The Horsley Drive Upgrade
Environmental Investigation Report
Appendix M – Landscape and visual impact assessment report

June 2017
The Horsley Drive Upgrade M7 to Cowpasture Road
Urban Design, Landscape Character and Visual Impact Assessment

Prepared for

Roads and Maritime Services NSW

By

CONTEXT Landscape Design

Level 2, 52-58 William Street
East Sydney NSW 2011
PO Box A866
Sydney South NSW 1235
T +61 2 8244 8900
F +61 2 8244 8988
E context@context.net.au
W www.context.net.au

© 2017

Document Control

<table>
<thead>
<tr>
<th>Revision</th>
<th>Date</th>
<th>Revision Details</th>
<th>Author(s)</th>
<th>Approved</th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td>02/08/16</td>
<td>Preliminary Draft for Review</td>
<td>JP</td>
<td>DM</td>
</tr>
<tr>
<td>02</td>
<td>31/01/17</td>
<td>Final</td>
<td>JP</td>
<td>DM</td>
</tr>
<tr>
<td>03</td>
<td>22/02/17</td>
<td>Final</td>
<td>SM</td>
<td>DM</td>
</tr>
<tr>
<td>04</td>
<td>07/04/17</td>
<td>Final</td>
<td>SM</td>
<td>DM</td>
</tr>
</tbody>
</table>
Table of Contents

01 Introduction 1
  1.1 Background to the project 2
  1.2 Purpose & scope of this report 2
  1.3 Report methodology 3
  1.4 Report structure 4
  1.5 Project description 4

02 Landscape Analysis 7
  2.1 Introduction 8
  2.2 Regional context 8
  2.3 Local context 10
  2.4 Land use 12
  2.5 Topography & hydrology 14
  2.6 Geology & soils 14
  2.7 Access & circulation 16
  2.8 Flora & fauna 18
  2.9 Visibility analysis 20
  2.10 Landscape character 24
  2.11 Opportunities & constraints 32

03 Urban Design Strategy 35
  3.1 Introduction 36
  3.2 Urban design vision 36
  3.3 Roads and Maritime urban design principles 36
  3.4 Project-specific urban design objectives and principles 38

04 Concept Design 41
  4.1 The Urban Design Concept 42
  4.2 Achieving objective 1 - a contextually responsive and integrated corridor 44
  4.3 Achieving objective 2 - a parkway through the Parklands 46
  4.4 Achieving objective 3 - designing for pedestrians & cyclists 52
  4.5 Achieving objective 4 - an environmentally sensitive corridor 54

05 Landscape Character Impact Assessment 57
  5.1 Introduction 58
  5.2 Landscape character impact assessment 59

06 Visual Impact Assessment 61
  6.1 Introduction 62
  6.2 Sensitivity, magnitude & impact 62
  6.3 Key viewpoints 64
  6.4 Visual impact assessment 66
  6.5 Visual impact assessment summary 74

07 Mitigation Strategy 77
  7.1 Introduction 78
  7.2 Detail design mitigation measures 78
  7.3 Construction period mitigation measures 80

08 References 81
List of Figures

Figure 2-1 Regional context 8
Figure 2-2 Local context 11
Figure 2-3 Surrounding land use 13
Figure 2-4 Topography and hydrology 15
Figure 2-5 Pedestrian, cycle and vehicular access and circulation 17
Figure 2-6 Flora and fauna 19
Figure 2-7 ZVI analysis from multiple base points 21
Figure 2-8 Aggregate potential ZVI 23
Figure 2-9 Landscape Character Zones 25
Figure 2-10 Character images - landscape character zone 1 26
Figure 2-11 Character images - landscape character zone 2 28
Figure 2-12 Character images - landscape character zone 3 30
Figure 2-13 Opportunities and constraints 32
Figure 4-1 Urban design concept plan 42
Figure 4-2 Cross section through Urban Farming gateway at Ferrers Road 50
Figure 6-1 Key viewpoints 65

List of Tables

Table 3-1 Roads and Maritime urban design principles incorporating project specific amendments 37
Table 5-1 Landscape character impact assessment matrix 58
Table 5-2 Landscape character impact magnitude ratings 58
Table 5-3 Landscape character impact assessment 59
Table 6-1 Visual impact assessment matrix 63
Table 6-2 Visual impact assessment; viewpoints 1 - 5 66
Table 6-3 Visual impact assessment; viewpoints 6 - 10 68
Table 6-4 Visual impact assessment; viewpoints 11 - 14 70
Table 6-5 Visual impact assessment; viewpoints 15 - 18 72
Table 6-6 Visual impact assessment summary 74
Table 7-1 Summary of landscape character impact mitigation measures to be incorporated during detailed design 78
Table 7-2 Summary of visual impact mitigation measures to be incorporated during detailed design 79
Introduction
1.1 Background to the project

Roads and Maritime Services NSW (Roads and Maritime) is planning for the future upgrade of a 2.4 km section of The Horsley Drive between the M7 Motorway and Cowpasture Road (the project).

The study area is located within the Fairfield Local Government Area and includes the adjoining regionally significant Western Sydney Parklands.

The road functions as a transit arterial road linking existing and planned urban, commercial and industrial areas to the M7 Motorway and Sydney Orbital Network beyond.

The objectives of the project are to:

• Provide a safer road environment for all road users in line with the NSW Road Safety Strategy 2012-2021
• Provide road capacity to meet road user demand in 2021 (and 10 years from opening) and road reserve to meet traffic demand in 2036 and contribute to the productivity and liveability in Western Sydney including Western Sydney Employment Area
• Improve freight access and connectivity to support economic growth in Western Sydney with particular emphasis on the Smithfield-Wetherill Park employment area and Western Sydney Employment Area
• Improve amenity along the corridor and accessibility and efficiency for public transport and facilitate active transport for pedestrians and cyclists.
• Minimise impacts and sensitively fit with the environment including Western Sydney Parklands
• Minimise ‘whole of life cost’ and provide value for money.

To meet these objectives, it is proposed to upgrade The Horsley Drive between the M7 Motorway and Cowpasture Road to a 4-lane divided road with central median. The upgrade anticipates further growth in the broader Western Sydney region by incorporating a central median that provides for future expansion to a 6-lane road.

1.2 Purpose & scope of this report

This urban design, landscape character and visual impact assessment report has been prepared for Roads and Maritime by Context as part of the environmental assessment of the project and to assist with corridor selection for the proposed upgrading of The Horsley Drive between the M7 Motorway and Cowpasture Road.

Context has worked in collaboration with Roads and Maritime’s infrastructure development team and Centre for Urban Design as well as specialist consultants GHD (engineering) and SMEC (traffic).

The purpose of this report is to inform the development of future stages of the project by analysing the study area, formulating a series of project-specific design principles and urban design vision, illustrating the urban design concept, documenting the potential landscape character and visual impacts of the project and preparing a strategy to mitigate these impacts.
1.3 Project description

Roads and Maritime is investigating the future upgrade of a 2.4 km section of The Horsley Drive between the M7 Motorway and Cowpasture Road. It is proposed to widen the existing road corridor to a 4-lane divided road with a central median that provides the potential to upgrade to a 6-lane road in the future.

The project is designed to meet the functions of an arterial road, ensuring safety and improving the integration of the road corridor with its broader setting.

The project would generally involve the following:

- Two 3.5m lanes in each direction (eastbound and westbound) on The Horsley Drive by pavement widening and upgrading in the eastern and western sections of the study area and road corridor realignment in the central section of the study area
- A 9.4m wide central median that provides the potential to upgrade to a 6-lane road in the future
- Upgrade to the signalised intersection at Ferrers Road and the associated right turn lane on The Horsley Drive
- A shared path on The Horsley Drive along the entire length of the project as well as north-south connectivity to the Western Sydney Parklands shared path
- Upgrading the existing roundabout at the intersection of The Horsley Drive and Cowpasture Road to a signalised intersection.
1.4 Report methodology

This urban design, landscape character and visual impact assessment report has been an iterative process in which urban design opportunities and constraints were integrated with the development of the corridor options in collaboration with the project team.

The process has involved:
- Consultation with key stakeholders
- Site visits and photographic record of the study area, its landscape character and visual qualities
- Desktop review of relevant planning policies and procedures relating to the study area and its immediate and regional context
- Analysis of the study area and surrounding landscape including the built and natural qualities of the area
- Analysis of the study area’s Zone of Visual Influence to form the basis of the assessment of the potential impact of the proposed upgrade on key viewpoints
- Analysis of the study area’s landscape character
- Development of urban design objectives and principles and urban design concept
- Development of the urban design concept
- Assessment of the potential landscape character impacts of the project
- Assessment of the potential visual impacts of the project
- Development of a mitigation strategy to be employed during detailed design development and throughout the construction period.

This process has occurred in collaboration with the project team with the aim of achieving an integrated urban design and engineering outcome that realises the design outcomes described in Roads and Maritime’s urban design policy.

1.5 Report structure

The structure of this report reflects the design process adopted in collaboration with the project team to achieve an integrated engineering and urban design outcome.

This report is presented in the following sections:
- **Section 01 Introduction** presents the background to the project, purpose and scope of this report and the relevant Roads and Maritime urban design policies and guidelines, together with a description of the Proposal and the assessment methodology undertaken in this report.
- **Section 02 Landscape Analysis** provides an analysis of the project corridor and its context, particularly in relation to the Western Sydney Parklands. This section also analyses the corridor’s existing visibility and presents a series of landscape character zones.
- **Section 03 Urban Design Strategy** presents the urban design vision for the project, Roads and Maritime’s urban design objectives and principles for all Roads and Maritime’s projects as well as a series of project-specific urban design principles informed by the landscape analysis.
- **Section 04 Concept Design** presents the urban design concept plan, discussing the concept proposals against each of the project-specific urban design principles.
- **Section 05 Landscape Character Impact Assessment** assesses the potential landscape character impacts of the project.
- **Section 06 Visual Impact Assessment** assesses the potential visual impacts of the project and develops a mitigation strategy to be employed during detailed design development and throughout the construction period.

