

## 5. URBAN DESIGN CONCEPT

### 5.1 OVERVIEW

The urban and landscape design concept has been developed based on the project objectives and principles, to achieve an integrated concept design for the project. It describes the relationship between the proposed road work, structures including bridges and the adjoining areas, based on the current engineering concept design.

The urban and landscape design concept identifies a series of works recommended for implementation within the identified construction footprint of the proposed upgrade, in conjunction with the construction of the engineering works. It seeks to provide a balance between the hard and soft elements of the project to deliver a project that makes a positive contribution to its setting.

The urban design concept consists of several components:

1. An urban design strategy outlining the overall approach to the design
2. Recommendations for road design elements including embankments, structures such as bridges and walls, hydrological features and roadside elements and furniture
3. A landscape planting concept including recommended species
4. Urban design concept plans at 1:5,000 describing main treatments and outcomes
5. A series of cross sections illustrating the outcomes and treatments in the third dimension, including interfaces with adjoining areas and the local road network
6. An elevation of the proposed Adams Road bridge to illustrate the relationship with the project and the local road network.

#### 5.1.1 Basis for future work

The urban design concept provides the basis for the environmental assessment of the project, including the landscape character and visual impact assessments in **sections 6 and 7** of this paper.

Together with the mitigation measures proposed in **section 8**, the concept design provides guidance towards the future detailed design and construction documentation. The mitigation measures are a series of opportunities to maximise integration of the project into the study area.

The detailed design and documentation of this work, both inside and outside the project area, would be the subject of comprehensive consultation with a range of stakeholders including State Government agencies, Penrith City Council, Liverpool City Council and the local community.

#### 5.1.2 Background documents

In order to achieve a high standard in urban design, this report considers a comprehensive list of design guideline documents set out by Roads and Maritime. This report has been carried out with reference to the following published Roads and Maritime documents:

- Beyond the Pavement
- Bridge aesthetics
- Landscape guideline
- Shotcrete design guidelines
- Water sensitivity urban design guideline
- Biodiversity guidelines

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## 5.2 URBAN DESIGN STRATEGY

The urban design strategy for the project is a large-scale diagram that translates the urban design principles and objectives into an overall urban design approach. It provides the basis for the development of the urban design concept plans and sections.

There are two important components to the urban design strategy:

1. Vegetation and views - refer **Figure 26**
2. Access and connections - refer **Figure 27**.

More detail is provided in the respective sections below.

### 5.2.1 Vegetation and views

Based on the findings of the contextual analysis, the study area can be divided into three broad urban design treatment zones. The treatment zones have been derived based on the identified LCZs and in consideration of the planned future land use changes in the areas surrounding the proposed upgrade.

The treatment zones are:

1. Badgerys Creek
2. Luddenham High Plateau
3. Orchard Hills

The treatment zones are illustrated in **Figure 26**. They broadly correspond to the LCZs through which the alignment of the upgraded The Northern Road passes and takes into account the planned land use changes both existing character and proposed.

Consistent with the urban design principles for vegetation and protection of prominent views, the urban design strategy seeks to provide for a balanced approach. The following are the design principles for each treatment zone.

#### **Badgerys Creek**

The design considerations within the Badgerys Creek treatment zone are:

1. Complement the existing character of a mix of open pasture and stands of Cumberland Plain Woodland vegetation
2. Reinforce creeks as ecological corridors as well as potential future open space links and networks
3. Stabilise cuttings with Cumberland Plain Woodland and endemic vegetation as appropriate
4. Provide for views to the Blue Mountains
5. Use vegetation to screen the Western Sydney Airport and designated future employment lands, subject to Obstacle Limitation Surface (OLS) and other airport operational and safety requirements
6. Design intersections as landscape features
7. Use vegetation to provide visual buffers to protect the outlook to the east for residents in Luddenham.

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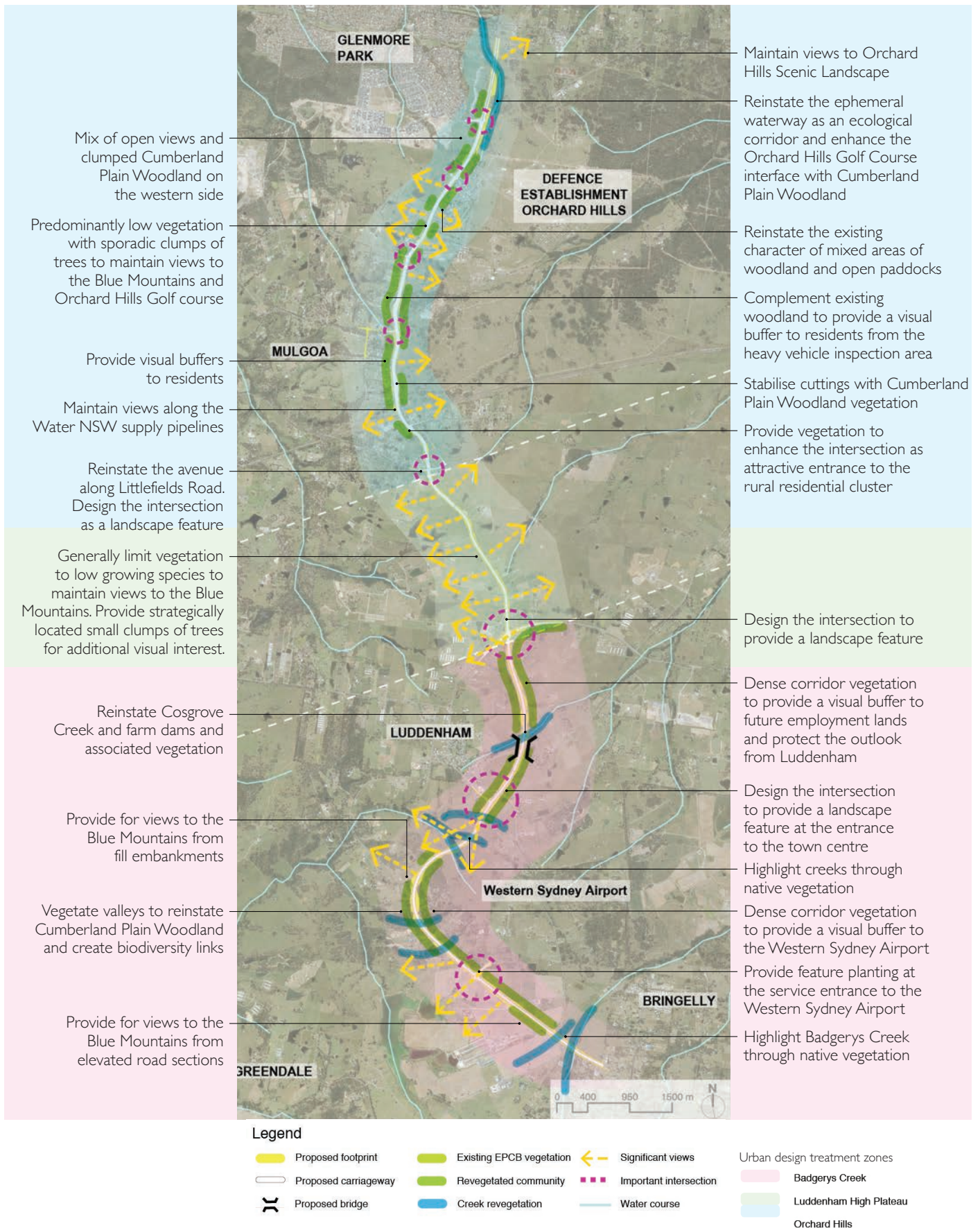


Figure 25: Urban design strategy for vegetation and views showing broad urban design treatment zones

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### **Luddenham High Plateau**

The design considerations within the Luddenham High Plateau treatment zone are:

1. Provide predominantly low vegetation to maintain distinctive long-distance views to both the east and the west
2. Provide sporadic small tree clumps to complement the existing character of paddocks with remnant trees. Strategically locate trees to maintain residents' views towards the Blue Mountains.

### **Orchard Hills**

The design considerations within the Orchard Hills treatment zone are:

1. Complement the existing character of a mix of open pasture and stands of Cumberland Plain Woodland vegetation
2. Reinforce creeks as ecological corridors as well as potential future open space links and networks
3. Stabilise cuttings with Cumberland Plain Woodland and endemic vegetation as appropriate
4. Provide for views to the Blue Mountains
5. Use Cumberland Woodland vegetation to provide a screen for residents fronting The Northern Road
6. Design intersections as landscape features to provide a positive arrival experience for rural residential clusters accessed from the route.

### **5.2.2 Access and connections**

The dividing median within the proposed alignment introduces a change to the allowable movements from properties onto The Northern Road. Changes to access arrangements for the majority of properties that currently have access directly onto The Northern Road and some properties that have access along roads that connect to The Northern Road would occur as a result of the project.

Additionally, the proposed alignment around the Western Sydney Airport and the Luddenham town centre deviates from the existing road corridor to run through rural properties. This would result in new segments of land that require access to the proposed alignment.

Proposed alternative access routes and arrangements are outlined in the *Traffic and Transport Assessment* (Appendix G of the EIS) prepared for the project.

Roads and Maritime would work with its construction contractor (once selected) to ensure that access to properties can be maintained throughout construction or alternate arrangements would be negotiated with relevant property owners.

The access and connections diagram highlights particular opportunities to achieve improved access and connections between the project and surrounding areas. In particular, there are a number of opportunities to enhance provision for active transport to realise positive community outcomes. The strategy is illustrated in **Figure 27**.



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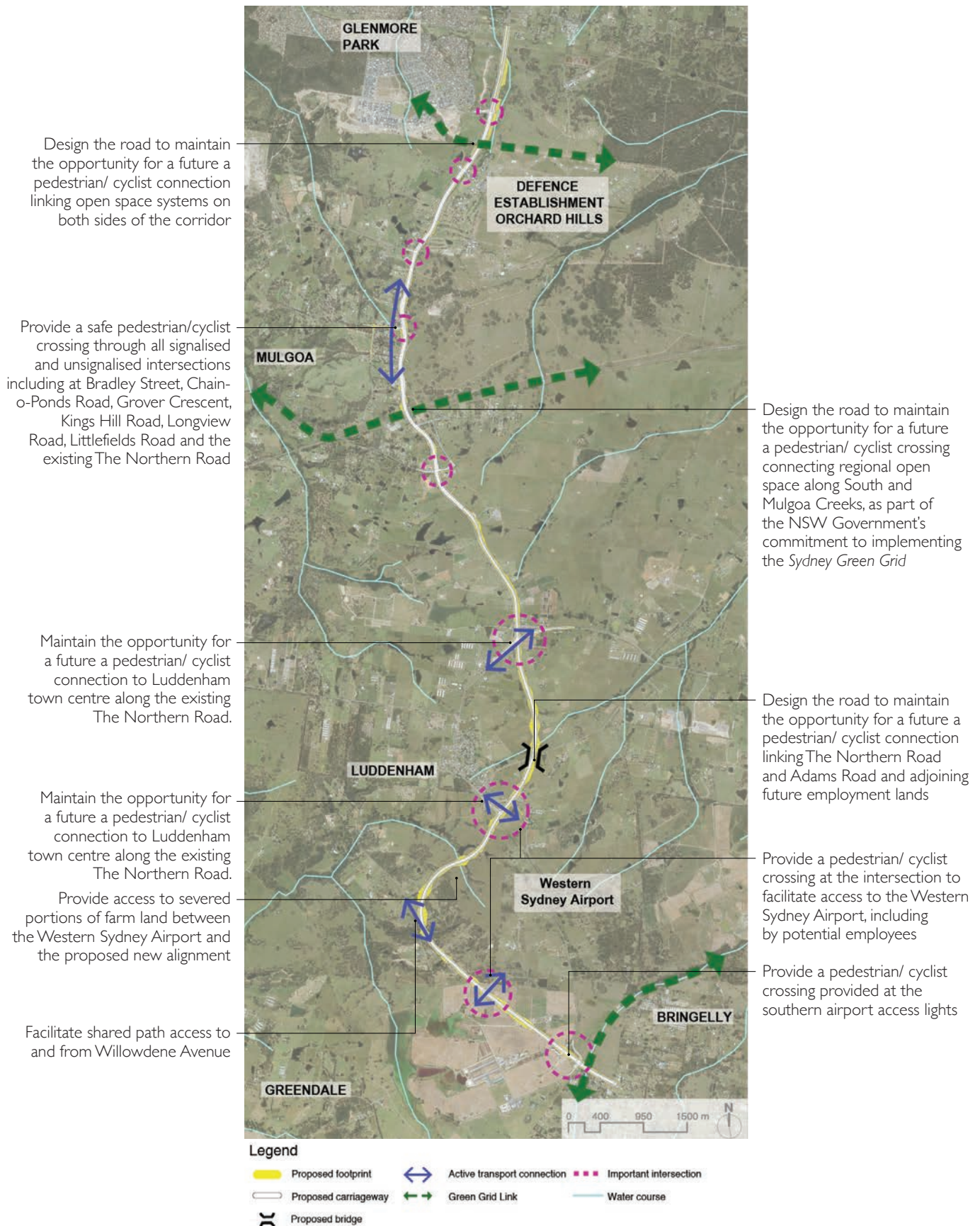


Figure 26: Urban design strategy for access and connections

## URBAN DESIGN CONCEPT

### 5.3 ROAD DESIGN ELEMENTS

The urban design plays an important role in influencing engineering aspects of the project. The following section describes the urban design approach for major road design elements. They include the following:

- **Structures**  
Structures include major engineering elements such as bridges or other structures that may be necessary to achieve the project within its surroundings
- **Earthwork formations**  
Earthwork formations include cuttings and embankments that are required to achieve the design parameters of the project within its surroundings
- **Hydrological features**  
Hydrological features include water management, flood mitigation and drainage systems that are required to ensure safe operation of the proposed work, as well as integration with natural hydrological systems. They would also include water quality infrastructure such as vegetated swales or rock check dams
- **Roadside elements**  
The range of furniture and ancillary structures within the road corridor such as safety barriers and signs, deemed necessary for the operation of the road or management of the impact on adjoining users.

#### **Design approach**

The general approach to the design of road elements is to satisfy the functional requirements for the safe and efficient operation of the road while also being appropriate to their location. In all cases, the design and implementation of the road design elements would need to satisfy the requirements of Austroads and Roads and Maritime design guidelines and practice notes.

It is also important that, in their detailed resolution, the visual expression of the road elements is true to their function as items of contemporary road infrastructure. Respect for the character of the local area will be achieved through sensitive consideration of the location, placement and scale of the new elements.

