

18 Visual amenity and urban design

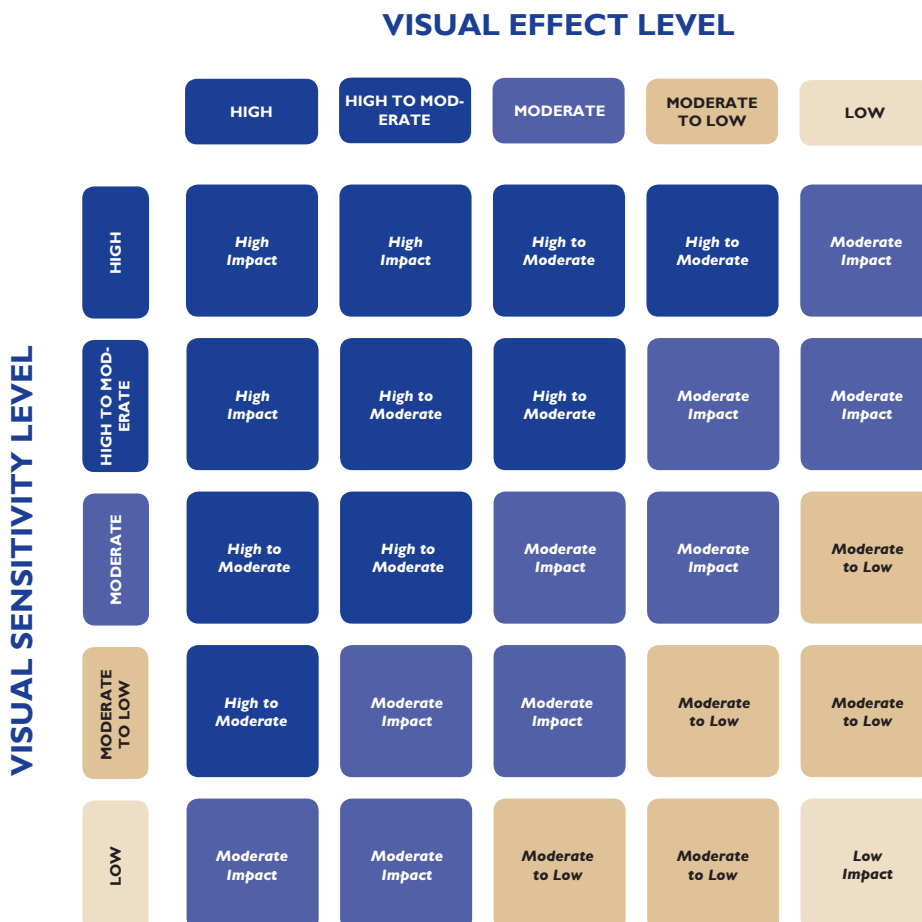
The visual impact of the project is assessed in this chapter. Additional assessment was deemed necessary to the environmental assessment requirements listed below, because of the potentially high visual impact of the proposed upgrade on the rural landscape of the area. A detailed study was prepared as part of this environmental assessment and is included as *Working Paper 11 - Urban design, landscape and visual assessment*.

Environmental assessment requirement	Where addressed
> Consideration of project and urban design (including noise barriers, retaining walls and landscaping) consistent with overall design of the Pacific Highway Upgrade Program and the existing (and desired) character of affected localities	Section 18.4 and Part C Section 5.15
> Consideration of the <i>Noise Wall Design Guideline</i> (RTA, 2006).	Section 18.4 and Part C Section 5.15

18.1 Assessment approach

The visual impact of the proposed upgrade was determined by considering both the visual effect of the proposed works and the visual sensitivity of surrounding areas, as determined by surrounding land use areas from which the upgrade would be visible and by the viewers likely to see the upgrade. **Figure 18.1** illustrates how various combinations of visual effect and visual sensitivity are combined to identify high, moderate or low visual impact levels.

Figure 18.1 - Identification of visual impact



Visual effect is the expression of the visual interaction between a proposed development and the existing visual environment surrounding it. The visual effect can also be expressed as the level of visual contrast between the proposed upgrade and the visual setting within which it would be placed. It considers the relationship of factors such as form, line, colour and texture between a proposed development and the surrounding environment.

Visual sensitivity is a measure of how critically a change to the existing landscape would be viewed from various areas and users. The visual sensitivity of a proposed development therefore depends on the type of viewers and surrounding land uses likely to see the proposed development, as well as on the visual characteristics of the existing environment. Tourists or people using recreational areas, for example, would use the surrounding landscape as part of their leisure experience and will view change to the landscape more critically than for example industrial or agricultural workers. Similarly, viewers are likely to be highly sensitive to development in natural or previously undeveloped areas and less sensitive to developments in areas which are already highly developed or widely considered to be of lesser scenic quality, such as industrialised areas.

Refer to *Working Paper 11 – Urban Design, Landscape and Visual Assessment* for a detailed description of how values were identified for visual effect and visual sensitivity.

For the purposes of the visual impact assessment, the proposed upgrade was divided into five precincts (**Figure 18.2**). The visual impact is assessed for each precinct.