This process has occurred in collaboration with the project team with the aim of achieving an integrated urban design and engineering outcome that realises the design outcomes described in Roads and Maritime’s urban design policy.
Landscape Analysis
2.1 Introduction

Beyond the Pavement; urban design policy procedures and design principles describes Roads and Maritime’s urban design principles applicable to all projects (Roads and Maritime Services Centre for Urban Design, 2014).

The aim of these principles is to ensure that Roads and Maritime projects fit sensitively into the natural patterns and systems of a place as well as with the form and scale of the built environment, its community and cultural setting.

The natural and built contextual qualities of the project are defined by a range of factors that include:

• regional and local geographical context
• topography, hydrology, geology and soils
• adjoining property ownership and land use
• pedestrian, cycle and vehicular access and circulation
• flora and fauna

These contextual qualities are described and illustrated in this section of the report.

2.2 Regional context

The project is located in the western Sydney suburb of Horsley Park, around 30 km west of Sydney’s CBD on The Horsley Drive between the M7 Motorway and Cowpasture Road (refer Figure 2-1).

The section of The Horsley Drive along which the project is situated project is situated adjoining Western Sydney Parklands with various land uses including farming and passive and active recreation facilities as well as a small number of private rural residential, commercial and agricultural properties. The surrounding lands support a range of use including residential, commercial and industrial.

The east-west corridor of The Horsley Drive bisects Western Sydney Parklands in connecting the Wetherill Park industrial area to the M7 Motorway and Sydney Orbital beyond.
2.3 Local context

Western Sydney Parklands

The Western Sydney Parklands forms the largest urban parkland system in Australia; a 5,280 hectare, 27 km long corridor stretching from Quakers Hill to Leppington (refer Figure 2-1). The Western Sydney Parklands Trust (WSPT) is responsible for the care, control and management of the Parklands.

The Horsley Drive corridor bisects the central region of the Parklands, forming the junction between the primary recreational core of the Parklands and the planned future Horsley Park Urban Farm precinct. Major recreation facilities located within the Parklands in the vicinity of The Horsley Drive include the Sydney International Equestrian Centre and Lizard Log recreation precinct, as well as the major north-south pedestrian/cycle path adjoining the WaterNSW Upper Canal.

The Parklands form a critical component of Western Sydney in terms of infrastructure, agriculture and water supply as well as other essential community facilities, providing employment and training opportunities in tourism, recreation and environment (WSPT, 2010).

A key strategic direction of the Parklands Plan of Management 2020 is to establish urban farming in the Parklands. The Horsley Park Precinct Urban Farm is the largest area of proposed urban farming. The Horsley Park Precinct Urban Farming Masterplan (WSPT, 2012) provides the opportunity for glasshouse, poly/ greenhouse, market garden, orchard and grove farming enterprises across 11 lots, covering 158.7 hectares of land. Implementation of the Masterplan will be stages of the short (two years), medium (two to five years) and long term (10 years plus).

The Parklands Plan of Management 2020 designates particular areas within the Parklands for future commercial development, such as the Business Hub north of The Horlsey Drive at its signalised intersection with Cowpasture Road.

Wetherill Park industrial area

The Wetherill Park industrial area adjoins the eastern boundary of the Parklands north of The Horsley Drive. The Horsley Drive’s passage through the Parklands forms an important freight connection between this industrial development and the M7 Motorway and results in a substantial number of heavy freight vehicle movements through the study area.

M7 Motorway

The M7 Motorway forms the western boundary of the Parklands between Minchinbury and Cecil Park and intersects The Horsley Drive at the western extent of the study area.

The Motorway provides an uninterrupted link between the M2, M4 and M5, forms part of the Sydney Orbital Network and provides an important freight vehicle route through and around the western Sydney region.
Wetherill Park
industrial area

BOSSLEY PARK

HORSLEY PARK

The Horsley Drive

Sydney International Equestrian Centre

Lizard Log passive & active recreation area

Horsley Park Urban Farming Precinct

Business Hub

Eastern Creek riparian corridor

M7 Motorway

Wallgrove Road

WaterNSW Upper Canal

Cowpasture Road

“The Keyhole” privately owned land

The Project Site

The Horsley Drive

Figure 2-2. Local context
2.4 Land use

Land use along the project primarily consists of rural parklands owned either by Western Sydney Parklands Trust (WSPT) or the State of New South Wales. Land owned by the State of New South Wales is reserved for National Park.

There are a number of rural residential properties adjoining the project as well as a service station and Wetherill Park industrial area in the central and eastern sections of the project respectively. The WaterNSW Upper Canal bisects the project within the eastern section of the study area.

**Western Sydney Parklands**

The majority of the project site is bordered by land owned by WSPT or the State of New South Wales. Together, these lands form the Western Sydney Parklands under the care, control and management of the WSPT.

The Horsley Drive forms the junction between the primary recreational core of the Parklands and the Horsley Park Urban Farming Precinct. North of the project, the Parklands consist of farming and pasture lands, while south of the project the Parklands include the passive and active recreation area of Lizard Log, the main north-south cycle and walking track in the Parklands and the Sydney International Equestrian Centre.

The area north of The Horsley Drive at its signalised intersection with Cowpasture Road is currently a Business Hub, while the area south-west of this intersection is proposed for the future Lizard Log commercial recreation and tourism.

**Rural residential**

Numerous rural residential properties are located within the Parklands and are proposed to be managed under the Parklands Plan of Management 2020 in the future. These properties are marked with an ‘x’ in Figure 2-3. A number of residential properties towards the central area of the project site will remain privately owned. These properties, often referred to as the ‘Key hole’, are bounded with a red line in Figure 2-3.

**Commercial/industrial**

The service station located within the central section of the project provides a heavy vehicle refueling station. The Sharks Golf Driving Range is also located within the central section of the project. The Wetherill Park industrial area adjoining the eastern end of the project primarily consists of bulky goods retail, storage/warehouses and motor vehicle repairs and sales.

**Infrastructure**

The WaterNSW Upper Canal is located within an infrastructure easement owned by WaterNSW. The Horsley Drive passes over the canal via the Westons Tunnel. A north-south shared path runs parallel to the canal; this path being the primary north-south pedestrian/cycle connection within the Western Sydney Parklands.
Figure 2-3. Surrounding land use
2.5 Topography & hydrology

The topography of the region is varied, rising from the low-lying alluvial flats adjoining Eastern Creek (72.50m AHD) in the western section of the study area to the elevated undulating ridge at Ferrers Road (99.00m AHD) before descending to the roundabout intersection at Cowpasture Road (57.00m AHD) in the eastern end of the study area.

Between the M7 Motorway and Eastern Creek, The Horsley Drive traverses generally flat landform between about 84.00m to 72.50m elevation AHD, falling from west to east. Between the low-lying Eastern Creek and Ferrers Road situated atop the undulating ridge, The Horsley Drive traverses a variety of flat and undulating landform rising west to east from 72.50m to 99.00m elevation AHD. Between Ferrers Road and Cowpasture Road, the proposal traverses generally undulating landform falling from west to east between around 99.00m and 57.00m elevation AHD.

Existing longitudinal slopes along The Horsley Drive vary, with a maximum grade of 9% occurring between Ferrers Road and the WaterNSW Upper Canal.

The project traverses two major water courses; Eastern Creek and the Sydney Water Supply Channel, which flow north to the Hawkesbury River and Prospect Reservoir respectively.

2.6 Geology & soils

The geology of the study area generally consists of Triassic shales and lithic sandstones, with a small number of volcanic vent intrusions. Tertiary river gravels and sands, of the Hawkesbury-Nepean Terrace Gravels landscape, partially cover much of the landscape, in addition to Quaternary alluvium along the areas main watercourses. (GHD, 2016)

Soils throughout the proposal site are comprised predominantly of intergrading Blacktown and Luddenham Soil Landscapes, summarised in Biodiversity Impact Assessment (GHD, 2016) summarises as follows.

- The Blacktown residual soil landscape occurs on gently undulating rises on Wianamatta Group shales, with local relief to 30m and slopes usually >5%. The soil unit typically comprises clayey soils of poor drainage overlying moderately reactive, highly plastic subsoils.

- The Luddenham erosional soil landscape occurs on undulating to rolling low hills on Wianamatta Group shales, comprising narrow ridges, hillcrests and valleys, often associated with Minchinbury Sandstone. Local relief is 50–80m, with slopes of 5–20%. Luddenham soils are characterised by shallow (<100 cm) dark podzolic soils or massive earthy clays on crests; moderately deep (70–150cm) red podzolic soils on upper slopes; moderately deep (<150 cm) yellow podzolic soils and prairie soils on lower slopes and drainage lines.
2.7 Access & circulation

The project will potentially impact numerous existing and planned future pedestrian, cycle and vehicular connections.

Existing pedestrian/cycle access & circulation
There are three primary existing pedestrian and cycle access points to The Horsley Drive at the M7 Motorway [1], Ferrers Road [2] and the WaterNSW Upper Canal [3] (refer Figure 2-5). The shared paths along the M7 Motorway and the WaterNSW Upper Canal form regionally significant connections and important north-south Parklands connections.

Pedestrian footpaths also exist along The Horsley Drive in some locations.

Existing vehicular access & circulation
The Horsley Drive provides a major vehicular thoroughfare between existing and planned urban, commercial and industrial areas and the M7 Motorway and Sydney Orbital Network beyond.

The Horsley Drive also intersects Ferrers Road atop the undulating ridge adjoining the WaterNSW Upper Canal. At this location, Ferrers Road forms the gateway to the Horsley Park Urban Farming Precinct.

A number of private driveways also have access to The Horsley Drive, with the majority of these occurring within the central section of the study area.

Access to the Sydney International Equestrian Centre for general traffic is from Saxony Road, while emergency access to the premises is also provided from The Horsley Drive. A gate is provided at the eastern end of the property for NSW Rural Fire Service vehicles.