#### **5.3.1 Bridges**

One bridge is proposed as part of the project. It is located east of the Luddenham town centre, where the proposed upgrade would bridge over Adams Road.

#### **Design approach**

In line with the Roads and Maritime *Bridge aesthetics* guidelines, design the bridge as a simple and elegant structure to:

- Complement the rural setting
- Maximise views of the landscape from both above and underneath.

Further, the design of the bridge takes into account the need for future upgrades to Adams Road, to fulfil its role as an arterial road and major link through the WSPGA and to employment lands in the WSEA beyond.

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### Description

The bridge would consist of twin bridges with a separate deck for each carriageway. The bridges would be about 65 metres long and consist of two separate spans supported by an 1800 deep plank bridge, a central pier and spill-through abutments - refer drawings.

### 5.3.2 Shared paths

The project would introduce a number of improvements for pedestrians and cyclists along The Northern Road including shared paths and footways to provide cycle and pedestrian connectivity. The urban design approach is to:

- Design shared paths and footways to maximise opportunities for future connection to the pedestrian and cycle networks in the WSPGA, SWPGA and the Western Sydney Airport
- Provide formal crossings at all signalised intersections to improve safety for pedestrians and cyclists to cross roads that would otherwise be uncontrolled
- Design shared paths to provide continuity of cycle links through un-signalised intersections in a safe and direct manner.

### 5.3.3 Earthwork formations

#### Cuttings

A number of large cuttings would be required along the proposed upgrade, in order to achieve the required longitudinal gradients through steeper parts of the landscape such as around Duncans Creek and in the Cosgrove Creek valley. They include cuttings in excess of ten metres deep.

The design of the cuttings has generally adopted a 4H:1V grade. This provides for a low maintenance cut batter slope that can be easily and successfully revegetated. Rounding of the top edges of the batters to transition from batter slopes to more natural gradients will help to integrate the formation with the surrounding landscape.

Revegetation is the preferred treatment for cuttings to restore Cumberland Plain Woodland along the route, as well as provide for a mix of vegetated and open route sections with views. The landscape design seeks to restore the existing bushland after completion of the roadwork, provided this is viable based on the soil conditions.

Revegetation would be a mixture of indigenous shrubs and grasses as well as canopy trees to complement surrounding bushland, except in areas where utility infrastructure or OLS requirements for the Western Sydney Airport prohibit tree planting - also refer **section 5.4.3**.

In the event that sound rock may be uncovered, retention of the rock as an exposed finish would be the preferred strategy. Exposed rock cuttings can heighten the travel experience and provide the road user with a geological appreciation of the region through which they are passing. The 'rawness' and robustness of the material adds colour and texture to the visual landscape, providing a contrast with the smooth and regular form of the materials often associated with roads.

#### Shotcrete

Generally the use of shotcrete in cuttings is not currently anticipated and is to be avoided.

Where unexpected conditions are uncovered during excavation that may lead to shotcrete being considered for the proposed upgrade, application of shotcrete would need to be carried out in accordance with the Roads and Maritime *Shotcrete Guidelines*.

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### **Embankments**

Embankments are potentially highly visible formations, especially within the exposed landscape of the Luddenham Plateau, and the steeper valleys around Duncans and Cosgrove Creeks. There are a number of very large embankments along the project, exceeding ten metres in height. They have the potential to stand out as highly unnatural land forms.

To minimise this effect, embankments need to be sensitively designed to maximise integration with the surrounding landscape and its scenic values. This includes appropriate landscape strategies to minimise visual contrast with the surrounding landscape character.

The design of embankments has generally adopted a 4H:1V grade. While this would be easily stabilised and vegetated, it does result in a fairly broad footprint for the project.

The visual impact of the embankments in the Badgerys Creek and Orchard Hills treatment zones will be somewhat reduced by the proposed landscape planting strategy. Vegetation will assist with visual screening of batters and embankment transitions to natural ground. In addition, and where possible it would be desirable to flatten out the toe of embankments to achieve maximum integration with the surrounding landform. This will maximise integration of the project with its setting in the event that revegetation should prove unsuccessful or slow.

### **5.3.4 Hydrological features**

The proposed upgrade would require the traversing of minor waterways and farm dams. Its construction and operation has the potential to impact aquatic ecosystems due to changes in water quality, habitat loss and instream barriers.

The urban design approach to the design of hydrological features would be to maximise green infrastructure, soft landscape and WSUD solutions to optimise outcomes at sensitive receiving environments, ensure a sustainable outcome and a good fit with the surrounding context, including adjoining rural areas within the MRA.

Water crossing structures and other components of the drainage system should be sensitively designed to provide a landscape solution that minimises the landscape character and visual impacts and takes into consideration all waterways within the area. Waterway crossings and biodiversity mitigation measures would include:

- Design bridges and culverts as fish friendly crossings and ensure that barriers to fish are not created and impacts to the existing hydrology are minimised
- Replacement or reinstatement of habitat in accordance with Roads and Maritime *Biodiversity Guidelines* including *Guide 5: Re-use of woody debris and bushrock* and *Guide 10: Aquatic habitats and riparian zones*
- Relocation of all large woody debris or snags instream.

The *Biodiversity Assessment Report* (Appendix I of the EIS) provides further specific measures from a biodiversity point of view.

### **5.3.5 Safety barriers**

Safety barriers along the road side generally would consist of wire-rope safety barriers with a transition to w-beam and three-beam barriers on bridge parapets.

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### 5.3.6 Headlight glare attenuation

Headlight glare requires mitigation in certain circumstances to reduce glare to oncoming traffic. Where possible based on available space and safe stopping sight distance requirements, low shrub planting would be provided in depressed medians along the road, with the exception of areas identified as having distinct views that are to be retained.

#### Fencing

Fencing on the upgrade is likely to consist of road corridor boundary fencing, and potentially some fauna fencing. To minimise fencing requirements a combined boundary/fauna fence could be employed in some locations. The design of the fence would be finalised in the detailed design stage and would be subject to approval by relevant authorities.

Due to the increase in road width, it is also likely that some fencing may need to be replaced or relocated. These fences would primarily be associated with strips of adjoining property that would be acquired. Fencing should be designed to match existing property fencing, which are predominantly basic and inconspicuous rural wire fences that are visually transparent and subservient to the landscape setting.

### 5.3.7 Bus shelters

Bus shelters should be a contemporary design to the approval of local Councils and bus operators. Bus stops should generally be provided to suit existing bus routes, as well as known future routes.

Additional bus stops may be required to meet the needs of the future residential and working population in the WSPGA and SWPGA. A bus strategy will be developed by Transport for New South Wales (TfNSW). This will likely involve consultation with stakeholders such as local councils, bus operators and the community and would determine the need and appropriate locations for additional bus stop locations. Where available, this information would be integrated in future detail design stages.

### 5.3.8 Variable message signs

Variable message signs (VMS) display traffic related advice to motorists, such as traffic delays, severe weather conditions, maintenance operations, incident reporting and incident management. They comprise a steel pole and electronic sign board structure that requires a substantial engineering design component - refer **Figure 28**.

Placement and design of any VMS will be guided by the Roads and Maritime TDT 2005/02b *Guidelines for the location and placement of variable message signs*.

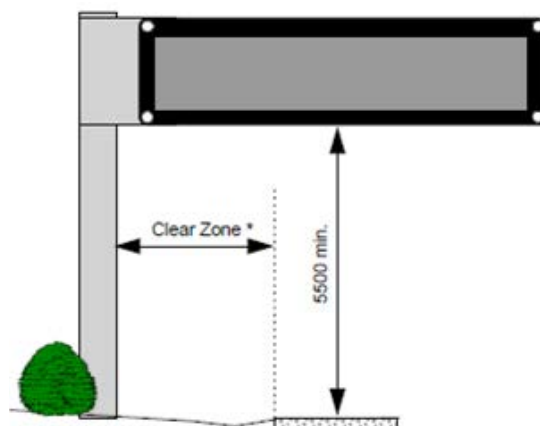


Figure 27: Variable message sign



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### 5.4 LANDSCAPE DESIGN

#### 5.4.1 Planting design principles

The planting design concept has been guided by the following principles:

- Complement the existing landscape, visual and spatial character through appropriate vegetation types and heights
  - Use vegetation to stabilise cut batters and to minimise their visual impact
  - Use vegetation to stabilise fill embankments, carefully balancing plant selection to ensure views of the surrounding landscape as identified on the strategy plans
  - Provide vegetation to screen the upgrade from sensitive nearby land uses where applicable
  - Provide tree cover in verges and medians where it is safe to do so, based on clear zone requirements
- Design softworks to direct views and vistas to emphasise the attractive rural setting, having regard to planned future land use changes, in particular the Western Sydney Airport and employment lands in the WSPGA
- Retain existing woodland where possible. Where removal can't be avoided reinstate native vegetation to compensate for the loss of vegetation and habitat
- Use vegetation to maximise potential for biodiversity links in areas of identified ecological value
- Enhance intersections through feature planting to provide 'gateways'. Examples include the entrances to the Luddenham town centre, to rural residential clusters, residential subdivisions and the service entry to the Western Sydney Airport. This would provide variety and visual interest along the route as well as visually enhance the local identity
- Select species around the end of the airport runway (at Willowdene Avenue) that are not bird-attracting to avoid safety risk for planes
- Wherever possible, use surplus local natural materials such as rock and timber in creek restoration and water quality treatments to help recover biodiversity and create habitat.

#### **Refinement during detailed design**

During detailed design, development of the planting concept and layouts for vegetation will be developed to ensure placement and species selection will be in accordance with all relevant requirements including the Roads and Maritime *Landscape guideline*, clear zone and stopping sight distance requirements and the OLS requirements of the Western Sydney Airport. Softworks will also need to consider the biodiversity offsetting requirements.

#### 5.4.2 Vegetation types

The plant species for the project would generally build on the native Cumberland Plain Woodland vegetation communities of the area. They may be supplemented by commercially available species known to perform well under arterial road conditions.

In selected areas including around the Luddenham town centre and the intersections that function as entrances to the Western Sydney Airport, additional feature species would be used to highlight the significance of these areas locally, regionally and nationally.

The following vegetation types have been identified for the project:

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### 1. *Low planting*

This vegetation type would consist of species up to 700mm high and typically consist of native grasses and groundcovers. It would be used in areas with unique views from or across the road corridor. It would also be used in verges between the carriageway and the shared path, to provide a degree of visual separation while ensuring good passive surveillance.

### 2. *Low shrub planting*

This vegetation type would consist of frangible fast growing species including groundcovers, grasses and low shrubs, typically up to about 1.4 metres tall. It would be used in medians to provide headlight glare attenuation and visual separation of carriageways. It would also be used on the lower slopes of embankments to provide stabilisation and integration with the surrounding landscape while maintaining views from or across the road corridor.

### 3. *Groundcover, shrub and tree planting*

This vegetation type would be used in areas where there are no constraints in terms of views and would include the full range of grasses, groundcovers, low and tall shrubs and trees. It would provide dense vegetation for the purposes of ecological restoration, as well as visual separation between the road corridor and sensitive users such as rural residents.

### 4. *Riparian vegetation*

Riparian vegetation would be located along creek lines and farm dams. It would include plants tolerant of flooding or submersion and be based on native vegetation communities as well as the existing species composition found in farm dams of the area.

### 5. *Feature planting*

Feature planting would be located at intersections and around the Luddenham town centre. Feature trees such as Norfolk Islands Pines and Liquidambar would be used in areas where a landmark feature is desirable, including around major intersections and along the alignment of the existing The Northern Road on the approach to the Luddenham town centre.

### 5.4.3 Plant selection principles

A preliminary list of plant species for use in the proposed upgrade has been identified - refer **Indicative plant selection**. Selection principles include:

- Plant species that are consistent with the local ecology and landscape character, including identified visual values and cultural plantings
- Selection of plant species that are robust, noninvasive and not fire promoting
- Exclusion of all species identified as noxious or local weeds
- Minimise ongoing maintenance requirements.

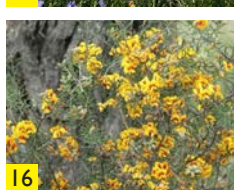
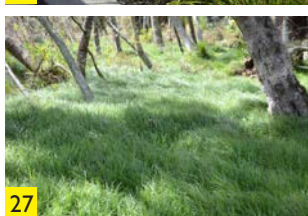
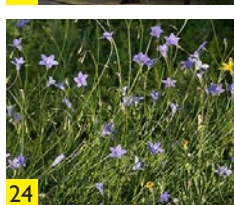
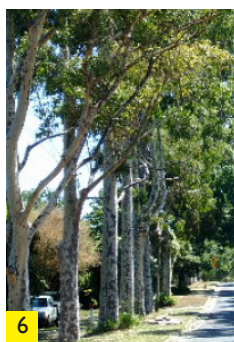
The detailed planting design stage would include further refinement of the plant species selection and detailed locations for different species and vegetation types, having regard to relevant Roads and Maritime policy including clear zone requirements, safe stopping sight distances, the *Landscape guideline* and the *Biodiversity guidelines*.

Specifications for plant material during the detailed design stage should maximise the use of local provenance plant material (plants grown from locally collected seeds) wherever possible for all native vegetation, in particular native revegetation.

