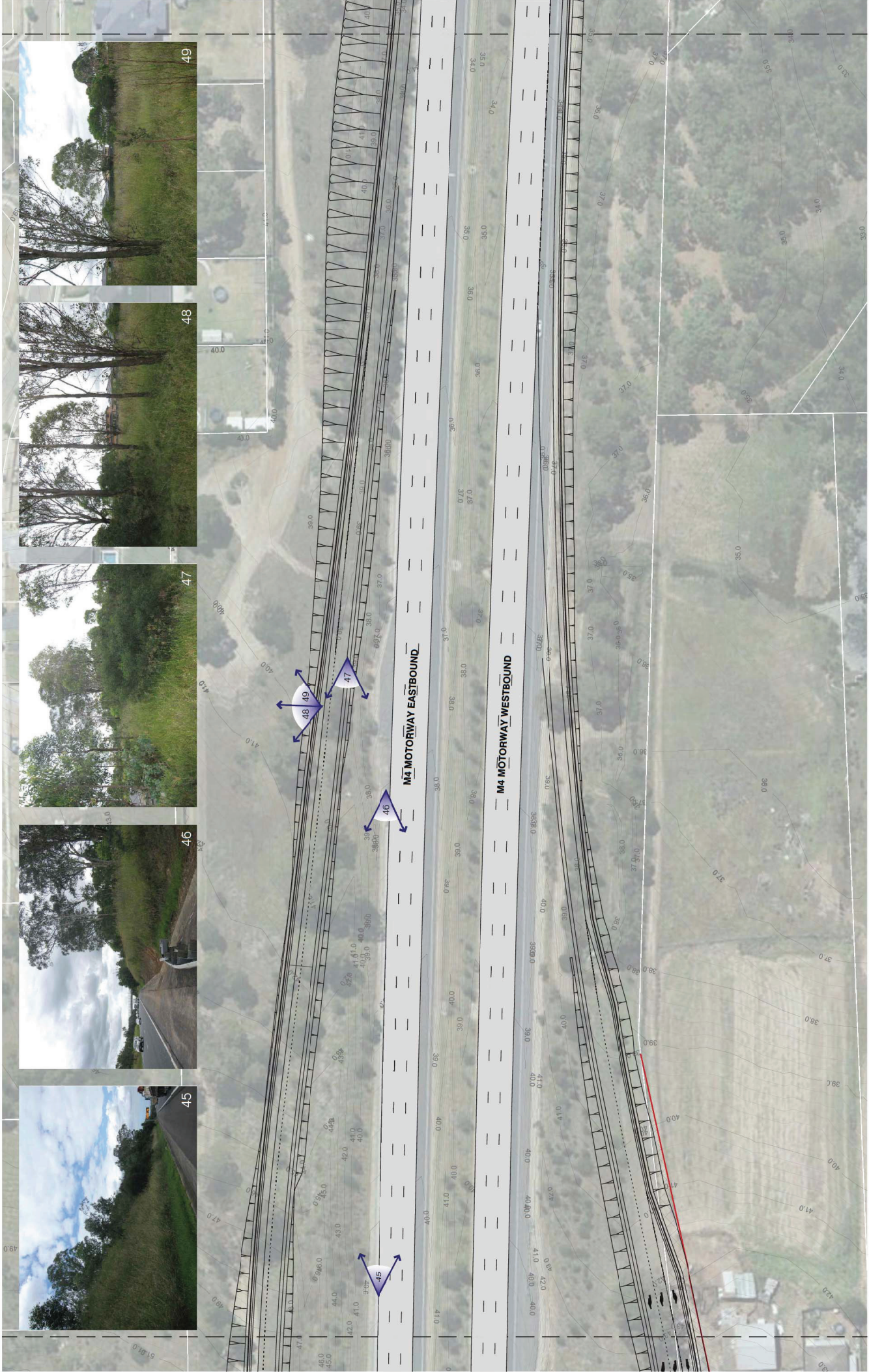




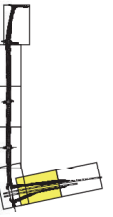
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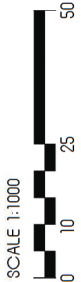
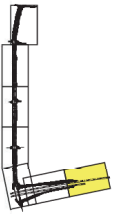
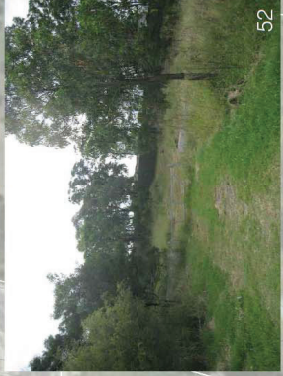
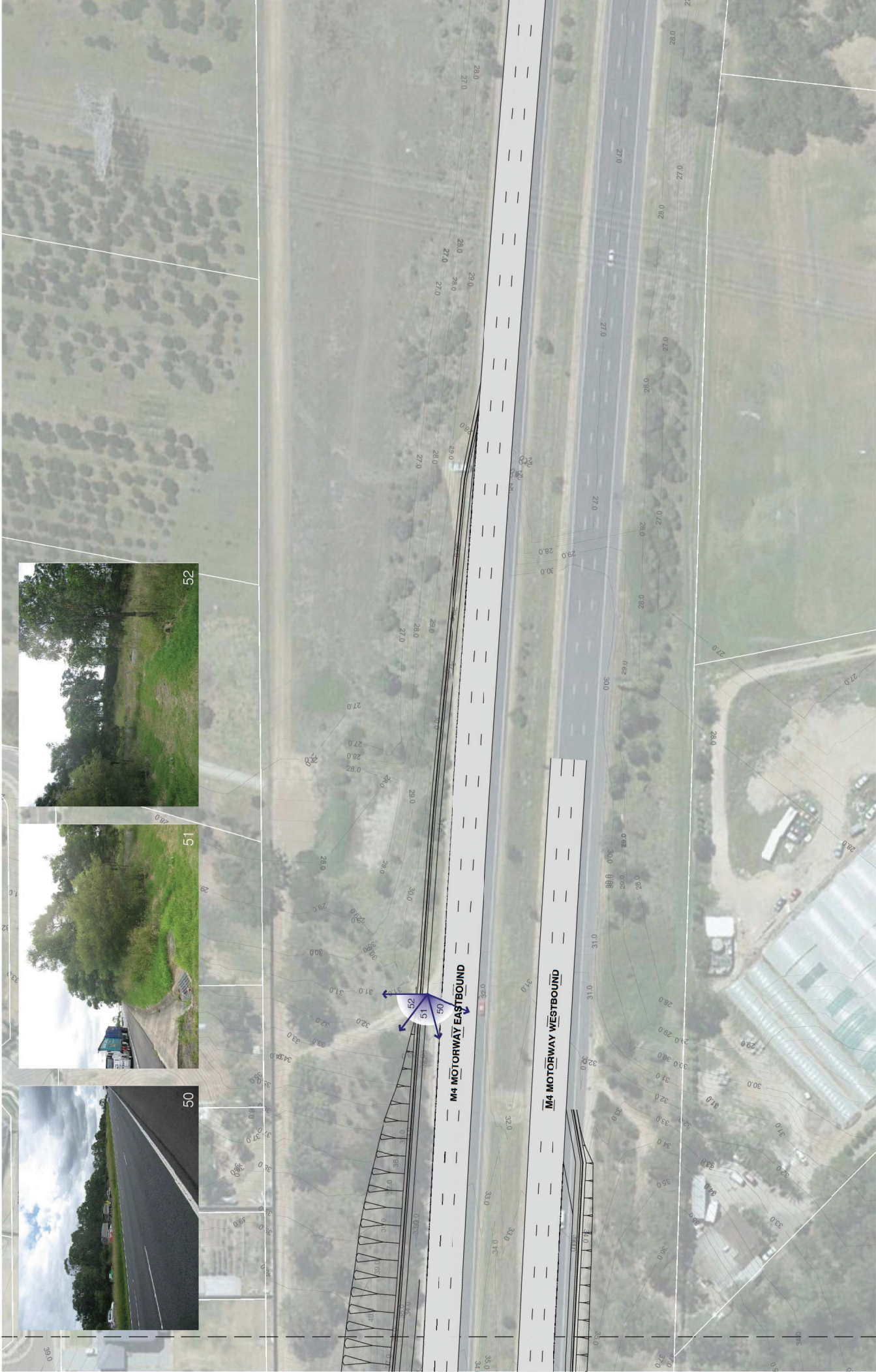




SCALE 1:1000









## 2.6 LANDSCAPE CHARACTER ZONES

Eight distinct landscape character zones have been identified along the route. These are identified from the combination of landuse, vegetation, landform and built form characteristics of the area.

### **Zone A – Semi-rural**

This zone is located on the southern portion of the project and is characterized by a semi-rural residential setting. South of the M4 Motorway, built form elements are exposed to Kent Road with modest single storey built form elements and commercial properties. North of the motorway, except for a single residence atop a prominent knoll, open pasture land with views towards the Blue Mountains define the sense of place. It should be noted that PTLUS has identified this land for residential land use in the future (see photos 01, 02, 10 and 11).

### **Zone B – Existing Housing Development**

Flanking most of the western verge, this zone comprises the suburb of Claremont Meadows and is predominantly characterised by freestanding single storey residential buildings. As the interface between the proposal and adjacent residences consists of solid and continuous backyard fencing, the visual exposure to the proposal is limited (see photos 14, 22, 25 through 35).

### **Zone C – Open Bushland**

To the southern end of the project and adjacent to the M4 corridor, is a pocket of open space with a strong bushland character. It is within this area that significant pockets of Cumberland Shale Plains Woodland have been identified (see photos 12 and 17).

### **Zone D – New Housing Development**

This area is currently in transition as part of a new housing development for Claremont Meadows. Double storey residences will flank the eastern verge of the widened road, with views from the second storey towards the proposal (see photos 20 and 24).

### **Zone E – Penrith SES Headquarters**

This small zone at the intersection of Fowler and Gipps Street houses the Penrith State Emergency Services. The property has a rather rural utilitarian character, which is in contrast with the surrounding land use (see photo 25).

### **Zone F – Proposed Sportsfields**

This area is currently open space with extensive grassed areas and stands of trees. A major recreation and parkland has been planned (Gipps Street Master Plan) by Penrith City Council. The project includes the incorporation of playing fields, hard courts, playground, parklands and other amenities as a regional recreational facility. This area has also been identified in Penrith's Local Environmental Plan 2010 as land with scenic and landscape value (see photo 34).

It should be noted however, that this area was previously a landfill location and there is limited scenic quality. Nevertheless, it is a valuable resource as landscape/open space and as the interface with the South Creek corridor.

### **Zone G – Open Grassland**

Directly adjacent to the Great Western Highway along the eastern verge is a large parcel of land with open grassland (see photos 40, 41 and 43).

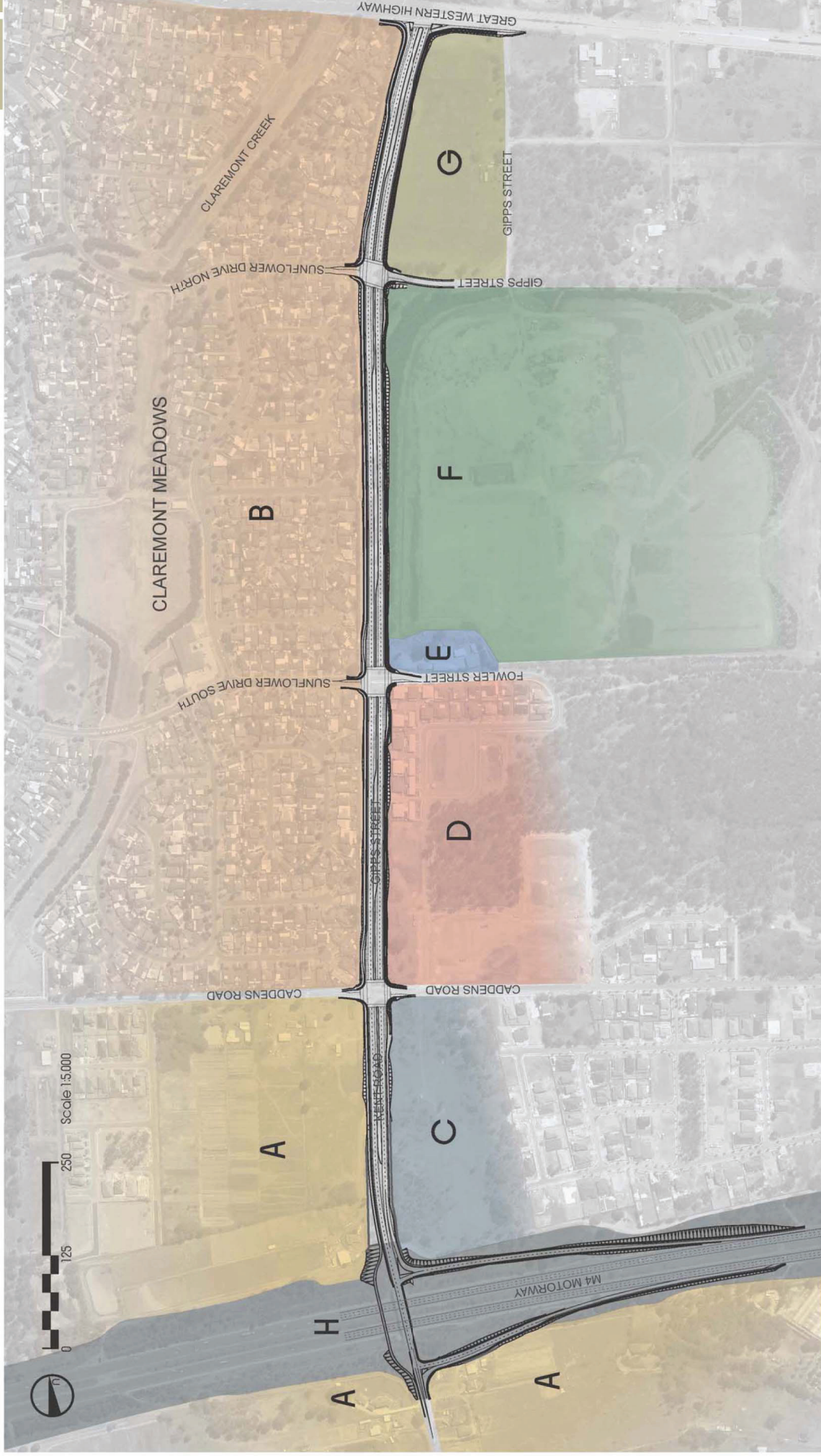
### **Zone H – M4 Motorway**

This zone of limited visual quality has also been identified in Penrith's Local Environmental Plan 2010 as land with scenic and landscape values. The wide road reserve with extensive green buffers provides a 'green' corridor adjacent to the motorway (see photos 04 and 05).

The impacts on these character zones are discussed in Section 5 of this report.



# WERRINGTON ARTERIAL ROAD - STAGE 1



## Legend

- ZONE A - Semi-Rural
- ZONE B - Existing Housing Development
- ZONE C - Open Bushland
- ZONE D - New Housing Development
- ZONE E - Perinth SES Headquarters
- ZONE F - Proposed Sportsfields
- ZONE G - Open Grass Lands
- ZONE H - M4 Motorway

## 2.7 KEY OPPORTUNITIES AND CONSTRAINTS

Key site opportunities and constraints are indicated on the following plans. In summary, they include:

### Opportunities

- Limiting the posted speed at 60km/hr to maximise retention of trees and new tree plantings
- Retention of backdrop vegetation
- Integration of cycle networks
- Integration with future park (Gipps Street Masterplan)
- Integration of Water Sensitive Design Initiatives
- Careful integration of noise walls to create an identity to the road corridor

### Constraints

- Impacts to Cumberland Plain Woodland
- Impacts to screening vegetation
- Limited width of western verge
- Private property impacts to existing fencing
- Above ground power lines to the eastern verge

### Sheet 2

#### Southern area - M4 Motorway to Caddens Road

Key opportunities are:

- Continuing Transit Boulevard character, especially to the median, with tree canopy and native grasses underneath;
- exploiting views to the west across valley to the Blue Mountains;
- retaining existing Cumberland Plains Woodland vegetation communities on eastern verge of road corridor;
- integrating WSUD (vegetated swale along western verge, to the south, past M4);
- integrating a green median to the north, with low scale native grasses and trees; and
- integrating possible noise walls as part of boundary fencing, should noise walls be determined for noise attenuation.

Key constraints include:

- Mitigating potential conflicts between cyclist and pedestrians at the bus stop, north of Caddens Road.

existing landscape character of eastern verge;

- strengthen Sunflower Drive South/Fowler Street intersection; and
- creating strong connectivity (pedestrian/cycle) from the road corridor into future parklands to the east.

It was not possible to integrate WSUD into the green median due to road drainage design criteria.

Key constraints are:

- Limited space on western verge for street trees;
- limited eastern verge for development of streetscape character and screening due to overhead power lines;
- existing metal fencing to streetscape - visually detracting; and
- existing streetscape devoid of trees, yet no above ground power lines.

### Sheet 4

#### Northern Section - Sunflower Drive North to Great Western Highway

Key opportunities are:

- Retaining and reinforcing the existing Cumberland Plains Woodland vegetation communities on eastern verge of road corridor;
- continuing Transit Boulevard character, especially to the median, with tree canopy and relocated date palms with native grasses underneath;
- integrating WSUD(vegetated swale along eastern verge) along future parkland boundary; and stormwater detention areas where shown, dependent upon soil properties;
- creating strong connectivity (pedestrian/cycle) from the road corridor into future parklands to the east; and
- implementing a retaining wall on western verge to allow path to align without creating a "dog leg" diversion in the verge.

Key constraints are:

- Tight verge on eastern side, restricting effective streetscape, with shared user path and potential noise wall; and
- the group of visually significant trees close to western verge, which should be retained if possible.

