6.4 Landscape and visual

A landscape character and visual impact assessment (paa.design 2012) was undertaken to assess the landscape and visual impacts of the proposal. The full report is provided in Appendix I and a summary of the report is provided below.

6.4.1 Methodology

The study area for the landscape and visual assessment is defined as all areas surrounding the proposal that have views of the proposal. This varies with topography and includes locations at San Isidore up to about 2.5 kilometres from the proposal.

The landscape character and visual impact assessment was prepared in accordance with Roads and Maritime's Environmental Impact Assessment Guidance Note – *Guidelines for landscape character and visual impact assessment* (RTA, 2008). The following methodology has been used to determine the potential landscape character and visual impacts of the proposal, including the highway realignment, new bridge and cut and fill areas:

- Contextual analysis – To describe the general setting for the proposal including land uses and existing features and possible future development based on the Wagga Wagga LEP.
- Landscape character impact assessment – A series of landscape character zones were identified that have a distinct character relating to landscape features including landform, vegetation and land use. An assessment was carried out to determine the sensitivity of the landscape character zones to the landscape and visual impacts of the proposal.
- Assessment of the visibility of the proposal – Key viewpoints were identified to aid assessment of the visual impact.
- Visual impact assessment – The anticipated impacts from the proposed activity were assessed and a landscape character and visual impact mitigation strategy was devised.

Landscape character impact assessment

The landscape character impact assessment considered:

- Sensitivity – how sensitive the character of the setting is to the proposed change.
- Magnitude – the nature of the project and how it would impact on the landscape character, ie a measure of the scale, form and visual character of the proposal.

Sensitivity and magnitude were classified by the rankings listed in Table 6.23.

Table 6.23: Visual impact sensitivity and magnitude rankings

Ranking	Definition
High	The proposal would be the dominant feature in the landscape and would significantly affect and change its character
High to Moderate	The proposal would form a significant and immediately apparent part of the landscape that affects and changes its character

Ranking	Definition
Moderate to Low	The proposal would form a visible and recognisable new element and may be readily noticed by the observer
Low	The proposal constitutes a minor component of the wider view
Negligible	Only a small part is discernible or at such a distance and is scarcely appreciated
None	No part of the proposal is discernible.

The rankings of sensitivity and magnitude were combined to provide an impact rating for the proposal on the landscape character based on the matrix in Table 6.24 (RTA 2009).

Table 6.24: Visual impact matrix

		MAGNITUDE					
		High	**High to moderate**	**Moderate**	**Moderate to low**	**Low**	**Negligible**
SENSITIVITY	**High**	High impact	High impact	High to moderate	High to moderate	Moderate	Negligible
	High to moderate	High impact	High to moderate	High to moderate	Moderate	Moderate	Negligible
	Moderate	High to moderate	High to moderate	Moderate	Moderate	Moderate to low	Negligible
	Moderate to low	High to moderate	Moderate	Moderate	Moderate to low	Moderate to low	Negligible
	Low	Moderate	Moderate	Moderate to low	Moderate to low	Low impact	Negligible
	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible

Visual impact assessment – key viewpoints

The significance of potential visual impacts on key viewpoints was assessed in relation to:

- The magnitude of visual change in the landscape. This is strongly influenced by the level of visibility of the new works. Magnitude is influenced by the scale, extent and duration of the views, and the proximity of the proposal to the viewer.
- The sensitivity in relation to the quality of the view and how susceptible it is to the proposed change. Visual sensitivity depends on the nature of the existing environment and on the likely response from people viewing the scene.

The categories of magnitude and sensitivity of visibility are defined in Table 6.25.

Table 6.25: Categories of magnitude and sensitivity of visibility

Category	Definition
High	Substantial to total loss of key elements, features or characteristics of the baseline visual character (ie view before construction) and/or introduction of elements considered to be totally uncharacteristic of the existing landscape character.

Category	Definition
Moderate	Partial loss of or alteration to one or more key elements, features or characteristics of the baseline visual character (ie view before construction) and/or introduction of elements that may be prominent but are not considered to be substantially uncharacteristic of the existing landscape character.
Low	Minor loss of or alteration to one or more key elements, features or characteristics of the baseline visual character (ie view before construction) and/or introduction of elements that are consistent with the existing landscape character.
Negligible	Very minor loss of or alteration to one of more key elements, features or characteristics of the baseline visual character (ie view before construction) and/or introduction of elements that are consistent with the existing landscape character (ie approximating the 'no change' situation).