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### Indicative plant selection

	Botanical name	Common name	Height at maturity
Feature Planting			
1	<i>Araucaria cunninghamii</i>	Hoop Pine	20m
2	<i>Fraxinus 'Raywoodii'</i>	Claret Ash	15m
3	<i>Liquidambar styraciflua</i>	Liquidambar	18m
4	<i>Nyssa sylvatica</i>	Black Tupelo	10m
5	<i>Photinia robusta</i>	Red-Leaf Photinia	5m
Cumberland Plain Woodland			
6	<i>Corymbia maculata</i>	Spotted Gum	30m
7	<i>Eucalyptus crebra</i>	Grey Ironbark	30m
8	<i>Eucalyptus moluccana</i>	Grey Box	25m
9	<i>Eucalyptus tereticornis</i>	Forest Red Gum	25m
10	<i>Acacia decurrens</i>	Black Wattle	2-10m
11	<i>Acacia implexa</i>	Lightwood	4-10m
12	<i>Asperula conferta</i>	Common Woodruff	0.5m
13	<i>Bursaria spinosa</i>	Blackthorn	3m
14	<i>Dodonaea viscosa</i>	Hop Bush	1-2m
15	<i>Dianella longifolia</i>	Blue Flax Lily	1m
16	<i>Dillwynia sieberi</i>	Prickly Parrot Pea	1m
17	<i>Hardenbergia violacea</i>	Native Sarsparilla	n/a
18	<i>Indigofera australis</i>	Native Indigo	1-2m
19	<i>Aristida ramosa</i>	Purple Wiregrass	1.2m
20	<i>Cymbopogon refractus</i>	Barbed Wire Grass	1.5m
21	<i>Themeda australis</i>	Kangaroo Grass	1m
22	<i>Lomandra filiformis</i>	Wattle Mat-rush	0.5m
23	<i>Microlaena stipoides</i>	Weeping Grass	0.3m
24	<i>Wahlenbergia gracilis</i>	Australian Bluebell	0.4m
Riparian			
25	<i>Carex appressa</i>	Tall sedge	1.2m
26	<i>Juncus usitatus</i>	Common Rush	1m
27	<i>Microlaena stipoides</i>	Weeping Grass	1m
28	<i>Pratia purpurascens</i>	Whiteroot	0.3m
Median & Verge Planting			
29	<i>Lomandra 'Katrinus'</i>	Mat-Rush	1m
30	<i>Lomandra 'Tanika'</i>	Mat-Rush	0.7m



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### 5.5 URBAN DESIGN CONCEPT

The urban concept design drawings are provided on the following pages. They include:

- Concept design plans
- Illustrative cross sections
- Illustrative bridge elevations and sections.

#### ***Concept design plans***

There are 15 drawing sheets to illustrate the concept design - also refer key plan on the following page:

1. Chainage 0 to 1,125 approximately.
2. Chainage 1,125 to 2,300 approximately
3. Chainage 2,250 to 3,425 approximately
4. Chainage 3,425 to 4,650 approximately
5. Chainage 4,550 to 5,775 approximately
6. Chainage 5,675 to 7,025 approximately
7. Chainage 6,875 to 7,850 approximately
8. Chainage 7,800 to 8,100, including the re-aligned Elizabeth Drive
9. Chainage 8,050 to 9,250 approximately
10. Chainage 9,175 to 10,400 approximately
11. Chainage 10,325 to 11,525 approximately
12. Chainage 11,525 to 12,700 approximately
13. Chainage 12,700 to 13,875 approximately
14. Chainage 13,875 to 15,075 approximately
15. Chainage 15,075 to 16,119 approximately.

#### ***Illustrative cross sections***

There are 11 cross sections, at the following locations (all road chainages are approximate):

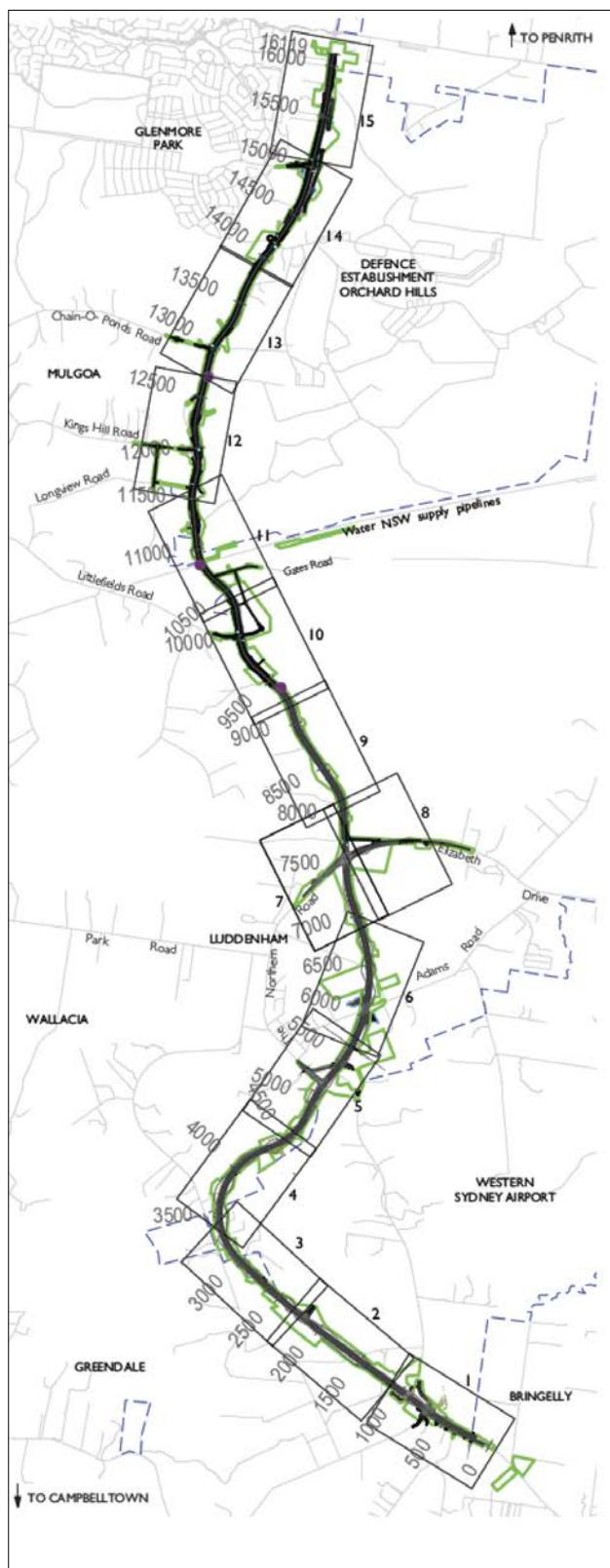
1. Chainage 925 approx – Badgerys Creek south of the new access culvert
2. Chainage 3,510 approx – Western Sydney Airport land near Willowdene Avenue
3. Chainage 3,795 approx – Rural residential in Willowdene Avenue
4. Chainage 4,440 approx – Duncans Creek dam
5. Chainage 5,930 approx – Cosgrove Creek Valley
6. Chainage 7,800 approx – 2,311 Elizabeth Drive
7. Chainage 9,145 approx – 2,776 The Northern Road
8. Chainage 10,970 approx – 2,559 The Northern Road
9. Chainage 12,320 approx – Grover Crescent Heavy Vehicle Inspection Bay
10. Chainage 13,280 approx – Orchard Hills Golf Club
11. Chainage 15,035 approx – Bradley Street intersection.

#### ***Illustrative bridge drawing***

A cross section and an elevation have been prepared for the Adams Road overbridge.

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KEY PLAN



LEGEND -  
URBAN DESIGN CONCEPT SHEETS 1-15

### Road Design Features

- Proposed construction boundary
- Carriageway
- Bus lanes
- Footway or shared path
- ▴ Fill batter
- ▾ Cut batter
- Ancillary site / construction compound
- Variable Message Signs (VMS)
- Temporary basin (construction only)
- Indicative new location of bus stop

### Proposed Vegetation

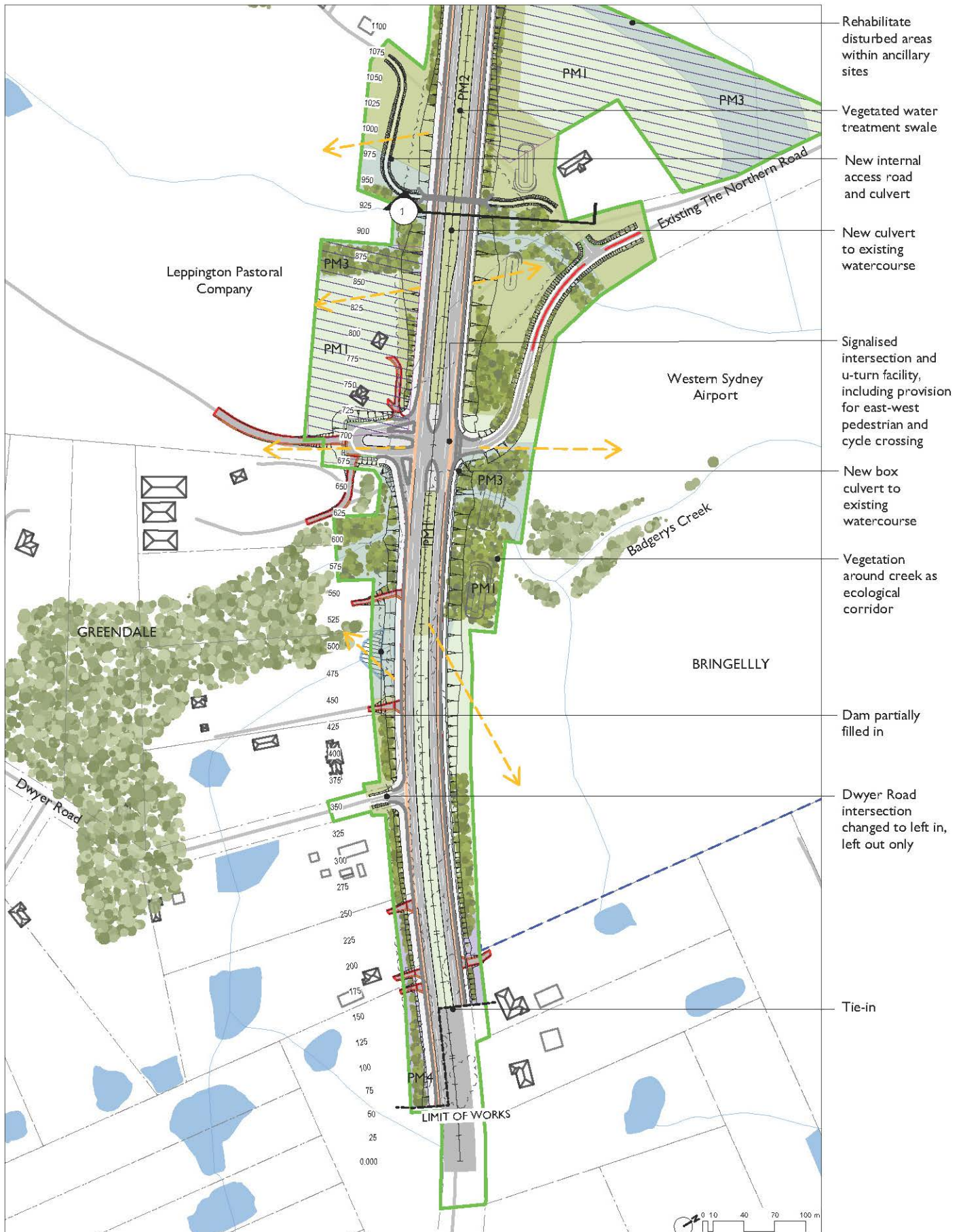
- New tree cover
- PM1 Groundcovers and grasses
- PM2 Groundcovers, shrubs and trees
- PM3 Riparian vegetation
- PM4 Feature planting

### Existing Features

- Existing trees retained
- Existing trees removed
- Existing contours at 10m interval
- ▬ Waterbodies
- ▬ Existing dam filled
- Existing building
- Existing building removed
- > Views from the proposed upgrade
- Commonwealth land

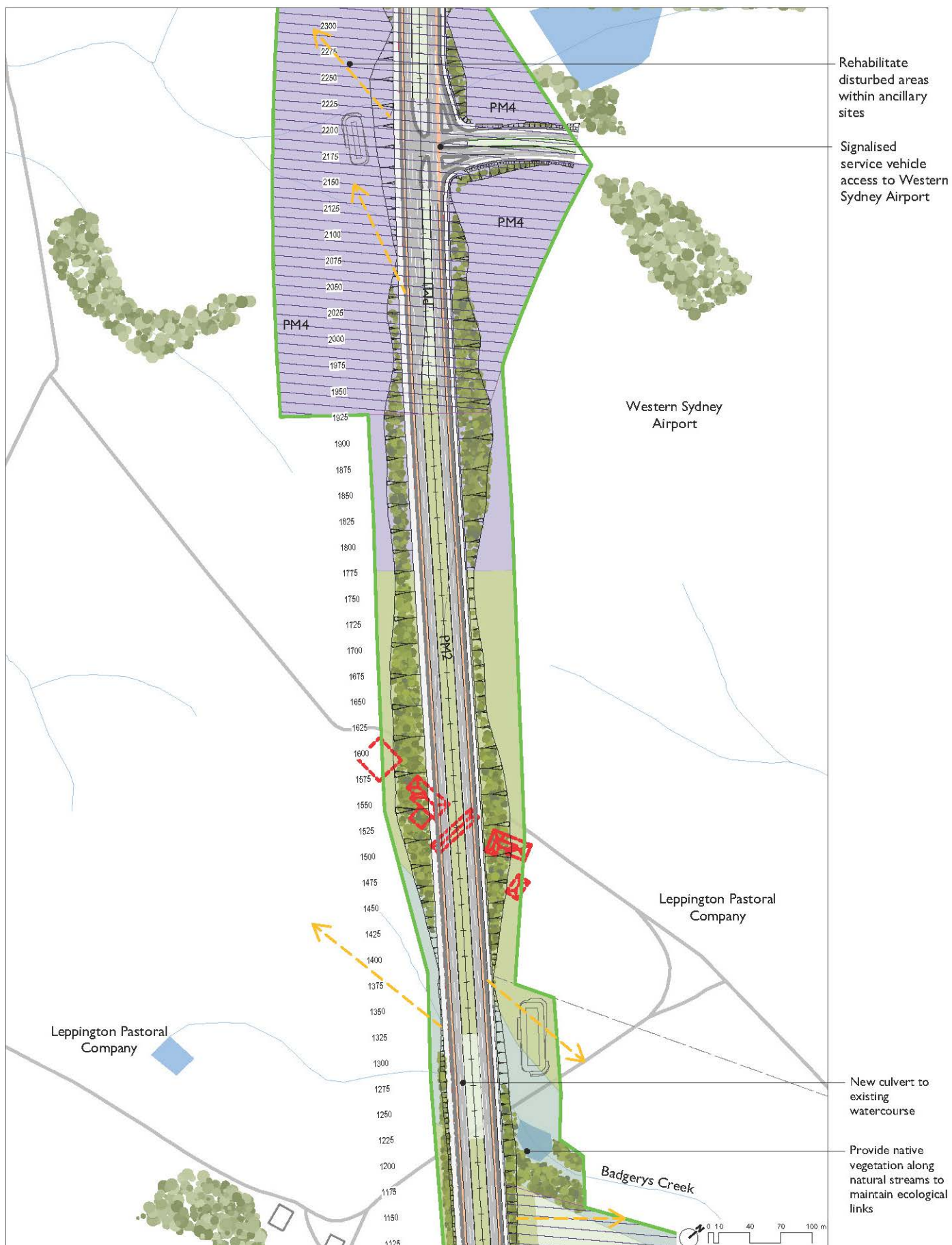


## URBAN DESIGN CONCEPT



Sheet 1 - Chainage 0 to 1,125 approximately.