### Sheet 3

#### Central Section - Caddens Road to Sunflower Drive North

Key opportunities are:

- Retaining and reinforcing the existing Cumberland Plains Woodland vegetation communities on the eastern verge of road corridor;
- continuing Transit Boulevard character, especially to the median, with tree canopy and native grasses underneath;
- integrating WSUD (vegetated swale along eastern verge) along future parkland boundary; and stormwater detention areas where shown, dependent upon soil properties;
- integrating a green median to the north, with low scale native grasses;
- integrating possible noise walls as part of boundary fencing, should noise walls be determined for noise attenuation;
- reinforcing pedestrian access points to western verge, into the community of Claremont Meadows- towards Falcon Crescent and San Diego Street;
- utilising/relocating existing date palms where required to maintain

### Sheet 1

#### Southern area- M4 Motorway Ramps

Key opportunities are:

- Reinforcing Cumberland Plains Woodland vegetation, and utilising existing as skyline vegetation from motorway views;
- begin the Transit Boulevard character, especially with the beginning of the wide median and
- integrating WSUD (vegetated swale along western verge, to the south, past M4.

Key constraints are:

- Batter stabilisation required to batters steeper than 2.5:1 ( currently 2:1, on both sides of the motorway ramps; and
- proximity of residents- requiring vegetative screening.





PROVIDE VEGETATIVE SCREENING TO ROAD CORRIDOR

**legend**

Visual/ Spatial

- Visual detractors
- Exploit significant views through appropriate landscape design
- Potential Mitigation

- Streetscape devoid of trees and overhead power; opportunity to increase presence of trees through landscape design
- Introduce retaining walls to reduce environmental and visual impacts

Circulation/ Permeability/ Land Use

- Reinforce pedestrian link
- Introduce cyclelink connectivity
- Proposed bus stop

Drainage/ Vegetation

- Incorporate vegetated swale
- Existing vegetation to be protected; skyline trees
- Existing Date Palms and Photinia Hedge

Planting Themes

- Reinforce Cumberland Plains vegetation
- Introduce trees within green median to articulate roadscape and create boulevard
- Introduce vegetation screening to road corridor
- Batter stabilisation on steep cut & fills





**legend**

**Visual/ Spatial**

- Visual detractors
- Exploit significant views through appropriate landscape design
- Potential Mitigation

**Circulation/ Permeability/ Land Use**

- Reinforce pedestrian link
- Introduce cyclelink connectivity
- Proposed bus stop

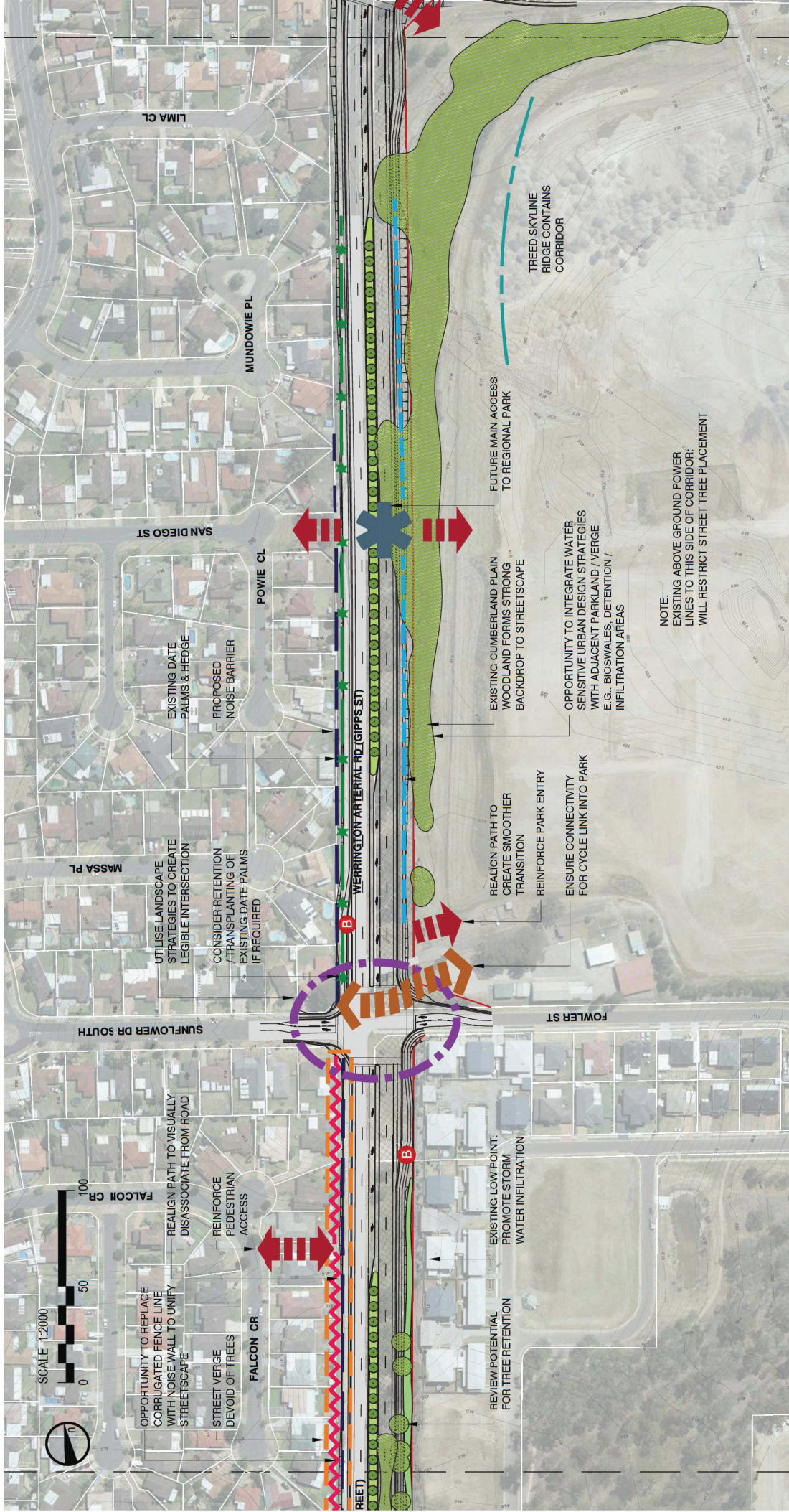
**Drainage/ Vegetation**

- Incorporate vegetated swale
- Existing vegetation to be protected; skyline trees
- Existing Date Palms and Photinia Hedge

**Planting Themes**

- Reinforce Cumberland Plains vegetation
- Introduce trees within green median to articulate roadscape and create boulevard corridor
- Introduce vegetation screening to road
- Batter stabilisation on steep cut & fills





**legend**

Visual/ Spatial

- Visual detractors
- Exploit significant views through appropriate landscape design
- Potential Mitigation
- Streetscape devoid of trees and overhead power; opportunity to increase presence of trees through landscape design
- Introduce retaining walls to reduce environmental and visual impacts

Circulation/ Permeability/ Land Use

- Reinforce pedestrian link
- Introduce cyclelink connectivity
- Proposed bus stop

Drainage/ Vegetation

- Incorporate vegetated swale
- Existing vegetation to be protected; skyline trees
- Existing Date Palms and Photinia Hedge

Planting Themes

- Reinforce Cumberland Plains vegetation
- Introduce trees within green median to articulate roadscape and create boulevard corridor
- Introduce vegetation screening to road
- Batter stabilisation on steep cut & fills





**Legend**

**Visual/ Spatial**

- Visual detractors
- Exploit significant views through appropriate landscape design
- Potential Mitigation

- Streetscape devoid of trees and overhead power, opportunity to increase presence of trees through landscape design
- Introduce retaining walls to reduce environmental and visual impacts

**Circulation/ Permeability/ Land Use**

- Reinforce pedestrian link
- Introduce cyclelink connectivity
- Proposed bus stop

**Drainage/ Vegetation**

- Incorporate vegetated swale
- Existing vegetation to be protected; skyline trees
- Existing Date Palms and Photinia Hedge

**Planting Themes**

- Reinforce Cumberland Plains vegetation
- Introduce trees within green median to articulate roadscape and create boulevard corridor
- Introduce vegetation screening to road
- Batter stabilisation on steep cut & fills



## 03 OBJECTIVES AND PRINCIPLES

The Overall Objective is to create a “Transit Boulevard” character to this transit road, within the service constraints of the corridor- both under ground and above ground.

Key Objectives include:

- Develop a vision for the project that would guide the urban design treatment of future sections of this road with the aim to ensure corridor wide consistency;
- integrate the road works sensitively in its setting;
- contribute to the functioning and future character of the area, including Gipps Street Master Plan, WELL and other developments within the immediate proposal area;
- minimise visual impacts, particularly to adjacent residential areas; and
- contribute to the quality of the public domain for the community.

Key design principles include:

### Connectivity

- Locate shared path along western verge to improve connectivity to residential areas, Well precinct and minimise conflicts with motorway ramps;
- avoid pedestrian paths along the eastern verge. This will maximise green zones, make use of potential future facilities (Gipps Street Master Plan) and converge pedestrians to enhance safety / perception of safety;
- visually reinforce the existing pedestrian access points from Claremont Meadows to the shared paths as a way to improve legibility and sense of journey;
- minimise conflicts between bus stop and shared path users and improve the legibility for users in conflict situations;
- provide signalised pedestrian/cycle crossing points at Caddens Road, Fowler Street and Gipps Street; and

- visually reinforce the main axis of the Gipps Street Master Plan along the access point with San Diego Street. This will enhance the sense of place by visually linking the parkland with the local neighbourhood.

### Built form elements

- Allow the potential development of bus shelters to be integrated within the confined road corridor;
- integrate bus shelter facilities with noise walls where feasible to provide a more integral appearance of built form elements;
- introduce different paving material at bus stops to enhance legibility for cyclists but also to introduce textures, colours and a visually higher quality public domain;
- develop a fencing strategy that provides a variety of finishes facing private residences, as integrated elements with noise barriers;
- minimise shading impacts for local residences in the integration of noise barriers;
- limit height of noise wall to maximum 3 metres;
- limit extent of noise walls along local street networks by architecturally treating private residences where required;
- divert shared path horizontal/vertical alignment from road alignment where practical to enhance safety and mitigate the linear character of the roadway; and
- design noise barriers if required with a simple and ‘clean’ appearance and retain consistency in this treatment as part of the road’s visual character. The noise barriers will be a prominent element along the corridor. Avoid stepping, create a design that can easily be duplicated for the future expansion of the arterial road to ensure identity of the overall corridor.

### Landscape Design Elements

- Establish a “Transit Boulevard” landscape character, as per “Growth Centres Framework”, that has a treed median, (achievable with reduced road speed of 60kmph and higher kerb) and treed verges, where possible, taking into consideration any overhead power line restrictions.
- Re-establish screening vegetation at the on-load ramp and Gipps Street (northern verge);
- minimise impacts to backdrop vegetation (off-load ramp and main cutting western verge);
- introduce retaining walls to minimise impacts to Cumberland Plain Woodland;
- minimise impacts to western verge where established vegetation provides screening (north of Sun Flower Drive South);
- consolidate open space areas including WSUD initiatives along edge of proposed park;
- maximise vegetation screening south of Fowler Street along the eastern verge to minimise visual impacts to private residences within new development areas; and
- reinforce Cumberland Plains Woodland vegetation where feasible

It should be noted, that a number of the listed principles would act as mitigating strategies.



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## 04 CONCEPT DESIGN

The sign posted speed for this section of road will be 60km/hr due to the relatively closely spaced signalized intersection layout. This provides the opportunity to treat the roadside as a Transit Boulevard, maximizing planting opportunities and providing a distinctive character to the road.

A key feature of the boulevard character is the integration of street trees within the median and along the verges. In this case, the western verge would be planted with a mixture of medium and small scale street trees due to the limited verge width and to minimize overshadowing into private properties. Due to the median's limited width, an Eisholz type kerb or similar is proposed to allow the planting of trees.

### Connectivity

Signalised intersections are proposed at the Motorway off-load ramp and Kent Road, at Caddens Road, at Sun Flower Drive South / Flower Street and at Sunflower Drive North / Gipps Street. The proposed layout would ensure that the existing connectivity to Claremont Meadows is not compromised whilst easing construction phasing.

As aforementioned, the shared path is proposed along the western verge to provide effective connectivity to Claremont Meadows and the WELL precinct.



PHOTO VIEWPOINT A, looking south from beyond Sunflower Drive South, to Caddens Road





**Legend**

**Built Elements**

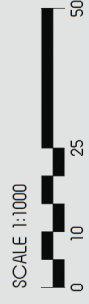
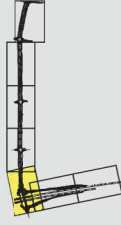
- Shared Path (2.5 - 3m wide)
- Footpath (1.5m wide)
- Noise Wall
- Retaining Wall

**Landscape Elements**

- Mass Planting Bed Type 1 (Mixed Canopy / Non Frangible)
- Mass Planting Bed Type 2 (Shrub Dominant / Frangible)
- Mass Planting Bed Type 3 (Native Grasses / Groundcovers)

**Water Sensitive Design**

- Bio-Swale
- Vegetated Swale
- Eucalypt Spot Planting
- Small Scale Street Trees
- Ficus
- Existing Palm Trees (to be relocated to median)
- Climbers





The landscape design follows the principles and objectives as outlined, and is summarized below with integrated plans, and sections for each zone:

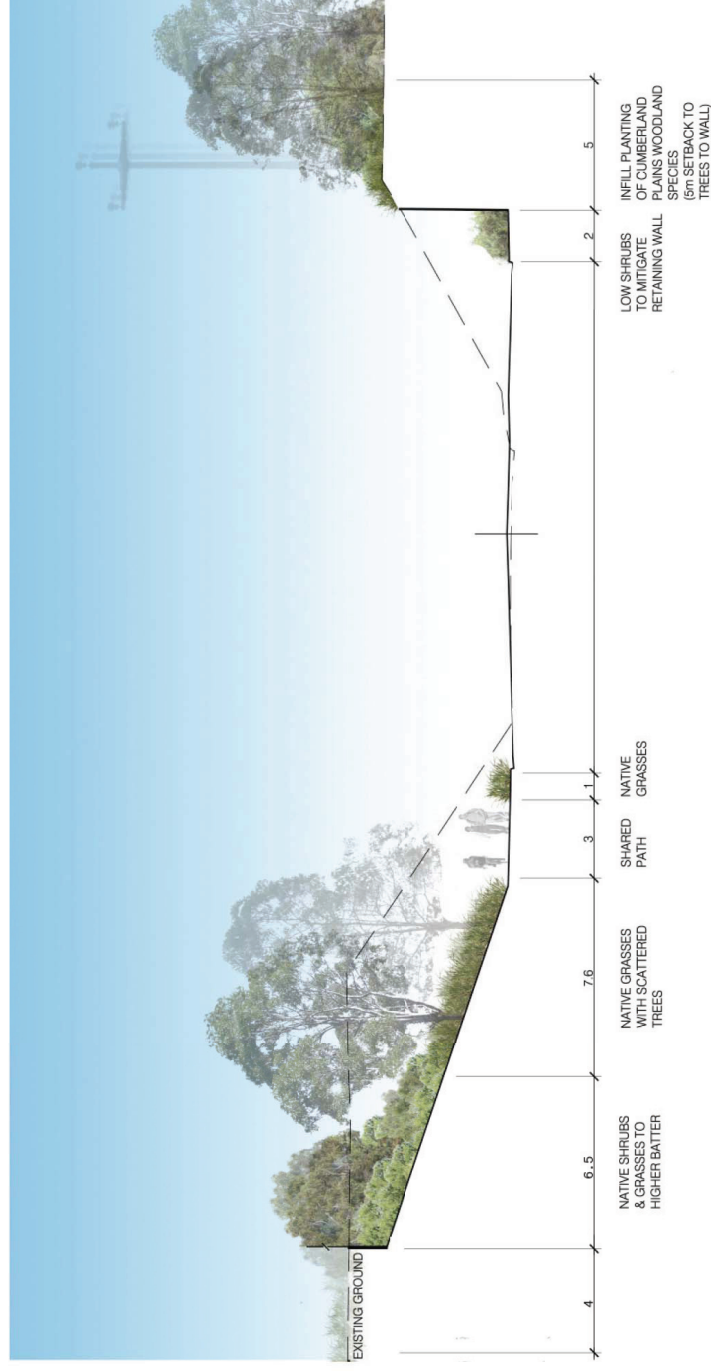
#### 4.1 INTEGRATED PLANS

##### M4 Motorway to Caddens Road Sheets 1, 2 (refer also Sections 360 and 480)

This section runs from the ridge line to the south of the project through rural lands, to the beginning of the suburban development on the western verge. The area to the west is rural and affords views across to the mountain range; and east to rural landscape. Some of these views, in the vicinity of the existing access road are protected in the design, the other areas have a higher need for future screening against future residences. Key landscape design proposals include:

- Planting design that respects the need for screening future residences, and provides areas of low scale shrub screening against the new retaining wall, contrasted with areas of native grasses with an upper canopy of scattered, small scale indigenous trees.
- Treating the cutting area to the south with native grasses/scattered trees on the west on the batter, and on the east with low shrubs against the new retaining wall. Above the retaining wall there will be a need to infill disturbed areas with planting of shrubs and grasses. Shrub planting is also proposed to the higher slopes of the batter, against the new retaining wall on the west.
- Rehabilitation of the native grasses beyond the corridor to the east, as recommended in the Ecobiological Report where shown on the drawing, as a means of offsetting the clearing of Cumberland Plains vegetation for the project.
- The beginning of the Transit Boulevard landscaped median character.

Above ground power lines will be re-installed on the eastern verge, where they currently are; it is presumed that the setback can be beyond the project corridor, given the tightness of the space and safety clearances required.