Maintenance vehicle access to WaterNSW land associated with the Upper Canal is accessed via driveways either side of The Horsley Drive.
Proposed north-south pedestrian and cycle track as part of the Horsley Park Urban Farming Precinct.

Maintenance vehicle access to WaterNSW Upper Canal either side of The Horsley Drive.

Figure 2-5. Pedestrian, cycle and vehicular access and circulation.
2.8 Flora & fauna

The Biodiversity Impact Assessment carried out by GHD (2016) includes detailed information on flora and fauna within the study area, briefly summarised below.

**Flora**

The majority of the study area has been cleared of native vegetation, and is composed of a mix of exotic pastureland, cultivated market gardens, residential and commercial development, and residential gardens. There are also sparsely scattered and isolated remnant canopy trees in areas of cleared vegetation, indicative of the Cumberland Plain Woodland that was historically present. (GHD, 2016)

Fields surveys carried out as part of the Biodiversity Impact Assessment confirmed the presence of two NSW plant community types in the study area:

- Grey Box-Forest Red Gum grassy woodland on flats of the Cumberland Plain, Sydney Basin (ME020) (Shale Plains Woodland – NPWS 2002)

A number of native revegetation areas are also present within and surrounding the study area, particularly within Western Sydney Parklands south of The Horsley Drive (GHD, 2016).

**Fauna**

The Parklands generally contain a variety of fauna including Swamp Wallabies, Echidnas, Eastern Grey Kangaroos, Lace Monitors and a diversity of birdlife. The Parklands is the headwaters to three major catchment areas with Eastern Creek being the largest tributary. (WSPT, 2013)

Fauna habitat within the study area is patchy due to past disturbance and land use, such as residential subdivision and grazing, and many of the remaining patches have poor quality lower strata and limited microhabitat availability. (GHD, 2016)

The proposal site contains few pre-European occupation age trees and associated habitat resources such as tree-hollows and stags. The more intact remnants provide potential habitat for a variety of fauna and the creeklines and associated tributaries provide habitat for birds, microbats and amphibians. (GHD, 2016)
Figure 2-6: Flora and fauna
2.9 Visibility analysis

2.9.1 Introduction

The Zone of Visual Influence (ZVI) represents the area from which The Horsley Drive corridor is potentially visible from the surrounding landscape. The process used to determine areas of visibility and non-visibility involves geospatial computer software and digital elevation data provided by Roads and Maritime in the form of 3D contours at 0.5m intervals.

A ZVI map illustrates the potential visibility of the road corridor based on landform only, using geospatial software to create a triangulated irregular network (TIN) surface on which the ZVI analysis is performed. This ZVI analysis does not take into account the potential visual screening created by natural and built objects such as trees and buildings.

Therefore, results of this analysis indicate areas where the road corridor definitely cannot be seen, whereas actual visibility is determined by inspecting the area to take account of variables that affect lines of sight.

2.9.2 ZVI analysis

The ZVI analysis was carried out for a number of different base points throughout the study area. These base points were given a height of 2m above the level of the road in each location, and positioned along the road corridor as follows:

• ZVI base point 1 - the western extent of study area
• ZVI base point 2 - the low point of The Horsley Drive at its crossing of Eastern Creek
• ZVI base point 3 - the midpoint between ZVI base points 2 and 4
• ZVI base point 4 - the high point of The Horsley Drive atop the undulating north-south ridge
• ZVI base point 5 - The Horsley Drive at its crossing of the WaterNSW Upper Canal
• ZVI base point 6 - the eastern extent of study area

These maps indicate visibility of the road corridor by identifying areas from which the entire 2m height at each ZVI base point is visible (shown green), only part of the entire 2m height is visible (shown yellow) and none of the 2m height is visible (shown red).

Figure 2-7 illustrates the ZVI analysis for all six ZVI base points.
Figure 2-7. ZVI analysis from multiple base points
2.9.3 Zone of Visual Influence

The ZVI analysis discussed in the previous section establishes the extent to which the study area can potentially be seen from the surrounding landscape. The results of these individual analyses are aggregated within Figure 2-8 to illustrate the ZVI for the entire length of the study area.

Figure 2-8 highlights that the locations from which The Horsley Drive can potentially be seen are primarily located within the lower lying central area of the study area. Figure 2-8 also highlights the limited visibility of the study area from areas near the M7 Motorway and the ridgeline that runs north-south adjacent the WaterNSW Upper Canal.
Figure 2-8. Aggregate potential ZVI
2.10 Landscape character

Landscape character is the combined quality of the built, natural and cultural aspects that make up an area and provide its unique sense of place. Landscape in this context is taken to include all qualities and characteristics of a tract of land – landform, vegetation, built form, infrastructure and so on.

An analysis of the existing landscape of The Horsley Drive corridor was carried out to provide a baseline for the assessment of the significance of potential impacts resulting from the proposed upgrade.

The analysis involves identification of a series of Landscape Character Zones (LCZs) that are mapped in Figure 2-9 and described and illustrated in the following pages. The LCZs are areas that are relatively consistent in terms of their combination of landform, vegetation and land uses.
Figure 2-9. Landscape Character Zones

Landscape Character Zone 1: Eastern Creek flats
Landscape Character Zone 2: Undulating ridge
Landscape Character Zone 3: Wetherill Park slopes
2.10.1 Landscape character zone 1 - Eastern Creek flats

<table>
<thead>
<tr>
<th>Topography</th>
<th>Generally flat, gentle slopes towards Eastern Creek.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Natural drainage</td>
<td>Eastern Creek drains northwards</td>
</tr>
<tr>
<td>Geological qualities</td>
<td>Overlies interbedded sedimentary Triassic sandstone and shale beds of the Wianamatta Group sedimentary sequence.</td>
</tr>
<tr>
<td>Ecological characteristics</td>
<td>Endangered Ecological Communities; Alluvial Woodland and Shale Plains Woodland. No obvious aquatic habitat within Eastern Creek.</td>
</tr>
<tr>
<td>Agricultural qualities</td>
<td>Farms located north of the road.</td>
</tr>
<tr>
<td>Parks and open space</td>
<td>Sydney International Equestrian Centre located south of the road.</td>
</tr>
<tr>
<td>Cultural and recreational characteristics</td>
<td>Pedestrian footpath adjoining northern side of the road exposes pedestrians/cyclists to vehicular environment.</td>
</tr>
<tr>
<td>Built form</td>
<td>Scattered rural residential properties, setback from road varies. Larger commercial/industrial buildings include BP service station and golf driving range.</td>
</tr>
<tr>
<td>Spatial qualities</td>
<td>Relatively flat landform provides long distance views along the road corridor. The road corridor is generally open with minimal roadside planting, except where it passes over Eastern Creek which is enclosed by native bushland relatively close to the road edge.</td>
</tr>
<tr>
<td>Infrastructure</td>
<td>Concrete drainage culvert at Eastern Creek.</td>
</tr>
<tr>
<td>Economic or industrial features</td>
<td>BP service station, including heavy vehicle refueling facilities.</td>
</tr>
<tr>
<td>Landscape Character Sensitivity</td>
<td>LOW</td>
</tr>
</tbody>
</table>

Figure 2-10. Character images - landscape character zone 1
2.10.2 Landscape character zone 2 - Undulating ridge

<table>
<thead>
<tr>
<th>Character</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Topography</td>
<td>Generally undulating landform associated with the north-south ridgeline that runs parallel to the WaterNSW Upper Canal.</td>
</tr>
<tr>
<td>Natural drainage</td>
<td>No apparent major drainage lines.</td>
</tr>
<tr>
<td>Geological qualities</td>
<td>Overlies interbedded sedimentary Triassic sandstone and shale beds of the Wianamatta Group sedimentary sequence.</td>
</tr>
<tr>
<td>Ecological characteristics</td>
<td>Endangered Ecological Community; Shale Hills Woodland.</td>
</tr>
<tr>
<td>Agricultural qualities</td>
<td>Farms located north of the road near Ferrers Road.</td>
</tr>
<tr>
<td>Parks and open space</td>
<td>Rural parklands adjoin the south side of the road, although recreation facilities are limited to the shared path that runs along the WaterNSW Upper Canal easement, crossing The Horsley Drive at a dedicated signalised pedestrian crossing.</td>
</tr>
<tr>
<td>Cultural and recreational characteristics</td>
<td>Pedestrian footpath adjoining northern side of the road exposes pedestrians/cyclists to vehicular environment.</td>
</tr>
<tr>
<td>Built form</td>
<td>No built form immediately adjoining the road.</td>
</tr>
<tr>
<td>Spatial qualities</td>
<td>Landform provides an elevated spatial experience with open views intermittently screened by Shale Hills Woodland adjoining the road corridor.</td>
</tr>
<tr>
<td>Infrastructure</td>
<td>WaterNSW Upper Canal and Weston’s Tunnel at junction of landscape character zone 2 and 3.</td>
</tr>
<tr>
<td>Economic or industrial features</td>
<td>None. However the Wetherall Park industrial development can be seen from the eastern slopes.</td>
</tr>
<tr>
<td>Landscape Character Sensitivity</td>
<td>MODERATE</td>
</tr>
</tbody>
</table>
### 2.10.3 Landscape character zone 3 - Wetherill Park slopes

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Topography</strong></td>
<td>Gentle west-to-east slope associated with the north-south ridgeline that runs parallel to the WaterNSW Upper Canal.</td>
</tr>
<tr>
<td><strong>Natural drainage</strong></td>
<td>No apparent major drainage lines.</td>
</tr>
<tr>
<td><strong>Geological qualities</strong></td>
<td>Overlies interbedded sedimentary Triassic sandstone and shale beds of the Wianamatta Group sedimentary sequence</td>
</tr>
<tr>
<td><strong>Ecological characteristics</strong></td>
<td>Endangered Ecological Community; Shale Hills Woodland</td>
</tr>
<tr>
<td><strong>Agricultural qualities</strong></td>
<td>Rural pasture land adjoining both sides of the road corridor.</td>
</tr>
<tr>
<td><strong>Parks and open space</strong></td>
<td>Lizard Log commercial recreation and tourism.</td>
</tr>
<tr>
<td><strong>Cultural and recreational characteristics</strong></td>
<td>Recreation facilities are limited to the shared path that runs along the eastern edge of the Sydney Water Supply Channel easement.</td>
</tr>
<tr>
<td><strong>Built form</strong></td>
<td>No built form immediately adjoining the road.</td>
</tr>
<tr>
<td><strong>Spatial qualities</strong></td>
<td>Extensive views and vistas to the east from the higher elevations. Enclosed by landform and the vegetated edge of the WSP from lower elevations</td>
</tr>
<tr>
<td><strong>Infrastructure</strong></td>
<td>WaterNSW Upper Canal and Weston’s Tunnel at junction of landscape character zone 2 and 3.</td>
</tr>
<tr>
<td><strong>Economic or industrial features</strong></td>
<td>Landform provides an elevated spatial experience with open views across the urban development of Bossley Park and industrial development of Wetherill Park.</td>
</tr>
<tr>
<td><strong>Landscape Character Sensitivity</strong></td>
<td>MODERATE</td>
</tr>
</tbody>
</table>

---

Figure 2-12. Character images - landscape character zone 3
2.11 Opportunities & constraints

Figure 2-13 below illustrates the potential opportunities and constraints of the project, identified throughout the strategic design phase of the project and incorporated into the development of the urban design concept.