Impacts were assessed by applying a consistent set of criteria, as outlined in Table 6.26, to each of the key viewpoints or groups of viewpoints. The criteria take into account that the Olympic Highway is an existing high speed environment. People driving on a busy road and/or at high speeds are likely to be less sensitive to a change in the environment since they are focused on changes in traffic conditions and driving, compared to someone who is enjoying a recreational experience or someone who is viewing the scene from their living room.

Table 6.26: Criteria for assessing the visual impacts on viewpoints

Criterion	Definition	Rating
Duration of view		
Long term	Greater than 1 hour	High
Moderate term	30 minutes to 1 hour	Moderate
Short term	Less than 30 minutes	Low
Number of viewers		
High	Greater than 1,000	High
Moderate	100 to 999	Moderate
Low	Less than 100	Low
Viewer sensitivity (type)		
Resident		High
Pedestrian/cyclist		Moderate
Motorist		Low
View Sensitivity		
Pristine landscape		High
Moderately modified landscape		Moderate
Significantly modified landscape		Low
View Distance / Proximity		
Short	Less than 100 metres	High
Medium	100 metres to 500 metres	Moderate
Long	Greater than 500 metres	Low

6.4.2 Existing environment

General description

Kapooka is at the southern limit of Wagga Wagga urban area. It forms a transition from the rolling hills of Wagga and Uranquinty into the more gently undulating to flatter landscape of the Riverina. The woodland on the hills in the study area forms part of a key link between the hills and the floodplain of the Murrumbidgee River.

The topography of the northern and southern sections of the study area has different physical characteristics. North of the existing bridge, the corridor is in a relatively narrow valley with wooded steeper side slopes, creating a sense of enclosure. Silvalite Reserve is located on the eastern side of the proposal in this section. South of the bridge, the valley becomes much wider and gently sloping. This section contains open woodland and cleared pastures, and has a greater sense of openness. The southern section has more expansive views than the northern section (see Figure 6.5).

The study area largely comprises rural-residential and agricultural properties. A decommissioned fuel depot is located immediately south of the existing bridge. A quarry is located south-east of the proposal.

The residential area of the Kapooka Military Area and two rural dwellings (residences 1 and 2) are located west of the Sydney to Melbourne Rail Line. A single rural dwelling (residence 3) is located at the southern end of the proposal. The residences are shown in Figure 1.2.

The Wiradjuri Walking Track travels from north to south through the study area, east of the proposal. The track passes through Silvalite Reserve. The track provides a shared path for cyclists and walkers for a distance of about 30 kilometres around Wagga Wagga.

The suburb of San Isidore is located about north-west of the proposal. The proposal may be visible from rural residential properties in San Isidore up to about 2.5 kilometres from the proposal.