18.2 Existing visual character

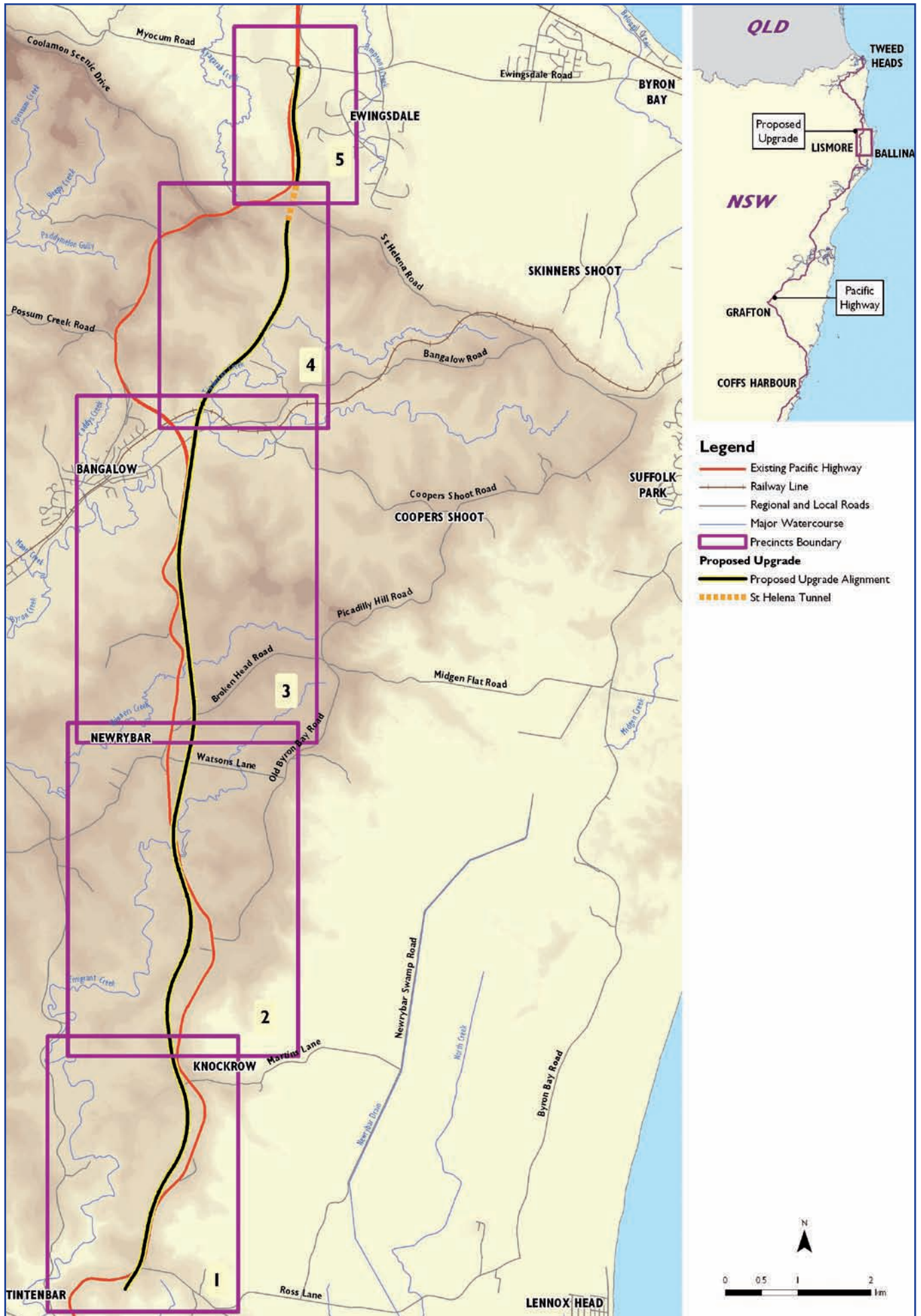
18.2.1 Landform

The site for the proposed upgrade is on the elevated Alstonville Plateau which is defined by a steep escarpment on its northern and eastern edges, falling to a relatively flat coastal plain.

The escarpment that separates the plateau areas and the coastal flats is aligned roughly parallel to the coast, running in a north-easterly to south-westerly direction. The escarpment rises above the coastal plain, generally increasing in height from about 80 m above sea level in the south of the study area to over 180 m above sea level at Granuaille Hill, above McLeods Shoot Lookout in the north of the study area. It provides a dominant landform feature in the locality, accounting for much of the area's scenic quality.

The landscape of the elevated plateau is characterised by a steeply undulating landform dissected by numerous watercourses. As a result of this, the escarpment itself as well as the ridges and higher slopes on the plateau are exposed to many viewpoints. Conversely, the lower slopes and valleys of the plateau are often concealed from many viewpoints in the locality. The elevated areas within the study area also provide expansive regional views towards the Pacific Ocean and inland. Many properties situated on the upper slopes of the escarpment in particular, enjoy spectacular and uninterrupted views towards the Pacific Ocean and across the coastal flats, headlands and ridges.

Figure 18.2 - Visual assessment precincts



18.2.2 Vegetation

On the elevated plateau, the combination of a subtropical climate and highly rich and productive soils produces a lush cover of both indigenous and exotic vegetation, interspersed by more open areas of paddocks or plantations. A recurring feature along the current highway is the significant number of macadamia tree plantations whose grid arrangements provide a unique character to the local agricultural landscape. The types and degree of vegetation cover combined with the steeply undulating landform results in a highly diverse and scenic landscape.