The environmental constraints included below have been sourced from the Parklands’ Plan of Management 2020 together with the Biodiversity Impact Assessment (GHD, 2016) for The Horsley Drive Upgrade.

Figure 2-13. Opportunities and constraints
Endangered Ecological Communities (shown green throughout)

Western Sydney Parklands
Horsley Park Urban Farming Precinct

optimum location for pedestrian/cycle crossing

Central Section

Eastern Section

Horsley Drive Business Hub

Eastern section road widening:
Widening to the south to align with Parklands’ Plan of Management

potentially shared path connections to future development

potential left in / left out vehicular access to future development

Wildlife crossing point to improve the environmental quality of Eastern Creek if feasible

Opportunities to rehabilitate bushland corridor in areas disturbed by road construction

Western section road widening:
Widening to the north has the least impact and benefits the merge from the M7 as well as service station ingress and egress provision

Optimum location for pedestrian/cycle crossing

Service station ingress and egress provision

Golf driving range ingress and egress provision

Lizard Log

Western Sydney Parklands
Horsley Park Urban Farming Precinct

Aboriginal PAD sites predominantly on the southern side of Horsley Drive

Central Section

Eastern Section

The Horsley Drive Upgrade M7 to Cowpasture Road
Urban Design, Landscape Character and Visual Impact Assessment | Revision 4 - April 2017
The urban design vision for the upgrade of The Horsley Drive is to create a contextually sensitive road corridor that increases road capacity while promoting pedestrian and cycle connectivity along and across the road corridor. In particular, the urban design vision recognises The Horsley Drive’s key location adjacent to the Western Sydney Parklands and provides for the development of this region in line with the future vision of the Parklands and the unique landscape and rural parklands character of the area.
Urban Design Strategy
3.1 Introduction

Roads and Maritime currently has in place a series of design guideline documents that aim to produce best practice design outcomes for road projects in NSW. Design guidelines that have been considered in the preparation of this report include:

- Beyond the Pavement (Roads and Maritime, 2014)
- Landscape Guideline (Roads and Maritime, 2008)

3.2 Urban design vision

The urban design vision for the upgrade of The Horsley Drive is to create a contextually sensitive road corridor that increases road capacity while promoting pedestrian and cycle connectivity along and across the road corridor. In particular, the urban design vision recognises The Horsley Drive’s key location adjacent to the Western Sydney Parklands and provides for the development of this region in line with the future vision of the Parklands and the unique landscape and rural parklands character of the area.

3.3 Roads and Maritime urban design principles

*Beyond the Pavement: urban design policy procedures and design principles* (Roads and Maritime, 2014) describes Roads and Maritime urban design principles that aim to achieve an integrated engineering and urban design outcome for all Roads and Maritime projects.

These principles capture the urban design qualities that any project should have and from which more project-specific urban design objectives and principles can be derived. They form the basis for thinking about and evaluating design, deriving the criteria to judge the quality of a project’s urban design. (Roads and Maritime, 2014)

*Beyond the Pavement* urban design principles are presented in Table 04. Where principles have been amended to suit The Horsley Drive project, these amendments are shown in *italics*. Where either part or all of the principle is not relevant to this project, it is shown *struck through*. 
<table>
<thead>
<tr>
<th><strong>PRINCIPLE ONE</strong></th>
<th><strong>PRINCIPLE SIX</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Contribute to the</td>
<td>Incorporate heritage and cultural contexts</td>
</tr>
<tr>
<td>urban structure</td>
<td>Integrate historic structures, buildings and precincts into design of transport infrastructure.</td>
</tr>
<tr>
<td>and revitalisation</td>
<td>Consider the role of networks in the structuring of towns, cities and regions.</td>
</tr>
<tr>
<td></td>
<td>Consider the role of road and maritime transport infrastructure in revitalizing and transforming areas.</td>
</tr>
<tr>
<td></td>
<td>Consider both transport and community needs in planning and designing road networks and hierarchies.</td>
</tr>
<tr>
<td></td>
<td>Create an urban road corridor streets and boulevards that provide a strong sense of place.</td>
</tr>
<tr>
<td></td>
<td>Consider the potential opportunities of a reduction in traffic volume.</td>
</tr>
<tr>
<td></td>
<td><strong>PRINCIPLE SEVEN</strong></td>
</tr>
<tr>
<td></td>
<td>Designing an experience in movement</td>
</tr>
<tr>
<td></td>
<td>Enhance the view from the road.</td>
</tr>
<tr>
<td></td>
<td>Provide visual stimuli within the road corridor.</td>
</tr>
<tr>
<td></td>
<td>Create a progressive sequence of visual events.</td>
</tr>
<tr>
<td><strong>PRINCIPLE TWO</strong></td>
<td><strong>PRINCIPLE EIGHT</strong></td>
</tr>
<tr>
<td>Fitting into the</td>
<td>Create self-explaining road environments</td>
</tr>
<tr>
<td>built fabric</td>
<td>Distinguish between the different functions and speeds of roads by differentiating their appearance.</td>
</tr>
<tr>
<td></td>
<td>Improve the legibility of roads.</td>
</tr>
<tr>
<td></td>
<td><strong>PRINCIPLE NINE</strong></td>
</tr>
<tr>
<td></td>
<td>Achieve integrated and minimal maintenance design</td>
</tr>
<tr>
<td></td>
<td>Use robust durable and contextually sensitive materials fit for purpose and place.</td>
</tr>
<tr>
<td></td>
<td>Provide a self-reliant and minimal maintenance natural landscape.</td>
</tr>
<tr>
<td></td>
<td>Avoid opportunities for vandalism.</td>
</tr>
<tr>
<td></td>
<td>Create a simple, coordinated and neat composition of road elements along a corridor.</td>
</tr>
<tr>
<td></td>
<td>Consider the design quality of major road and maritime components and individual built elements.</td>
</tr>
</tbody>
</table>

Note: Where principles have been amended to suit The Horsley Drive project, these amendments are shown in italics. Where either part or all of the principle is not relevant to this project, it is shown struckthrough.

Table 3-1. Roads and Maritime urban design principles incorporating project-specific amendments
3.4 Project-specific urban design objectives and principles

**OBJECTIVE 1**

*Provide an upgraded road corridor that is responsive to and integrated within its existing and planned future context*

**Principles**
1.1 Consider existing landform and development patterns
1.2 Strengthen the relationship between the road corridor and the adjoining Western Sydney Parklands (refer Objective 2)
1.3 Highlight and celebrate the ecological and heritage values of Eastern Creek and the WaterNSW Upper Canal and emphasise the road corridor’s crossing of these watercourses
1.4 Vary the grading of cut and fill embankments where appropriate to provide natural variation and integrate embankments with local landform

**OBJECTIVE 2**

*Strengthen The Horsley Drive’s sense of passage through the Western Sydney Parklands*

**Principles**
2.1 Convey the Parklands themes along the length of The Horsley Drive, providing landscape treatments along the road corridor that strengthen the presence of the adjoining Parklands
2.2 Reinforce the road corridor’s entry into the Parklands at The Horsley Drive’s intersections with the M7 Motorway and Cowpasture Road
2.3 Emphasise the entry to the Horsley Park Urban Farm at Ferrers Road
2.4 Ensure the road corridor’s interface with Horsley Park Urban Farming Precinct takes account of potential landscape character and visual impacts resulting from future land uses

**OBJECTIVE 3**

*Provide a cohesive and legible pedestrian and cycle network*

**Principles**
3.1 Improve pedestrian and cycle connectivity across The Horsley Drive to service the Western Sydney Parklands north-south shared path within the WaterNSW Upper Canal easement
3.2 Provide east-west shared path connections along southern side of The Horsley Drive for pedestrians and cyclists to connect with the existing shared path along the M7 Motorway and to existing and future development within the Parklands

**OBJECTIVE 4**

*Enhance the natural systems and cultural and heritage values of the corridor*

**Principles**
4.1 Where appropriate, incorporate in the design species from adjoining natural systems and ecologies including Endangered Ecological Communities
4.2 Where appropriate, recognise Aboriginal and European cultural and heritage values within the design
4.3 Minimise the potential visual impacts of the project
Lizard Log (1.5 km)
The Dairy (2 km)
Calmley Hill City Farm (3.5 km)
04
Concept Design
4.1 Urban Design Concept

The urban design concept responds to the urban design vision and the project-specific urban design objectives and principles identified and illustrated in Chapter 3 Urban Design Strategy.

The iterative development of the urban design concept has been an integral part of the collaborative design process for the project. The concept has been developed in close consultation with Roads and Maritime, project team consultants including GHD as well as the Western Sydney Parklands Trust.