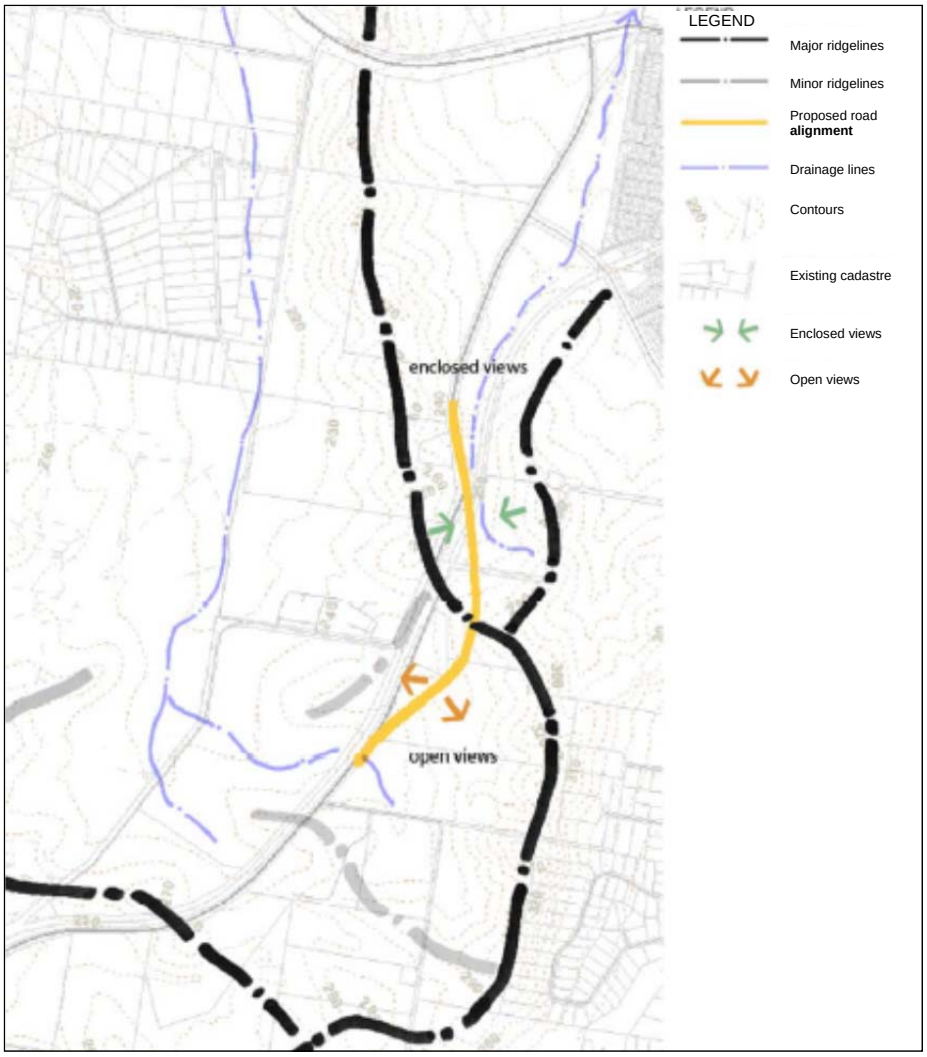

Figure 6.5: Enclosed and open views in the study area
Base map source – Wagga Wagga City Council 2012

Landscape character zones

Seven landscape character zones were identified in the study area and are described below. The locations of the character zones are shown in Figure 6.6.

Landscape Character Zone 1 – Silvalite Reserve

Silvalite Reserve has an area of about 60 hectares and has been set aside for the conservation of ecological values. It comprises lower wooded slopes and a gully. The vegetation comprises White Box woodland. The proposal is generally located along the eastern and southern boundaries of the reserve. The Wiradjuri Walking Track runs in a north-south direction through the reserve.

Landscape Character Zone 2 – existing road and rail corridor

The existing road and rail corridor provides major rail services between Sydney and Melbourne. The road corridor provides access to Kapooka as well as an important road freight transport route, including between Brisbane and Melbourne. The rail corridor is generally located in cut below the road corridor. Toward the south of the

proposal it is located on fill and is higher than the highway. Some remnant vegetation is present along the road and rail corridors and between the road and rail line. The road and rail corridors define the edge of some of the land use types including Silvalite Reserve. The existing bridge at Kapooka is a brick arch overbridge constructed in 1880 and is a heritage item listed in the Wagga Wagga LEP.

Landscape Character Zone 3 – conservation and biodiversity area

The area is zoned for environmental conservation and is located on the eastern side of the proposal. The topography includes rolling hills, low rises and ridges. The main ridge forms a saddle at the existing bridge. The vegetation comprises grassy White Box woodland. The vegetation has been modified by agricultural land use.

Landscape Character Zone 4a – agricultural research station

This area includes land used for agriculture and research, including grazing and dry land cropping. The topography is undulating and generally slopes toward the existing road corridor. The vegetation comprises White Box woodland and agricultural land. The area has been disturbed through development for agricultural purposes.

Landscape Character Zone 4b – open woodland / rural agriculture north

This area comprises land partly cleared and used for agricultural purposes, and includes residences 1 and 2. The topography is undulating and generally slopes toward the existing road corridor. The vegetation includes White Box woodland and agricultural land. The area has been disturbed through development for agriculture and plantings of non-locally native trees. The proposal would be located close to residences 1 and 2.

Landscape Character Zone 4c – open woodland / rural agriculture south

This area comprises land used for agriculture including grazing, and includes residence 3. The topography is undulating and generally slopes toward the existing road corridor. The vegetation comprises White Box woodland and introduced grassland. The area has been disturbed and extensively cleared through development for agriculture.

Landscape Character Zone 5 – Kapooka Military Area and residential area

Landscape Character Zone 5 contains Commonwealth owned land used for the Kapooka Military Area, including the Kapooka residential area. A ridge runs between the existing Camp Access Road and the Kapooka residential area. The land rises further to the west. The vegetation comprises some remnant woodland and planted introduced species.