SECTION AT CHAINAGE 360



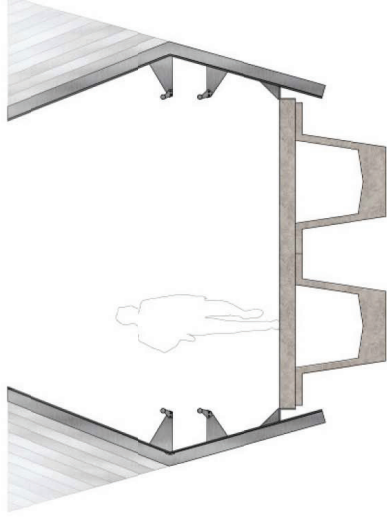
## Pedestrian Overbridge

At the M4 Motorway, a new shared path footbridge would be proposed west of the existing bridge. The structure is situated so as to allow the future duplication of the existing road bridge and is conceived as a twin precast Super T superstructure with a central pier aligned with the existing bridge.

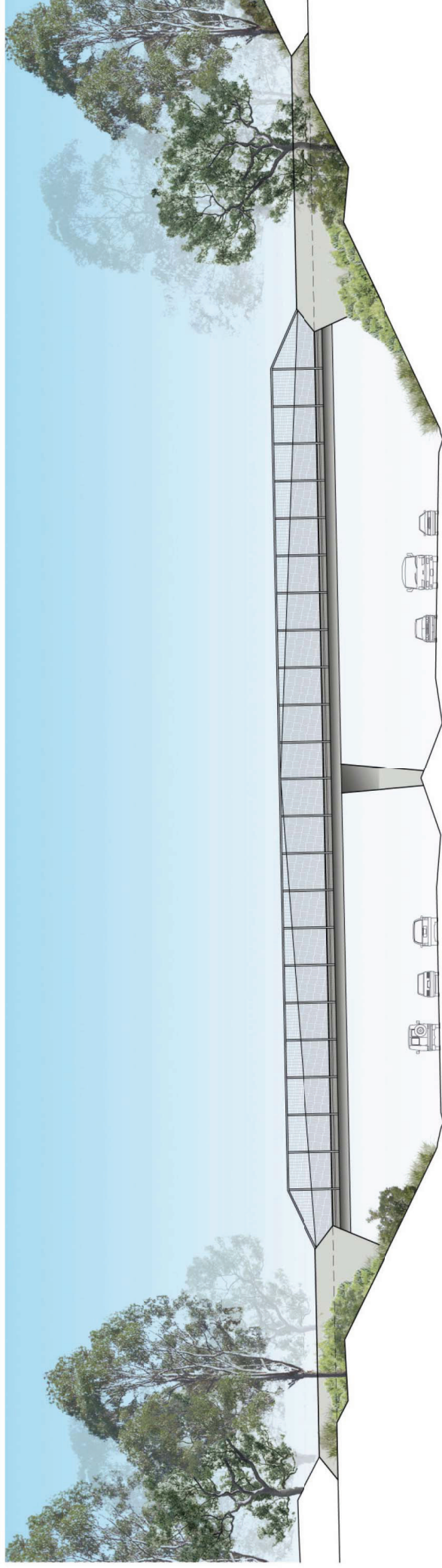
Safety screens would be incorporated into the structure with rails, balustrades and lighting fully integrated with the screen component.

Although the new bridge would cross a motorway corridor, the area's scenic quality as identified in Penrith's LEP makes it unsuitable for large format advertising. Hence, such approach is not recommended.

The existing bridge would be slightly modified by integrating traffic barriers to each side.



PEDESTRIAN OVERBRIDGE SECTION



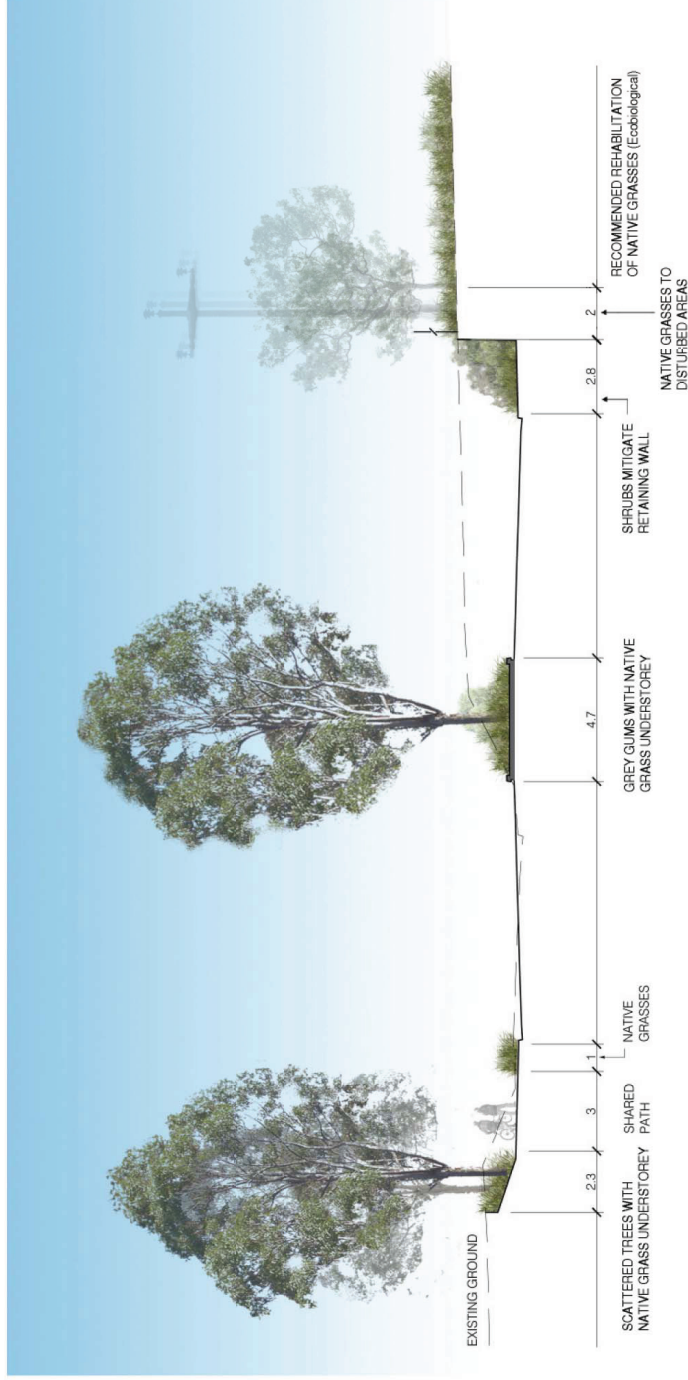
PEDESTRIAN OVERBRIDGE ELEVATION



Caddens Road to Sunflower Drive South  
 Sheets 2, 3 ( refer to Sections 760 and 1000)

This section has existing residences along the western verge and future residential proposed to the eastern verge for the southern half, with residences on higher ground, perched above the road corridor to the northeastern verge, up until Fowler Street. Key landscape design proposals include:

- Dense planting to eastern verge where housing and future housing is perched above the road corridor;
- Areas of native grass with scattered Cumberland Woodland Plains shrubs, grasses and small scale interspersed trees to the eastern verge (under overhead power lines) ;
- Wide, landscaped "Boulevard" median with street trees (*Eucalyptus punctata*, Grey Gum) , and understorey of low shrubs to mitigate headlight glare, and native grasses;
- Climbers to noise wall (if required) adjacent the bus stop near Caddens Road;
- Integration of adjacent pathway from Falcon Crescent to Werrington Arterial Road, requiring subtle grades to transition footpaths;
- Opportunity to integrate a bio-filtration area on the eastern verge, in front of the existing houses, beside the footpath, to assist in cleaning stormwater prior to releasing it into the piped system or further vegetated swales;
- With above ground power lines on the eastern verge, the tree planting will need to be low, maximum 5-6 metres high. Species proposed is *Angophora hispida*, which would complement the Cumberland Plains woodland species, and *Eucalyptus ficifolia*, Red Flowering Gum.



SECTION AT CHAINAGE 480





**Legend**

**Built Elements**

- Shared Path (2.5 - 3m wide)
- Footpath (1.5m wide)
- Noise Wall
- Retaining Wall

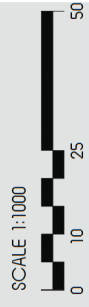
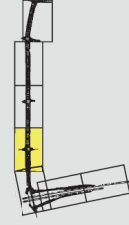
**Landscape Elements**

- Mass Planting Bed Type 1 (Mixed Canopy / Non Frangible)
- Mass Planting Bed Type 2 (Shrub Dominant / Frangible)
- Mass Planting Bed Type 3 (Native Grasses / Groundcovers)

**Water Sensitive Design**

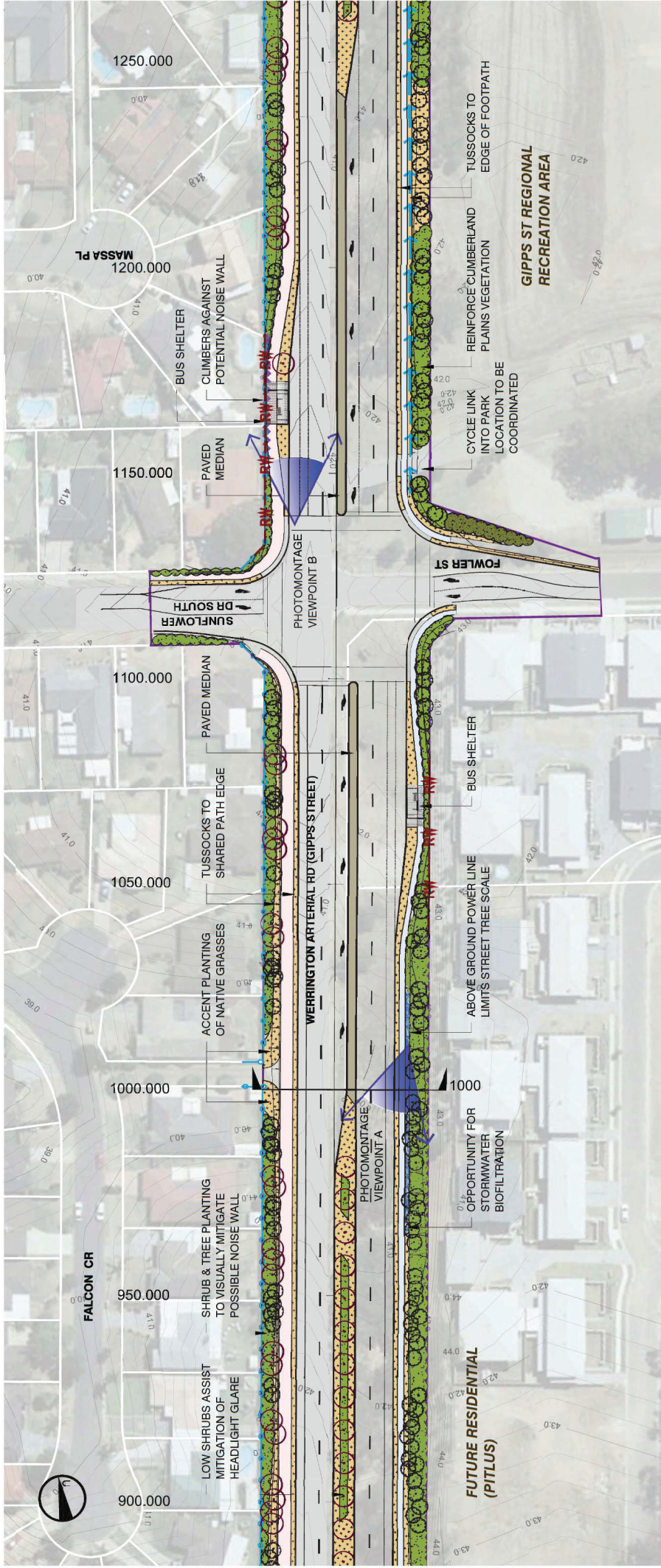
- Eucalypt Spot Planting
- Small Scale Street Trees
- Ficus
- Existing Palm Trees (to be relocated to median)
- Climbers

- Bio-Swale
- Vegetated Swale





# WERRINGTON ARTERIAL ROAD - STAGE 1



## Legend

### Built Elements

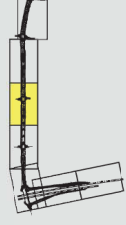
- Shared Path (2.5 - 3m wide)
- Footpath (1.5m wide)
- Noise Wall
- Retaining Wall

### Landscape Elements

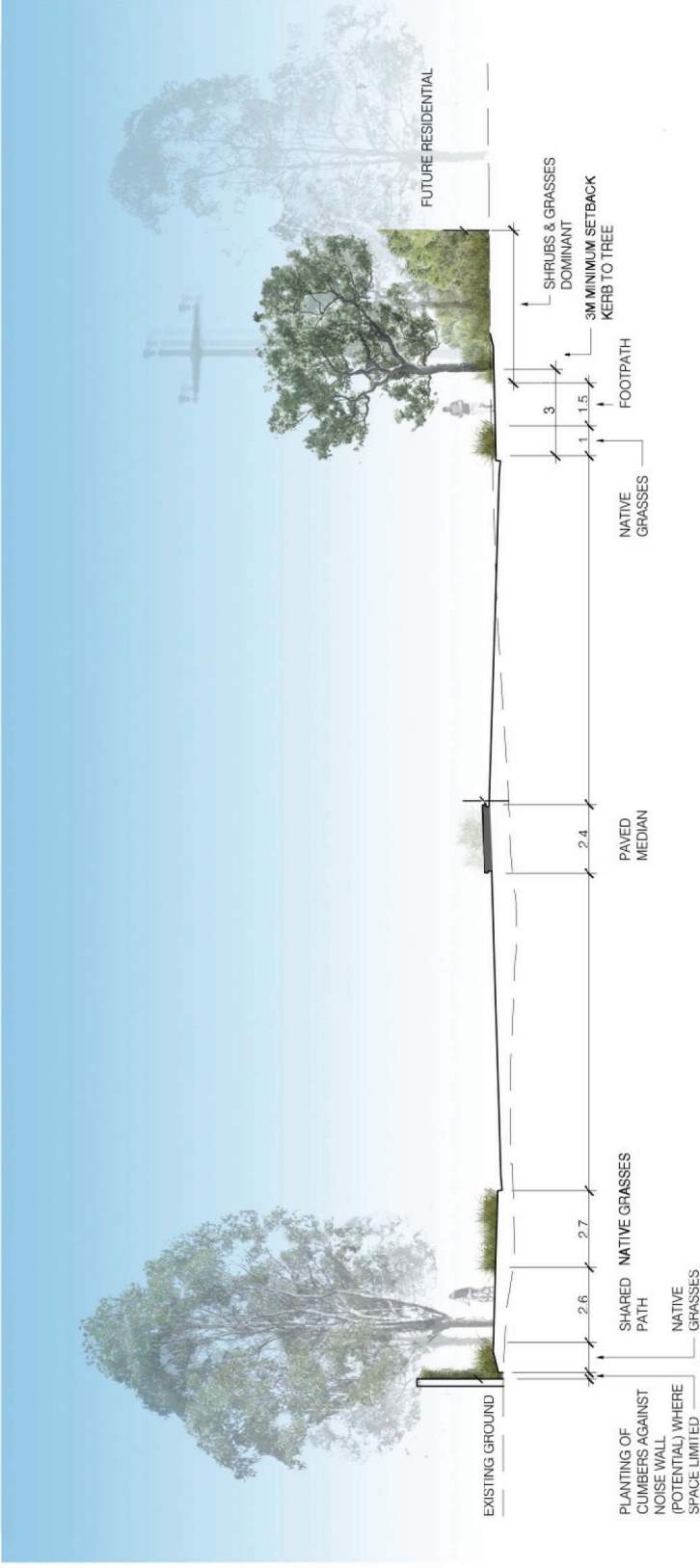
- Mass Planting Bed Type 1 (Mixed Canopy / Non Frangible)
- Mass Planting Bed Type 2 (Shrub Dominant / Frangible)
- Mass Planting Bed Type 3 (Native Grasses / Groundcovers)

### Water Sensitive Design

- Bio-Swale
- Vegetated Swale
- Eucalypt Spot Planting
- Small Scale Street Trees
- Ficus
- Existing Palm Trees (to be relocated to median)
- Climbers