The following pages detail and illustrate the urban design concept in relation to the project specific urban design objectives and principles.

Objectives include:
1. Provide an upgraded road corridor that is responsive to and integrated within its existing and planned future context
2. Strengthen The Horsley Drive’s sense of passage through the Western Sydney Parklands
3. Provide a cohesive and legible pedestrian and cycle network
4. Enhance the natural systems and cultural and heritage values of the corridor
LEGEND
1. Informal clumped tree planting
2. Horsley Park Urban Farm gateway orchard tree planting incorporating entry design as per WSPT design manual
3. Formal Cumberland Plain Woodland tree planting
4. Eastern Creek bridge structure
5. Batter grade reduction (where possible while avoiding EECs)
6. Shared path to southern side of The Horsley Drive
7. Footpath to northern side of The Horsley Drive
8. Shared path connection to crossing at Ferrers Road intersection
9. Cumberland Plain Woodland supplementary planting
10. Landscape rehabilitation and revegetation to disused roadway - to be seeded with native grasses
11. Retaining walls at WaterNSW Upper Canal
12. Median planting
13. Lizard Log entry gates and signage to be retained
14. Bus stop
15. Potential pedestrian refuge island
16. Revegetate exposed cut and fill embankments
Landform and future development patterns within the Parklands provide three distinct driver experiences through the study area:

1. The low lying alluvial flats adjoining Eastern Creek in the western section of the study area reflect the character of rural residential and agricultural land use patterns.
2. The elevated undulating ridge at Ferrers Road represents the road corridor’s main interface with and gateway to the future Horsley Park Urban Farm Precinct.
3. The gentle slopes descending to Cowpasture Road in the eastern end of the study area will undergo a change in character with the introduction of future development bordering the road corridor.

These zones pre-empt three different responses within the urban design concept, numbered below to correspond with the zones listed above.

Principle 1.1
Consider existing landform and development patterns

Principle 1.2
Strengthen the relationship between the road corridor and the adjoining Western Sydney Parklands (refer Objective 2)

Refer Urban Design Objective 2.
Principle 1.3
Highlight and celebrate the ecological and heritage values of Eastern Creek and the WaterNSW Upper Canal and emphasise the road corridor’s crossing of these watercourses.

A 10m single span plank bridge is proposed at Eastern Creek. Bridge materials and finishes should be sympathetic to the adjoining parklands landscape.

Revegetation to disturbed areas within the riparian corridor of Eastern Creek will provide the project with an opportunity to make a positive contribution to the environmental health of the creek corridor, including a potential wildlife corridor at Eastern Creek if feasible.

New retaining structures at the WaterNSW Upper Canal should use materials in keeping with the canal’s existing heritage qualities.

Principle 1.4
Vary the grading of cut and fill embankments where appropriate to provide natural variation and integrate embankments with local landform.

Where fill embankments extend into the adjoining Parklands, these should be flattened where appropriate (i.e. to a grade of 6:1) to reduce the perception of a fill embankment and maximise its future useability.

Where fill embankments occur along residential frontages, varying grades combined with landscape treatments should aim to tie new earthworks in with existing landforms as best as possible.

Cut and fill embankments through the central section of the proposal, where the new road alignment traverses the undulating north-south ridge, will be readily visible for both motorists travelling on The Horsley Drive and residents/employees from surround areas further afield. Grading of these embankments should vary as required to tie in with the localised landform of the adjoining Parklands to allow the upgrade to fit seamlessly with its surrounds.
Urban Design Objective 2 - Strengthen The Horsley Drive’s sense of passage through the Western Sydney Parklands

4.3 Achieving objective 2 - a parkway through the Parklands

Principle 2.1
Convey the Parklands themes along the length of The Horsley Drive, providing landscape treatments along the road corridor that strengthen the presence of the adjoining Parklands.

The character of the Parklands is brought as close as possible to the road edge, framing the driver experience as The Horsley Drive traverses the Parklands.

Scattered clumps of native tree planting both sides of the corridor capture views and vistas across the adjoining Parklands acreage where possible, while screening adjoining land uses where necessary.

Realignment of the Parklands north-south shared path at Ferrers Road retains its existing character and curvature to emphasise the recreational nature of the path.

Ensure the Western Sydney Parklands Design Manual is used to develop the interface between The Horsley Drive and Western Sydney Parklands.

Principle 2.2
Reinforce the road corridor’s entry into the Parklands at The Horsley Drive’s intersections with the M7 Motorway and Cowpasture Road.

Informal clumped tree planting at the eastern end of the project corridor near Cowpasture Road (South side of The Horsley Drive only), as well as at the western end of the corridor near the M7 Motorway, reflects the natural aesthetic of the local landscape to emphasise The Horsley Drive’s entry into the Parklands landscape.
Existing lines in the agricultural landscape form the inspiration for the Horsley Park Urban Farm gateway concept at the intersection of The Horsley Drive and Ferrers Road. Formal orchard planting envelopes the intersection, providing a strong experiential event for drivers travelling along The Horsley Drive, as well as for pedestrians and cyclists on the Parklands’ north-south shared path.

Provision of a ‘gateway’ at Ferrers Road will emphasise the landscape character of the urban farming precinct. Where appropriate, a reduction on the grade of cut and fill slopes with reduce the perception of embankments in these areas and maximise this land’s future usability.

Where desirable, revegetation of cut and fill slopes will also provide screening of future land uses and buildings associated with the Horsley Park Urban Farming Precinct.

Principle 2.3
Emphasise the entry to the Horsley Park Urban Farming Precinct at Ferrers Road

Principle 2.4
Ensure the road corridor’s interface with Horsley Park Urban Farm takes account of potential landscape character and visual impacts resulting from future land uses.
Cross section refer Figure 4.2
Figure 4-2. Cross section through Urban Farming gateway at Ferrers Road

Gateway orchard planting and revegetation to embankment
Parklands shared path
Gateway orchard planting
Foot path
Eastbound carriageway & bus priority lane
Planted median
Westbound carriageway & turning lanes
Roadside shared path

Gateway orchard planting to embankment

WaterNSW access track & Parklands shared path

Cumberland Plain Woodland planting and revegetation to embankment
Urban Design Objective 3 - Provide a cohesive and legible pedestrian and cycle network

4.4 Achieving objective 3 - designing for pedestrians & cyclists

Principle 3.1
Improve pedestrian and cycle connectivity across The Horsley Drive to service the Western Sydney Parklands north-south shared path within the WaterNSW Upper Canal easement

Realignment of the shared path at The Horsley Drive / Ferrers Road intersection aims to replicate the existing character and curvature of the path.

Landscape treatments between the shared path and road carriageway strengthen the sense of separation between the two elements in the vicinity of the Ferrers Road intersection.

Principle 3.2
Provide east-west shared path connections along The Horsley Drive for pedestrians and cyclists to connect with the existing shared path along the M7 Motorway and to existing and future development within the Parklands

A new 3m wide shared path facility adjoins the southern side of the upgraded The Horsley Drive, providing improved east-west connectivity between the M7 Motorway shared path and the recreation facilities of the Parklands including Lizard Log.

The upgraded intersection of The Horsley Drive and Cowpasture Road will improve east-west connectivity for pedestrians and cyclists between the Parklands and the residential suburb of Bossley Park.
view to the Sydney CBD from the Parklands shared path at Ferrers Road
4.5 Achieving objective 4 - an environmentally sensitive corridor

**Principle 4.1**
Where appropriate, incorporate in the design species from adjoining natural systems and ecologies including Endangered Ecological Communities.

Vegetation species for roadside and median planting vary along the length of the corridor in response to variations in adjoining vegetation communities. Species derived from Alluvial Woodland and Shale Plains Woodland are used in the western section of the project. Predominant tree species include *Eucalyptus amplifolia* and *Eucalyptus tereticornis*, with *Angophora floribunda* occurring less frequently. Species derived from Shale Hills Woodland are used in the eastern section of the project. Predominant tree species include *Eucalyptus moluccana* and *Eucalyptus tereticornis* with *Eucalyptus crebra* occurring less frequently.

**Principle 4.2**
Where appropriate, recognise Aboriginal and European cultural and heritage values within the design.

The built form and material qualities of new retaining structures at the WaterNSW Upper Canal should make reference to the European cultural heritage value of the canal and tunnel. Materials should reflect the utilitarian qualities of the water channel, and potentially incorporate plain concrete and sandstone where appropriate.
Principle 4.3
Minimise the potential visual impacts of the project

Roadside revegetation and planting prioritises screening for adjoining rural residential, agricultural and commercial properties. Where The Horsley Drive adjoins open acreage of the Parklands, planting is arranged in a way that retains existing views into the Parklands while providing screening where appropriate.

Planting within the central median maximises the amount of readily visible vegetation, reducing the visual impact for both motorists driving along the road and residents/employees from surrounding areas further afield.

If The Horsley Drive is upgraded in the future to a six lane configuration, the planted median will require modifications to ensure it continues to adhere to road safety design requirements.
Landscape Character Impact Assessment
5.1 Introduction

Landscape character is the combined quality of the built, natural and cultural aspects that make up an area and provide its unique sense of place. The potential impact of the project on the existing landscape character of The Horsley Drive corridor is therefore considered as an aggregate of the sensitivity of its landscape and the magnitude of the proposed work.

Table 5-1 below illustrates how the level of sensitivity and magnitude are combined to achieve an overall rating of landscape character impact in accordance with the Roads and Maritime’s Environmental Impact Assessment Practice Note - Guideline for Landscape Character and Visual Impact Assessment EIA-N04.

The assessment has identified the overall impact of the proposed works on each LCZ by firstly predicting the sensitivity of the LCZ to changes that would result from the proposed works and then identifying the likely magnitude of the proposed works within each LCZ.

Sensitivity of landscape character reflects the quality of an area’s sense of place (including all built, natural and cultural aspects) and its capacity to absorb change, i.e. how sensitive it would be to changes resulting from the proposed works.