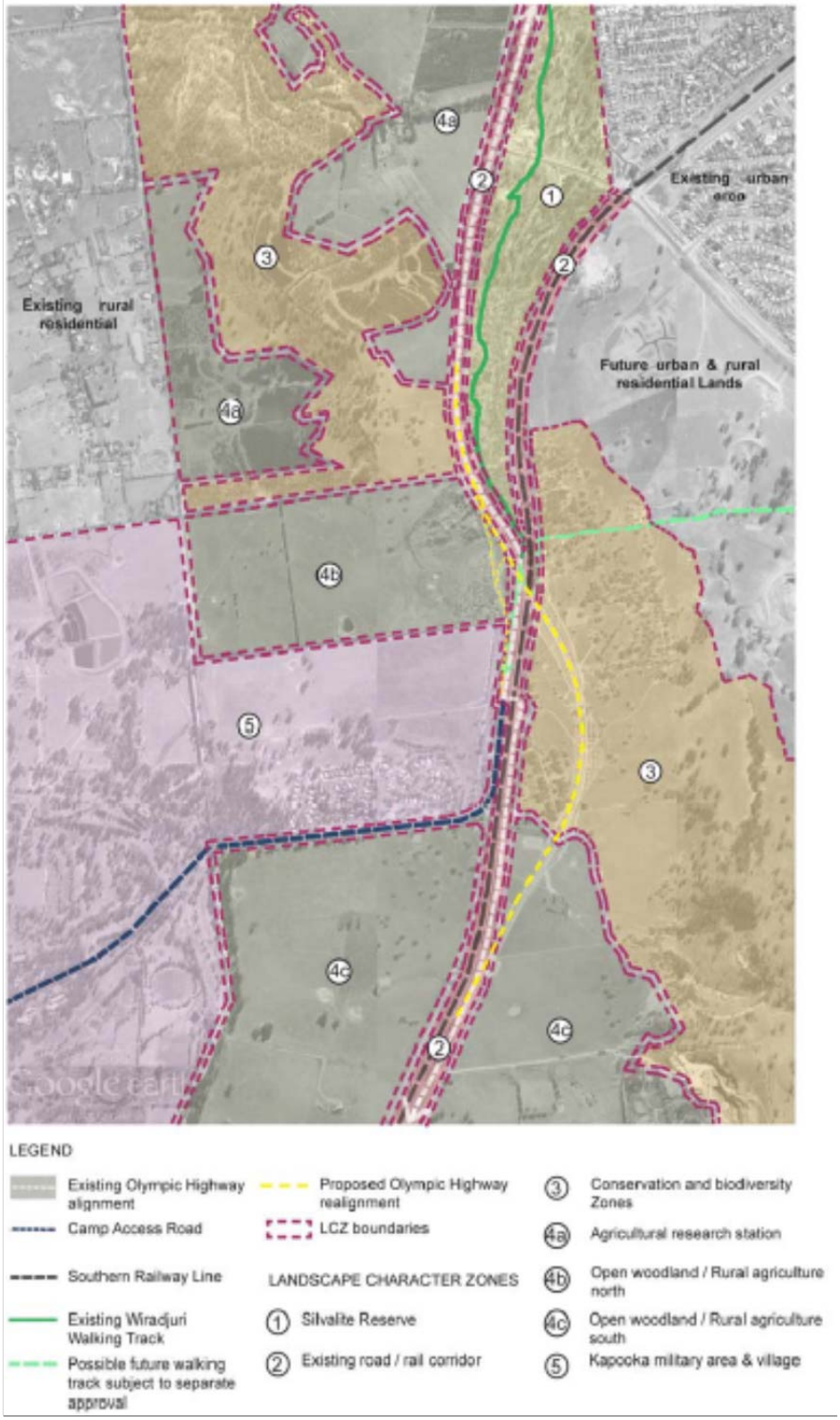

Figure 6.6: Landscape character zones in the study area
Base map source – Google Earth Pro 2012

6.4.3 Potential impacts

Construction

Visual impacts during construction would generally be associated with:

- Construction of road embankments.
- Positioning of plant and equipment along the alignment.
- Removal of vegetation.
- Establishment of site compounds and stockpile sites.

These have the potential to temporarily affect views for residents, road users on the Olympic Highway and Camp Access Road, and Wiradjuri Walking Track users.

Visual impacts would occur at residence 1 as a result of the removal of trees and construction of the new driveway and highway alignment. The proposal generally conforms to the ground surface at this location, so this residence would not experience visual impacts from large amounts of cut or fill.

Visual impacts would occur at residence 3 during the construction of the proposal, particularly the section of fill between chainages 68540 and 68860, which would have a maximum height of nine metres. The residence would have views of the construction works along the alignment, including the road, driveway and sediment basins, and would also have views of the construction compound. Residence 3 is located in an agricultural landscape and would not be substantially affected by the removal of vegetation.

These effects would be temporary and it is anticipated landscaping of the fill banks would reduce the magnitude of changes in the medium term.