The escarpment slopes are generally steeper and less suitable for agriculture, resulting in a combination of open grassed paddocks with clumps of exotic and native trees, the latter primarily on the steeper slopes.

18.2.3 Settlement patterns

The settlement pattern within and adjacent to the study area is a mixture of small towns and villages with relatively closely settled rural properties in the surrounding areas. Bangalow is the largest town in the study area and located on its western edge. Newrybar is a small village on the Pacific Highway which services the local area. Ewingsdale in the north is a relatively recent subdivision on the lower escarpment slopes overlooking Byron Bay.

Residential properties outside these towns concentrate along the local roads through the study area, creating small hamlets close to the roads' edges which often follow the ridge lines of the high plateau.

A number of recent residential subdivisions are evident in the area, complementing more traditional rural housing and taking advantage of the spectacular rural and coastal views.

18.3 Visual impacts

18.3.1 Precinct 1 – Knockrow (Ross Lane to Martins Lane)

Visual effect

The proposed upgrade would result in a notable increase in road infrastructure in this precinct, in particular in the area immediately north of the Ross Lane interchange where there would be a large number of parallel roadways, including the local access road, northbound on-ramp, the upgraded highway and the existing highway alignment. The provision of individual cuttings for some of these would assist in reducing the overall visual effect of the large number of roadways in close proximity to one another and associated expanse of pavement.

While there would be a large amount of road infrastructure at the Ross Lane interchange, the majority of this would be in place prior to construction works for the upgraded highway, including the two roundabouts, and the changes to the existing highway alignment, crossing over the upgraded highway on a new bridge structure. The new local access roads on the western side of the upgrade further increase the amount of road infrastructure in the precinct.

Another area where the increase in road infrastructure would be highly visible would be in areas where both the new local access road and the upgraded highway would be located on fill embankments so that they would be relatively exposed to views from the existing highway alignment.

The intersection of the proposed local access road and the existing highway alignment approximately half way between Carney Place and Martins Lane would be a noticeable new element, but would be of relatively small scale.

The construction of the upgraded highway would further affect the visual character of the precinct through the severance of agricultural properties. Apart from the introduction of a new infrastructure element in the landscape, specific effects would be the loss of some macadamia plantations, as well as the prominence of cuttings and fill embankments associated with the upgrade. These would be highly noticeable when seen from both affected properties and beyond, but especially in the area between Carney Place and Martins Lane West. This section of the proposed upgrade would be located on large fill embankments through relatively open countryside. It would therefore be widely exposed to views, in particular from the existing highway alignment which in this area features only limited roadside vegetation.

In other sections within the precinct, the proposed upgrade would be located in cuttings which would make it less visually prominent from the surrounding landscape. However, the cuttings themselves would have a potentially significant visual effect, especially large cuttings or where soil conditions and poor slope stability would require engineered stabilisation measures such as benching, retaining walls, rock netting or shotcreting.

In terms of effects on individual properties, local access driveways are currently small in scale. They are terminated by the existing highway alignment and property owners are able to enjoy views into the landscape beyond the existing Pacific Highway. As a result of the proposed upgrade and associated earthworks, the views along many access driveways would be blocked instead by fill embankments. This would affect the vistas along these driveways and the respective experience of affected property owners.

Another effect of the proposed upgrade would be the loss of property boundary plantations along the edge of the existing highway alignment, which currently make an important contribution to the landscape character of the precinct.

Visual sensitivity

The proposed upgrade would be visible from the existing highway alignment and from new local access roads. Viewers would include local residents and tourists both of whom are likely to be highly sensitive to visual changes in the landscape. However, the overall number of potential viewers is limited by the comparatively few roads and buildings which would be within close proximity of the proposed upgrade. The visual sensitivity of this precinct is therefore likely to be low to moderate.



Visual assessment precinct 1 looking north. The Ross Lane interchange is at the bottom of the photograph.

Visual impact

The visual impact of the proposed upgrade in this precinct would be likely to be moderate due to the moderate to high visual effect and the low to moderate visual sensitivity of viewers in the precinct.

18.3.2 Precinct 2 – Emigrant Creek (Martins Lane to Broken Head Road)

Visual effect

Major visual changes specific to the precinct would result from the construction of the creek crossings and associated works including the realignment of the existing highway near Emigrant Creek, the construction of the Ivy Lane interchange, the removal of vegetation,

including agricultural plantations, and the large cuttings and fill embankments required to achieve a satisfactory vertical road alignment. Road infrastructure beyond the proposed upgrade itself would be limited compared to other precincts, with this precinct requiring relatively few new or amended local access arrangements.

Works at Emigrant Creek would be of significant scale. They would include the realignment of the existing highway, including lowering of the alignment to allow the upgrade to pass over it, and the construction of fill embankments leading up to the creek crossing. The twin bridges in the proposed upgrade, spanning both the realigned existing highway and Emigrant Creek would be significant new structures. Further, a major cutting would be required on the southern approach to Emigrant Creek and would be clearly visible from the existing highway alignment. The overall visual effect of the Emigrant Creek crossing itself would be somewhat reduced by the location of the

works in the Emigrant Creek valley. While the valley is visually well contained, much of the existing heavy vegetation cover is closely aligned with the existing highway and would need to be removed. While visibility of the Emigrant Creek crossing is currently limited as a result, following the proposed upgrade the crossing would be more widely exposed to views, in particular from the west, unless vegetation is reinstated in this area.