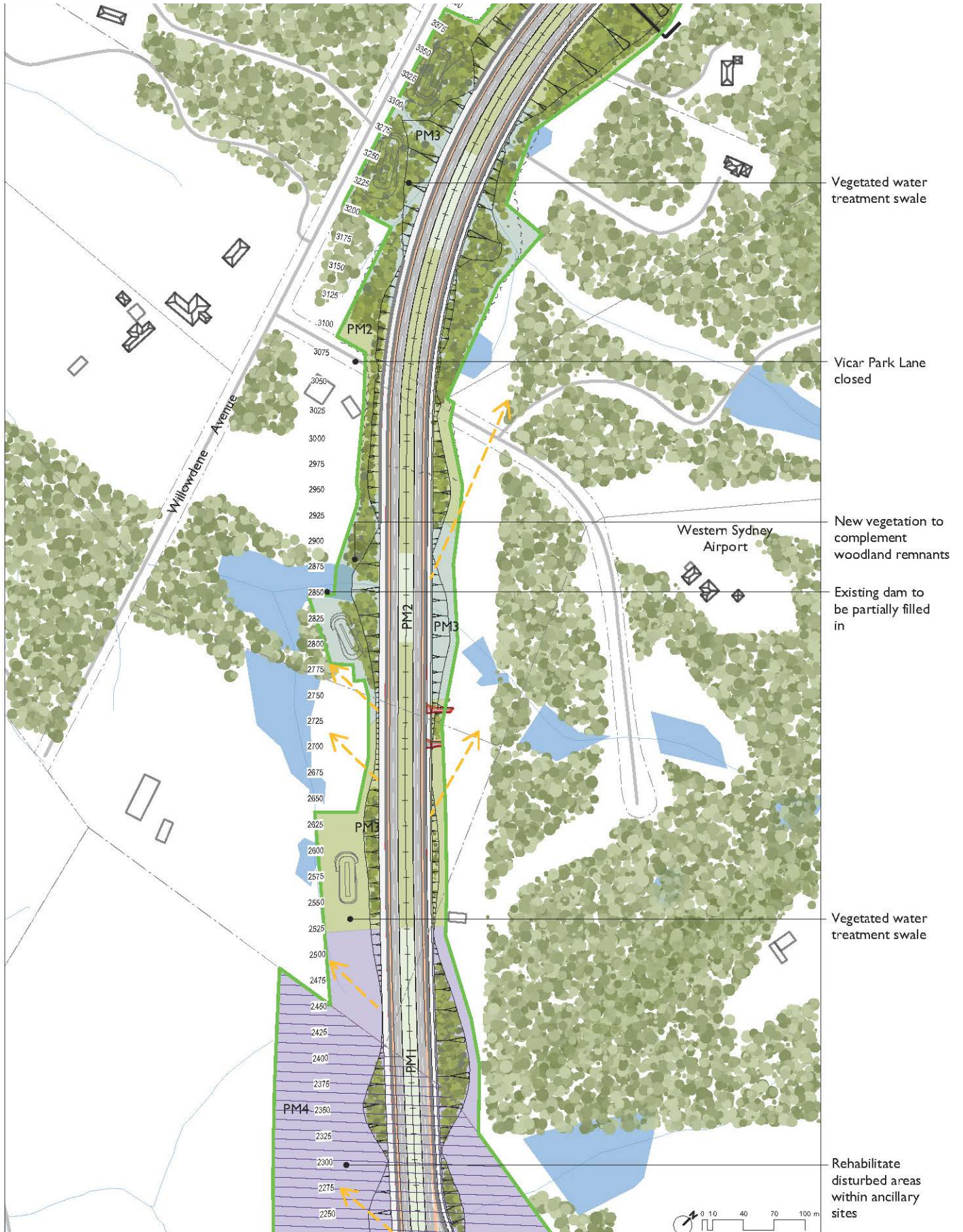
## URBAN DESIGN CONCEPT



Sheet 2 - Chainage 1,125 to 2,300 approximately



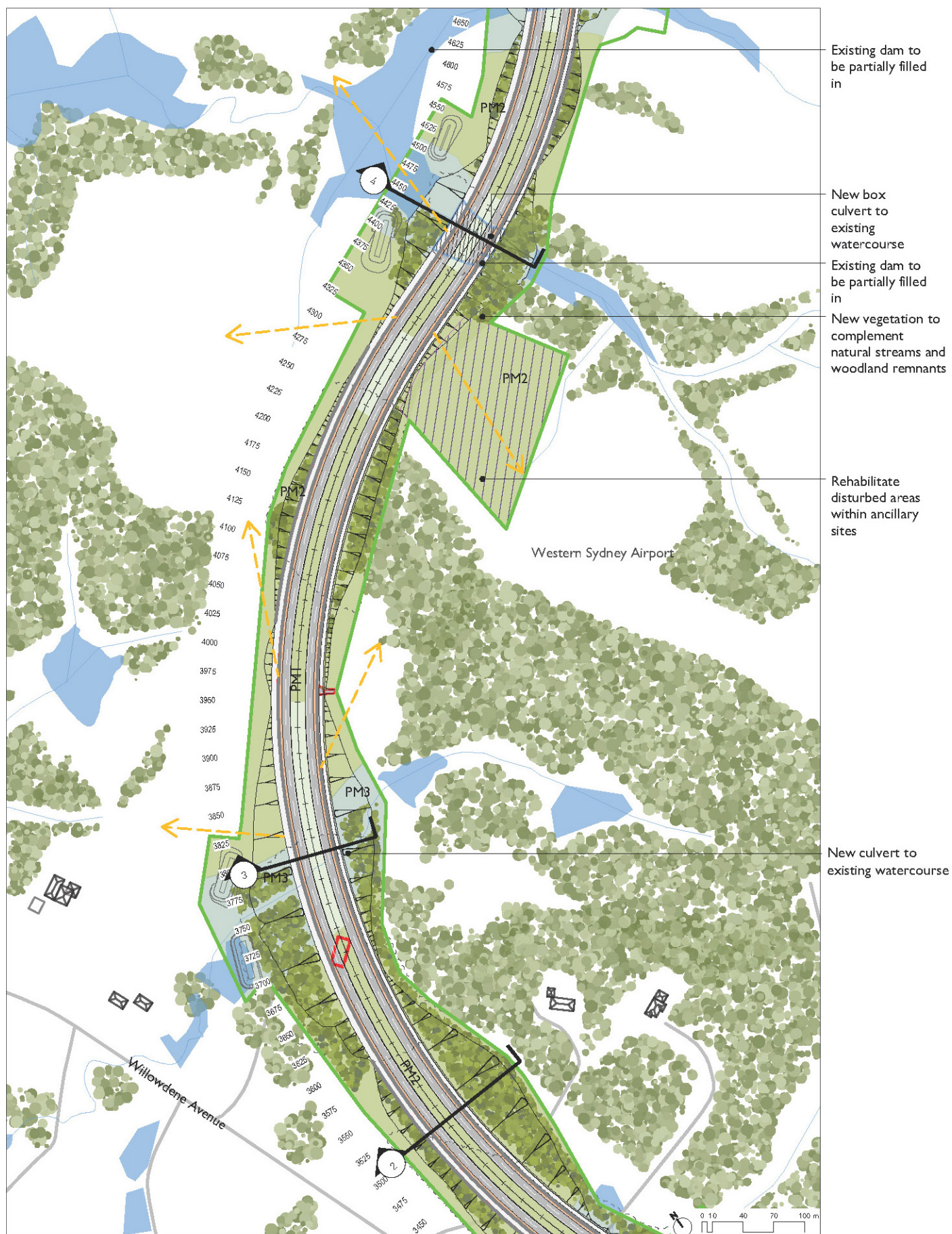
## URBAN DESIGN CONCEPT



Sheet 5 - Channage 2,250 to 3,425 approximately



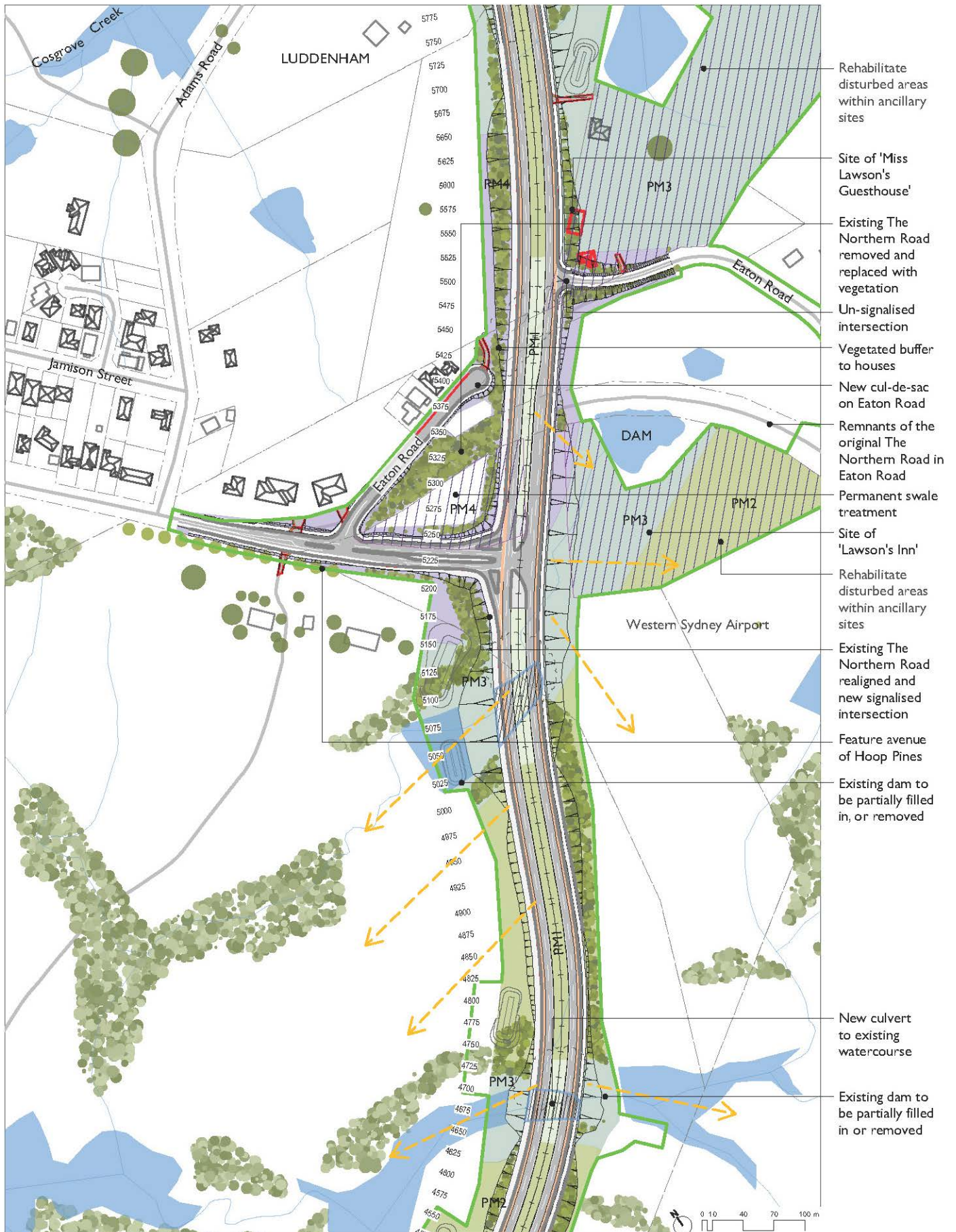
## URBAN DESIGN CONCEPT



Sheet 4 - Chainage 3,425 to 4,650 approximately



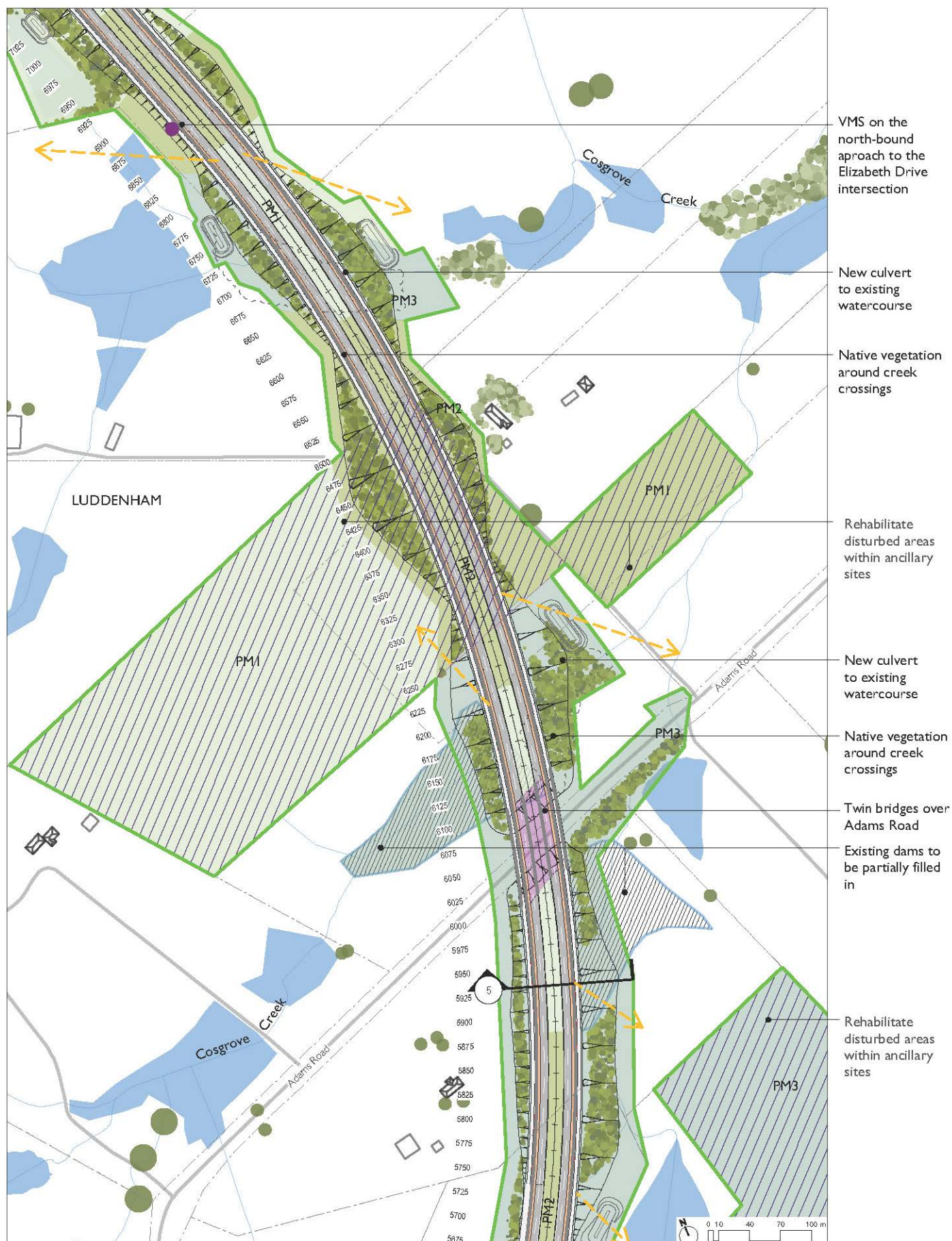
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Sheet 5 - Chainage 4,550 to 5,775 approximately