Construction works, including earthworks, vegetation removal, sediment basins, site compounds and stockpile sites would be visible throughout construction. The construction works would be seen by road users from the existing highway and Camp Access Road, and by Wiradjuri Walking Track users. The visual impacts of construction works would be temporary.

Operation

Impacts on landscape character zones

The impacts of the proposal in each of the landscape character zones are provided in Table 6.27.

Table 6.27: Impacts on landscape character zones

Landscape character zone	Impacts	Sensitivity	Magnitude	Impact rating
Zone 1 - Silvalite Reserve	Silvalite Reserve would be affected by the construction of the proposed stage one temporary road and a sediment basin. These would require the removal of woodland vegetation.	Moderate	Moderate / Low	Moderate

Landscape character zone	Impacts	Sensitivity	Magnitude	Impact rating
Zone 2 - Existing Road / Rail Corridor	The proposal would widen the road footprint and increase the fill embankment, with the loss of some vegetation.	Moderate / Low	Moderate / Low	Moderate / Low
Zone 3 - Conservation and Biodiversity Area	The proposal would involve substantial cutting and filling, and would result in the removal of native woodland.	High	High	High
Zone 4a - Agricultural Research Station	The extent of works includes upgrading works only along the existing alignment, with minimal impacts.	Low	Low	Low
Zone 4b - Open Woodland / Rural Agriculture North	The realignment of the highway and Camp Access Road would impact on the two rural properties due to the loss of vegetation and the location of the roads closer to the dwellings. A new intersection is also proposed.	High	High	High
Zone 4c - Open Woodland / Rural Agriculture South	The proposal involves total new alignment through part of this zone. However, the landscape has been modified by previous agricultural land uses. A residence would be affected by the proposal in this zone.	High / Moderate	High / Moderate	High / Moderate
Zone 5 - Kapooka Military Area & residential area	Camp Access Road would be extended but would generally follow the existing alignment within this zone.	Negligible	Negligible	Negligible

Impacts on key viewpoints

The visual envelope map in Figure 6.7 shows the areas potentially affected by the proposal.