The twin underpasses and bridge over the Emigrant Creek tributary near 'Yarrenbool Place' would represent another highly noticeable visual change, being located immediately alongside the existing highway alignment.

The construction of the Ivy Lane interchange, associated roundabouts, underpass and local access roads on the western side of the proposed upgrade would introduce a significant amount of road infrastructure in this part of the precinct, representing a notable visual change. With the exception of the off-ramp, these are all located on fill embankments, adding to the visual prominence of the infrastructure. However, the location of the interchange just offset from the ridge line and the irregular pattern of vegetation in the area would conceal it to a degree, lessening its visual effect.



Visual assessment precinct 2 looking south. Newrybar is on the bottom right of the photograph.

The construction of the proposed upgrade would result in a reduction in the area covered by macadamia plantations between Martins Lane and Old Byron Road, on the western side of the existing highway. This would be highly noticeable, as plantations currently about the existing highway alignment and provide a pleasant visual experience with their highly textured foliage and strict grid arrangement that provides a constantly changing pattern to the passing viewer. Following the proposed upgrade, plantations in this area would be confined to the western side of the proposed upgrade. In addition to losing the experience of driving along the edge of the plantations, the plantations currently restrict views and their removal would expose the proposed upgrade more widely to views from the existing highway alignment. In particular when approaching the Macadamia Castle from the south, both the proposed upgrade and local access road would be highly visible as they cut through the rural landscape below the ridge line along which the existing highway is located.

North of Emigrant Creek, the proposed upgrade would sever existing macadamia and coffee plantations. This would be noticeable from a number of locations within the precinct, including the existing highway and the proposed upgrade, from Old Byron Road, Watsons Lane and from within the affected properties themselves. The effect would be exaggerated by the changing angles created between the wide sweeping curves of the proposed upgrade and the strong grid pattern of the plantations. The resulting conflicting geometries would make it obvious that the proposed upgrade was imposed on the pre-existing agricultural landscape.

With regard to earthworks, the proposed upgrade in this precinct would traverse a series of valleys and ridge lines and as a result would require significant earthworks along much of the route to achieve a satisfactory vertical alignment. In particular, a number of large cuttings are required around the Macadamia Castle and the Ivy Lane interchange, near the Emigrant Creek crossing and north up to Watsons Lane. The construction of a noise barrier near Newrybar Public School (likely to be a landscaped earth mound) would represent a further noticeable modification to the natural landscape. Provided the mound is successfully vegetated and well designed to integrate with the natural landform and the cutting under Broken Head Road, its visual effect may be able to be reduced over time and as vegetation matures.

The size of the cuttings and fill embankments together with the severing of properties throughout much of the precinct would result in a notable visual effect, in particular on the affected land holders. The proposed upgrade would feature prominently when seen from their properties. This would be exacerbated by the fact that additional trips would be needed to be made by these land holders who would need to use the new local access road and the existing highway alignment to travel between the severed halves of their properties.

Cuttings and fill embankments would also be noticeable from parts of the local road system.

Visual sensitivity

The visual sensitivity of this precinct is likely to be moderate, as sections of the proposed upgrade within this precinct would be exposed to a potentially large number of viewers who would be able to see the proposed upgrade from the existing highway alignment, local access roads, local residences and properties and possibly from Newrybar Public School. Limited glimpses may also be possible from the Harvest Café terrace in Newrybar, where a large number of people currently enjoy the outlook beyond the existing highway and into the agricultural landscape to the east. Viewers would include local residents and tourists who are likely to be highly sensitive to visual changes in the landscape.

Visual impact

The visual impact of the proposal in this precinct would likely be moderate due to the moderate visual effect of the proposed upgrade and the moderate visual sensitivity of viewers in the precinct.

18.3.3 Precinct 3 – Bangalow (Broken Head Road to Byron Creek)

Visual effect

The major visual changes in the Bangalow precinct would be associated with the significant amount of earthworks in the precinct, specifically the major cutting through 'Arundel', the works around the existing Bangalow bypass, the crossing of Broken Head Road and the severing of agricultural plantations.



Visual assessment precinct 3 looking north. Bangalow is on the left of the photograph.

The proposed upgrade in this precinct would traverse a series of valleys and ridge lines, requiring significant earthworks along much of the route to achieve a satisfactory vertical alignment. In particular, large cuttings would be required near Broken Head Road and to the north. A particularly large cutting would be required near 'Arundel', and would also represent a significant visual change in the landscape, slicing through a natural hill top. Being set against the skyline, it is widely exposed to views, especially from the north. Areas from which the cutting would be able to be seen include elevated parts of the Bangalow township, such as areas from Rankin Drive or other areas north of the railway line, and parts of the St Helena ridge. In addition to the significant vertical size of these cuttings, cutting angles of repose would need to be relatively flat, therefore occupying a large footprint. Substantial fill embankments would also be required in the Byron Creek floodplain. Similarly, the large cuttings

near Broken Head Road and the bridge itself would result in notable visual changes that would be highly visible from Broken Head Road and the residences and other properties located along it.

The proposed works around the Bangalow interchange would be significant due to the large increase in road infrastructure, including the pavement surfaces of the four parallel roadways (the north- and southbound carriageway of the proposed upgrade, the realigned existing highway on the current northbound carriageway of the Bangalow bypass and the proposed new local access road), on- and off-ramps, roundabout and additional bridges over Bangalow Road and Byron Creek.