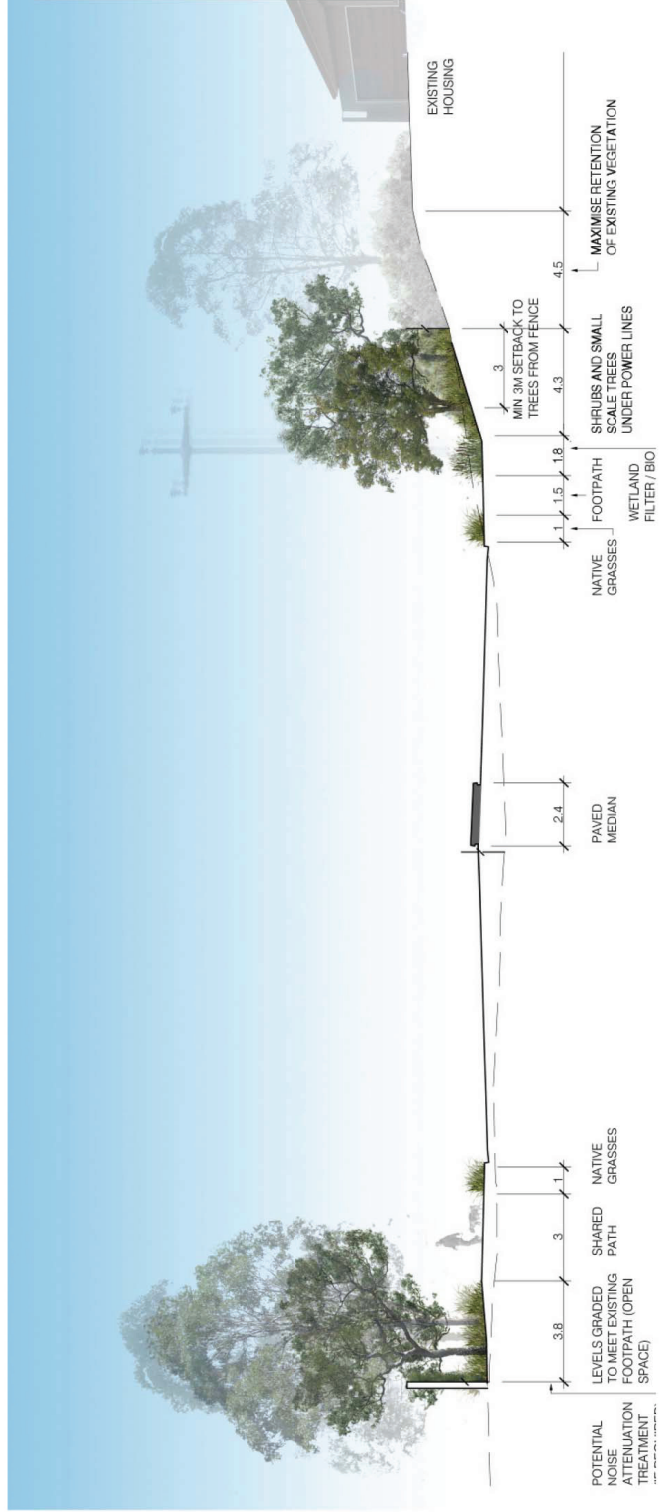






SECTION A1 CHAINAGE '160





SECTION AT CHAINAGE 1000





**Legend**

**Built Elements**

- Shared Path (2.5 - 3m wide)
- Footpath (1.5m wide)
- Noise Wall
- Retaining Wall

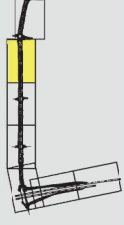
**Landscape Elements**

- Mass Planting Bed Type 1 (Mixed Canopy / Non Frangible)
- Mass Planting Bed Type 2 (Shrub Dominant / Frangible)
- Mass Planting Bed Type 3 (Native Grasses / Groundcovers)

- Eucalypt Spot Planting
- Small Scale Street Trees
- Ficus
- Existing Palm Trees (to be relocated to median)
- Climbers

**Water Sensitive Design**

- Bio-Swale
- Vegetated Swale



SCALE 1:1000







Sunflower Drive South to Sunflower Drive North  
Sheets 3, 4 ( refer also Section 1460)

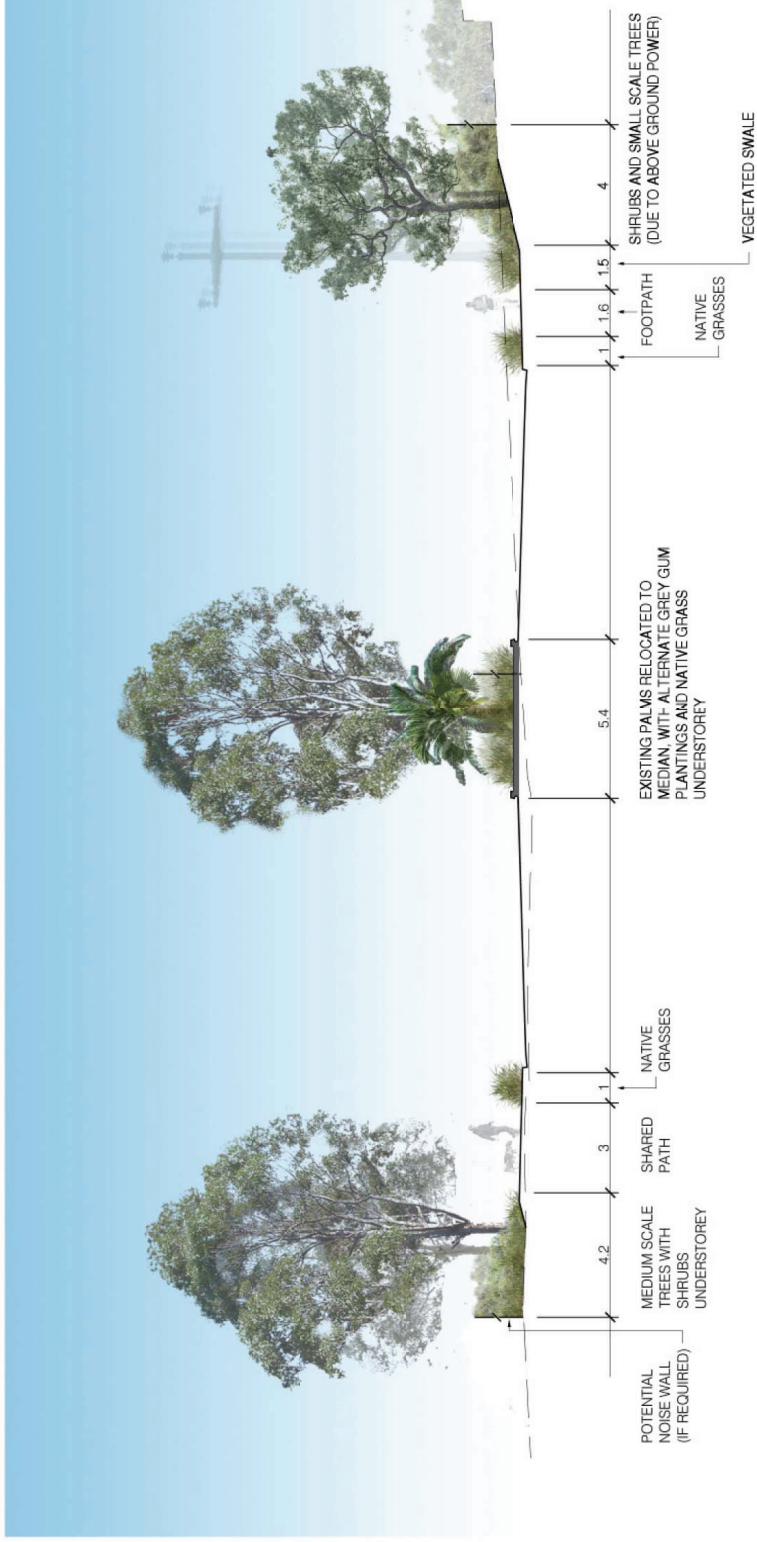
With existing residences lining the western verge, the east as comparison will be future parkland- the Gipps Street Masterplan, as illustrated in Section 2 of this report. Key landscape design proposals include:

- Shrub dominant planting to western verge where housing lines the road corridor, with addition of medium and small sized street trees to add shade to the verge;
- Accent planting of *Ficus* with native grasses ( as per accent planting shown in the Gipps Street Masterplan) or distinctive Cumberland Woodland Plains trees to the future park entrance;
- Boulevard median character utilising the transplanted existing date palms, with alternate plantings of *Eucalyptus punctata*, Grey Gum, to provide a unique landscape character, with understory of native grasses;
- Climbers to noise wall (if required) adjacent the bus stop near Sunflower Drive South ;
- Integration of adjacent pathway from San Diego Street to Werrington Arterial Road, requiring subtle grades to transition footpaths;
- Opportunity to integrate bio-filtration areas with vegetated swales on the eastern verge, beside the footpath, adjacent the future parklands to assist in cleaning stormwater prior to releasing it into the piped system or further vegetated swales;
- With above ground power lines on the eastern verge, the tree planting will need to be small scale, maximum 5-6 metres high. Species proposed is *Angophora hispida*, and *Banksia integrifolia* which would complement the Cumberland Plains woodland species, with accents of *Eucalyptus ficifolia*, Red Flowering Gum.



PHOTOMONTAGE B. View looking north from Sunflower Drive South.





SECTION AT CHAINAGE 1460





### Sunflower Drive North to Great Western Highway Sheet 5

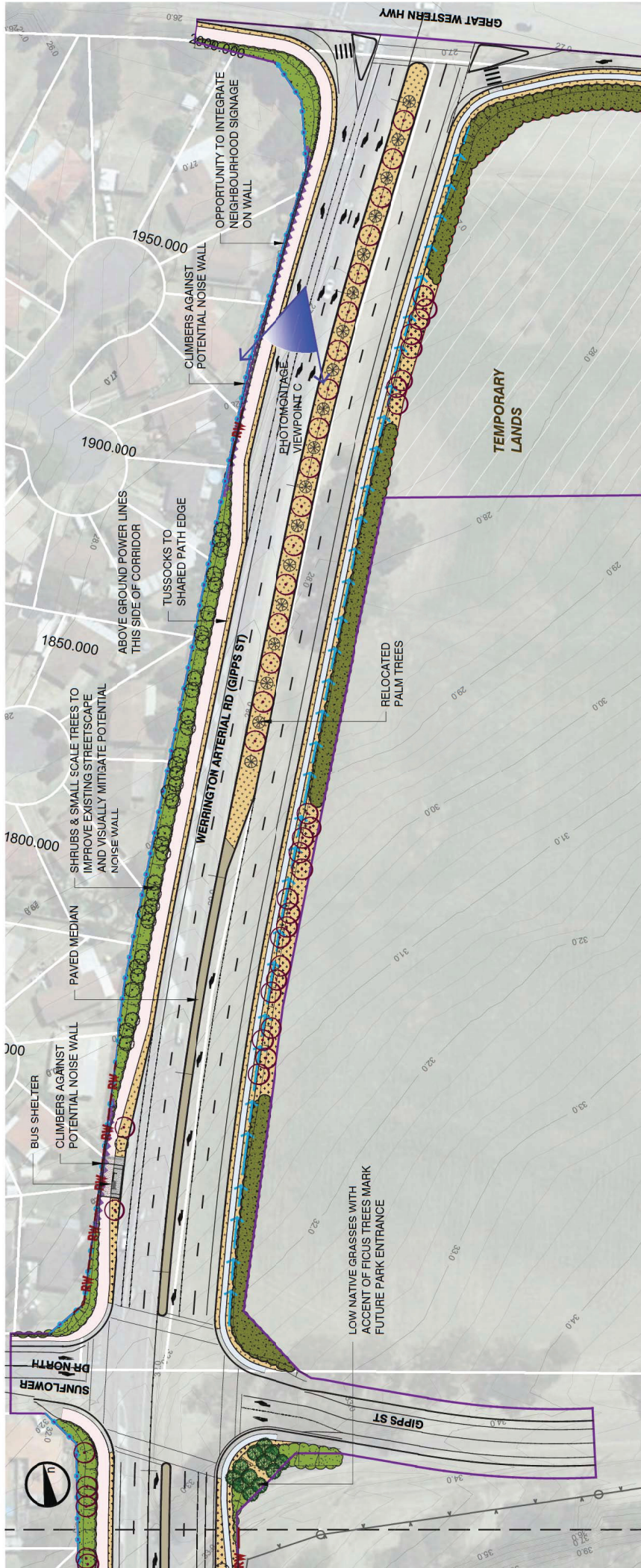
This section is similar to the previous section, with existing residences lining the western verge, and the east as comparison is open grassland, as illustrated in Section 2 of this report. Key landscape design proposals include:

- Shrub dominant planting to western verge where housing lines the road corridor, with addition of medium sized street trees to add shade to the verge;
- Accent planting of native grasses with stands of either Deciduous trees ( as per Gipps Street Masterplan), distinctive Cumberland Woodland Plains trees or *Ficus* trees to the future park entrance on the corner of Werrington Road Arterial and Gipps Street;
- Boulevard median character utilising the transplanted existing date palms, with alternate plantings of *Eucalyptus punctata*, Grey Gum, to provide a unique landscape character, with understory of native grasses;
- Climbers to noise wall (if required) adjacent the bus stop near Sunflower Drive North ;
- Planting of low native grasses/ tussocks between kerb and shared path to provide visual definition.
- Opportunity to integrate bio-filtration areas with vegetated swales on the eastern verge, beside the footpath, adjacent the future parklands to assist in cleaning stormwater prior to releasing it into the piped system or further vegetated swales;
- Opportunity to evaluate potential to integrate a water quality pond or bio- filtration area to assist with biological stormwater treatment for the road corridor and to add ecological value within the future parkland to the north east of the corridor, adjacent the Great Western Highway; and
- With above ground power lines on the western verge, the tree planting will need to be small scale, maximum 5-6 metres high. Species proposed is *Angophora hispida*, and *Banksia integrifolia* which would complement the Cumberland Plains woodland species, with accents of *Eucalyptus foefolia*, Red Flowering Gum.



PHOTOMONTAGE C. View looking south towards Sunflower Drive North.





**Legend**

**Built Elements**

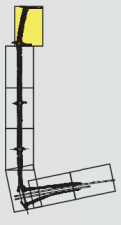
- Shared Path (2.5 - 3m wide)
- Footpath (1.5m wide)
- Noise Wall
- Retaining Wall

**Landscape Elements**

- Mass Planting Bed Type 1 (Mixed Canopy / Non Frangible)
- Mass Planting Bed Type 2 (Shrub Dominant / Frangible)
- Mass Planting Bed Type 3 (Native Grasses / Groundcovers)

**Water Sensitive Design**

- Bio-Swale
- Vegetated Swale
- Eucalypt Spot Planting
- Small Scale Street Trees
- Ficus
- Existing Palm Trees (to be relocated to median)
- Climbers



SCALE 1:1000

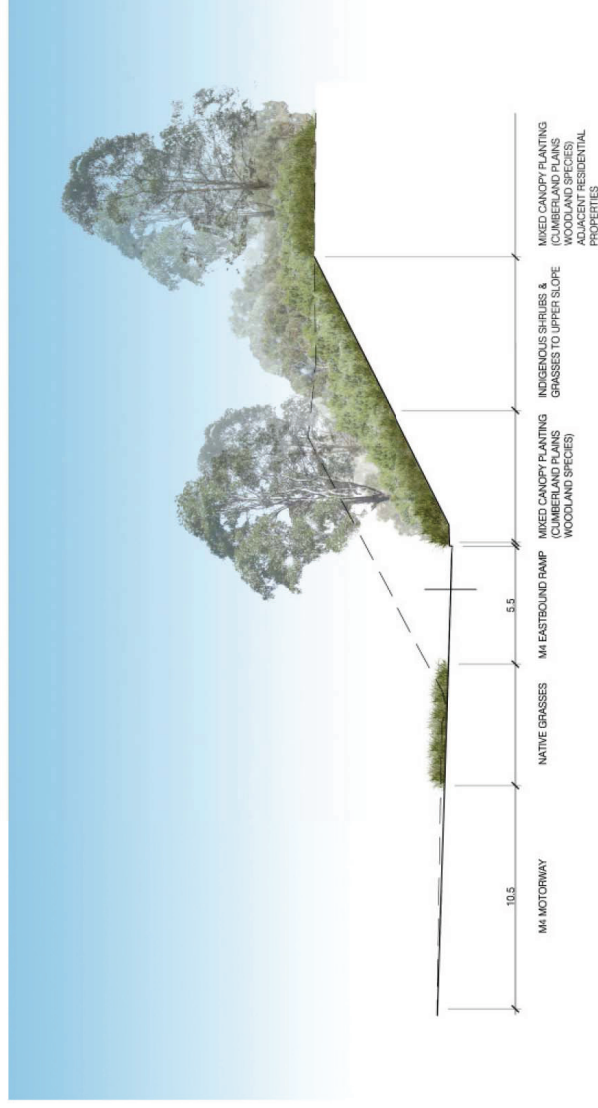




M4 ON-load and off-load ramps  
Sheets 6,7

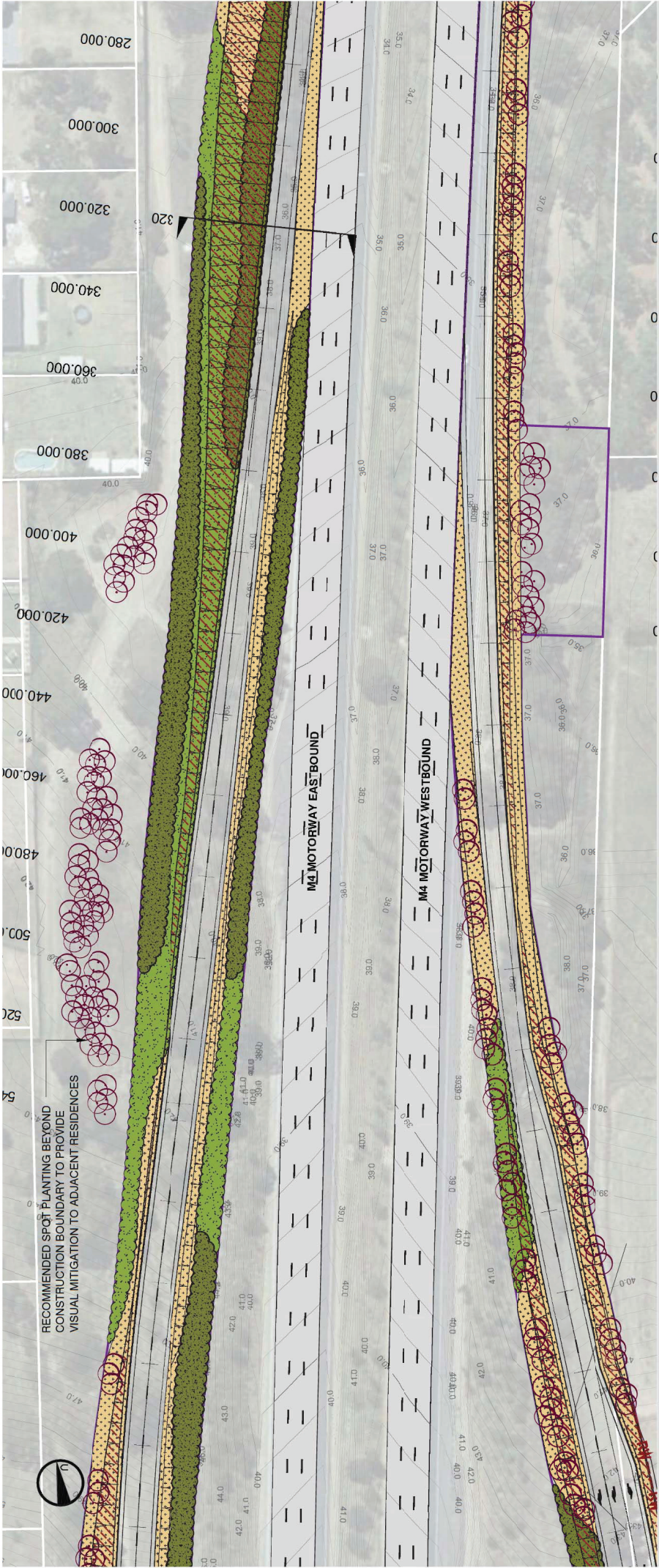
The landscape strategy for these areas is to mitigate any impacts to adjacent residences and re-establish Cumberland Plains woodland vegetation on the batters as shown. Key landscape design proposals include:

- Shrub dominant planting to western verge batters, with mixed canopy on the lower slope, and scattered plantings of *Eucalypts* between the top of the batter and the residential fencelines beyond;
- Low shrub planting to other areas, with drifts of native grasses as shown; and
- On the eastern verges, reinforce low scale native grassland, with scattered trees to allow spatial views across rural land.