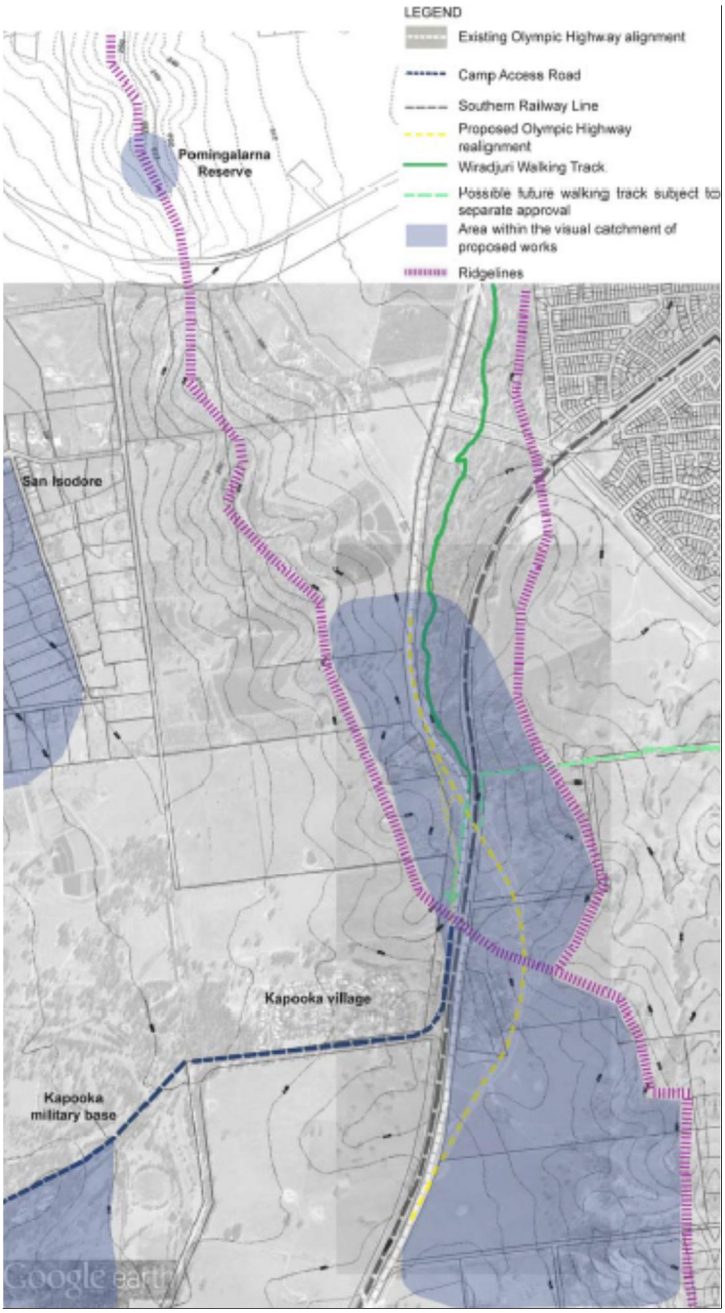

Figure 6.7: Visual envelope map
Base map source – Google Earth Pro 2012

Figure 6.8 shows the key viewpoints along the road corridor and from the surrounding area. The codes of the key viewpoints shown in the figures are described in Table 6.28.

Table 6.28: Key viewpoints descriptions

Code	Description
N	View looking north along the road corridor
S	View looking south along the road corridor

Code	Description
CR	Views along Camp Access Road
RC	Views from within rail corridor
A	Views along the walking track
R	Potential views from existing residences
DV	Potential district views

The key viewpoints include:

- Northbound key viewpoints N1 to N3 – road users.
- Southbound key viewpoints S1 to S9 – road users.
- Camp Access Road intersection CR1 to CR4 – road users.
- Rail line corridor key viewpoints RC1 and RC2 – rail corridor users.
- Wiradjuri Walking Track key viewpoint A1 – walking track users.
- Potential residents key viewpoints R1 to R5 – existing residences.
- Road corridor district views DV1.