Further increasing the degree of visual change in this area would be the removal of roadside vegetation lining the eastern side of the existing highway alignment and Bangalow bypass, in what would be the median strip of the proposed upgrade. This vegetation is particularly dense and well established and its removal would alter the outlook from the existing highway alignment, opening up views towards the east. These views would be largely dominated by the hard pavements associated with the proposed upgrade and the new

local access road. In addition to representing a highly noticeable loss, it would also expose the upgrade works and existing highway alignment to views from a larger area than is currently the case. The narrow distance between the different road and carriageways limits the potential for landscaping or other measures that would provide visual separation or screening.

Visual effects around the Bangalow interchange would be further increased by the potential construction of a noise barrier on the western side of the existing highway, required to provide noise amelioration to residents of outlying residential areas in Bangalow, including the 'Clover Hill' estate. If a noise barrier was constructed at this location, it would be likely to require the removal of significant established vegetation on the western side of the existing highway. The cumulative effect of these works would be the complete removal of vegetation along what is currently a densely vegetated road and visually pleasant road corridor. Revegetation would eventually resemble the current situation.

The twin bridges over Byron Creek and the railway line would constitute a significant infrastructure element. The relatively open and exposed location of the bridge and associated large fill embankments in the floodplain of Byron Creek would exacerbate the visual effect, with little screening provided by either the landform or vegetation cover. In this naturally flat landscape, the large fill embankments in particular would be highly noticeable as a 'foreign' object in the landscape. The height of the bridge would also readily reveal the construction method of the bridge, including the numerous piles that are likely to be required. Initial design investigations have indicated that piles are likely to be staggered which will result in a more solid appearance of the two bridges when seen from surrounding areas.

While the bridge over Bangalow Road would be significantly shorter, its visual effect would be similar as it is equally raised above the natural floodplain level, and readily exposed to viewers driving along Bangalow Road, which is important as one of the main entry and arrival points at the township.

A second instance of major twin bridges would need to be constructed over Skinners Creek. They would be almost parallel to the existing highway alignment and within close proximity to it. Its significant elevation above the natural valley floor, together with the earthworks associated with the structure, would make it a visually noticeable and therefore important infrastructure element in the precinct. Because of this, the detailed design resolution of the bridge would have a significant bearing on its visual effect when seen from surrounding areas or the existing highway.

Another visual effect of the proposed upgrade results from the severing of a number agricultural crop areas on the eastern side of the existing highway alignment. Affected crops would include macadamia plantations, as well as coffee plantations south of Broken Head Road. The visual effect of severed plantations, in particular of severed macadamia plantations, would be highly noticeable from the proposed upgrade, from Broken Head Road and from within the affected properties themselves. North of Broken Head Road where macadamia plantations are largely set out in fairly straight rows either perpendicular or parallel to existing roads, the visual effect of severed plantations would be exaggerated by the changing angles between the proposed upgrade alignment and the strong grid pattern of the plantations. The resulting conflicting geometries would make it obvious that the proposed upgrade was imposed on the pre-existing agricultural landscape.

Visual sensitivity

The visual sensitivity of this precinct is likely to be high, as much of the proposed upgrade would be exposed to viewing by a potentially large number of local residents and tourists, both of whom would be highly sensitive to changes in the landscape. The proposed upgrade would be highly visible from local roads such as the existing highway alignment (including the Bangalow bypass), the new local access road, Bangalow Road and Broken Head Road. A potentially large number of viewers would also be able to see the works associated with the proposed upgrade from parts of Bangalow, in particular from areas in close proximity to the upgrade such as around Ballina Road, and from higher lying areas north of the railway line. Other potential viewers would include farm workers and local residents on properties east of the proposed upgrade and along Broken Head Road.

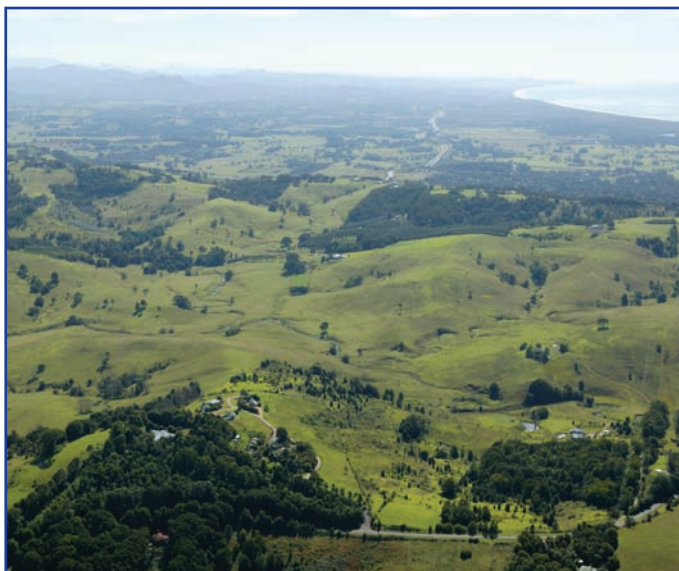
Visual impact

The visual impact of the proposed upgrade in this precinct would likely be moderate to high due to the moderate visual effect and the high visual sensitivity of viewers in the precinct.