SECTION AT CHAINAGE 320 - ONLOAD RAMP





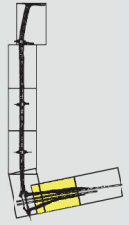
RECOMMENDED SPOT PLANTING BEYOND CONSTRUCTION BOUNDARY TO PROVIDE VISUAL MITIGATION TO ADJACENT RESIDENCES

**Legend**

- Built Elements**
- Shared Path (2.5 - 3m wide)
  - Footpath (1.5m wide)
  - Noise Wall
  - Retaining Wall

- Landscape Elements**
- Mass Planting Bed Type 1 (Mixed Canopy / Non Frangible)
  - Mass Planting Bed Type 2 (Shrub Dominant / Frangible)
  - Mass Planting Bed Type 3 (Native Grasses / Groundcovers)

- Water Sensitive Design**
- Bio-Swale
  - Vegetated Swale
  - Eucalypt Spot Planting
  - Small Scale Street Trees
  - Ficus
  - Existing Palm Trees (to be relocated to median)
  - Climbers



SCALE 1:1000







**Legend**

**Built Elements**

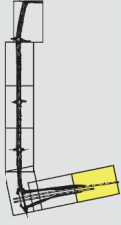
- Shared Path (2.5 - 3m wide)
- Footpath (1.5m wide)
- Noise Wall
- Retaining Wall

**Landscape Elements**

- Mass Planting Bed Type 1 (Mixed Canopy / Non Frangible)
- Mass Planting Bed Type 2 (Shrub Dominant / Frangible)
- Mass Planting Bed Type 3 (Native Grasses / Groundcovers)

**Water Sensitive Design**

- Bio-Swale
- Vegetated Swale
- Eucalypt Spot Planting
- Small Scale Street Trees
- Ficus
- Existing Palm Trees (to be relocated to median)
- Climbers





## Above Ground Power Relocation

Position of above ground power lines have great impact on landscape/streetscape character, as they restrict planting of effective street trees. Currently, the existing above ground powerlines run along the eastern verge and require to be relocated from Gipps Street to the M4 in order to accommodate the new roadway.

## legend

Existing 33 KW Power Line      Proposed Underground 33 KW Power Line Relocation

Two options have been considered for the relocation of powerlines. Option 1 (preferred option) proposes the under grounding from Gipps Street to the M4. This would maximise planting opportunities and reduce the visual clutter of the streetscape. Option 2 would consider relocating the existing powerlines with an overhead configuration between Gipps Street and Fowler Street and from Caddens Road to the M4. The remaining section between Fowler Street and Caddens Road would be proposed as underground lines to visually mitigate the proposal's impact.

The design philosophy of Option 2 is based on maximising landscape buffer zones with large scale trees in those areas where such treatment is most effective and needed. The wider eastern verge provides the opportunity for large scale tree planting, which would significantly mitigate the impact from the loss of significant vegetation as a result of the proposal (particularly between Sunflower Drive South and Caddens Road).



OPTION 1

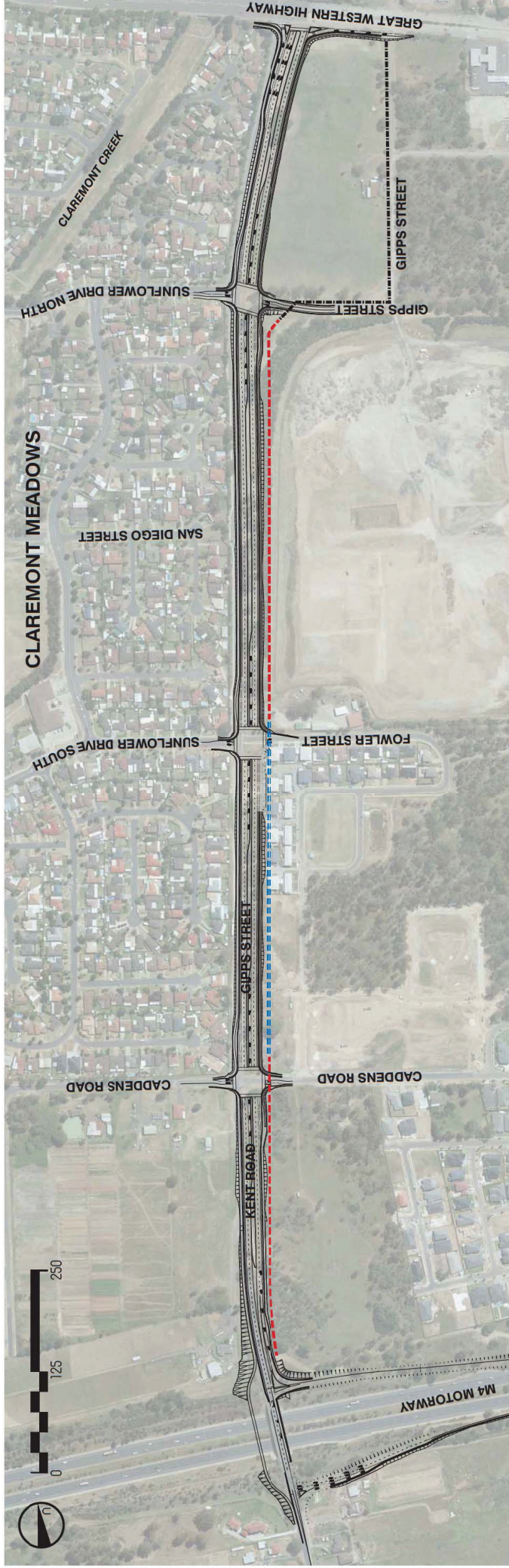


In this case, by 'borrowing' from the adjacent landscape, the future Gipps Street Parkland would provide extensive vegetative screening to assist in visually mitigating the prominence of the overhead power lines. However considering the significance of the park as a regional destination, it is a less desirable outcome

Option 1 (preferred option) allows a more consistent approach with planting that is in keeping with the desired character of a transit boulevard and would create a better streetscape, greener road corridor whilst reducing the visual impact of the overall project.

legend

-  Existing 33 KW Power Line
-  Proposed Underground 33 KW Power Line Relocation
-  Proposed Above Ground 33 KW Power Line Relocation



OPTION 2



## 4.2 LANDSCAPE ELEMENTS

### Landscape Revegetation

The landscape design input has been based on the application of safety, security and aesthetic principles to create a sustainable, ecological, low maintenance design which fits within the broader landscape setting, as well as considering future land use patterns each side of the road corridor.

The majority of the works will be undertaken as "mass planting beds" - i.e. cultivation, topsoil where required, planting of tubestock and mulching with wood chip mulch. Planting strategies include:

- planting of tubestock or advanced stock into mass planted beds; the planting types include mixed canopy, with trees, shrubs and grasses; shrub dominant and native grasses/groundcovers;
- spot planting of trees within areas either seeded or planted with native grasses;
- small scale street tree planting where above ground power is proposed;
- medium scale street tree planting to tight verge areas, or where solar access is required;
- transplanting of existing palms into the median- this will require careful timing of construction, and possible nursery assistance;
- accent planting of *Ficus* trees at the park entrances; and
- hydroseeding and hydromulching steep batters, with interplanting of grasses.

### Batter stabilisation techniques- hydroseeding, hydromulching and interplanting

For the ramps adjacent the M4 where slopes are steeper- max 2:1, we propose a three stage process involving hydroseeding, followed by hydromulching; followed with interplanting of hikos and tubestock, as required.

**A mix of species** is recommended for hydroseeding the native grasses to tolerate the extreme heat and dry conditions of Western Sydney. Timing is also critical as certain species germinate in different seasons. There are two native grassing mixes proposed- one for warmer weather, one for cooler weather.

Typical section treatments are as shown overleaf.

The advantages of this approach are as follows:

- With hydroseeding, **direct contact of the native seed to the topsoil is established**, which ensures successful germination strike with native grasses. In the past, with hydromulching the presence of the hydromulch mixture prohibits the seed's direct contact with the soil, therefore limiting the success.
- The two stage process of hydromulching, composed of a temporary cover crop, wood pulp, cane fibre and a tackifier, after hydroseeding, will establish a quick cover to **stabilise the ground surface and prevent slippage of soils down the slope**.
- The hydroseeding of the native grasses first establishes its **own mulch layer of grasses**, without requiring the normal 75mm thick mulch layer required to traditionally planted beds. As native grasses are used as a mulch therefore, without importing wood chip mulch, this approach is more sustainable.

- This approach **saves duplication on site of the initial soil conservation/batter stabilisation/ hydromulching procedures** normally done before the landscape construction commences. This approach combines the two approaches into one.

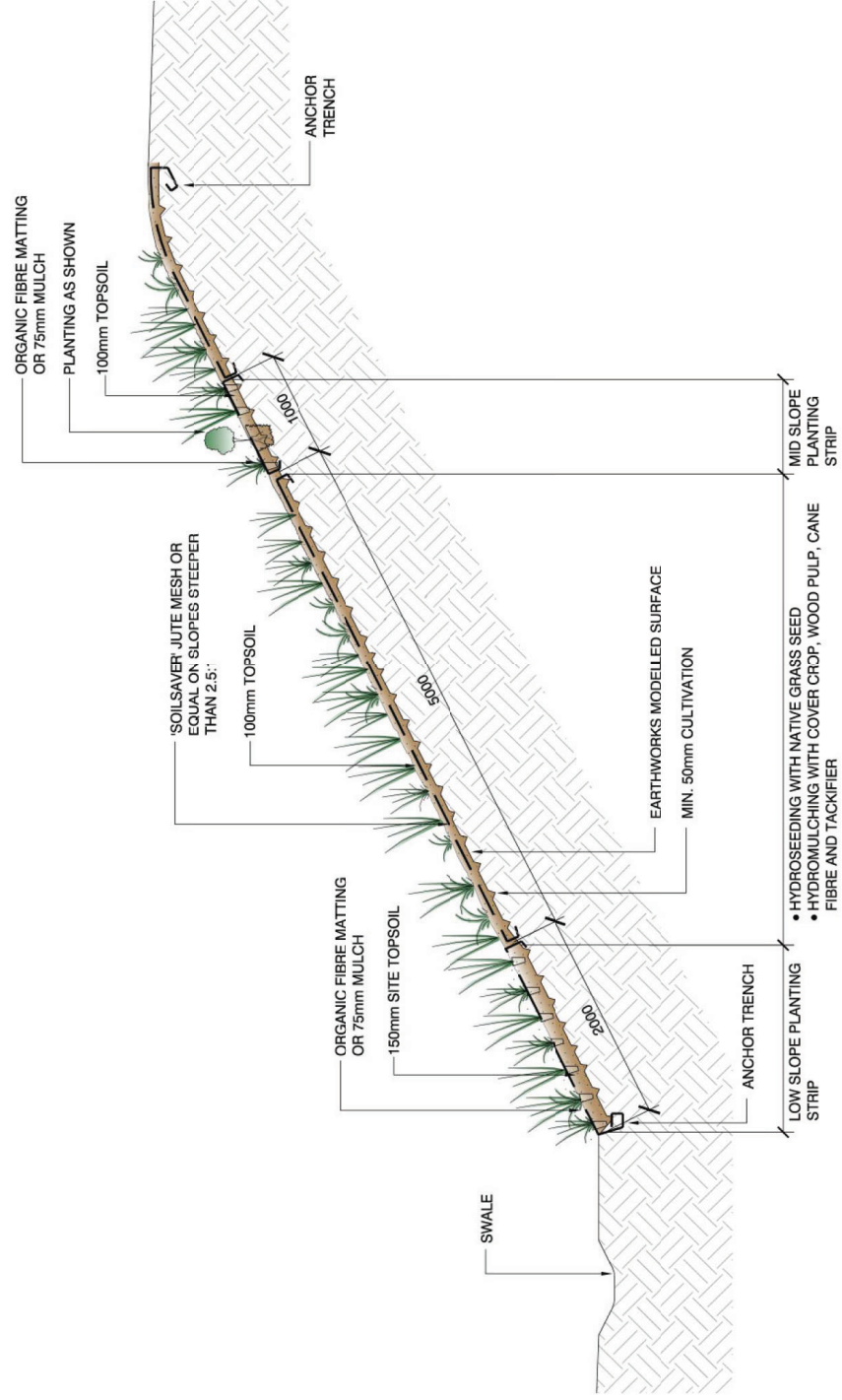
**A superior overall project outcome is achieved**, especially with minimal weed infestation due to the proposed techniques above.

On the M4 ramps, there is a need for steeper batters of max 2:1 that will require particular batter stabilisation measures.

These areas will employ a range of landscape/revegetation treatments that may include the following additional stabilisation methods, alongside the hydroseeding and hydromulching technique. :

- planting strips, mid slope and to lower slopes of longer batters (in excess of 5 metres) to prevent topsoil slippage;
- areas of planting direct into organic fibre matting; and
- possibly strips of native turf laid across contours to reduce topsoil slippage.





BATTER STABILISATION TREATMENTS



## Planting Themes

The planting design utilises Cumberland Plains Woodland species where feasible within the constrained urban environment. Spatial, safety and service constraints effect placement of the larger tree species and the planting design therefore accommodates other species to complement the indigenous palette.

The more open areas, such as the M4 ramps and the large cutting can reflect more true indigenous planting species. In terms of native grasses in particular, use of "cultivars" in broad scale ecological plantings should be limited as they are potentially harmful to the broader landscape and distracting to potential pollinators of wild populations, impacting on the integrity of locally occurring related species reducing the genetic diversity of Sydney's Bushland over time.

### Proposed plantings include:

### Scattered Tree Planting- for trees planted beyond safety clear zones

|   |                                |
|---|--------------------------------|
| <i>Acacia decurrens</i>                       | <i>Black Wattle</i>            |
| <i>Angophora floribunda</i>                   | (30M) Rough-barked Apple       |
| <i>Corymbia maculata</i>                      | (20-25M) Spotted Gum           |
| <i>Eucalyptus amplifolia</i>                  | (30M) Cabbage Gum              |
| <i>Eucalyptus crebra</i>                      | (35M) Narrow Leaved Ironbark   |
| <i>Eucalyptus longifolia</i>                  | Woollybutt                     |
| <i>Eucalyptus moluccana</i>                   | (25M) Grey Box                 |
| <i>Eucalyptus teriticornis</i>                | Forest Red Gum                 |
| <i>Melaleuca stypheloides</i>                 | <i>Prickly leaved Tea-tree</i> |
| <b>Shrubs</b>                                 |                                |
| <i>Acacia implexa</i>                         | Lightwood                      |
| <i>Acacia binervia</i>                        | Coastal Myall                  |
| <i>Acacia fimbriata</i>                       | Fringed Wattle                 |
| <i>Acacia parramattensis</i>                  | Parramatta Wattle              |
| <i>Bursaria spinosa</i>                       | Blackthorn                     |
| <i>Daviesia ulicifolia</i>                    | Goose Bitter Pea               |
| <i>Dillwynia sieberi</i>                      | Prickly Parrot Tree            |
| <i>Dodonaea viscosa subsp. cuneata</i>        | Wedge-leaf Hop-bush            |
| <i>Grevillea parviflora subsp. parvifolia</i> | Small flowered Grevillea       |
| <i>Hakea sericea</i>                          | Bushy Needlewood               |
| <i>Indigofera australis</i>                   | Austral Indigo                 |
| <i>Kunzea ambigua</i>                         | Tickbush                       |
| <i>Persoonia nutans</i>                       | Nodding Geebung                |

*Philothea myoporoides, syn. Eriostemon myoporoides,*  
*Pultenaea parviflora*  
*Ozothanus diosmifolius*  
 Bush Pea  
 Rice Flower

### Native Grasses

The native grass mix should be robust, self- sustaining and ecologically appropriate. It will be predominantly hydroseeded on larger batters, and planted as hikos/tubestock in other areas. There are two mixes proposed :  
**Native Grasses & Ground Covers mix**  
 (for adjacent bus stop areas)

These species are proposed for where people will be lingering, sitting, waiting for bus stops, where more textural contrast is preferred compared to the indigenous, native grass species.

*Austrodanthonia fulva*  
*Dianella caerulea "Breeze"*  
*Dianella caerulea*  
*Lomandra longifolia "Tanika"*  
*Themeda australis*  
 Wallaby Grass  
 Blue Flax Lily (hybrid)  
 Blue Flax Lily  
 Spiny-Headed Mat Rush  
 Kangaroo Grass

### Native Grasses- general use along verges, batters where informal, natural character proposed

The mix of species reflects Cumberland Plains grasslands, and will provide a sustainable outcome and be resilient for insect attack and to changing climate conditions.