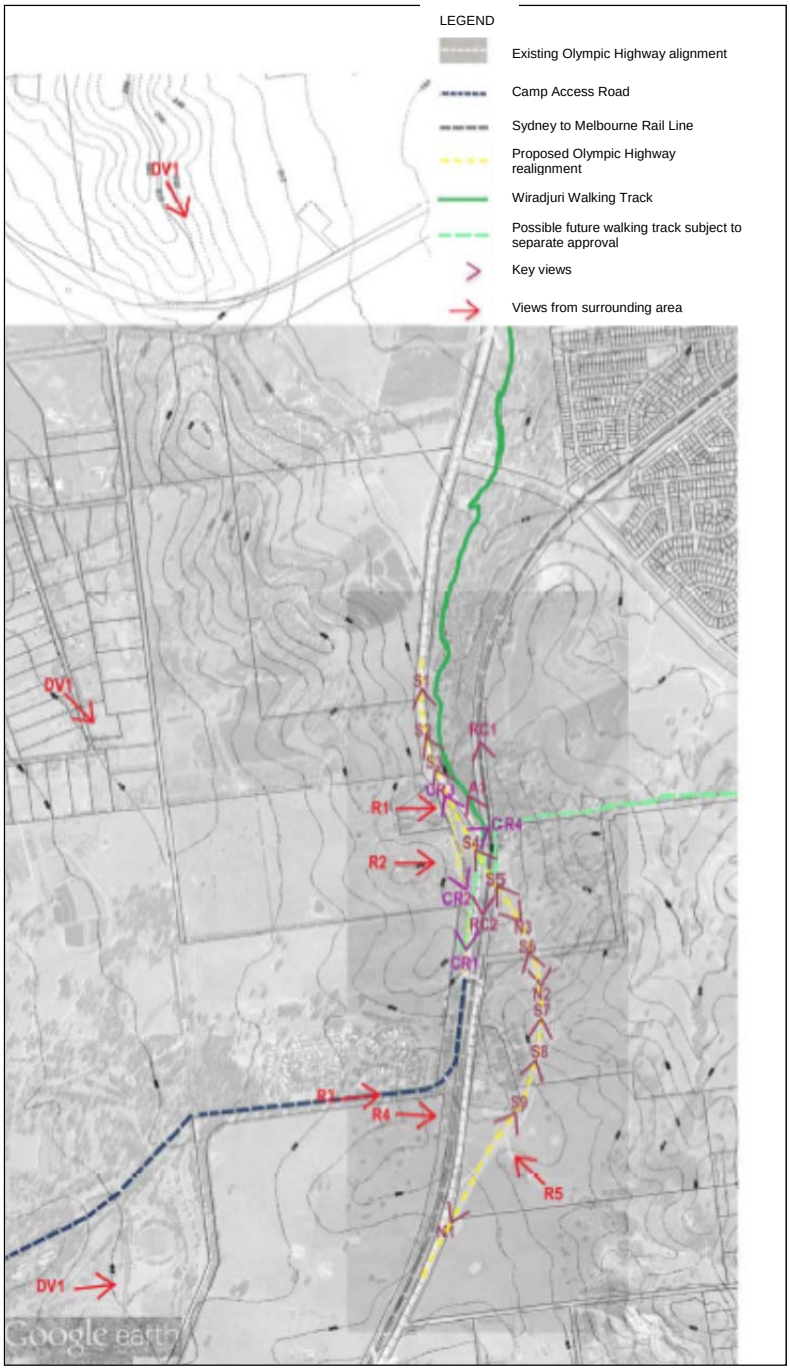

Figure 6.8: Key viewpoints from the surrounding area and along the proposed road corridor
Base map source – Google Earth Pro 2012

The impacts of the proposal on the key viewpoints are described and assessed in relation to impacts to motorists, rail users, pedestrians and cyclists, and residents in Table 6.29.

Table 6.29: Impacts on key viewpoints

Viewpoint	Motorist	Train	Pedestrian / cyclist	Resident	Comments
Northbound road users					
N1	Moderate	N/A	N/A	N/A	Whilst the road is on a new alignment the extent of earthworks is relatively minor compared to other sections of the road. The landscape has been modified.
N2	Low	N/A	N/A	N/A	The road would emerge from the major cutting. The embankment would be visible. The landscape has been previously modified.
N3	Low to moderate	N/A	N/A	N/A	The impact is considered low to moderate as there would be alteration of more than one element, including the proposed bridge and the embankment fill. The existing landscape is substantially modified.
Southbound road users					
S1 and S2	Low	N/A	N/A	N/A	Only minor alterations at the northern extent of the works are required and therefore the visual impact is considered low.
S3	Low to moderate	N/A	N/A	N/A	The proposed realignment would commence here. Key elements would be altered, including loss of vegetation and introduction of the right hand turn to Camp Access Road. The impacts are considered moderate. The existing landscape has been substantially modified.
S4	Low to moderate	N/A	N/A	N/A	The cutting comes into view where the new bridge crosses the rail line, but at a distance. This landscape has been substantially modified.
S5	Moderate	N/A	N/A	N/A	Some loss of vegetation as alignment of road on fill. The cutting is more exposed.
S6 and S7	Moderate to high	N/A	N/A	N/A	The cutting would be substantial, being about 18 metres deep and about 420 metres long. It is considered to be a moderate to high visual impact as the landscape has been modified.

Viewpoint	Motorist	Train	Pedestrian / cyclist	Resident	Comments
S8	Low to moderate	N/A	N/A	N/A	There would be partial alteration of the view due to the cutting embankment. View opens out into rolling hills.
S9	Low to moderate	N/A	N/A	N/A	The southern extent of works would result in minor alteration of the road corridor and views but will introduce new cuttings and fill embankments.
Camp Access Road intersection road users					
CR1 and CR2	Low to moderate	N/A	Moderate	N/A	The proposed new section of Camp Access Road is generally located within the existing alignment, with some minor variations. Views of the existing bridge from Camp Access Road may be affected by decommissioning treatments. An earthen bank may detract from its heritage significance. The visual impacts are considered to be low to moderate.
CR3 and CR4	Low to moderate	N/A	Moderate	N/A	The proposed Camp Access Road intersection would have a moderate visual impact due to the introduction of multiple elements, including loss of vegetation, a new cutting and the new intersection alignment.
Rail line corridor users					
RC1 and RC2	N/A	Low to moderate	N/A	N/A	The bridge and abutments and fill embankments would be visible for only a short duration. The existing bridge would be retained.
Wiradjuri Walking Track users					
A1	N/A	N/A	Moderate	N/A	The visual impact is considered moderate due to the change and inclusion of a pedestrian / cyclist pathway across the batter and under and over the bridge. The shared path would provide a more attractive visual experience for pedestrians and cyclists than the existing track between Camp Access Road and the Wiradjuri Walking Track

Viewpoint	Motorist	Train	Pedestrian / cyclist	Resident	Comments
Residents					
R1 (residence 1 – see Figure 1.2)	N/A	N/A	N/A	High	The road would be located closer to residence 1 and would also result in loss of a substantial amount of vegetation. Therefore, the visual impact is considered to be high due to the loss of key elements. A new entry would be combined with the entry to residence 2.
R2 (residence 2 – see Figure 1.2)	N/A	N/A	N/A	Moderate	Whilst the alignment of Camp Access Road would be located closer to residence 2, vegetation would remain around the residence, reducing the visual impact. The new entrance would be combined with the entry to residence 1.
R3	N/A	N/A	N/A	Low	The proposed road alignment is generally obscured from the Kapooka residential area by topography and vegetation.
R4	N/A	N/A	N/A	Low to moderate	Glimpses of part of the proposal may be visible from this dwelling. However, a substantial amount of vegetation would be retained between the dwelling and the proposal.
R5 (residence 3 – see Figure 1.2)	N/A	N/A	N/A	Moderate	The visual impact would be moderate as the road alignment would be closer to the dwelling and there would be some loss of vegetation. A new entry is proposed.