18.3.4 Precinct 4 – Tinderbox Creek Valley (Byron Creek to St Helena Ridge)

Visual effect

Major visual changes in the Tinderbox Creek valley precinct result from the large size of cuttings, from the construction of the tunnel portals and the construction of the bridge over the Tinderbox Creek tributary and associated Tinderbox Road diversion.



Visual assessment precinct 4 looking north. St Helena Road is at the bottom of the photograph.

Significant earthworks would be required for much of the precinct, with major cuttings needed north of Tinderbox Road and around the tunnel portal. The cutting on the tunnel approach would result in a major visual change to the character of the existing hillside, due to its significant height, the extent of excavation of the natural hillside, the steep nature of the cutting faces and the need for benching to improve stability. The steep cutting faces are likely to present challenges to revegetation, and are therefore likely to require 'hard' engineering stabilisation measures which would result in a stark contrast to the existing grazing landscape.

While the magnitude of cuttings associated with the portal construction provides an indication of the potential visual effect of the portal in quantitative terms, the actual visual effect on the surrounding landscape may be greater. It would be determined to a significant degree by the final design and detail treatment of the tunnel approach

and portals. Recommendations on the design of the tunnel portals are provided in the "Urban and Landscape Design Concept Plan" section of *Working Paper 11 – Urban design, landscape and visual assessment*.

In addition, the landscape of the precinct is fairly open and would readily expose the upgrade and associated works to viewers on surrounding properties and local ridge line roads.

While road infrastructure in this precinct would be minimal beyond the upgraded highway itself, the diversion of Tinderbox Road and the construction of the bridge over the Tinderbox Creek tributary would result in a notable visual change. While the design of the bridge has the potential to reduce the visual effect of the structure, its visibility would generally be limited to immediately surrounding areas, due to the landform and vegetation cover along the creeks in the vicinity of the proposed bridge and road diversion.

Visual sensitivity

The proposed upgrade in this precinct would be able to be viewed mainly by local residents and farm workers in the Tinderbox Creek valley. In general farm workers may be less sensitive to visual changes than residents whose view from private properties would be affected. While the remote nature of the Tinderbox Creek valley is likely to further increase the sensitivity to changes in the level of development, the overall number of viewers is comparatively low, due to the sparse level of settlement and associated road systems. Tourists may also be able to obtain glimpses of the proposed upgrade, when travelling along the ridgeline roads that surround the valley, in particular St Helena Road and Bangalow Road. However, most of these views would be fairly distant.

The overall visual sensitivity of this precinct is likely to be low to moderate.

Visual impact

The visual impact of the proposed upgrade in Precinct 4 would likely be moderate to high due to the high visual effect and the low to moderate visual sensitivity of viewers in the precinct.

18.3.5 Precinct 5 – Ewingsdale

Visual effect

Major visual changes specific to the fifth precinct result from the large increase in road infrastructure on the Ewingsdale spur, the associated large fill embankments and the construction of the tunnel portals and associated excavation works.

The construction of the proposed upgrade adjacent to the alignment of the existing highway would approximately double the amount of road infrastructure on the Ewingsdale spur. Similarly, roadway infrastructure would increase noticeably around the Ewingsdale interchange, as a result of the diversion of the existing highway alignment and the provision of the additional access road. However, the scale of the infrastructure around the interchange is already significant, helping to reduce the degree to which the changes would be perceived as modifying the existing landscape.

The works on the Ewingsdale spur on the other hand would result in a more significant visual change, in particular the tunnel portals and associated cuttings, and the large fill embankments located along the eastern side of much of the proposed upgrade. Construction of the latter would also require the removal of roadside vegetation on the eastern side of the existing highway which currently provides visual screening from Ewingsdale. A stand of vegetation immediately north of the tunnel portal would also need to be removed and the loss of vegetation on the prominent spur would be highly noticeable.

In addition, the cutting on the tunnel approach would represent a major visual change to the character of the St Helena ridge, due to its significant height, the steep nature of the cutting face and the need for benching and other stabilisation measures. The engineering works required around the tunnel portal would be in stark contrast to the existing vegetated landscape character. These works would also be highly visible, being exposed to views from the St Helena ridge and from the coastal lowlands below.

Visual sensitivity

The proposed upgrade and associated works would be readily visible from sections of local roads including the existing highway alignment, St Helena Road, Myocum Road and Coolamon Scenic Drive, as well as from the proposed upgrade itself. Potential viewers would include local residents and tourists. The works would also be visible from McLeods

Shoot Lookout, a popular tourist destination and rest stop which offers spectacular panoramic views over the coastal lowlands, the Pacific Ocean and mountain ranges in the background.

Cape Byron is the other major lookout and tourist destination in the area, however, its distance from the proposed upgrade is so large (greater than 8 km) that it would be difficult to see the proposed upgrade.

The residential area of Ewingsdale is in relatively close proximity to the proposed upgrade, as reflected in the number of buildings in the middleground distance. However, overall building numbers in the precinct are comparatively low and views from Ewingsdale to the proposed upgrade are limited by the topography of the area as well as the existing vegetation cover.

The overall visual sensitivity of Precinct 5 is therefore likely to be low to moderate.



Visual assessment precinct 5 looking south-east. Ewingsdale interchange is in the centre of the photograph.