*Austrodanthonia spp*  
*Callipedium spicigerum*  
*Cymbopogon refractus*  
*Dianella caerulea*  
*Hardenbergia violacea*  
*Imperata cylindrica*  
*Lomandra longifolia*  
*Lomandra filiformis*  
*Lomandra multiflora*  
*Microlaena stipoides var. stipoides*  
*Poa labillardieri*  
*Themeda australis*  
*Wahlenbergia gracilis*  
 Wallaby Grass  
 Scented Top Grass  
 Barbed-wire Grass  
 Blue Flax Lily  
 False sarsparilla (in rampart areas)  
 Blady Grass  
 Spiny Headed Mat-Rush  
 Wattle Mat-rush  
 Many Flowered Mat-Rush  
 Weeping Grass  
 Large Tussock Grass  
 Kangaroo Grass  
 Native Bluebell

### Median Planting

There are two planting design themes for the sections of wide median.

#### Native Shrubs and Groundcovers/Native Grasses

The following species are proposed for the section of wide median, where shown on the drawings, where the existing palms are not being transplanted: *Philothea myoporoides, syn. Eriostemon myoporoides, Westringia fruticosa* prostrate, *Callistemon "White Anzac,* with the native grass/ groundcover mix, and native grasses mix.

#### Transplanted Palms with Native Grasses

To create a memorable entrance from the Great Western Highway, travelling south, and to add variety and interest in the suburban landscape, it is proposed to utilise the existing palms through transplanting them into the wider sections of median.

#### Small scale street trees

Where there are above ground power lines proposed, there is still a need to create a sense of landscaped verge. Hence there is a need to introduce a small scaled tree under the power lines, to create some shade and to create a pleasant streetscape. Species proposed under these circumstances include:

*Corymbia ficifolia* (5-6m)  
*Banksia integrifolia* (5-6m)  
*Callistemon viminalis* (5m)

#### Street tree planting

*Eucalyptus punctata* (Grey Gum) is proposed as the dominant street tree, also for the central median, where there are no service/space restrictions on the verges. *Eucalyptus amplifolia (Cabbage Gum)* and *Angophora floribunda* are proposed when space permits, further from kerb. The 60kmph road speed permits street trees to within 3 metres from the kerb on the verges.

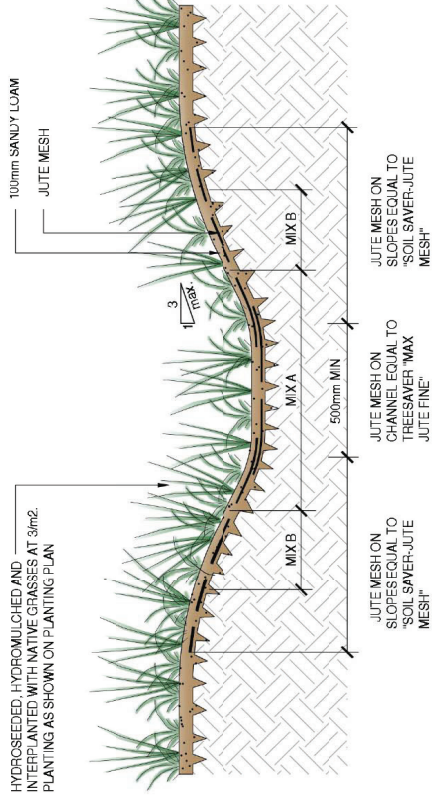
#### Accent Park Entry Trees

Proposed trees to mark the future park entrance are Ficus.

#### Water sensitive design (WSUD) planting

There are proposed vegetated swales and bio-filtration areas. Species appropriate to these areas include:





VEGETATED SWALE

Channel/ swale bottom and Bio-filtration areas

- Carex appressa*
- Carex longebrachiata*
- Juncus usitatus*
- Poa labillardiera*
- Isolepis nodosa*

Slopes of channel/swale:

- Carex appressa*
- Dianella caerulea*
- Imperata cylindrica*
- Lomandra longifolia*
- Themeda australis*

Water Sensitive Design

The proposed design considered the introduction of water sensitive design measures by maximising on-site infiltration, reduce piping and minimise drainage impacts to existing vegetation. The proposed vegetated swale locations and bio-retention areas are shown on the drawings.

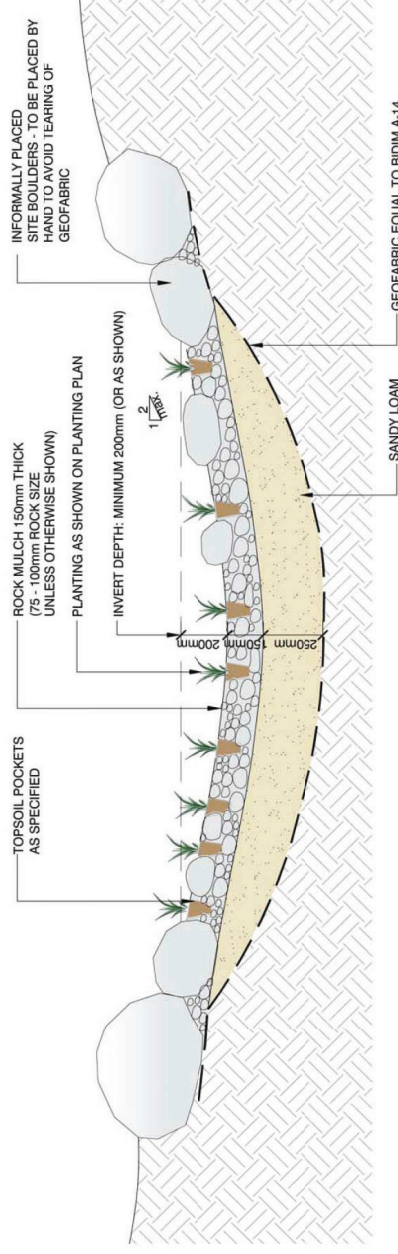
There is potential at the north eastern section of the project, abutting the Great Western Highway for a future water quality control pond that would also provide aesthetic and ecological benefits to the future park, at Gipps Street.

Paving

It is proposed to use a dark grey 600 x 300mm paver at the bus stop areas and for the widening of the median's maintainable edge strip.

Maintainable Edge Strip

A 300mm wide strip of dark grey concrete pavers is proposed against the concrete kerbs to create a total paved strip of 500mm wide. This is a standard RTA dimension to minimise maintenance costs. This material finish will extend into the widened paved areas at the ends of the medians. The concept is to create a textural and colour definition to contrast with the concrete kerbs and road pavement. The intent is also to use a colour/finish that will also assist in creating a richer dimension to the streetscape that reflects the rural nature of the site.



BIO-RETENTION AREA



MID/DARK GREY PAVEMENT



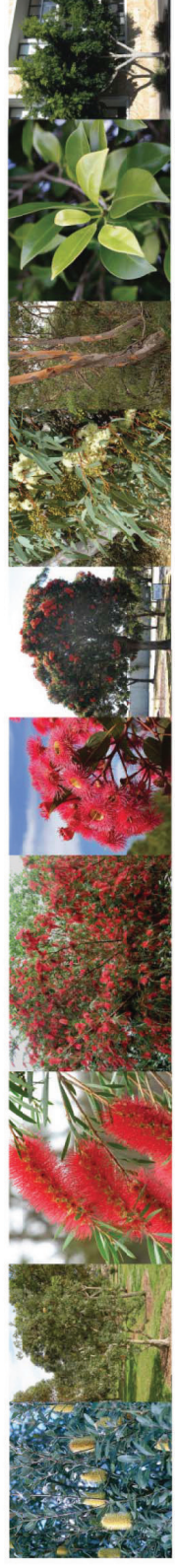
## Planting Strips

### SPW- MC Shale Plain Woodland Mixed Canopy- Trees



*Acacia decurrens* 'Sydney Wattle'    *Angophora floribunda* 'Rough-Barked Apple'    *Eucalyptus amplifolia* 'Cabbage Gum'    *Eucalyptus moluccana* 'Grey Box'    *Eucalyptus tereticornis* 'Forest Red Gum'    *Melaleuca stypheloides*    *Ficus microcarpa* var. *hillii* 'Hills Fig'

### Street Tree Planting



*Banksia integrifolia* 'Coastal Banksia'    *Callistemon viminalis* 'Weeping Bottlebrush'    *Corymbia ficifolia* 'Summer Red'    *Eucalyptus punctata* 'Grey Gum'    *Ficus microcarpa* var. *hillii* 'Hills Fig'    *Kunzea ambigua* 'Tickbush'

### SHW-MC Shale Hills Woodland Mixed Canopy- Shrubs



*Acacia implexa* 'Lightwood'    *Davisia ulicifolia* 'Gorse Bitter Pea'    *Bursaria spinosa* 'Australian Blackthorn'    *Dodonea triquetra* 'Hopbush'    *Hakea sericea* 'Bushy Needlewood'    *Dodonea triquetra* 'Hopbush'    *Indigofera australis* 'Austral Indigo'

### Shrubs



*Bursaria spinosa* 'Sweet Bursaria'    *Dodonea viscosa* subsp. *cuneata* 'Hopbush'    *Hakea sericea* 'Bushy Needlewood'    *Indigofera australis* 'Austral Indigo'



Grasses and Groundcovers



*Dianella caerulea*  
'Blue Flax Lily'

*Hardenbergia violaceae*  
'False Sarsparilla'

*Imperata cylindrica*  
'Blady Grass'

*Lomandra longifolia*  
'Spiny-headed Mat-rush'

*Lomandra multiflora*  
'Many Flowered Mat-Rush'

*Microleana stipoides*  
'Weeping Grass'

GC-A Native Grasses & Groundcovers



*Austrodanthonia* sp  
'Tail Wallaby Grass'

*Dianella caerulea*  
'Blue Flax Lily'

*Dianella caerulea*  
'Blue Flax Lily'

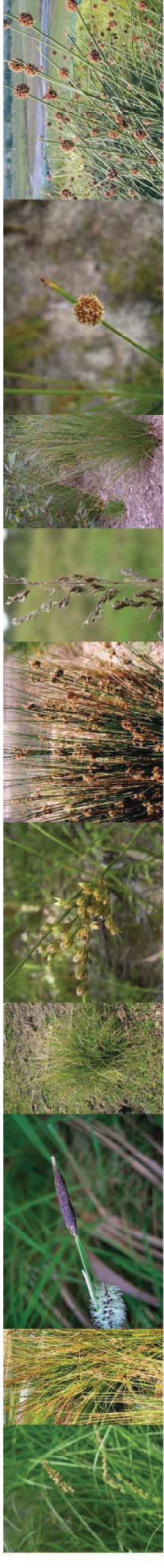
*Lomandra longifolia*  
'Spiny-headed Mat-rush'

*Lomandra longifolia* 'Tanika'  
'Spiny-headed Mat-rush' (hybrid)

*Themeda australis*  
'Kangaroo grass'

*Microleana stipoides*  
'Weeping Grass'

BIOF-2 Biofiltration Swale/ Rain Garden- Swale Invert



*Carex appressa*  
'Wild Sedge'

*Carex longibrachiata*  
'Tail Sedge'

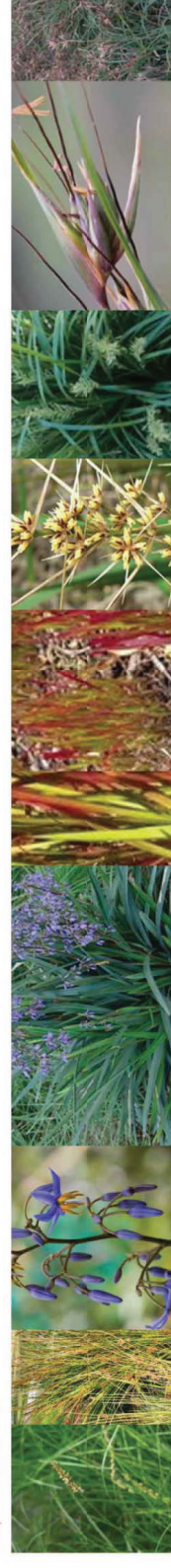
*Juncus usitatus*  
'Common Rush'

*Poa labillardieri*  
'Large Tussock Grass'

*Isolepis nodosa*  
'Knobby Club Rush'

*Lomandra longifolia*  
'Spiny-headed Mat-rush'

Slope of Channel



*Carex appressa*  
'Wild Sedge'

*Dianella caerulea*  
'Blue Flax Lily'

*Imperata cylindrica*  
'Blady Grass'

*Lomandra longifolia*  
'Spiny-headed Mat-rush'

*Themeda australis*  
'Kangaroo Grass'

*Lomandra longifolia*  
'Spiny-headed Mat-rush'



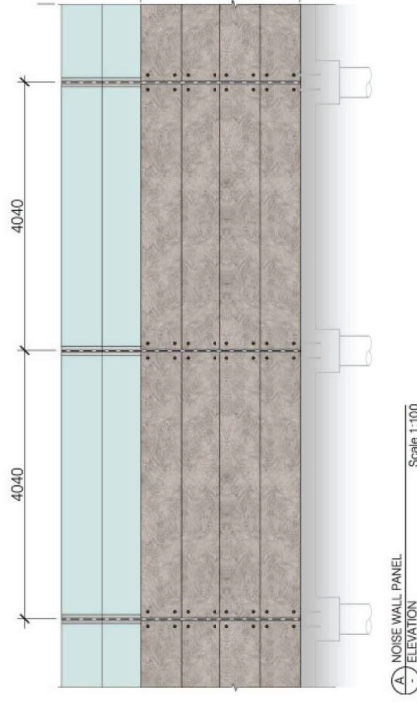
### 4.3 BUILT FORM ELEMENTS

#### Noise Barriers

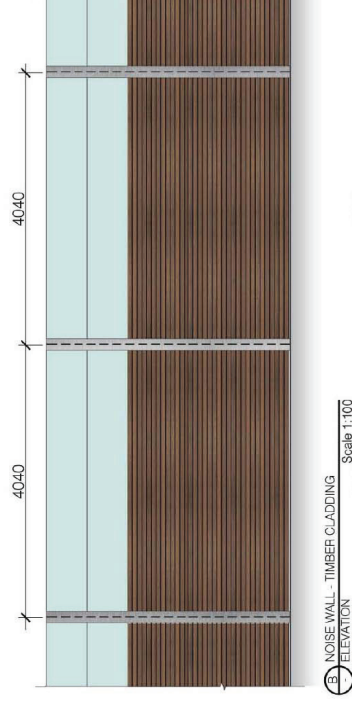
It is anticipated that noise barriers would be required along the western verge fronting residences from Claremont Meadows. Should these elements be required, the proposed design would be double sided noise walls that provide flexibility in the cladding material to face the individual residences. Facing the road corridor, light-weight precast panels equivalent to Hebel or compressed fibre cement panels are proposed. These treatments would be consistent along the corridor, assisting in unifying the streetscape, compared to the existing varying fence type treatments.

The opportunity exists to incorporate 'Claremont Meadows' along the wall in the form of a modest recess to add interest and identity to the streetscape. Facing the residences, three options could be considered - timber paling fence cladding (figure B), or colorbond (figure C), or the same treatment facing the roadway (figure A).

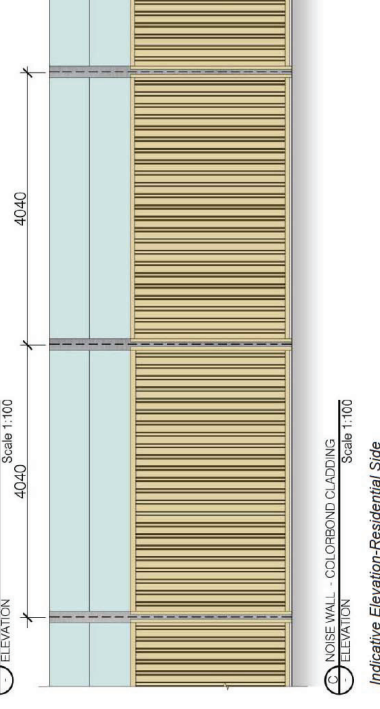
To minimize any overshadowing and to visually mitigate impacts of the barrier to residences and the streetscape, the portion of the noise barrier above 2.4 metres height would be clad with an acrylic panel. This would be applied project wide to achieve a coherent appearance and could be adapted in the future stages of the overall project as part of the identity of the roadway. The barriers facing the road would be painted in a dark grey colour to help them visually recede, whilst the side facing residences would be treated individually.



Indicative Elevation-Roadside or residents.



Indicative Elevation-Residential Side



Indicative Elevation-Residential Side



Colorbond and timber cladding are common fencing treatments along the road corridor.





### Bus Stops

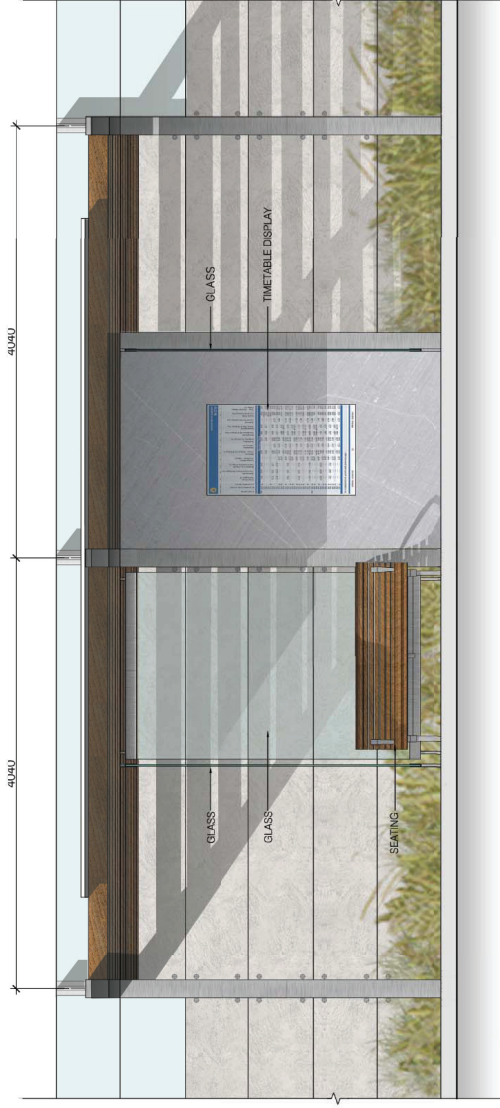
Bus stops have been designed to allow the incorporation of shelters if required. It is recommended that the structure of bus shelters is integrated with the noise barrier structure if these elements are required. In this case, the structure of the bus shelter would extend from the noise wall, creating a cantilevered roof that extends towards the roadway, minimizing any visual obstructions and creating a lighter appearance.