Viewpoint	Motorist	Train	Pedestrian / cyclist	Resident	Comments
Road corridor district views					
DV1	N/A	N/A	N/A	Moderate	Rural residential properties in San Isidore may see the top of the cut on the eastern boundary of the proposal. The view impact is mitigated by the distance of the dwellings from the proposal. Some parts of the fill embankment may be visible from the base within the Kapooka Military Area but views would be likely to be filtered through existing vegetation. The proposal would retain most of the vegetation west of the cutting and within the decommissioned fuel depot. This vegetation would play an important role in screening views of the cutting.

Summary of impacts

Key changes in the visual character of the study area would include:

- Removal of the abrupt geometric change of the existing rail crossing.
- The creation of a totally different driving experience more in keeping with a rural highway environment. The cutting would create a sense of drama.
- The proposal would involve substantial cutting and fill embankments. It would result in the loss of some vegetation and would change the existing rural character. The project is within an area that has been modified. Revegetation of the landscapes in the study area (see Section 6.1) would assist in ameliorating the visual impacts of the proposal.
- Two dwellings may be adversely affected by the proposal; residence 1 at the northern end of the proposal and residence 3 at the southern end (named R1 and R5 in Figure 6.8 and Table 6.29). These residences would be affected by the proposed realignment of the Olympic Highway and loss of vegetation. The incorporation of landscaping screening treatments would mitigate visual impacts to these residences.
- The shared path would provide a more attractive visual experience for pedestrians and cyclists than the existing track between Camp Access Road and the Wiradjuri Walking Track.

6.4.4 Safeguards and management measures

Impact	Environmental safeguards	Responsibility	Timing
Landscape and visual - visual impacts of proposal	• The proposed bridge will be designed in accordance with Roads and Maritime's bridge aesthetics guidelines (RTA 2003). • The detailed design of the bridge will be	Project manager	Pre-construction

Impact	Environmental safeguards	Responsibility	Timing
	kept to a simple, clean structure with any services to be appropriately concealed in the design of the bridge as far as practicable. • In the design development, consideration will be given to rounding the tops of the cuttings to soften the appearance • The footprint for construction works will be kept to a minimum to minimise earthworks and maintain existing stands of vegetation wherever possible.		
Landscape and visual - views of sediment basins	• Permanent water quality basins will be shaped to create a natural appearance and to soften the visual impact where practicable.	Project manager	Pre-construction
Landscape and visual - visual impacts on existing bridge	• Pavement will be removed and the surface revegetated at the approaches to the existing heritage bridge. Appropriate barriers would be installed to prevent public road access. The barriers considered will include alternatives that are in keeping with the heritage value of the bridge.	Project manager and contractor	Pre-construction
Landscape and visual - visual impacts of proposal on residences 1 and 3	• Landscape treatments, including vegetation screens, will be implemented to screen residences 1 and 3, which are in close proximity to the road corridor, as early as possible. • Revegetation will use a combination of planted and seeded material to provide short to medium term visual screen to the residences.	Project manager	Construction
Landscape and visual - visual impacts of construction works	• Fencing with material attached (eg shade cloth) to shield views will be provided around the construction compound and other areas where feasible. • The visual intrusiveness of fencing required for safety purposes, eg on the tops of cuttings, will be minimised by setting back and using fences appropriate to a rural setting. • The work site will be left in a tidy manner at the end of each work day.	Project manager and contractor	Construction
Landscape and visual - views of cut and fill batters	• Batters will be revegetated progressively and vegetated slopes would not exceed a grade of 2:1.	Project manager	Construction
Landscape and visual - views of sediment basins	• Locally native plantings will be used to further soften the appearance of these structures and integrate them into the landscape.	Project manager and contractor	Construction

Impact	Environmental safeguards	Responsibility	Timing
Landscape and visual - visual impacts of vegetation removal	• Vegetation removal will be minimised as much as possible. • Vegetation will be re-established at disturbed edges. • Revegetation will use locally native species.	Project manager and contractor	Construction