Magnitude refers to the scale, form and character of the proposed works within the LCZ. It reflects the degree of visual contrast between the proposed works and the landscape setting in which the works will be seen.

As discussed in Section 2.10, the study area has been divided into three Landscape Character Zones (LCZ). The sensitivity of each LCZ was assessed, a summary of which can also be found in Table 5-2.

<table>
<thead>
<tr>
<th>MAGNITUDE</th>
<th>HIGH</th>
<th>MODERATE</th>
<th>LOW</th>
<th>NEGLIGIBLE</th>
</tr>
</thead>
<tbody>
<tr>
<td>HIGH</td>
<td>High</td>
<td>Moderate</td>
<td>Low</td>
<td>Negligible</td>
</tr>
<tr>
<td>Moderate</td>
<td>Moderate - High</td>
<td>Moderate</td>
<td>Low</td>
<td>Negligible</td>
</tr>
<tr>
<td>Low</td>
<td>Moderate</td>
<td>Moderate - Low</td>
<td>Low</td>
<td>Negligible</td>
</tr>
<tr>
<td>Negligible</td>
<td>Negligible</td>
<td>Negligible</td>
<td>Negligible</td>
<td>Negligible</td>
</tr>
</tbody>
</table>

Table 5-1. Landscape character impact assessment matrix (Roads and Maritime, 2013)

Table 5-2. Landscape character impact magnitude ratings
### 5.2 Landscape character impact assessment

<table>
<thead>
<tr>
<th>LANDSCAPE CHARACTER ZONE</th>
<th>SENSITIVITY</th>
<th>MAGNITUDE</th>
<th>LANDSCAPE CHARACTER IMPACT</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>LCZ 1</strong></td>
<td><strong>EASTERN CREEK FLATS</strong></td>
<td>Low</td>
<td>Low</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• This generally flat landform gently slopes towards Eastern Creek.</td>
<td>• The proposed works within this zone duplicate the existing road condition, with works limited to expansion of the road corridor to the north.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• The road corridor is generally open with minimal roadside planting, except at Eastern Creek, which is closely bordered by woodland.</td>
<td>• While the project will result in a larger road surface, the existing mixed-use semi-rural character of the landscape is expected to remain relatively similar.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• A variety of residential, commercial and agricultural properties adjoin the road corridor with varying setbacks.</td>
<td></td>
</tr>
<tr>
<td><strong>LCZ 2</strong></td>
<td><strong>UNDULATING RIDGE</strong></td>
<td>Moderate</td>
<td>High</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• This undulating landform has a strong relationship with the character of the adjoining Parklands.</td>
<td>• The proposed works will have the greatest impact on the study area in this character zone.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• The road corridor provides an elevated spatial experience with open views intermittently screened by woodlands adjoining the road corridor.</td>
<td>• Localised changes in landform will alter the relationship between the road corridor and the adjoining Parklands.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• The corridor is predominantly bounded by agricultural properties.</td>
<td>• Stands of Cumberland Plain Woodland, an Endangered Ecological Community, will be impacted by the project.</td>
</tr>
<tr>
<td><strong>LCZ 3</strong></td>
<td><strong>WETHERILL PARK SLOPES</strong></td>
<td>Moderate</td>
<td>Moderate</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• This sloping landform has a strong relationship with the character of the adjoining Parklands.</td>
<td>• New entry condition at Parklands entry to Lizard Log.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Works extend down Cowpasture Road and along The Horsley Drive east of its intersection with Cowpasture Road.</td>
</tr>
</tbody>
</table>

Table 5-3. Landscape character impact assessment
06 Visual Impact Assessment
6.1 Introduction

Based on the assessment of the existing visibility of The Horsley Drive, the potential visual impact of the project has been assessed by combining the sensitivity of the viewers to the proposed works with the magnitude of the proposed works within existing views.

Visual sensitivity, magnitude and visual impact are explained in the following sections.

Factors affecting the levels of sensitivity and magnitude are sourced from numerous industry resources and the project team’s experience in visual impact assessment, and have not been sourced from RMS publications or guidelines.

6.2 Sensitivity, magnitude & impact

6.2.1 Visual Sensitivity

Visual sensitivity refers to the visual importance of the view and how sensitive it is to any change resulting from the proposed work. Sensitivity is dependent on:

- Distance between viewer and the proposal
- The category of viewer (resident, worker, shopper, open space user)
- The elements of the proposal that are visible
- Importance of the view (for example, identified in tourist guides, static or moving viewpoint, do people deliberately seek the view).

Generally, viewers with the highest levels of sensitivity typically include:

- Residents who would have existing attractive views affected by the proposed upgrade works
- Users of public open space where their attention is focused on visual landscape values, such as scenic lookout points or natural landscape areas with attractive views
- Communities in which the proposed works would result in changes to the landscape views that they value.

Viewers with the lowest visual sensitivity are most likely to be:

- Those engaged in work where their attention is focused on their work
- People engaged in active recreation activities such as team sports
6.2.2 Magnitude

The magnitude of a proposal refers to the scale, form and character of the proposed works. In the case of visual impact assessment, it also incorporates how far the proposed works are from the viewer.

The categories of magnitude are defined as:

- **High** – total loss of key elements/features/characteristics of the existing landscape and/or introduction of elements considered to be totally uncharacteristic of the existing landscape character
- **Moderate** – partial loss of/or alteration to one or more key elements/features/characteristics of the existing landscape and/or introduction of elements that may be prominent but not considered to be substantially uncharacteristic of the existing landscape
- **Low** – minor loss of/or alterations to one or more key elements/features/characteristics of the existing landscape and/or introduction of elements that are consistent with the existing landscape
- **Negligible** – very minor alteration to one or more key element/features/characteristics and/or introduction of elements that are consistent with the existing landscape (i.e. approximating the ‘no change’ situation).

6.2.3 Visual Impact Assessment

The various levels of visual impact are predicted through the combination of sensitivity and magnitude in accordance with the matrix in Table 6-1.

The visual impact significance levels are defined as:

- **High** – the proposed works would form a significant and immediately apparent part of the existing view that would affect and change its overall character in either a positive or negative way
- **Moderate** – the proposed works may form a visible and recognisable new element within the overall scene and may be readily noticed by a viewer
- **Low** – the proposed works would constitute only a minor change to the existing view and might be missed by the casual observer; awareness of the development would not have a marked effect on the overall quality of the view and the visual sensitivity is relatively low
- **Negligible** – only a very small part of the proposed works would be discernible and/or it would be located at such a distance that it would be scarcely visible.

<table>
<thead>
<tr>
<th>SENSITIVITY</th>
<th>MAGNITUDE</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>High</td>
</tr>
<tr>
<td>Moderate</td>
<td>Moderate - High</td>
</tr>
<tr>
<td>Low</td>
<td>Moderate - Low</td>
</tr>
<tr>
<td>Negligible</td>
<td>Negligible</td>
</tr>
</tbody>
</table>

Table 6-1. Visual impact assessment matrix (Roads and Maritime, 2013)
6.3 Key viewpoints

Based on the assessment of the existing visibility of The Horsley Drive as described in Section 2.9, the potential visual impact of the project has been assessed by combining the sensitivity of the viewers to the proposed works with the magnitude of the proposed works within existing views. Visual sensitivity, magnitude and visual impact are explained in the following sections.
Figure 6.1. Key viewpoints
### 6.4 Visual impact assessment

<table>
<thead>
<tr>
<th>VIEWPOINT</th>
<th>SENSITIVITY</th>
<th>MAGNITUDE</th>
<th>VISUAL IMPACT</th>
</tr>
</thead>
<tbody>
<tr>
<td>VP 1 Wallgrove Road (a), Felton Street (b) &amp; Walworth Road (c) residences</td>
<td>Moderate</td>
<td>Negligible</td>
<td>Negligible</td>
</tr>
<tr>
<td></td>
<td>The sensitivity of residents would usually be rated high, however due to their distance from the proposal and limited extent of visible works, the rating is reduced to moderate.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>VP 2 Horsley Park Urban Farming Precinct (west)</td>
<td>Moderate</td>
<td>Low</td>
<td>Low - Moderate</td>
</tr>
<tr>
<td></td>
<td>Visitors to the farms would have moderate sensitivity to the apparent changes in local landform and vegetation.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>VP 3 Horsley Park Urban Farming Precinct (east)</td>
<td>Moderate</td>
<td>High</td>
<td>Moderate - High</td>
</tr>
<tr>
<td></td>
<td>Visitors to the farms would have moderate sensitivity to the apparent changes in local landform and vegetation.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>VP 4 Horsley Drive residences (no. 1657, 1667, 1671, 1677 &amp; 1681)</td>
<td>High</td>
<td>High</td>
<td>High</td>
</tr>
<tr>
<td></td>
<td>Residents on The Horsley Drive have a high sensitivity to the proposal due to the proximity and orientation to the works. (Some of these residences would be impacted by the project and acquisition required)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>VP 5 Horsley Drive residences (no. 1650 &amp; 1662)</td>
<td>High</td>
<td>High</td>
<td>High</td>
</tr>
<tr>
<td></td>
<td>Residents on The Horsley Drive have a high sensitivity to the proposal due to the proximity and orientation to the works.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 6-2. Visual impact assessment; viewpoints 1 - 5
Vegetation at THD / Ferrers Rd intersection

Roadside vegetation to be removed

Viewpoint 1 - Wallgrove Road residences

Viewpoint 2 - Horsley Park Urban Farming Precinct (west)

Viewpoint 3 - Horsley Park Urban Farming Precinct (east)

Viewpoint 4 - The Horsley Drive residences
### 6.4 Visual impact assessment cont’d