## URBAN DESIGN CONCEPT



Sheet 6 - Chainage 5,675 to 7,025 approximately





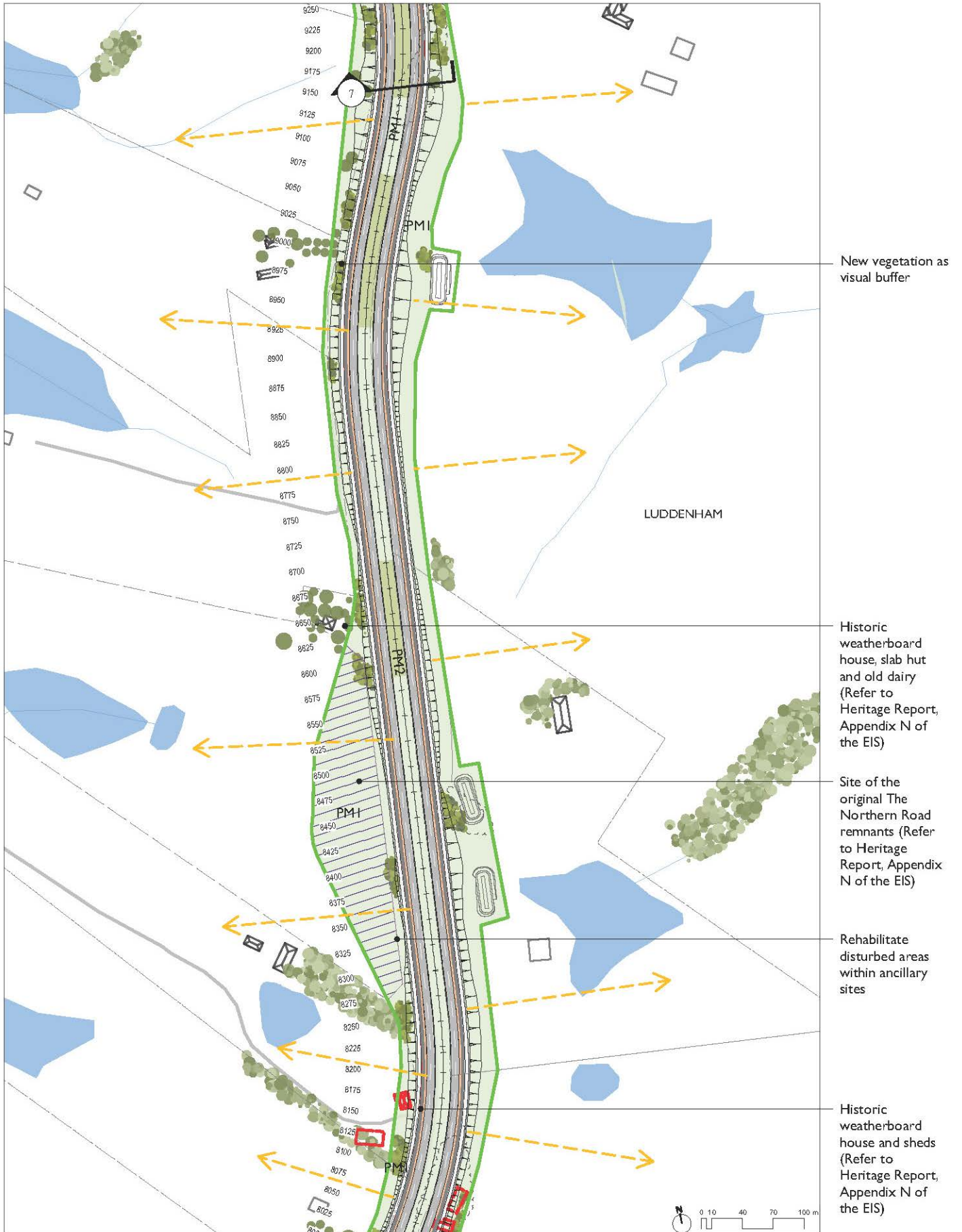
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Sheet 8 - Chainage 7,800 to 8,100, including the re-aligned Elizabeth Drive