The shared path has been situated behind the bus shelter to minimize potential circulation conflicts. A trellis structure would be incorporated over the shared path to mark the bus stop, enhance legibility and to provide some shade. The incorporation of a different paving material would assist in delineating the interface of the shared path with the bus stop and introducing some texture to the public domain areas. The result is an integral solution that attempts to minimize the visual impact of these elements by integrating them with other components whilst improving the amenity and legibility for pedestrian and cyclist.

Along the eastern verge, the bus stops are treated as free standing structures similar in character except at Sun Flower Drive South where a retaining wall would be required at the property line, resulting in a similar configuration as along the western verge. This low retaining wall would be required to avoid impacts to private properties.

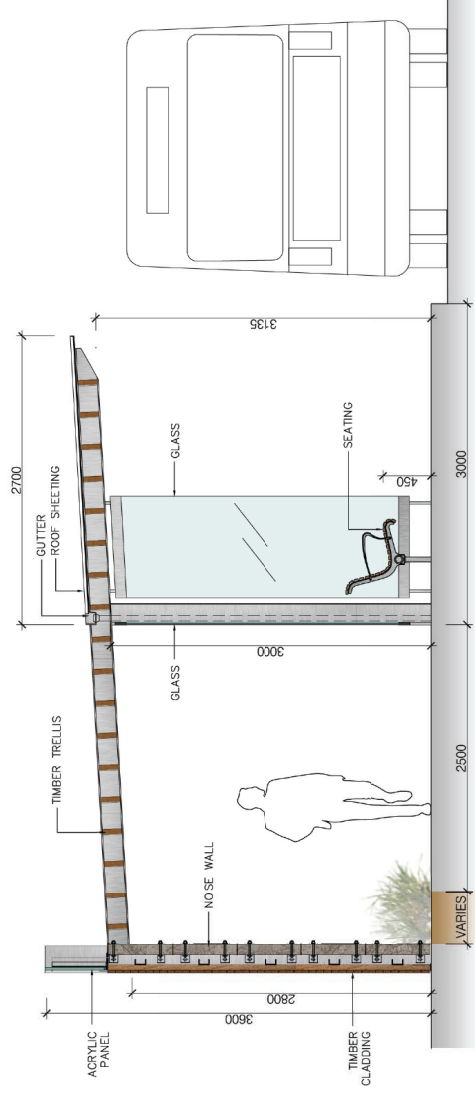


Existing bus stop - the amenity of bus stops would be improved and integrated with other built form elements.



B BUS SHELTER  
- ELEVATION

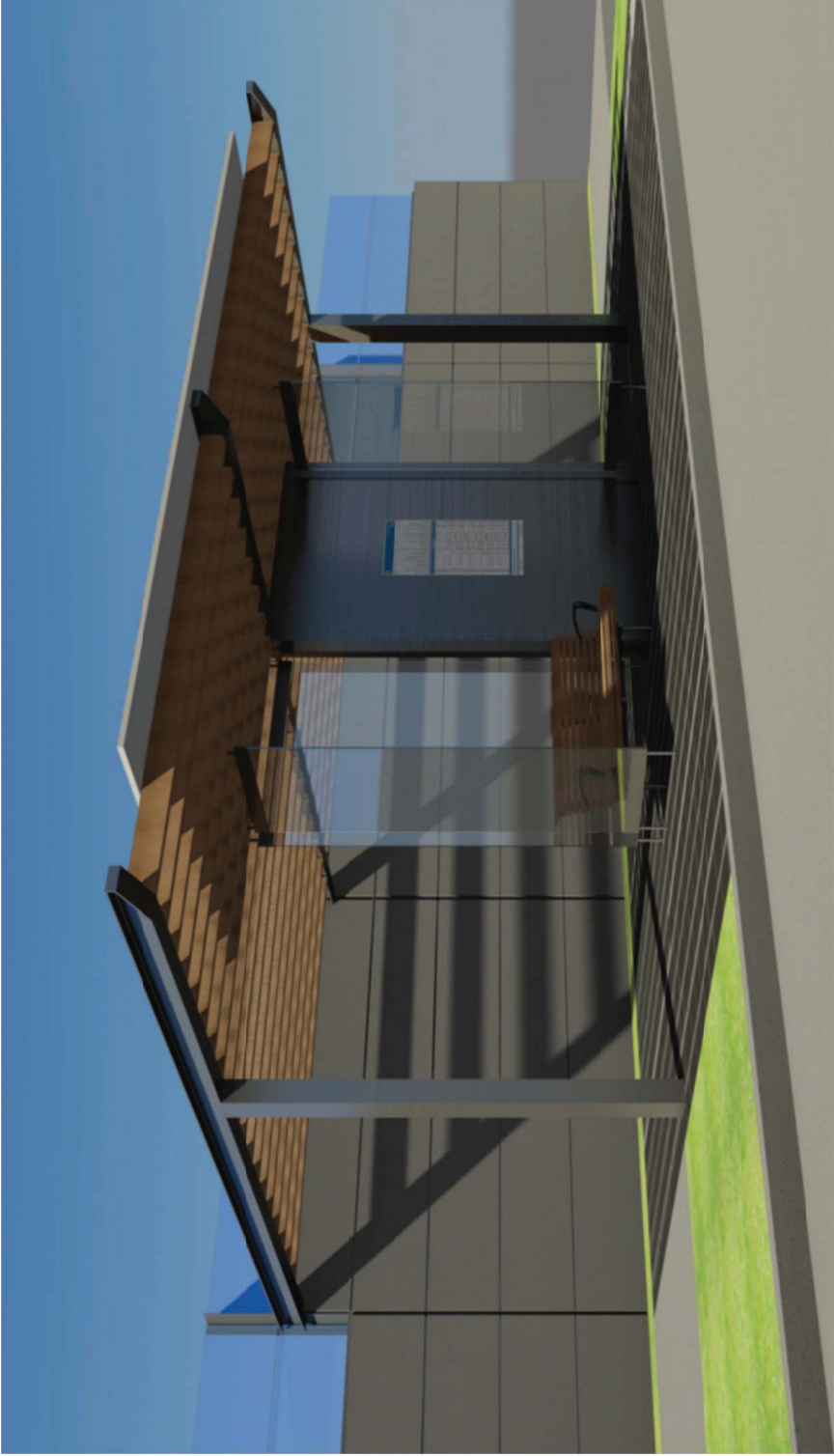
Scale 1:50



C BUS SHELTER  
- SECTION

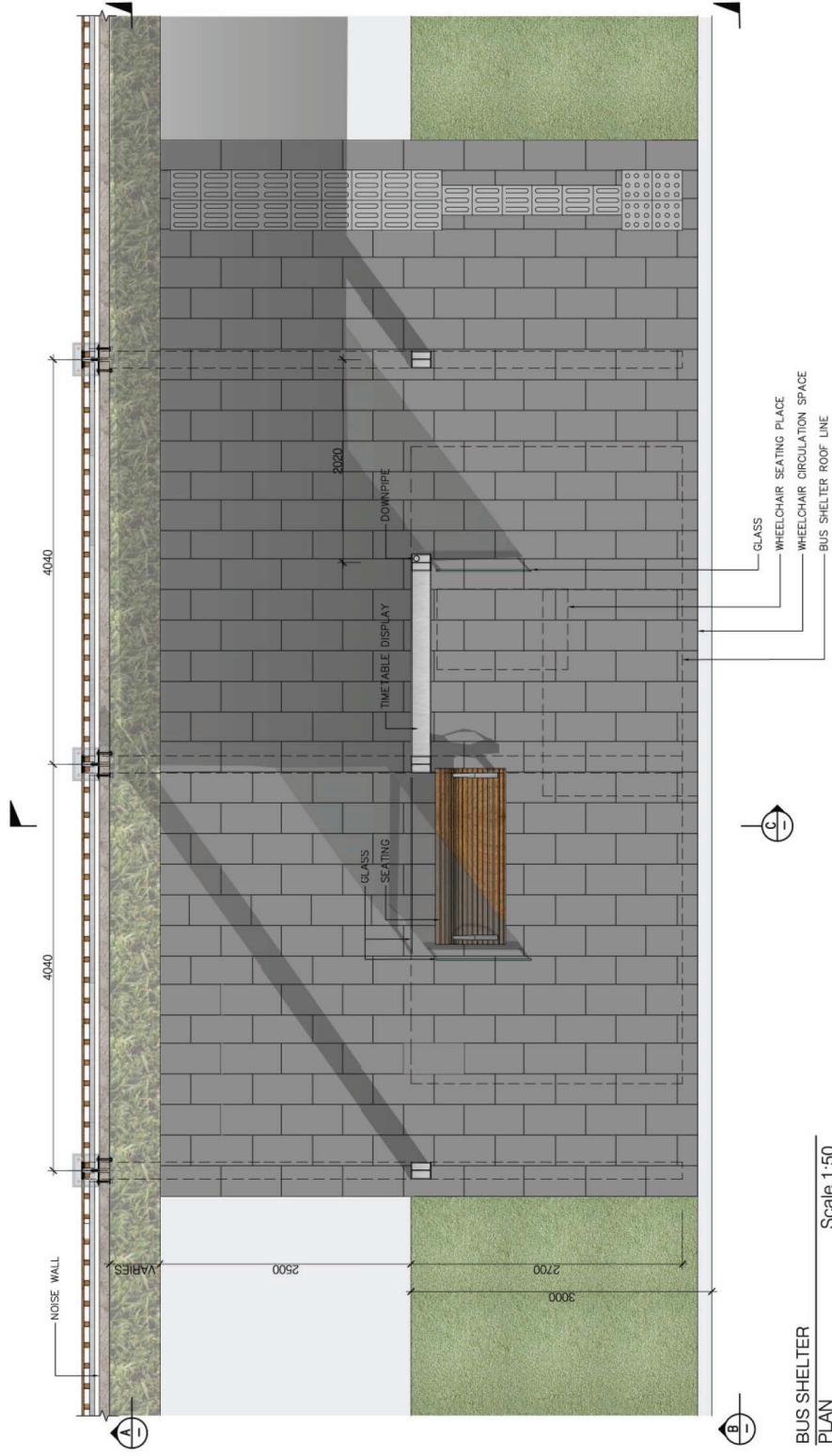
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INDICATIVE BUS SHELTER

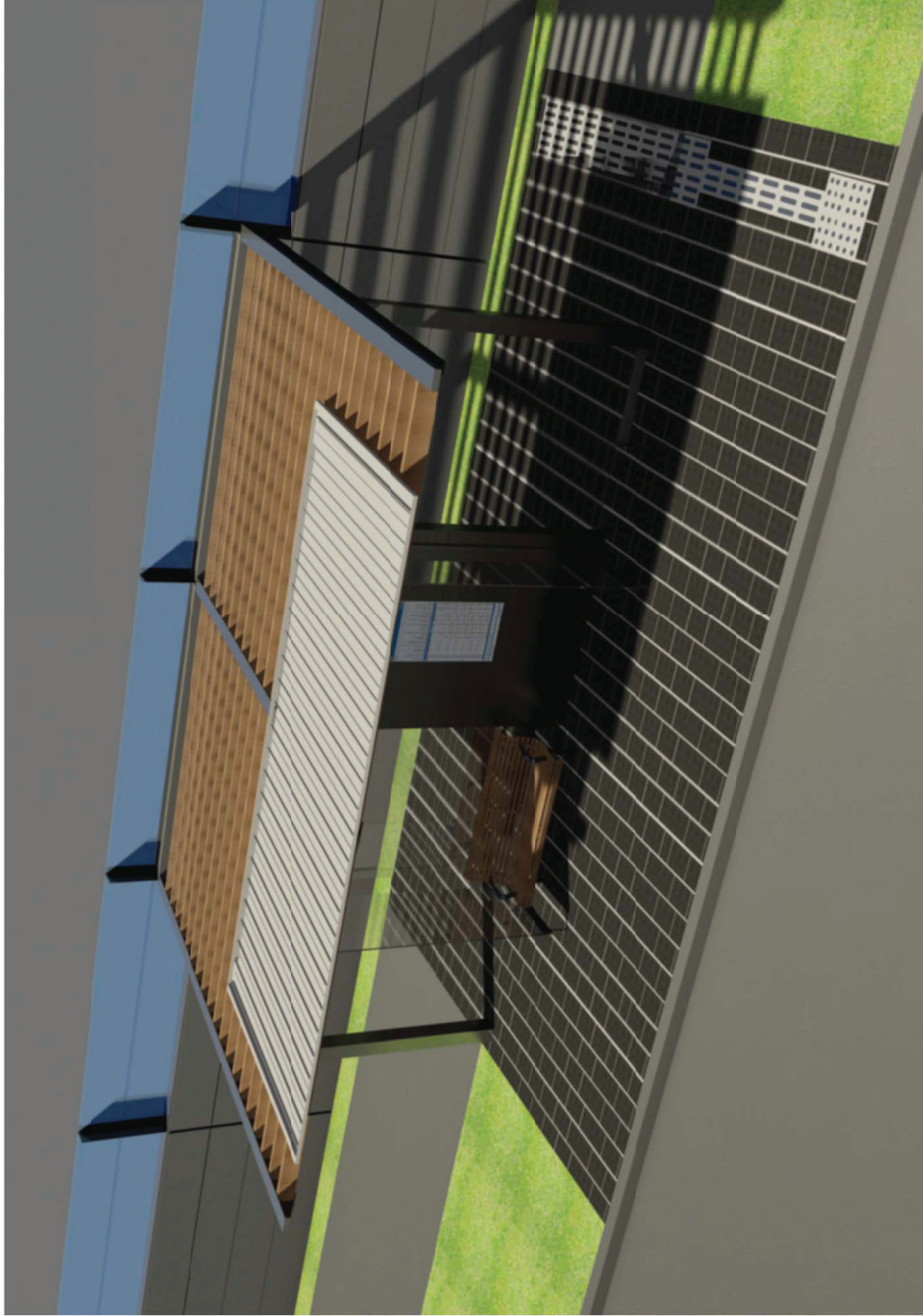




BUS SHELTER  
PLAN

Scale 1:50





INDICATIVE BUS SHELTER



## Retaining Walls

There are three types of retaining wall treatments.

### Cut Retaining Walls Facing the Road

This type of retaining wall occurs on both verges at approximately chainage 400 to avoid impacts to private property or significant vegetation. A minor wall would also be required in front of the northbound bus stop at Sunflower Drive South. The retaining walls are proposed in situ concrete with a rope finish. The rope finish would act as an anti-graffiti deterrent and provide a rich texture to the wall helping it to visually recede and create a softer appearance that would aid in the identity of the roadway. This treatment could be applied in the future stages of the overall project to ensure consistency and identity of Werrington Arterial Road.

### Retaining Walls facing private properties

Wherever bus stops are required, a minor retaining wall would be required. In the case that these elements interface with a noise wall, they would be aligned with the barrier and treated / painted in a similar fashion to minimise visual clutter.

In the case that the retaining walls are free standing and due to their limited height, a simple Class 2 finish is proposed.



*In situ concrete with a rope finish*



# 05 LANDSCAPE CHARACTER AND VISUAL IMPACT ASSESSMENT

## 5.1 LANDSCAPE CHARACTER IMPACTS

The landscape character impact is based on the aggregate of an area's built, natural and cultural character and sense of place. In this regard, it is measured by the combination of the area's sensitivity and the magnitude (scale, character and distance). As part of the sensitivity assessment, public perception of the project, its absorption capacity and the area of significance- whether local, regional or national, have been taken into account.

For example, commercial properties are generally considered less sensitive than private residences, whilst heritage properties are generally considered more sensitive than residential properties. Transient type spaces are generally considered less sensitive compared to spaces where people spend more time in.

The table shown below illustrates how the level of sensitivity and magnitude are combined to achieve an overall level of impact for both the landscape character impact and the visual impact.

|             |                  | Magnitude        |                  |                  |                  |                 |            |  |  |
|-------------|------------------|------------------|------------------|------------------|------------------|-----------------|------------|--|--|
|             |                  | high             | high to moderate | moderate         | moderate to low  | low             | negligible |  |  |
| Sensitivity | high             | high             | high             | moderate to high | moderate to low  | low             | negligible |  |  |
|             | high to moderate | high             | high             | moderate to high | moderate to high | moderate        | negligible |  |  |
|             | moderate         | moderate to high | moderate to high | moderate         | moderate         | moderate to low | negligible |  |  |
|             | moderate to low  | moderate to high | moderate         | moderate         | moderate to low  | moderate to low | negligible |  |  |
|             | low              | moderate         | moderate         | moderate to low  | low              | negligible      |            |  |  |
|             | negligible       | negligible       | negligible       | negligible       | negligible       | negligible      |            |  |  |

Table 1: Landscape Visual Impacts Rating Table.

### Impact on Zone A

The rural residential character is greatly determined by the sparse, low scale, built form density with generous setbacks which visually underpin the rural character of the area. The project would have limited impact on the setting except for the properties north of the motorway. It is important to minimise impacts to the property located atop the knoll, as the widening of the road would encroach towards the property.