<table>
<thead>
<tr>
<th>VIEWPOINT</th>
<th>SENSITIVITY</th>
<th>MAGNITUDE</th>
<th>VISUAL IMPACT</th>
</tr>
</thead>
<tbody>
<tr>
<td>VP 6</td>
<td>Low</td>
<td>High</td>
<td>Moderate</td>
</tr>
<tr>
<td>Golf driving range</td>
<td>Low</td>
<td>High</td>
<td>Moderate</td>
</tr>
<tr>
<td>Users of the driving range are predominantly occupied with other activities and therefore would have low sensitivity to the proposal.</td>
<td>Mature Eucalypts lining the front of this property would require removal.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>VP 7</td>
<td>Low</td>
<td>Moderate</td>
<td>Low - Moderate</td>
</tr>
<tr>
<td>Service station</td>
<td>Low</td>
<td>Moderate</td>
<td>Low - Moderate</td>
</tr>
<tr>
<td>Users of the service station are predominantly occupied with other activities and therefore would have Low sensitivity to the proposal.</td>
<td>Mature Eucalypts across the road from the front of this property would require removal.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>VP 8</td>
<td>High</td>
<td>Moderate</td>
<td>Moderate - High</td>
</tr>
<tr>
<td>Horsley Drive residences (no. 1617 &amp; 1627)</td>
<td>High</td>
<td>Moderate</td>
<td>Moderate - High</td>
</tr>
<tr>
<td>Residents on The Horsley Drive have a high sensitivity to the proposal due to the proximity and orientation to the works.</td>
<td>Semi-mature Eucalypts lining the front of these properties would require removal.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>VP 9</td>
<td>Moderate</td>
<td>Moderate</td>
<td>Moderate</td>
</tr>
<tr>
<td>Ferrers Road southbound</td>
<td>Moderate</td>
<td>Moderate</td>
<td>Moderate</td>
</tr>
<tr>
<td>Motorists on Ferrers Road would have moderate sensitivity to change in the Ferrers Road approach to The Horsley Drive.</td>
<td>The new Ferrers Road intersection would involve substantial earthworks.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>VP 10</td>
<td>Moderate</td>
<td>Moderate</td>
<td>Moderate</td>
</tr>
<tr>
<td>WSP shared path southbound</td>
<td>Moderate</td>
<td>Moderate</td>
<td>Moderate</td>
</tr>
<tr>
<td>Users of the shared path through the Parklands would have moderate sensitivity to the apparent changes in local landform and shared path environment.</td>
<td>The new Ferrers Road intersection would involve substantial earthworks and changes to the shared path environment.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>VP 10A</td>
<td>High</td>
<td>Low</td>
<td>Moderate</td>
</tr>
<tr>
<td>WSP Water NSW Upper Canal looking South</td>
<td>High</td>
<td>Low</td>
<td>Moderate</td>
</tr>
<tr>
<td>Due to the heritage item and its rural setting</td>
<td>The Proposed alignment moves away from the heritage item and the decommissioned road will be grassed providing more curtilage to the canal headwall. The realigned Water NSW access track will use part of the decommissioned road alignment</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 6-3. Visual impact assessment; viewpoints 6 - 10
Road widening and vegetation removal on opposite side of road

Viewpoint 7 - Service station

Roadside vegetation to be removed

Viewpoint 8 - Horsley Drive residences

Roadside vegetation to be removed

THD / Ferrers Rd intersection

Viewpoint 9 - Ferrers Road southbound

Viewpoint 10 - WSP shared path southbound

Viewpoint 10A - WSP Water NSW Upper Canal looking South
### Visual impact assessment cont’d

<table>
<thead>
<tr>
<th>VIEWPOINT</th>
<th>SENSITIVITY</th>
<th>MAGNITUDE</th>
<th>VISUAL IMPACT</th>
</tr>
</thead>
<tbody>
<tr>
<td>VP 11</td>
<td>WSP</td>
<td>Moderate</td>
<td>High</td>
</tr>
<tr>
<td></td>
<td>shared path</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>northbound</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>VP 11A</td>
<td>High</td>
<td>High</td>
</tr>
<tr>
<td></td>
<td>WSP-Water</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>NSW Upper Canal</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>looking North</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>VP 12</td>
<td>Low</td>
<td>Negligible</td>
</tr>
<tr>
<td></td>
<td>Cowpasture Road</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>soutbound</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>VP 13</td>
<td>Low</td>
<td>Negligible</td>
</tr>
<tr>
<td></td>
<td>Wetherill Park</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>industrial area</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>VP 14</td>
<td>Low</td>
<td>Low</td>
</tr>
<tr>
<td></td>
<td>The Horsley Drive</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>westbound</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Table 6-4. Visual impact assessment; viewpoints 11 - 14**
Viewpoint 11 - WSP shared path northbound

Viewpoint 11A - WSP-Water NSW Upper Canal looking North

Viewpoint 12 - Cowpasture Road southbound

Viewpoint 13 - Wetherill Park industrial area

Viewpoint 14 - The Horsley Drive westbound
### Table 6-5. Visual impact assessment; viewpoints 15 - 18

<table>
<thead>
<tr>
<th>VIEWPOINT</th>
<th>SENSITIVITY</th>
<th>MAGNITUDE</th>
<th>VISUAL IMPACT</th>
</tr>
</thead>
<tbody>
<tr>
<td>VP 15  Bossley Park residences</td>
<td>High</td>
<td>Low</td>
<td>Moderate</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Residents in Bossley Park backing on to The Horsley Drive have a high sensitivity to the proposal due to the proximity and orientation to the works.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Minor road widening works to the southern side of The Horsley Drive would be apparent to motorists.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>VP 16  Cowpasture Road northbound</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Motorists on Cowpasture Road would have low sensitivity to change in the The Horsley Drive and Cowpasture Road environments.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Minor road widening works to the southern side of The Horsley Drive would be apparent to motorists.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>VP 17  Lizard Log visitors</td>
<td>High</td>
<td>Negligible</td>
<td>Negligible</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Visitors to Lizard Log Park would have high sensitivity due to the recreational nature of their visit to Lizard Log.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The proposal would be scarcely visible due to dense screen planting along the northern boundary of the park.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>VP 18  Horsley Drive residence - Parklands’ property impacted by the road widening works</td>
<td>High</td>
<td>High</td>
<td>High</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Residents on The Horsley Drive have a high sensitivity to the proposal due to the proximity and orientation to the works. This is Parklands’ property that will be directly impacted by the road widening works.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 6-5. Visual impact assessment; viewpoints 15 - 18
Vegetation at THD / Ferrers Rd intersection

Road widening works to THD in foreground

Vegetation at THD / Ferrers Rd intersection

Viewpoint 15 - Bossley Park residences

Roadside vegetation to be removed

Viewpoint 16 - Cowpasture Road northbound

Vegetation at THD / Ferrers Rd intersection

Viewpoint 17 - Lizard Log visitors

Residential land to be cleared

Viewpoint 18 - Horsley Drive residence
### 6.5 Visual impact assessment summary

A total of 20 viewpoints form the basis of the visual impact assessment. A summary of the assessment results are presented Table 6-6.

Out of the 20 selected viewpoints, the range of visual impact ratings were determined as follows:

- Four viewpoints would have High visual impact
- Three viewpoints would have Moderate to High visual impact
- Five viewpoints would have Moderate visual impact
- Two viewpoints would have Low to Moderate visual impact
- Two viewpoints would have Low visual impact
- Four viewpoints would have Negligible visual impact.

A rating of High occurs in an area where proximity to the works is greatest, in particular where residential properties front The Horsley Drive at locations where the proposal is expected to result in the removal of roadside vegetation. Where the proposal is close to the heritage item of the Water NSW Upper Canal and the Southern Weston Tunnel Headwall.

Beyond these situations, the majority of impact ratings involve Moderate, Low and Negligible ratings. This generally reflects the low visibility of the existing road corridor and the proposed works. It also indicates that the scale of the proposal would be consistent with the existing road environment.

<table>
<thead>
<tr>
<th>VIEWPOINT</th>
<th>SENSITIVITY</th>
<th>MAGNITUDE</th>
<th>VISUAL IMPACT</th>
</tr>
</thead>
<tbody>
<tr>
<td>VP 1</td>
<td>Wallgrove Road, Felton Street &amp; Walworth Road residences</td>
<td>Moderate</td>
<td>Negligible</td>
</tr>
<tr>
<td>VP 2</td>
<td>Horsley Park Urban Farming Precinct (west)</td>
<td>Moderate</td>
<td>Low</td>
</tr>
<tr>
<td>VP 3</td>
<td>Horsley Park Urban Farming Precinct (east)</td>
<td>Moderate</td>
<td>High</td>
</tr>
<tr>
<td>VP 4</td>
<td>Horsley Drive residences</td>
<td>High</td>
<td>High</td>
</tr>
<tr>
<td>VP 5</td>
<td>Horsley Drive residences</td>
<td>High</td>
<td>High</td>
</tr>
<tr>
<td>VP 6</td>
<td>Golf driving range</td>
<td>Low</td>
<td>High</td>
</tr>
<tr>
<td>VP 7</td>
<td>Service station</td>
<td>Low</td>
<td>Moderate</td>
</tr>
<tr>
<td>VP 8</td>
<td>Horsley Drive residences</td>
<td>High</td>
<td>Moderate</td>
</tr>
<tr>
<td>VP 9</td>
<td>Ferrers Road southbound</td>
<td>Moderate</td>
<td>Moderate</td>
</tr>
<tr>
<td>VP 10</td>
<td>WSP shared path southbound</td>
<td>Moderate</td>
<td>Moderate</td>
</tr>
<tr>
<td>VP 10A</td>
<td>WSP-Water NSW Upper Canal looking South</td>
<td>High</td>
<td>Low</td>
</tr>
<tr>
<td>VP 11</td>
<td>WSP shared path northbound</td>
<td>Moderate</td>
<td>High</td>
</tr>
<tr>
<td>VP 11A</td>
<td>WSP-Water NSW Upper Canal looking North</td>
<td>High</td>
<td>High</td>
</tr>
<tr>
<td>VP 12</td>
<td>Cowpasture Road southbound</td>
<td>Low</td>
<td>Negligible</td>
</tr>
<tr>
<td>VP 13</td>
<td>Wetherill Park industrial area</td>
<td>Low</td>
<td>Negligible</td>
</tr>
<tr>
<td>VP 14</td>
<td>The Horsley Drive westbound</td>
<td>Low</td>
<td>Low</td>
</tr>
<tr>
<td>VP 15</td>
<td>Bossley Park residences</td>
<td>High</td>
<td>Low</td>
</tr>
<tr>
<td>VP 16</td>
<td>Cowpasture Road northbound</td>
<td>Low</td>
<td>Low</td>
</tr>
<tr>
<td>VP 17</td>
<td>Lizard Log visitors</td>
<td>High</td>
<td>Negligible</td>
</tr>
<tr>
<td>VP 18</td>
<td>Horsley Drive residence - Parklands’ property impacted by the road widening works</td>
<td>High</td>
<td>High</td>
</tr>
</tbody>
</table>

Table 6-6. Visual impact assessment summary
Lizard Log (1.5 km)
The Dairy (2 km)
Calmley Hill City Farm (3.5 km)
07

Mitigation Strategy
Closely adjoining Western Sydney Parklands, The Horsley Drive Upgrade presents a series of unique challenges and opportunities. This report has identified the potential impacts of the upgrade on the adjoining Parklands, residents and commercial properties, as well as residents and commercial properties further afield.