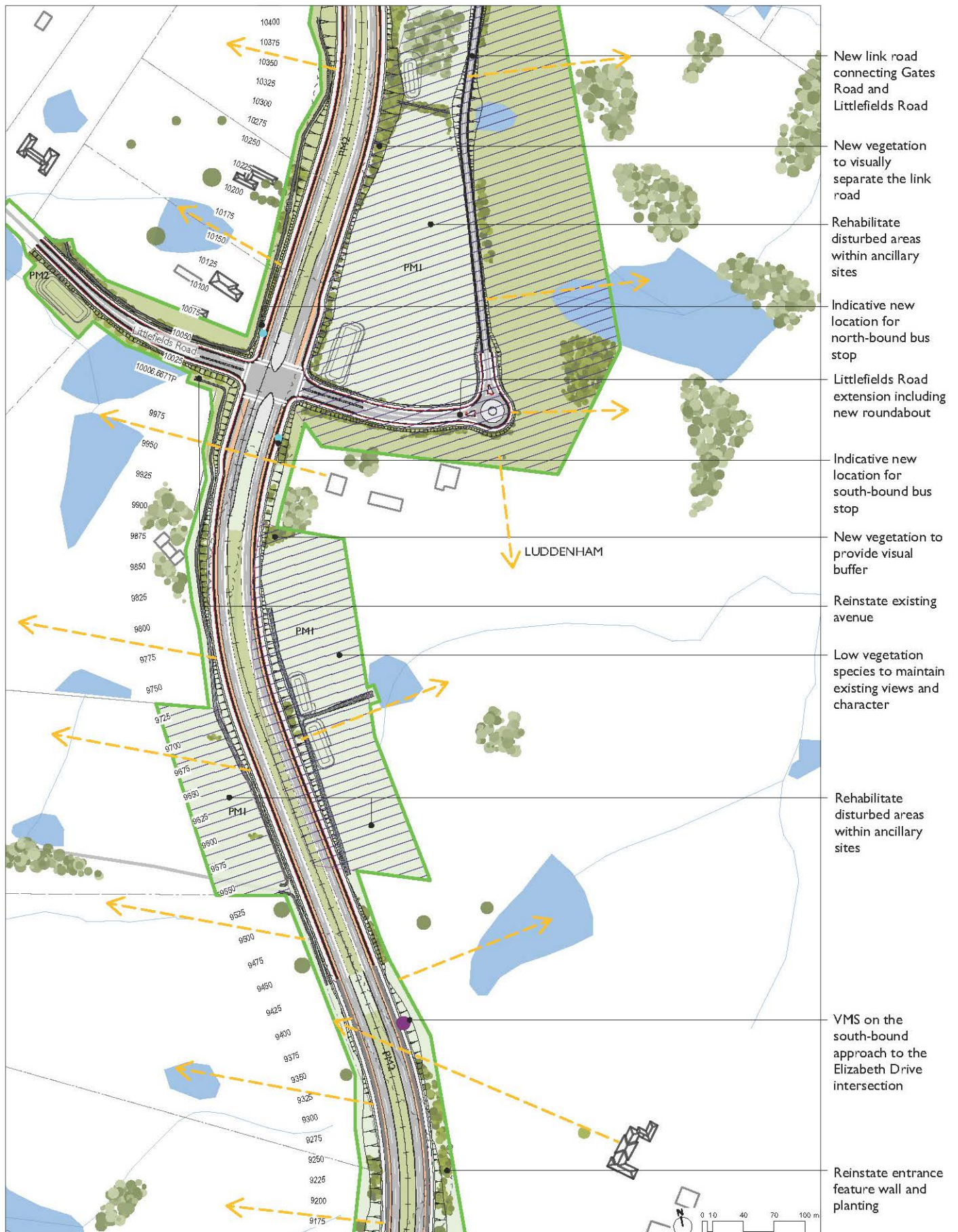


## URBAN DESIGN CONCEPT



Sheet 9 - Chainage 8,050 to 9,250 approximately

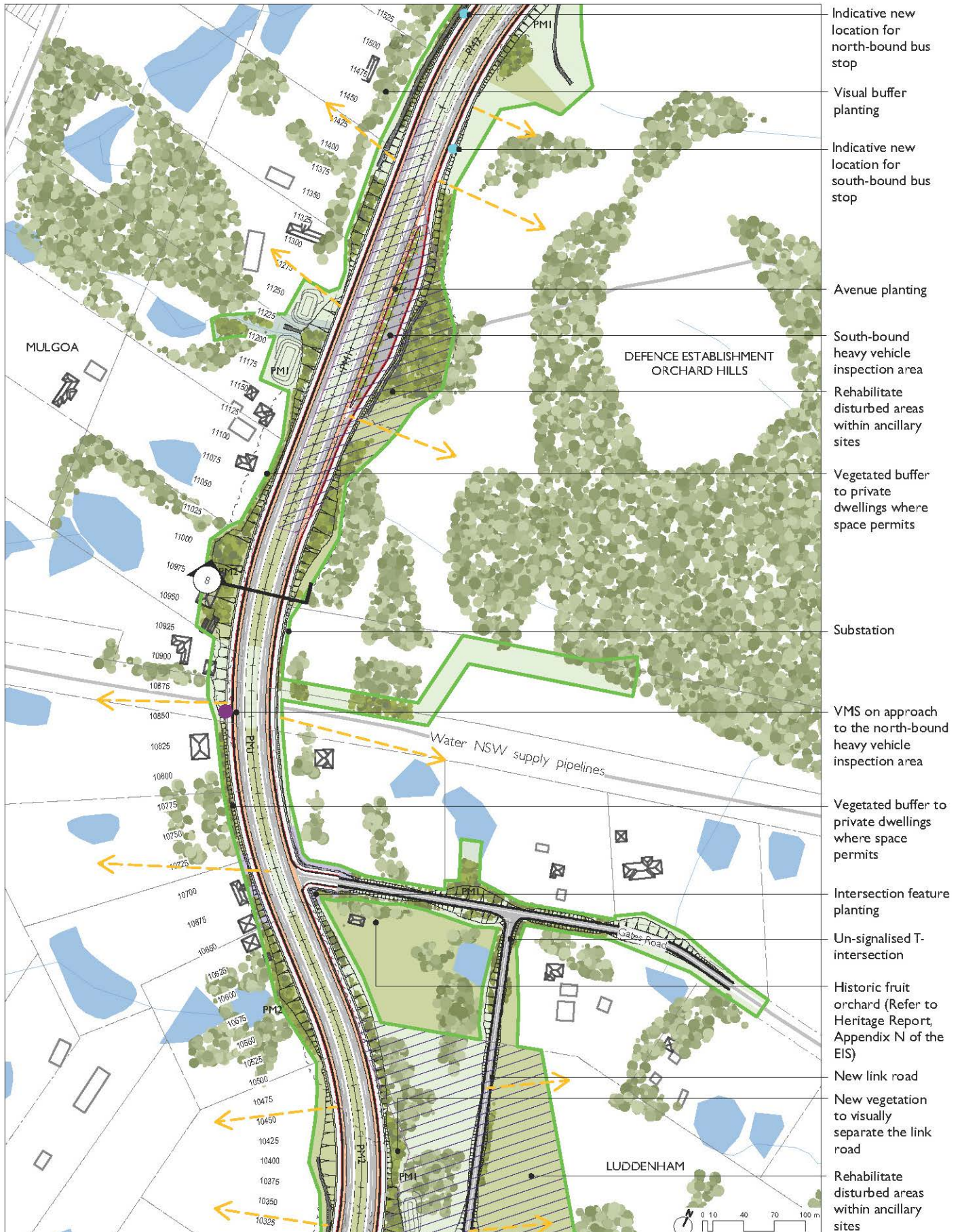
## URBAN DESIGN CONCEPT



Sheet 10 - Chainage 9,175 to 10,400 approximately



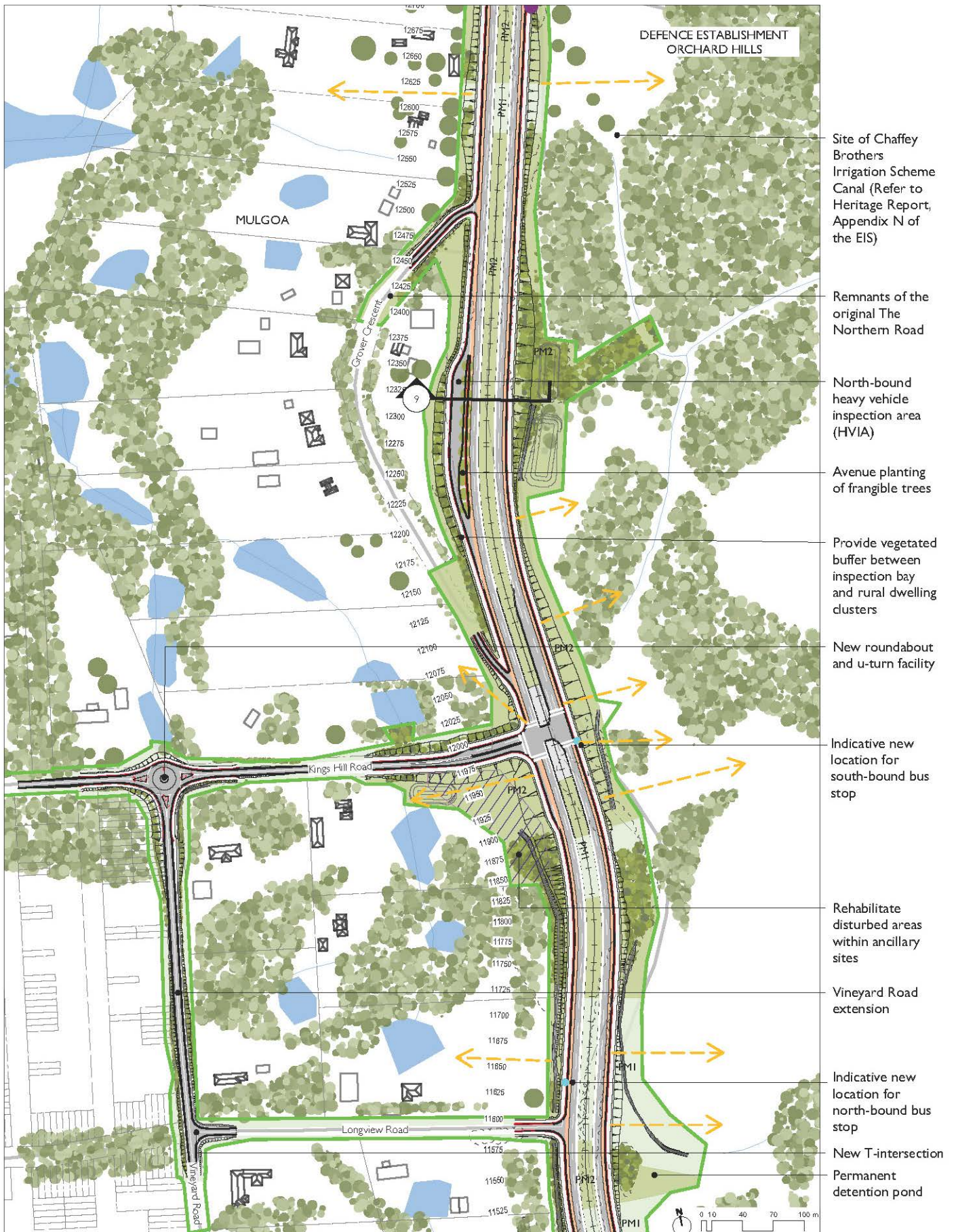
## URBAN DESIGN CONCEPT



Sheet 11 - Chainage 10,325 to 11,525 approximately



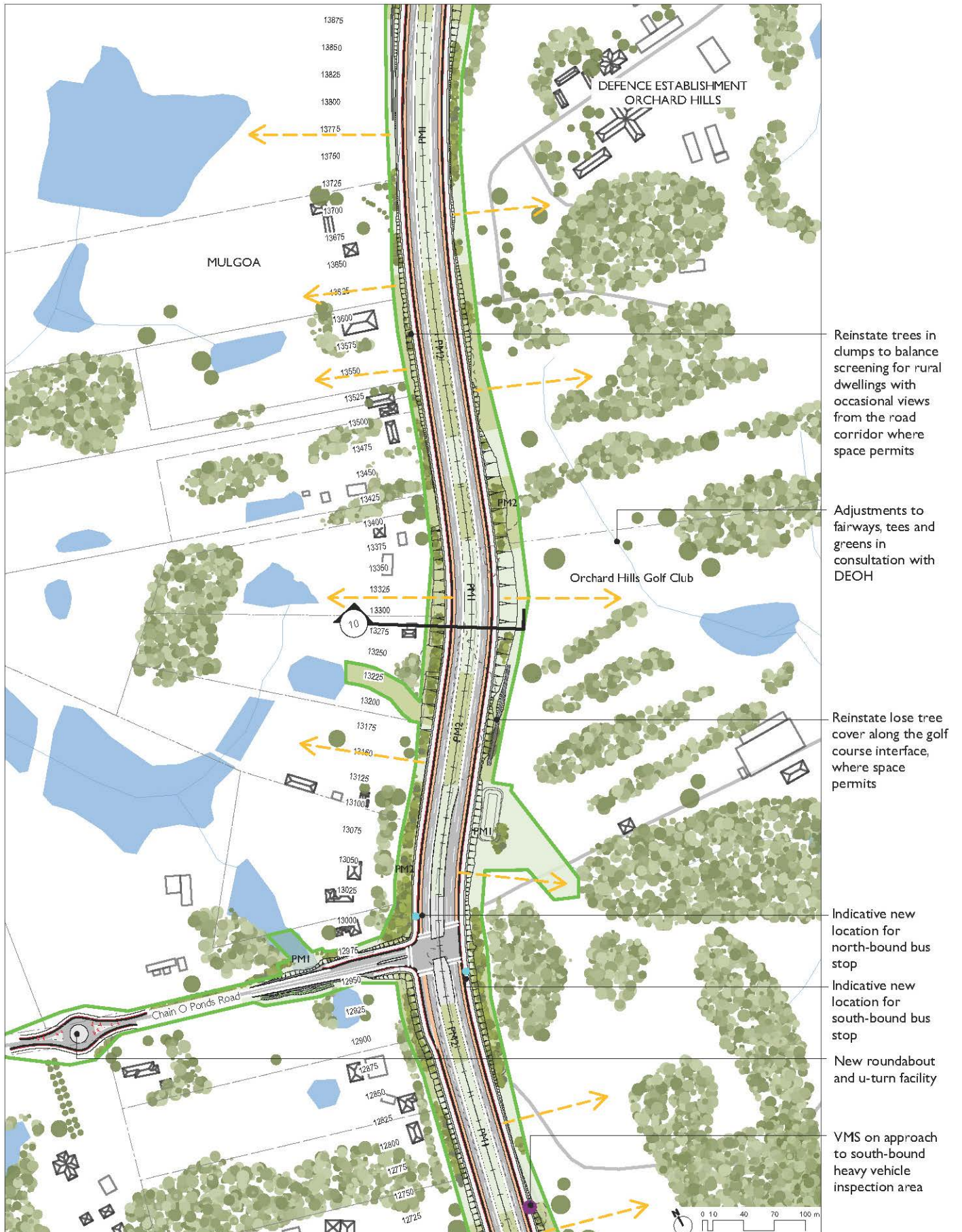
## URBAN DESIGN CONCEPT



Sheet 12 - Chainage 11,525 to 12,700 approximately



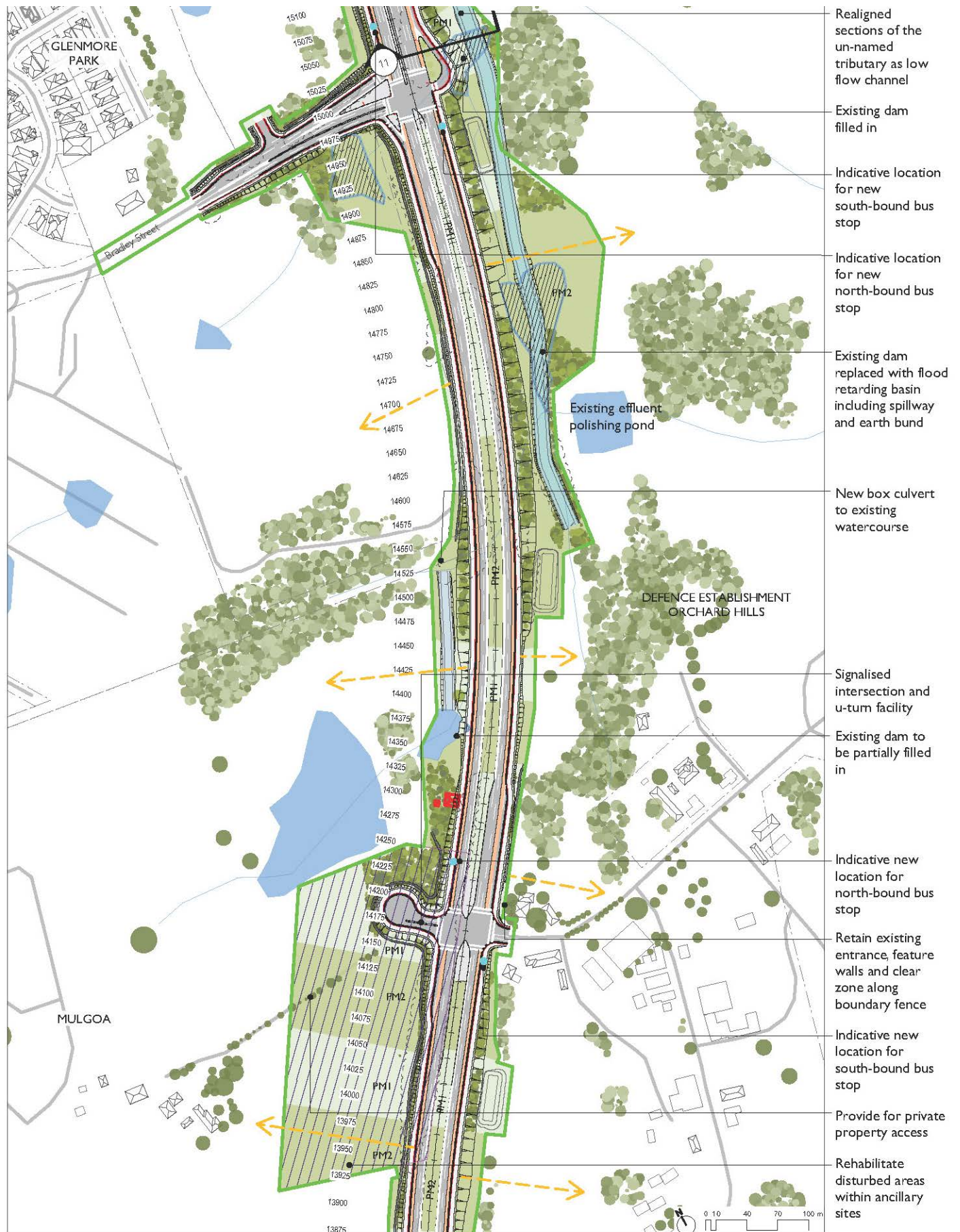
## URBAN DESIGN CONCEPT



Sheet I3 - Chainage 12,700 to 13,875 approximately



## URBAN DESIGN CONCEPT



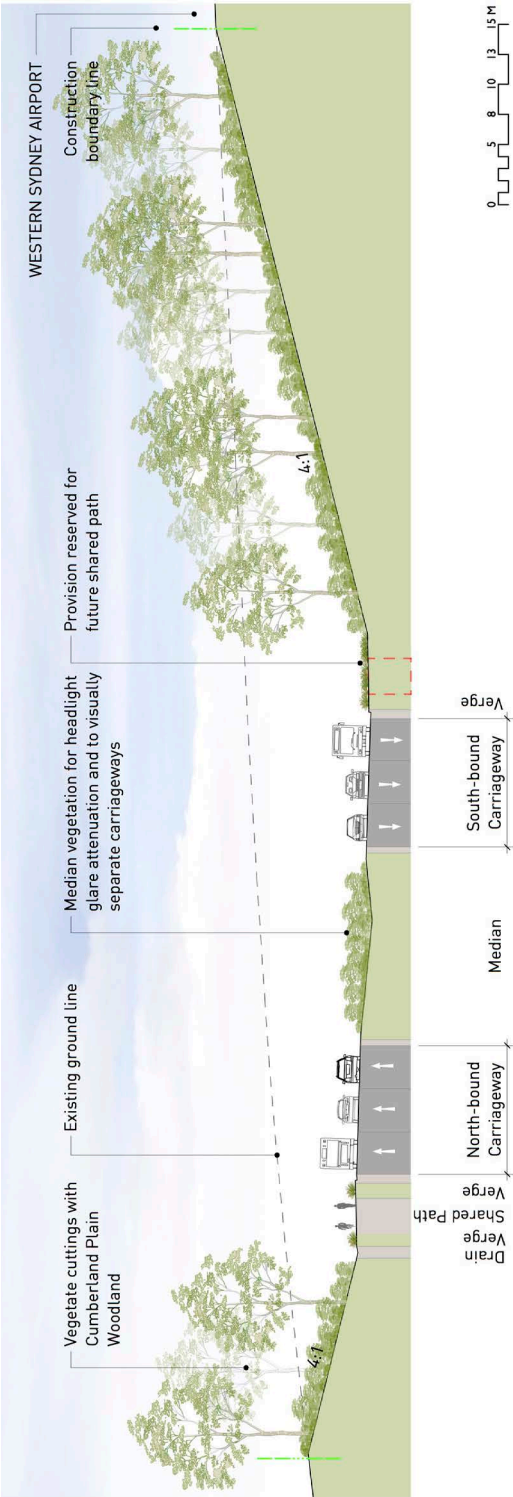
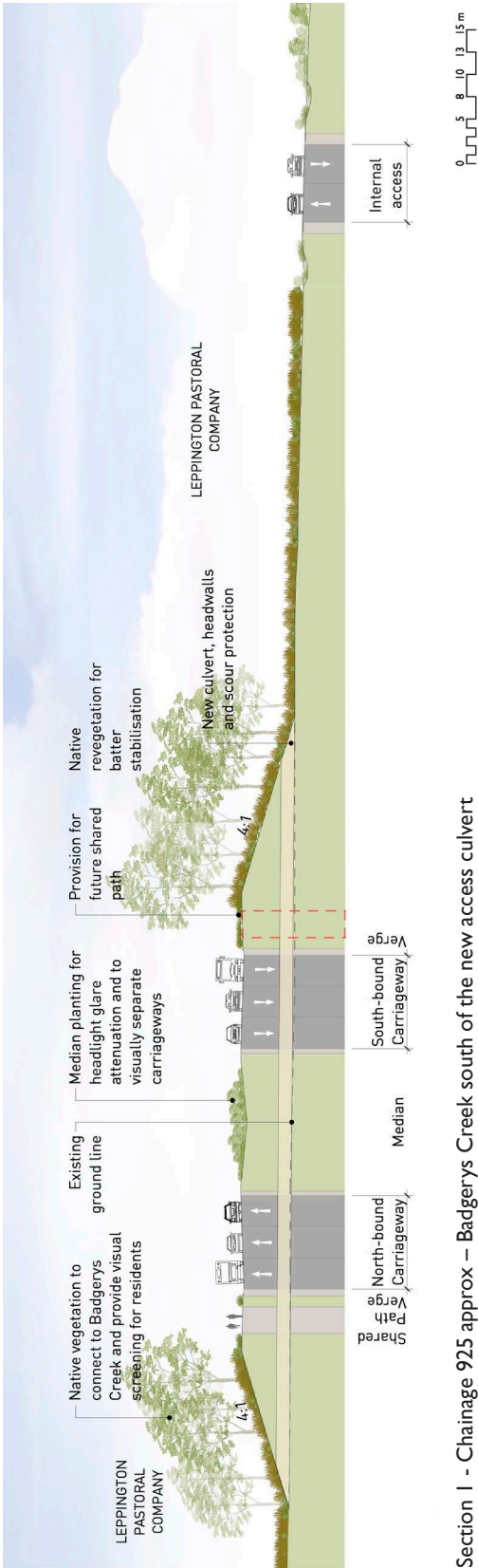
Sheet 14 - Chainage 13,875 to 15,075 approximately