The sensitivity of the character zone was assessed as being moderate, driven by the residential land use and the limited number of viewers within this zone. The magnitude of impact of the proposal on this character zone was determined as low, except for the aforementioned property north of the motorway. In this case, the magnitude of impact is considered moderate to high due to impacts to the existing cutting situation and change to the roadscape character. Hence an overall moderate to low rating is assigned to the zone.

This results in a moderate landscape character impact.

Key mitigating measures include the consideration of retaining walls to minimise impacts to existing vegetation and the cutting. In addition, planting in front of retaining walls would reduce the prominence of built form elements.

### Impact on Zone B

The residential land use within Zone B is considered to have a moderate sensitivity although its urban character has a moderate to high absorption capacity as the proposal would further reinforce the urban nature of the area.

The magnitude of impact is considered moderate to low since most residences do not directly interface with the proposal. The proposal would emphasise the urban character of the area, changing from a modest road to an arterial, yet this transformation will not fundamentally change the sense of place of Claremont Meadows.

The result is a moderate impact driven by the sensitivity of the land use.

### Impact on Zone C

Zone C is comprised of road reserves and open space. The sensitivity within this character zone was assessed as low due to its land use as minor remnant pockets of open space. It should be noted, that whilst the southern area within this zone is of high environmental significance, its scale has a limited contribution to the overall sense of place and character of the overall landscape setting.

**Impact on Zone D**

The magnitude of impact is considered low, taking into account the scale of the proposal, that directly impacts either area. Hence a low landscape character impact is considered appropriate as it would not change the setting's character.

**Impact on Zone E**

This zone comprises the new residential developments along the eastern verge and provides a similar situation as described in Zone B. However, a moderate to low sensitivity rating has been assessed as the area is going through an expected transformation in urban development.

**Impact on Zone F**

A moderate to low magnitude of impact has been assigned consistent with Zone B. The resulting landscape character impact would be moderate to low, driven by the expected increased urban nature of the area.

**Impact on Zone G**

There is limited opportunity for any mitigation measures due to the constrained width of the corridor. Wherever possible the retention of trees should be considered as a key mitigation strategy.

**Impact on Zone H**

This zone is fairly exposed to the proposal, however it is considered to have a low sensitivity rating due to its land use.

The magnitude of impact of the proposal on this character zone was determined as moderate since the proposal directly interfaces with this zone, however it would not fundamentally change its character. Overall, a low to moderate landscape character impact has been assessed.

**Impact on Zone A**

This zone is has been assessed based on the future development of the Gipps Street Master Plan, and as a result a high sensitivity rating is considered appropriate, taking into consideration the recreational value and regional significance of the facilities.

**Impact on Zone B**

In terms of magnitude of impact, the proposal would have a limited effect, partially due to the generous buffer zones the Master Plan provides from the road corridor, which would help in spatially disassociating the grounds from the road. Hence, a low rating is considered appropriate.

**Impact on Zone C**

A moderate landscape character impact has been assessed for this zone.

**Impact on Zone D**

Zone D is comprised of grassland and scattered woodland. The sensitivity within this character zone was assessed as moderate due to its open and green character offering vistas to the east.

**Impact on Zone E**

The magnitude of impact is considered low taking into consideration the limited encroachment of the proposal into this zone. However, stands of trees that contribute to the character would be removed as part of the proposal influencing the magnitude rating to moderate.

**Impact on Zone F**

As a consequence, the landscape character impact for this zone is considered moderate.

**Impact on Zone H**

The sensitivity within the motorway corridor has been assessed as low due to the transient quality of this zone.

The magnitude of impact is considered moderate due to the introduction of on/off load ramps and the pedestrian bridge. However, the M4's corridor's character would not fundamentally change and this type of change is in character with its setting.

| character zones | sensitivity  | magnitude    | impact       |
|-----------------|--------------|--------------|--------------|
| A               | moderate     | moderate-low | moderate     |
| B               | moderate     | moderate-low | moderate     |
| C               | low          | low          | low          |
| D               | moderate-low | moderate-low | moderate-low |
| E               | low          | moderate     | moderate-low |
| F               | high         | low          | moderate     |
| G               | moderate     | low          | moderate-low |
| H               | low          | moderate     | moderate-low |

Table 2 : illustrates the resulting landscape character impact for all six zones.



## 5.2 VISUAL IMPACT ANALYSIS

In order to assess the visual impact, a Visual Envelope Map or the proposal's visual catchment from the surrounding area has been prepared. The visual catchment is defined either by topographical features, built form elements or screening vegetation. In this case, the proposal has a limited visual exposure due to the screening effect of existing fencing and vegetation, particularly along the western verge.

The visual exposure for Zone F has been based on the future development of the Gipps Street Master Plan. As the plan foresees extensive buffer vegetation between Gipps Street and the main recreational areas of the park, the visual exposure of the proposal is strongly limited.

For Zone H, the visual exposure is high as there is limited vegetative screening within the open grassland.

Within Zone H, as the visual exposure is strongly limited due to the cutting situation of the M4 Motorway, there is a low visual exposure of the overall project.

Within Zone A, the visual exposure varies; areas south of the motorway are fairly confined by vegetation and built form elements, whilst north of the motorway, the visual exposure increases due to the exposed open grass areas. It should be noted that the drop in topography towards the west would somewhat assist in limiting the visual exposure within this area.

For Zone B, the visual exposure is limited by the continuous backyard fencing of private residences. It should be noted, that there are a few double storey residences where views towards the proposal are attainable from the second storey.

The visual exposure for Zone C is considered moderate to high. At the southern end of the project, the exposure is limited by stands of trees and bushland vegetation, whilst to the northern end the visual exposure is considered high due to the open grasslands.

A limited visual exposure has been assessed for Zone D based on the future development of this residential area. Hence, backyard fencing acts as a screening device. Most residences are double storey allowing views into the road corridor from the upper floor.

Within Zone E, located directly adjacent to the proposal and with limited vegetative screening, the visual exposure is considered high.





legend





### 5.3 VISUAL IMPACT ASSESSMENT

The visual impact assessment has been based by selecting representative viewpoints of the various conditions along the road corridor. Due to the limited accessibility into private properties, the particular viewpoints are not taken from within these properties, but along the road's verge. The visual impact assessment discusses the likely visual effects these properties would experience as a result of the proposal.

In order to determine the visual impact, sensitivity values have been assigned to the various viewpoints. The sensitivity rating, combined with the visual magnitude rating determines the visual impact for each viewpoint, and is based on the matrix describe in Section 5.1 - Table 1.

It should be noted that the ratings are measured relative to each other rather than being assigned through an absolute scale. Hence the resulting visual impact rating is project specific and identifies those areas with the highest and lowest impacts.

The magnitude is based on the likely visual effect of the proposal on a specific viewpoint (e.g. scale, character, screening and distance). The sensitivity is assessed based on the sensitivity of the viewer and the nature of the activity of the viewer as explained in Section 5.1.

The following key viewpoints ( 1 to 6) have been identified along the route and are considered representative of the more sensitive situations for the visual impact assessment. It should be noted that the assessment considers likely impacts from within private properties, rather than just discussing the particular viewpoint. This is due to the limited accessibility to these properties.

# WERRINGTON ARTERIAL ROAD - STAGE 1



legend

Viewpoints for Visual Impact Assessment







viewpoint 1

|  |  |
|--|--|
| description of setting                   | Chainage 260 - On-load Ramp Looking west   |
| element of proposal visible              | Single lane on-load ramp with extensive cutting to the northern verge. The proposal would significantly impact the setting with extensive removal of existing vegetation. Views towards the proposal from the second storey of some residences would be likely with some screening retained. |
| nature of impact                         | Adverse  |
| visual sensitivity                       | Low (roadway)<br>High (residences)   |
| magnitude of visual effect               | High (roadway)<br>Moderate (residences)  |
| overall rating of visual impact          | Moderate (roadway)<br>Moderate to high (residences)  |
| comment                                  | Most residences along the northern verge would not be affected except those that are double storey. In many instances existing vegetation would be retained, providing valuable screening.   |
| mitigation strategy                      | Reinstatement of screen planting would considerably reduce impacts for residences in the mid-long term. The reinstatement of mixed canopy and shrub vegetation would contribute to re-establishing the original character of the setting.  |
| rating of visual impact after mitigation | Moderate (roadway)<br>Moderate to high (residences)  |



viewpoint 2

|  |   |
|--|---|
| description of setting                   | Chainage 525 looking south  |
| element of proposal visible              | Dual two lane carriageway separated by a median converging to a two lane road. Shared path along the western verge. The proposal would encroach on both verges with loss of some vegetation.  |
| nature of impact                         | Adverse   |
| visual sensitivity                       | Low (roadway)<br>High (residences)  |
| magnitude of visual effect               | High (roadway)<br>Moderate (residences)   |
| overall rating of visual impact          | Moderate (roadway)<br>Moderate to high (residences)   |
| comment                                  | The existing roadway would become a more dominant feature within the setting. Impacts to the residence on the knoll would be limited due to the extensive setbacks, offset by the topographical high ground, allowing mid-distant views towards the north. Impacts to Cumberland Plains Woodland along the eastern verge. |
| mitigation strategy                      | Re-establishment of stands of trees would provide screening along the western verge. Introduction of a retaining wall along the eastern verge would minimise any impacts to the stands of Cumberland Plains Woodland. Overhead powerlines to be retained along the eastern verge.   |
| rating of visual impact after mitigation | Moderate (roadway)<br>Moderate to high (residences)   |



viewpoint 3

|  |   |
|--|---|
| description of setting element of proposal visible | Chainage 675 - Looking North<br>Dual carriageway separated by central median. The proposal would considerably impact the eastern verge. Extensive removal of existing mature vegetation would impact the setting. Residences would have limited views towards the proposal due to existing fencing and or the introduction of noise barriers screening views. |
| nature of impact                                   | Adverse   |
| visual sensitivity                                 | Low (roadway)<br>High (residences)  |
| magnitude of visual effect                         | High (roadway)<br>Low (residences)  |
| overall rating of visual impact                    | Moderate (roadway)<br>Moderate (residences)   |
| comment  | The loss of mature trees along the eastern verge would create a more open setting. Residences would lose views to the upper canopies of the trees, however some trees beyond the road corridor would be retained, limiting the impact. The introduction of a treed median would greatly contribute in limiting the visual impact.                             |
| mitigation strategy                                | Stands of trees along the median would provide partial visual screening along the eastern verge. Underground powerlines are recommended to re-establish large trees along the eastern verge.  |
| rating of visual impact after mitigation           | Moderate (roadway)<br>Moderate to high (residences)   |



viewpoint 4

|  |  |
|--|--|
| description of setting element of proposal visible | Chainage 925- Looking North<br>Dual two lane carriageway separated by a median with Sunflower Drive South intersection in the distance. The proposal would encroach predominantly on the eastern verge with loss of a few stands of trees.   |
| nature of impact                                   | Adverse  |
| visual sensitivity                                 | Low (roadway)<br>High (residences)   |
| magnitude of visual effect                         | High (roadway)<br>Low (residences)   |
| overall rating of visual impact                    | Moderate (roadway)<br>Moderate (residences)  |
| comment  | There is limited exposure of the proposal to residences along the western verge. Residences along the eastern verge would be exposed from the second storey, however there is limited windows facing the roadway due to fence screening. The road setting would become more urbanised and formal. The treed median would assist in settling the road within its setting. |
| mitigation strategy                                | Stands of small scale trees along eastern verge and fragile low planting along the western verge in combination with the treed median would assist in integrating the proposal in its setting whilst providing some vegetative screening. It is recommend to underground the overhead powerlines.  |
| rating of visual impact after mitigation           | Moderate (roadway)<br>Moderate (residences)  |





viewpoint 5

|  |  |   |
|--|--|---|
| description of setting element of proposal visible | Chainage 1125 looking north  | Dual carriageway separated by central median with bus stop in the foreground. The proposal would predominantly impact the eastern verge with the loss of some mature trees. Along the southern verge, the potential integration of noise barriers would have a limited impact to the adjacent residences. |
| nature of impact                                   | Adverse  |   |
| visual sensitivity                                 | Low (roadway)<br>High (residences)   |   |
| magnitude of visual effect                         | Moderate to High (roadway)<br>Low (residences)   |   |
| overall rating of visual impact                    | Moderate (roadway)<br>Moderate (residences)  |   |
| comment  | The loss of mature trees along the eastern verge would create a more open setting. The introduction of enhanced bus stop facilities and a shared user path would enhance the public domain areas and local urban permeability. The future parkland of Gipps Street Master Plan would contribute to reducing impacts to the setting. The treed median would add character, amenity and identity to the roadway. |   |
| mitigation strategy                                | Low scale vegetation along the eastern verge would be reinstated to integrate the road corridor in its setting. Existing vegetation beyond would limit the overall visual impact. Overhead powerlines would be retained along the eastern verge.   |   |
| rating of visual impact after mitigation           | Moderate to Low (roadway)<br>Moderate (residences)   |   |



viewpoint 6

|  |   |  |
|--|---|--|
| description of setting element of proposal visible | Chainage 1950 looking south   | Dual two lane carriageway with central median and shared path along the western verge. The proposal would encroach predominantly on the eastern verge with loss of a few stands of trees. The western verge would be slightly impacted by the introduction of the shared path and loss of some vegetation. |
| nature of impact                                   | Adverse   |  |
| visual sensitivity                                 | Low (roadway)<br>High (residences)  |  |
| magnitude of visual effect                         | Moderate (roadway)<br>Low (residences)  |  |
| overall rating of visual impact                    | Low to Moderate (roadway)<br>Moderate (residences)  |  |
| comment  | There is limited exposure of the proposal to residences along the western verge. Residences along the eastern verge would be exposed from the second storey, however there is limited fenestration facing the roadway. The road setting would become more urbanised and formal, though the treed median would add character, amenity and identity to the roadway. |  |
| mitigation strategy                                | Re-establishment of stands of trees along eastern verge. Landscape enhancements to western verge. Relocation of existing palms and new tree plantings to the median would assist in reinstating the existing streetscape character. Overhead powerlines to be retained along western verge.   |  |
| rating of visual impact after mitigation           | Low to Moderate (roadway)<br>Moderate (residences)  |  |

## 06 LANDSCAPE CHARACTER AND VISUAL IMPACT MITIGATION STRATEGY

Mitigation measures are design treatments that are recommended to abate the visual impacts of proposed works, including ways to lessen the visual effect of the proposed project. These measures have been integrated into the design of the project and will be developed further in the development of the design. They include:

- A key mitigation measure is the re-establishment of vegetation, particularly along the western verge between Caddens Road and Sunflower Drive South. This strategy requires the under grounding of power lines making best use of the wider eastern verge for large scale tree re-vegetation.
- The introduction of a treed median would significantly assist in re-establishing mature vegetation, provide visual screening and give the road corridor a stronger identity in line with the Transport Boulevard Concept.
- The introduction of retaining walls along the eastern verge in the vicinity of chainage 400 would contribute to the retention of mature Cumberland Plains Woodlands which strongly define the setting in this area.
- The provision of screening vegetation along the northern verge of the on-load ramp would limit the visual exposure of the ramp and assist in re-establishing the existing character.
- Relocation of palms within the median, with the addition of Eucalypt plantings would contribute to retaining the existing streetscape character, and adding larger scaled trees within the road corridor.

Other mitigation measures, if required, include the introduction of a continuous noise barrier which would assist in unifying the streetscape. Painting it in a dark colour would visually recede this element.

Overall, the visual impact of the proposal is considered to have an overall moderate rating which is consistent with the landscape character impact. This correlation is due to the visual significance of vegetation buffers, contributing to the character of the landscape. This highlights the significance of potential mitigation measures, assisting in reinstating the original character and reducing the overall rating.

| viewpoint | location  | sensitivity | magnitude     | impact        |
|-----------|-----------|-------------|---------------|---------------|
| 1         | roadway   | Low         | High          | Moderate      |
|           | residence | High        | Moderate      | Moderate-high |
| 2         | roadway   | Low         | High          | Moderate      |
|           | residence | High        | Moderate      | Moderate-high |
| 3         | roadway   | Low         | High          | Moderate      |
|           | residence | High        | Low           | Moderate      |
| 4         | roadway   | Low         | High          | Moderate      |
|           | residence | High        | Low           | Moderate      |
| 5         | roadway   | Low         | Moderate-high | Moderate      |
|           | residence | High        | Low           | Moderate      |
| 6         | roadway   | Low         | Moderate      | Moderate-low  |
|           | residence | High        | Low           | Moderate      |

Table 3 : visual impact for all six viewpoints identified in section 5.3.



## 07 CONCLUSION

As the proposal is situated within a constrained road corridor, there are limited opportunities to visual integrate the project in its setting. Hence any opportunities to integrate structures, such as the potential noise barriers with the private property fencing have been recommended as they would greatly assist in mitigating the new works.

The strongest contributor to the road's identity would be the treed median which would also assist in mitigating the overall impact of the proposal. As the relatively flat topography minimises the need for any retaining structures, the impact of these built form elements would be limited.

Given that much of the adjacent open space alongside the road corridor has high scenic and landscape value (refer Penrith LEP), and in order to improve visual mitigation and to maximise the creation of a boulevard character for the new road corridor, it is strongly recommended that as a minimum, the overhead powerlines between Caddens Road and Sunflower Drive South are under grounded.

Further, consideration could be given to under grounding the power lines for the full extent of the eastern verge. This would enhance the streetscape and provide further opportunities to plant large scale trees along the eastern verge, ( in addition to the western verge), which would create a more effective and cohesive streetscape/boulevard character.

The proposal would deliver a homogeneous streetscape with a boulevard character that would be integral and in nature with the future development of the area. Enhanced public domain areas (bus stop areas) that are user friendly and improved cycle facilities would provide a great benefit to the local community.