In future stages of the project the development of the Urban Design Vision will be dependent on the cooperation of Roads and Maritime, WaterNSW, Fairfield City Council and Western Sydney Parklands Trust.

Key mitigation strategies will need to be employed throughout detailed design development in future stages of the project. In addition to this, numerous mitigation measures employed during the construction period will also reduce the impact of the project. Both are discussed below.

### 7.1 Introduction

Refinement of the landscape concept will occur during future detailed design stage(s) of the project. This development of the landscape concept, including selection of species, is to be carried out in conjunction with Western Sydney Parklands Trust, Fairfield City Council, WaterNSW and all relevant utility authorities including Endeavour Energy. Tree planting is to consider the clearance requirement of High Voltage Power lines where applicable.

Detailed design mitigation measures specific to particular areas of the project are discussed in the following tables.

### 7.2 Detail design mitigation measures

<table>
<thead>
<tr>
<th>LANDSCAPE CHARACTER ZONE</th>
<th>CHARACTER IMPACT</th>
<th>MITIGATION MEASURES</th>
</tr>
</thead>
<tbody>
<tr>
<td>LCZ 1 Eastern Creek flats</td>
<td>Low</td>
<td>‟Provide frangible tree and low understory planting in the median, giving consideration to maintenance requirements and safety standards ‟Provide informal tree and understory planting bordering both sides of the road corridor ‟Provide habitat restoration planting to disturbed areas in vicinity of Eastern Creek ‟Investigate wildlife crossing opportunities at Eastern Creek during detailed design development</td>
</tr>
<tr>
<td>LCZ 2 Undulating ridge</td>
<td>Moderate - High</td>
<td>‟Provide frangible tree and low understory planting in the median, giving consideration to maintenance requirements and safety standards ‟Provide formalised planting at Ferrers Road ‘gateway’ to future Horsley Park Urban Farming Precinct ‟Ensure the realignment of the shared path is in keeping with existing parkland character of the path</td>
</tr>
<tr>
<td>LCZ 3 Wetherill Park slopes</td>
<td>Moderate</td>
<td>‟Provide frangible tree and low understory planting in the median, giving consideration to maintenance requirements and safety standards ‟Provide informal tree and understory planting on the southern side of the road corridor ‟Transition batters into the existing landform</td>
</tr>
</tbody>
</table>

Table 7-1. Summary of landscape character impact mitigation measures incorporated during detailed design

<table>
<thead>
<tr>
<th>VIEWPOINT</th>
<th>VISUAL IMPACT</th>
<th>MITIGATION MEASURES</th>
</tr>
</thead>
<tbody>
<tr>
<td>VP 1</td>
<td>Negligible</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Revegetate cut and fill embankments</td>
</tr>
<tr>
<td>VP 2</td>
<td>Low - Moderate</td>
<td>Provide screen planting adjoining the road corridor (Planting in front of private properties would be undertaken in consultation with the property owners).</td>
</tr>
<tr>
<td>VP 3</td>
<td>Moderate - High</td>
<td>Revegetate cut and fill embankments using species derived from Cumberland Plain Woodland</td>
</tr>
<tr>
<td></td>
<td>Moderate - High</td>
<td>Provide formal planting at Ferrers Road ‘gateway’ to future Horsley Park Urban Farming Precinct</td>
</tr>
<tr>
<td>VP 4</td>
<td>High</td>
<td>Revegetate cut and fill embankments</td>
</tr>
<tr>
<td></td>
<td>High</td>
<td>Provide screen planting adjoining the road corridor (Planting in front of private properties would be undertaken in consultation with the property owners).</td>
</tr>
<tr>
<td>VP</td>
<td>Location</td>
<td>Impact</td>
</tr>
<tr>
<td>-----</td>
<td>-------------------------------</td>
<td>--------------</td>
</tr>
</tbody>
</table>
| 5   | Horsley Drive residences      | High         | • Revegetate cut and fill embankments  
• Provide screen planting adjoining the road corridor (Planting in front of private properties would be undertaken in consultation with the property owners). |
| 6   | Golf driving range            | Moderate     | • Investigate use of retaining wall to minimise encroachment on private property  
• Revegetate cut and fill embankments, if applicable, using species derived from Cumberland Plain Woodland  
• Provide screen planting adjoining the road corridor (Planting in front of private properties would be undertaken in consultation with the property owners). |
| 7   | Service station               | Low - Moderate | Provide tree planting along the shared path where feasible                                                                                                                                                    |
| 8   | Horsley Drive residence       | Moderate - High | N/A - property acquired                                                                                                                                             |
| 9   | Ferrers Road southbound       | Moderate     | • Investigate use of retaining wall to minimise encroachment on private property  
• Revegetate cut and fill embankments using species derived from Cumberland Plain Woodland  
• Provide formal planting at Ferrers Road ‘gateway’ to future Horsley Park Urban Farming Precinct |
| 10  | WSP shared path southbound    | Moderate     | • Ensure the realignment of the shared path is in keeping with existing parkland character of the path  
• Provide formal planting at Ferrers Road ‘gateway’ to future Horsley Park Urban Farming Precinct  
• Revegetate cut and fill embankments using species derived from Cumberland Plain Woodland |
| 10A | WSP-Water NSW Upper Canal looking South | Moderate     | • Develop detailed design of any proposed construction works in the vicinity of WaterNSW Upper Canal in consultation with WaterNSW and Western Sydney Parklands Trust  
• Re-instate the backdrop of rolling grassland over the northern section of the Weston tunnel  
• Use utilitarian materials which complement the existing canal, such as plain concrete, brick and sandstone in the construction of the retaining structures |
| 11  | WSP shared path northbound    | Moderate - High | • Develop detailed design of any proposed construction works in the vicinity of WaterNSW Upper Canal in consultation with WaterNSW and Western Sydney Parklands Trust  
• Provide tree planting where appropriate in consultation with WaterNSW to mitigate the visual impact of the proposal within the visual curtilage of the canal  
• Consider endemic grassland planting at the base of wing walls to reduce the visual scale of the walls  
• Use utilitarian materials which complement the existing canal, such as plain concrete, brick and sandstone in the construction of the retaining structures |
| 12  | Cowpasture Road southbound    | Negligible   | N/A                                                                                                                                                    |
| 13  | Wetherill Park industrial area | Negligible   | N/A                                                                                                                                                    |
| 14  | The Horsley Drive westbound   | Low          | Provide street tree and understorey planting to the new road edge where feasible                                                                                                                                      |
| 15  | Bossley Park residences       | Moderate     | • Revegetate cut and fill embankments  
• Provide planting at intersection of The Horsley Drive and Ferrers Road  
• Provide screen planting adjoining the road corridor (Planting in front of private properties would be undertaken in consultation with the property owners). |
| 16  | Cowpasture Road northbound    | Low          | Provide street tree and understorey planting to the new road edge, where feasible, using species derived from Cumberland Plain Woodland                                                                               |
| 17  | Lizard Log visitors           | Negligible   | N/A                                                                                                                                                    |
| 18  | Horsley Drive residence       | High         | • Revegetate cut and fill embankments  
• Provide screen planting adjoining the road corridor (Planting in front of private properties would be undertaken in consultation with the property owners). |
7.3 Construction period mitigation measures

The following mitigation measures should be implemented during the construction period to reduce both temporary and residual impacts resulting from the project:

• Prior to the works commencing a full archival recording must be undertaken by a qualified heritage consultant of the entire existing curtilage of the Weston tunnel mouth up to the existing Horsley Drive
• Retain existing entrances to the Parklands or provide alternative access arrangements during the construction period, including access to Lizard Log and the Sydney International Equestrian Centre’s emergency access
• Ensure landscape treatments within the Parklands, including fencing, are consistent with the Western Sydney Parklands Design Manual
• Define the extent of all construction activity within detailed design and documentation drawings, including temporary works, in order to minimise the footprint of the project and protect adjoining areas during construction, in particular endangered vegetation communities within the Parklands
• Identify, protect and maintain existing trees to be retained, including those within construction compound areas, throughout the entire period of the works in accordance with Australian Standard 4970 Protection of Trees on Development Sites and under the direction of a suitably qualified Arborist
• Ensure north-south pedestrian/cycle connectivity along the shared path adjacent the WaterNSW Upper Canal is maintained during the construction period, by either maintaining existing access routes until construction of the new path alignment is complete or by providing temporary alternative access routes
• Consider providing suitable barriers to screen views from adjacent areas where practical during construction
• Screen of divert temporary lighting to reduce unnecessary light spill to adjoining residential and commercial areas, as well as to adjoining areas of nocturnal habitat
• Protect heritage items to be retained under the direction of a suitably qualified heritage consultant
• Return disturbed areas of land to their pre-construction state progressively throughout the construction period where possible, or once construction is complete.


GHD. 2016. The Horsley Drive Biodiversity Impact Assessment. GHD, Sydney, Australia.