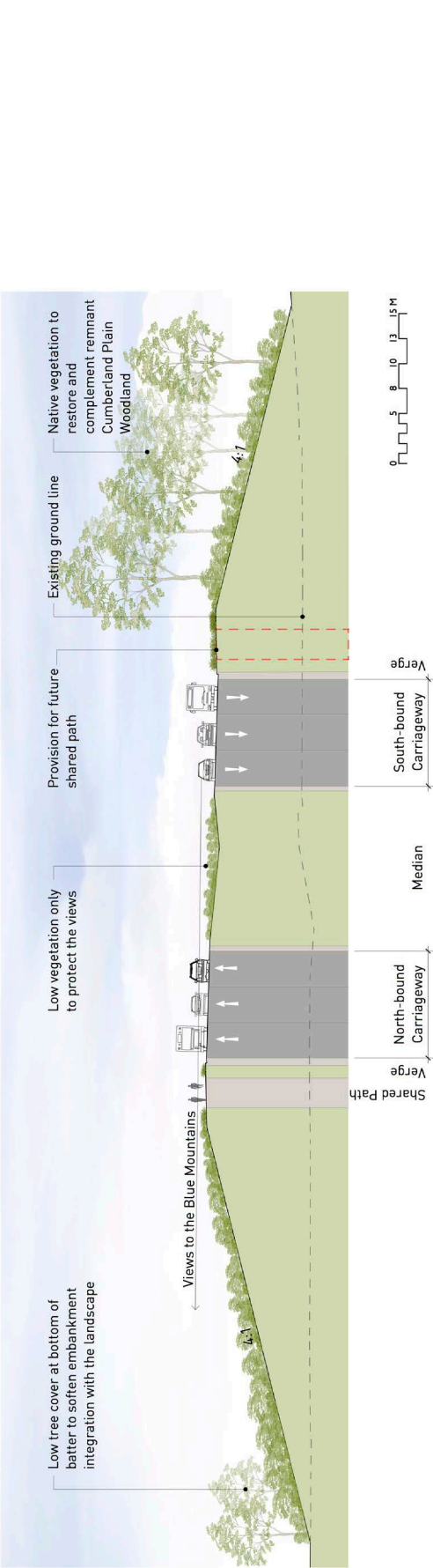
Sheet 15 - Chainage 15,075 to 16,119 approximately.



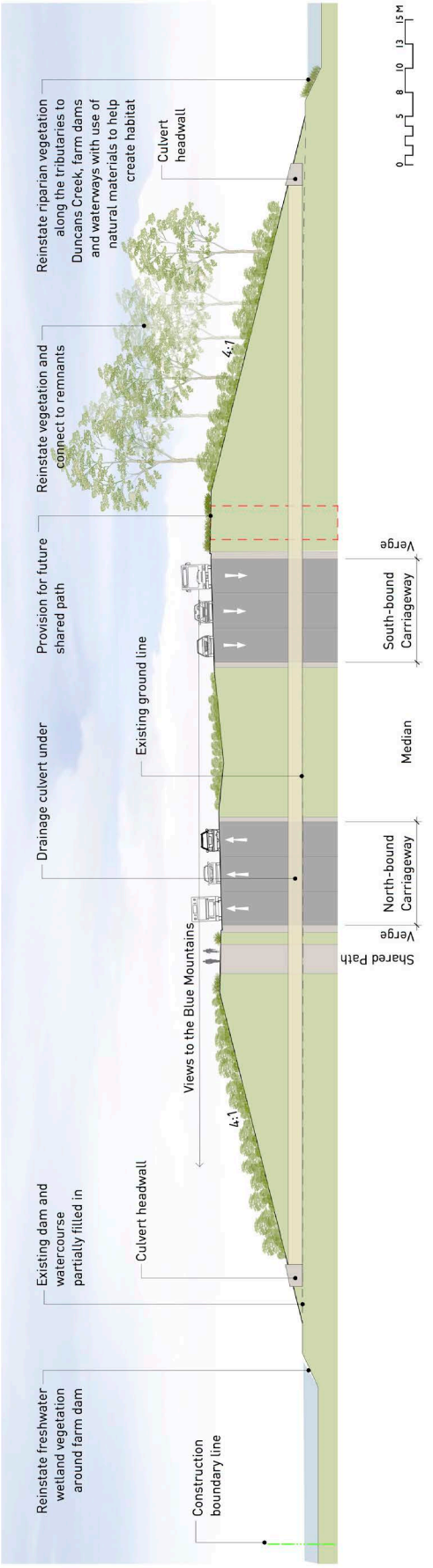
URBAN DESIGN CONCEPT



URBAN DESIGN CONCEPT

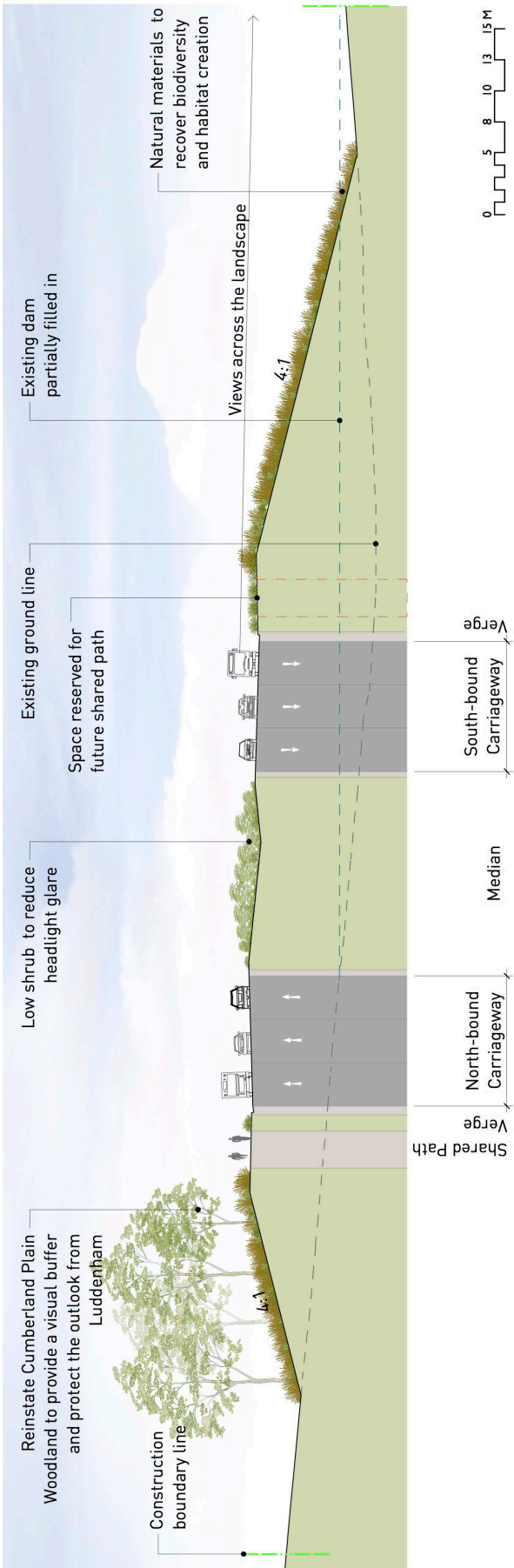


Section 3 - Chainage 3,795 approx – Rural residential in Willowdene Avenue

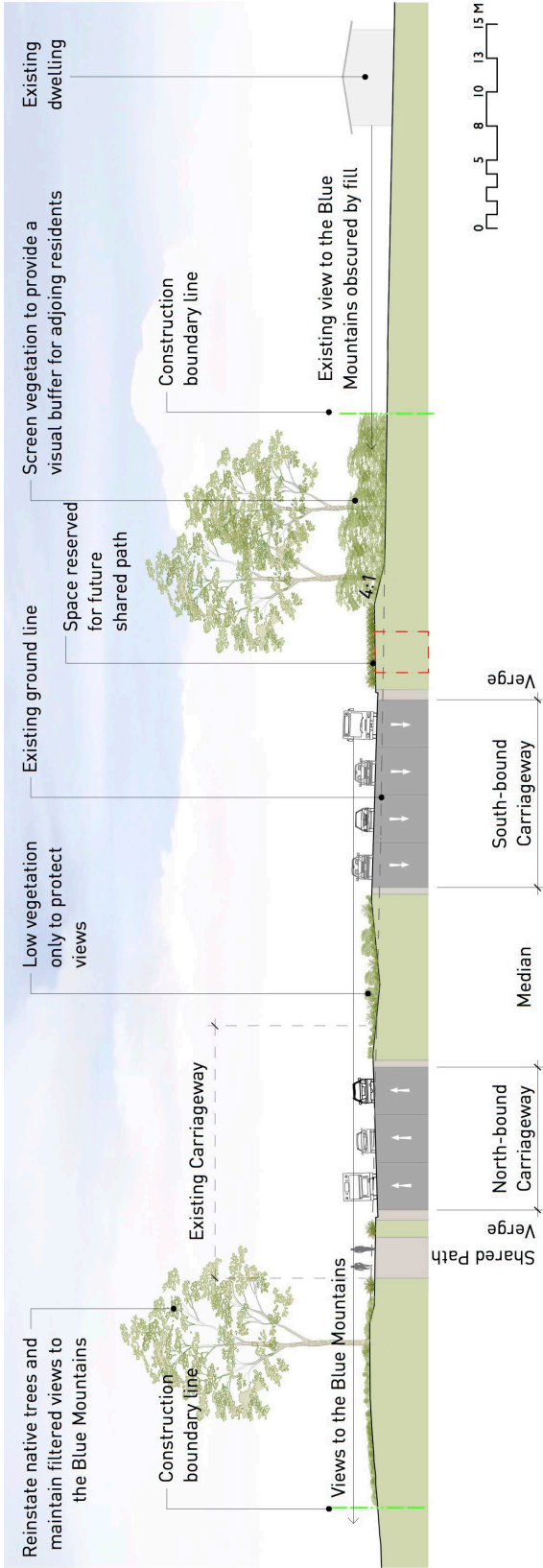


Section 4 - Chainage 4,775 approx – Duncan's Creek catchment dam

URBAN DESIGN CONCEPT



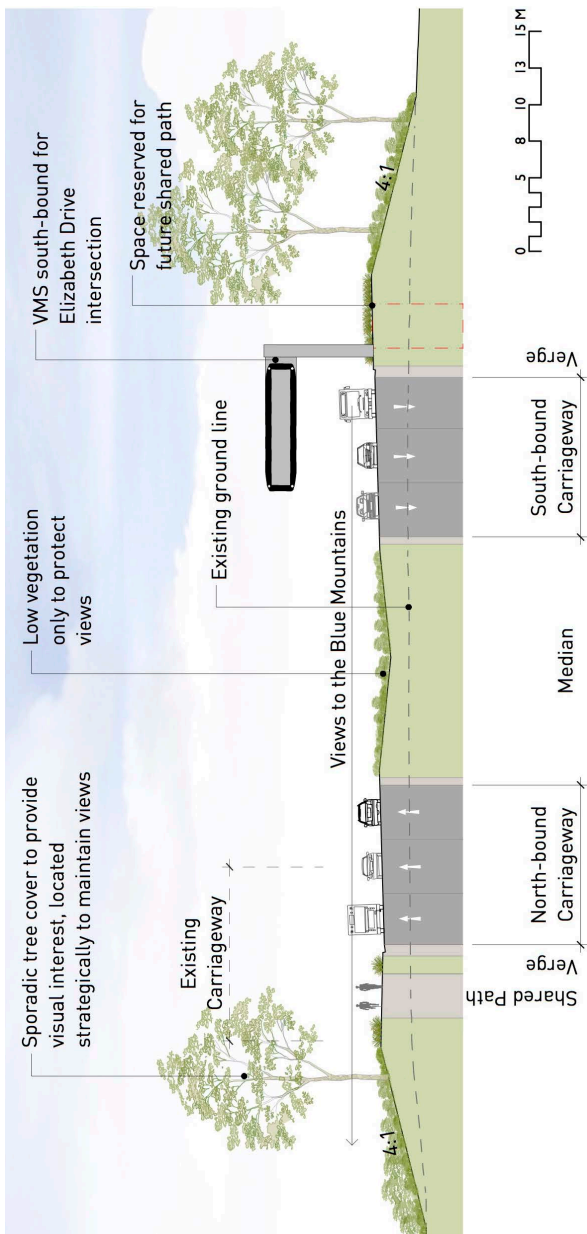
Section 5 - Chainage 5,930 approx - Cosgrove Creek Valley