Visual impact

The visual impact of the proposed upgrade in Precinct 5 would be likely to be moderate due to the moderate to high visual effect and the low to moderate visual sensitivity of viewers in the precinct.

18.3.6 Visual impact overview

The predicted visual impacts for each precinct reflect the corresponding local conditions. They further reflect the scale of the road infrastructure within each precinct's setting and the extent of visibility from surrounding viewpoints. However, the partially quantitative precinct assessment does not fully reflect the total visual impact of the proposed upgrade.

The scenic qualities of the landscape within and surrounding the study area are well recognised by residents and visitors alike. The growing popularity of the region as a place to live and to take a holiday is testament to the accepted beauty of the area's landscape and resulting lifestyle.

The combination of steep rolling topography and lush stands of vegetation encompassing areas of open and green paddocks creates an appealing natural setting. Layered over this setting is a relatively small scale pattern of rural development which conforms to the varied form of the natural features of the area. This layering of rural and natural elements produces an intricate cultural landscape pattern where neither element dominates the other. Settlements nestle into valleys and hillsides. Roads wind along ridge lines and around hills, through dense stands of vegetation and over watercourses. As a consequence, the landscape varies continuously and reveals changing characteristics to the traveller passing through the area.

The overall visual effect of the proposed upgrade on this kind of landscape is considered to be quite profound. The standard design requirements for a modern four lane dual carriageway motorway, with relatively gentle gradients and wide sweeping curves, introduces an entirely new form of infrastructure into the area. Where the existing road and rail infrastructure and pattern of subdivision respond to the constraints of the local topography and therefore become an integrated part of the overall composition of the landscape, the proposed upgrade would by necessity, override these constraints. As a result, the upgraded highway would become the dominant element cutting a relatively straight path through this varied landscape, overriding its existing patterns of development.

The proposed upgrade would be a piece of infrastructure of a scale which would be perceived as visually dominant across the length of the majority of the study area. Although the long term benefits of landscape plantings would modify the visual effects of the proposed upgrade to a degree, the overall width and comparatively straight alignment would not enable it to integrate into the landscape as the existing roads have done. The steepness and geotechnical composition of many cuttings would further limit the potential for and likely success of benefits of landscape design treatments.

Over time the visual impacts of the upgraded highway would be partially mitigated by the treatments proposed along its length. However, the scale of the road in this landscape would remain a visually dominant feature. It would therefore substantially and irrevocably change the visual character of the areas through which it passes.

Photographic simulations of the proposed upgrade have been prepared from four representative viewpoints to illustrate its visual effect in a range of situations. The four viewpoints are:

Viewpoint 1 – Robinson Road, Bangalow

Viewpoint 2 – Tinderbox Road, east of Bangalow

Viewpoint 3 – St Helena Road, St Helena Ridge (directly above proposed tunnel)

Viewpoint 4 – Existing Pacific Highway at Ewingsdale.

The viewpoint locations are shown in **Figure 18.3**, while the photographic simulations are shown in **Figure 18.4 - Figure 18.11**. Note that these views represent the proposed upgrade without landscape treatment. Over time the establishment of plantings would help to integrate the proposed upgrade into the landscape.