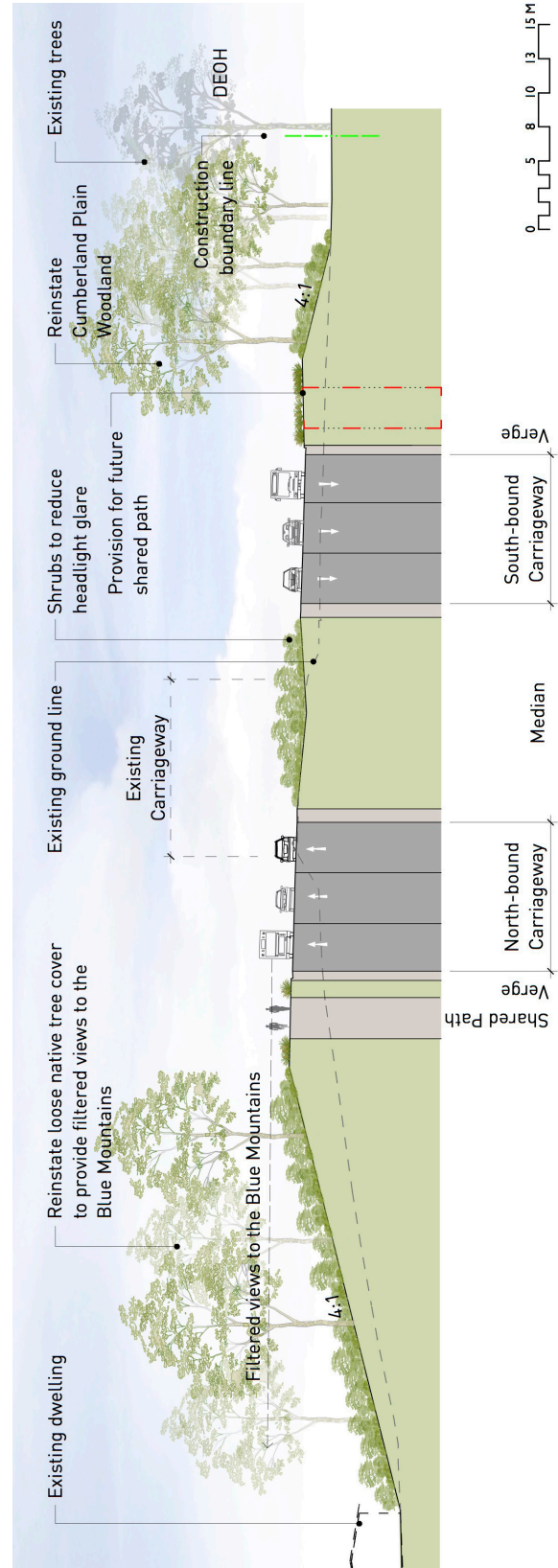
Section 6 - Chainage 7,800 approx - 2,311 Elizabeth Drive, Luddenham



## URBAN DESIGN CONCEPT

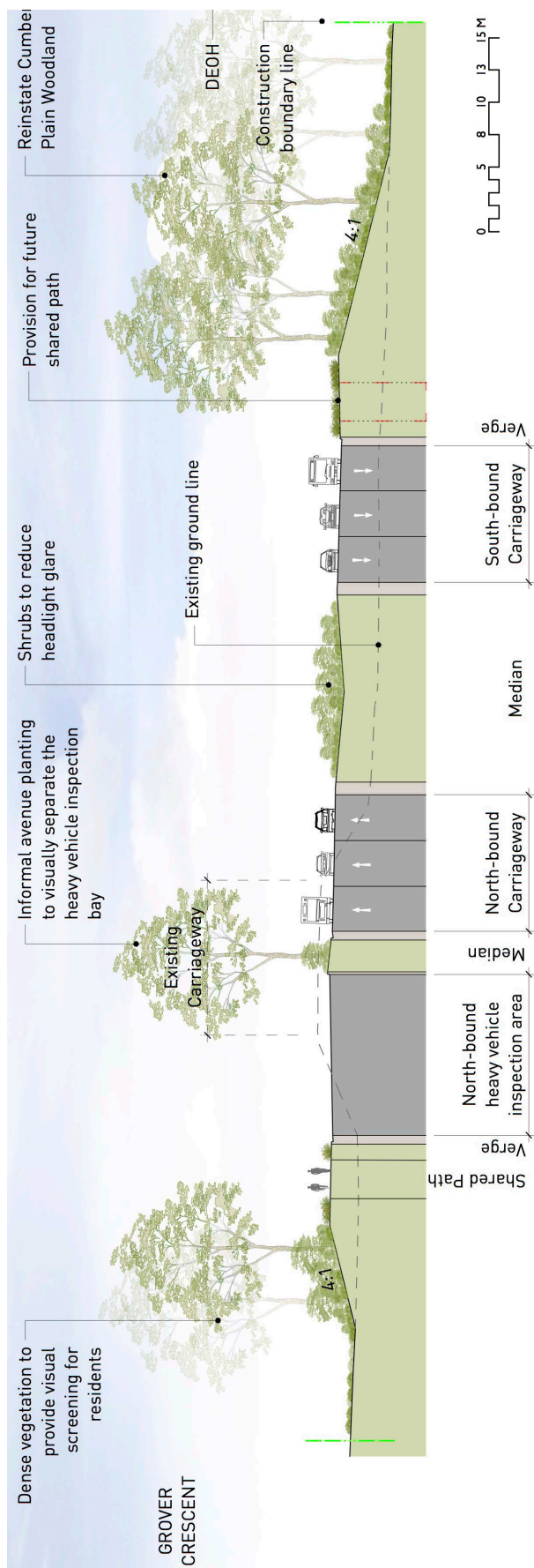


Section 7 - Chainage 9,145 approx - 2,776 The Northern Road, Luddenham

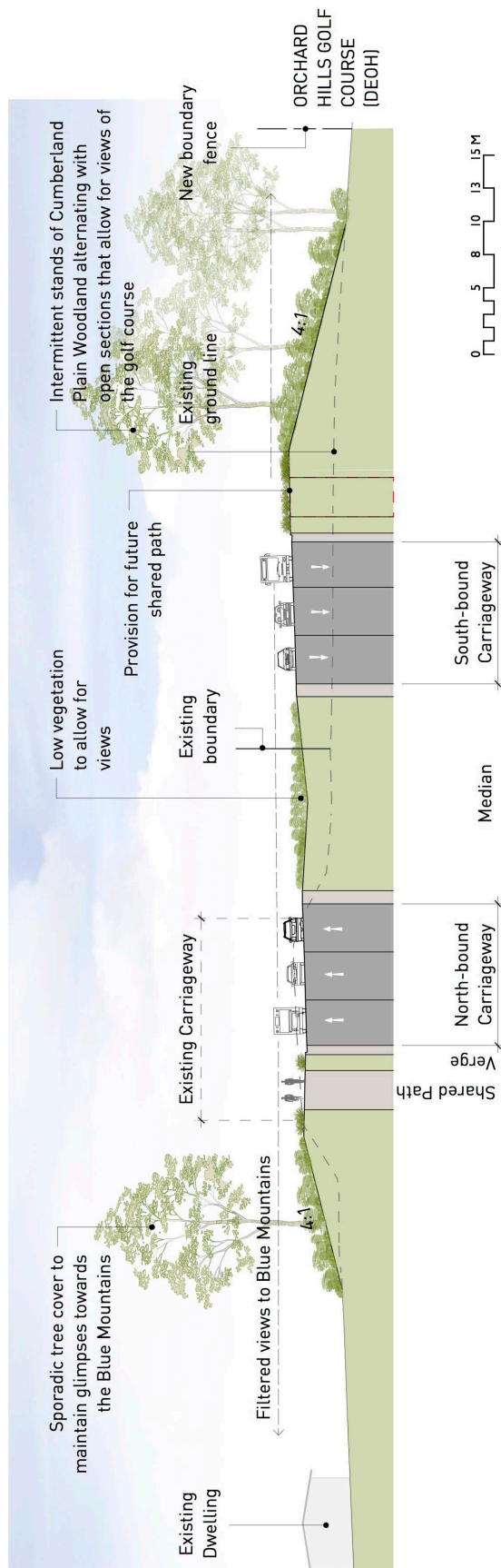


Section 8 - Chainage 10,970 approx - 2,559 The Northern Road

## URBAN DESIGN CONCEPT



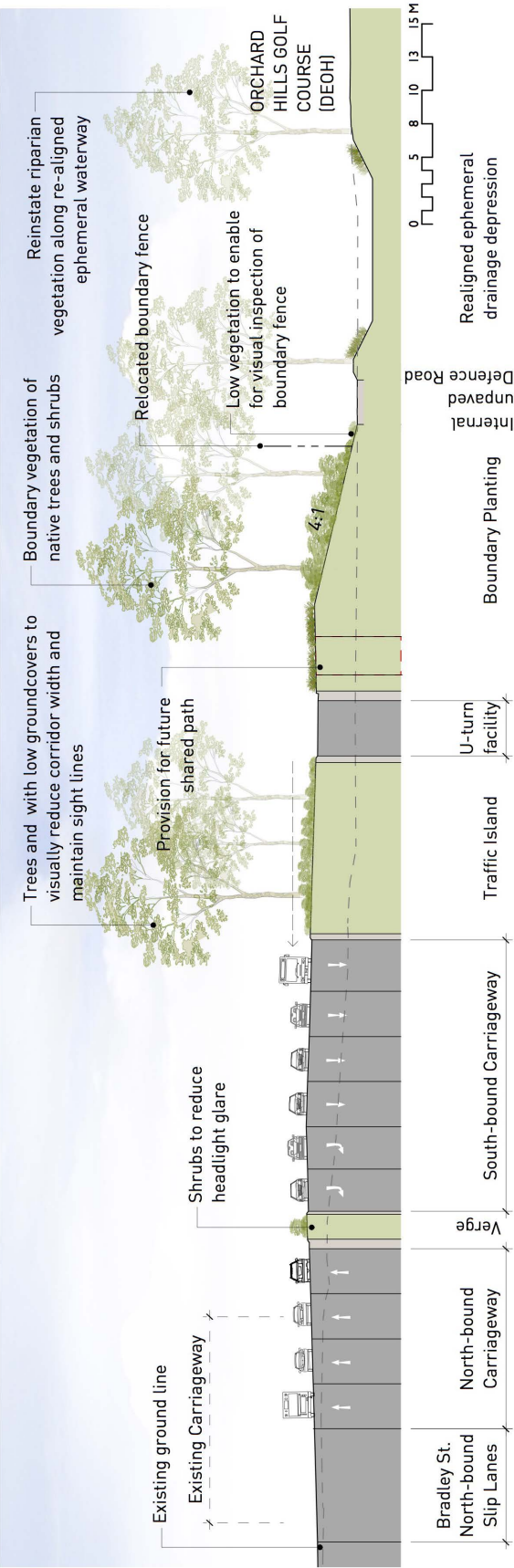
Section 9 - Chainage 12,320 approx - Grover Crescent Heavy Vehicle Inspection Bay



Section 10 - Chainage 13,280 approx - Orchard Hills Golf Club

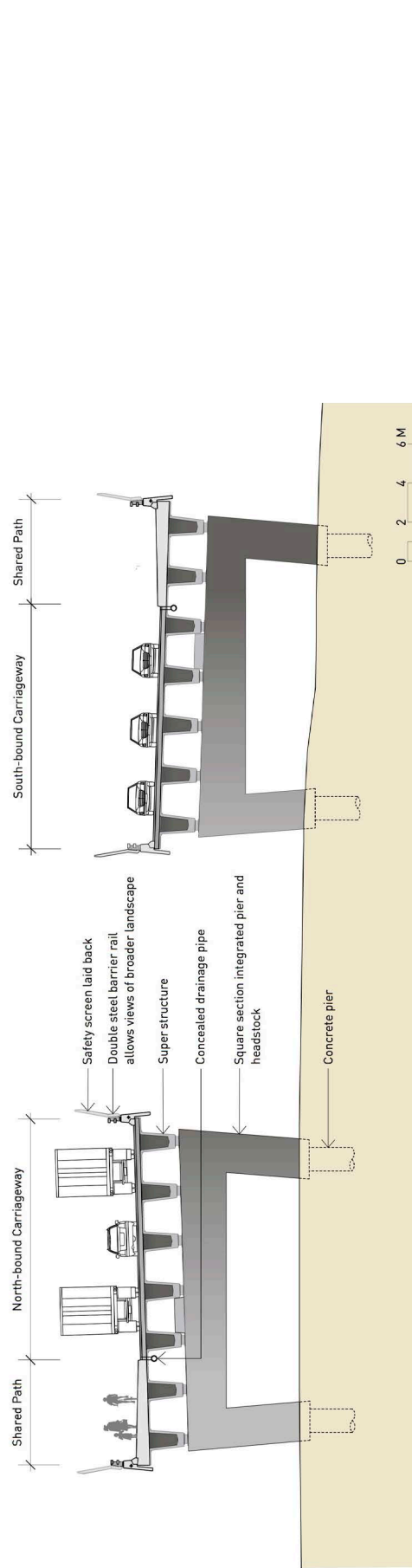


URBAN DESIGN CONCEPT

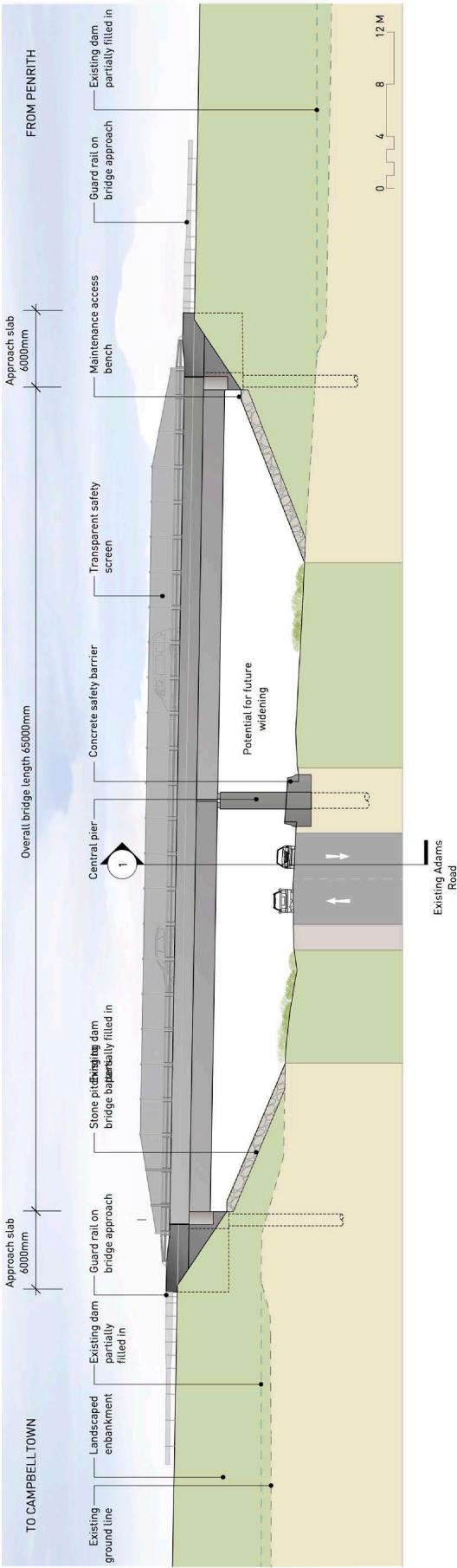


Section 11 - Chainage 15.035 approx – Bradley Street intersection

URBAN DESIGN CONCEPT



Adams Road bridge - cross section



Adams Road bridge - elevation