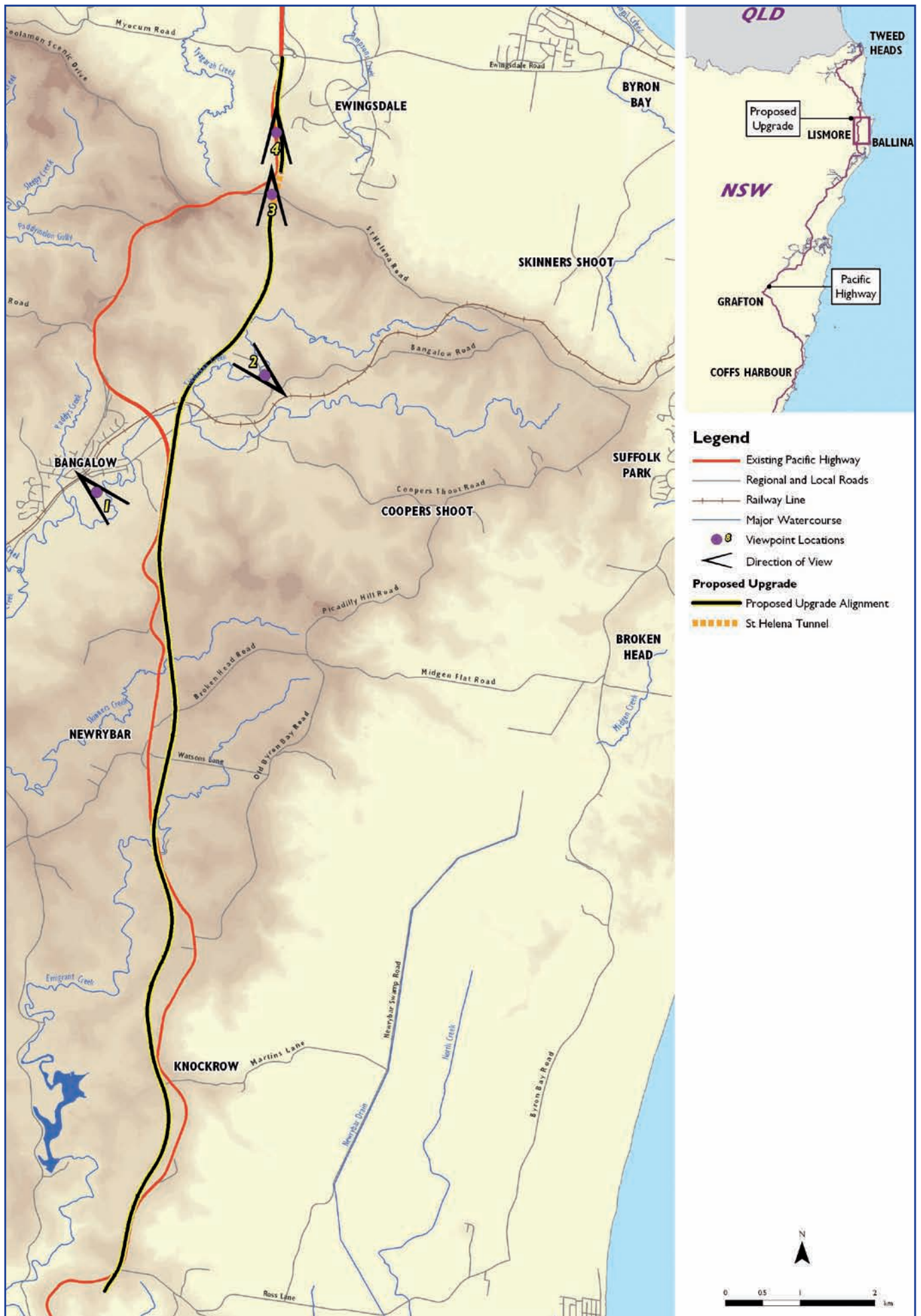
18.4 Management of impacts

Working Paper 11 – Urban design, landscape and visual assessment includes an ‘urban and landscape strategic concept’. This strategic concept is intended to form the basis of detailed urban and landscape design. It is aimed at minimising the visual impact of the proposed upgrade and integrating it into the surrounding landscape.

The urban and landscape strategic concept (detailed in *Working Paper 11 – Urban Design, Landscape and Visual Assessment*) has been developed around three main components:

- > Major landmarks.
- > Road infrastructure elements.
- > Corridor landscape strategy.

Figure 18.3 - Viewpoint locations



18.4.1 Major landmarks

Landmarks (**Figure 18.12**) will be key natural features along the route, which are likely to be the particularly memorable moments on the journey. They include major topographic features such as prominent ridge lines or floodplains, as well as areas that offer panoramic views of the surrounding countryside. Major landmarks also include features which will be important to local road users, residents and other viewers who would see them from beyond the road reservation. An example would be the Emigrant Creek crossing where the upgraded highway would pass over the existing highway alignment, which would be retained as the main local road link and tourist route.

As memorable key points along the route, the design of structures and elements associated with the upgraded highway around those landmarks will be important in influencing the experience and perception of the visual character of the proposed upgrade. They therefore would receive a high level of attention and design resolution in the detail design stages of the proposed upgrade, to achieve an outcome of high visual and urban design quality consistent with the importance of the landmark. More detailed information on landmarks is provided in the relevant precinct concept plans.

18.4.2 Road infrastructure elements

Road infrastructure elements are the major items of road infrastructure associated with the proposed upgrade, both along the upgraded highway and in connection with the local road system. They include elements such as interchanges, major cuttings, bridges, tunnel portals, noise barriers and local access roads (**Figure 18.13**).

Generally, it is these elements that will form the more highly visible components of the upgraded highway, being exposed to both motorists and to viewers in surrounding areas. Design resolution of the road infrastructure elements is important as, they define the junction points between the upgraded highway and the landscape beyond the immediate road corridor. Further, a number of these elements coincide with major landmarks along the route and are therefore likely to be particularly memorable.

In contrast, detailed design components such as safety barriers would not be perceptible by viewers from surrounding areas, being generally small in scale. While their design resolution would be important from the point of view of the motorists experience of the upgrade, it would have less influence on the way the upgrade would be perceived by viewers in surrounding areas.

The urban and landscape design strategic concept has identified a hierarchy of road infrastructure elements, based on their location and the relative importance of that location, as determined by the number of viewers likely to see the works, the visual and landscape setting, the identified visual effect and associated visual impact, and the potential for landscape planting or other mitigation measures to reduce the potential visual impact of the road infrastructure element. In addition, the proposed hierarchy emphasises the balance between the key considerations of design aesthetic and upfront costs.

Figure 18.4 - Viewpoint I, existing view – Robinson Road Bangalow looking south-east



Figure 18.5 - Viewpoint I, photographic simulation of proposed upgrade—Robinson Road Bangalow looking south-east



Figure 18.6 - Viewpoint 2, existing view – Tinderbox Road looking north-west



Figure 18.7 - Viewpoint 2, Tinderbox Road looking north-west - photographic simulation of proposed upgrade



Figure 18.8 - Viewpoint 3, St Helena Road looking south – existing view



Figure 18.9 - Viewpoint 3, St Helena Road looking south – photographic simulation of proposed upgrade



Figure 18.10 - Viewpoint 4, existing highway at Ewingsdale, existing view



Figure 18.11 - Viewpoint 4, existing highway at Ewingsdale, photographic simulation of proposed upgrade



Figure 18.12 - Urban and landscape design strategic concept – major landmarks

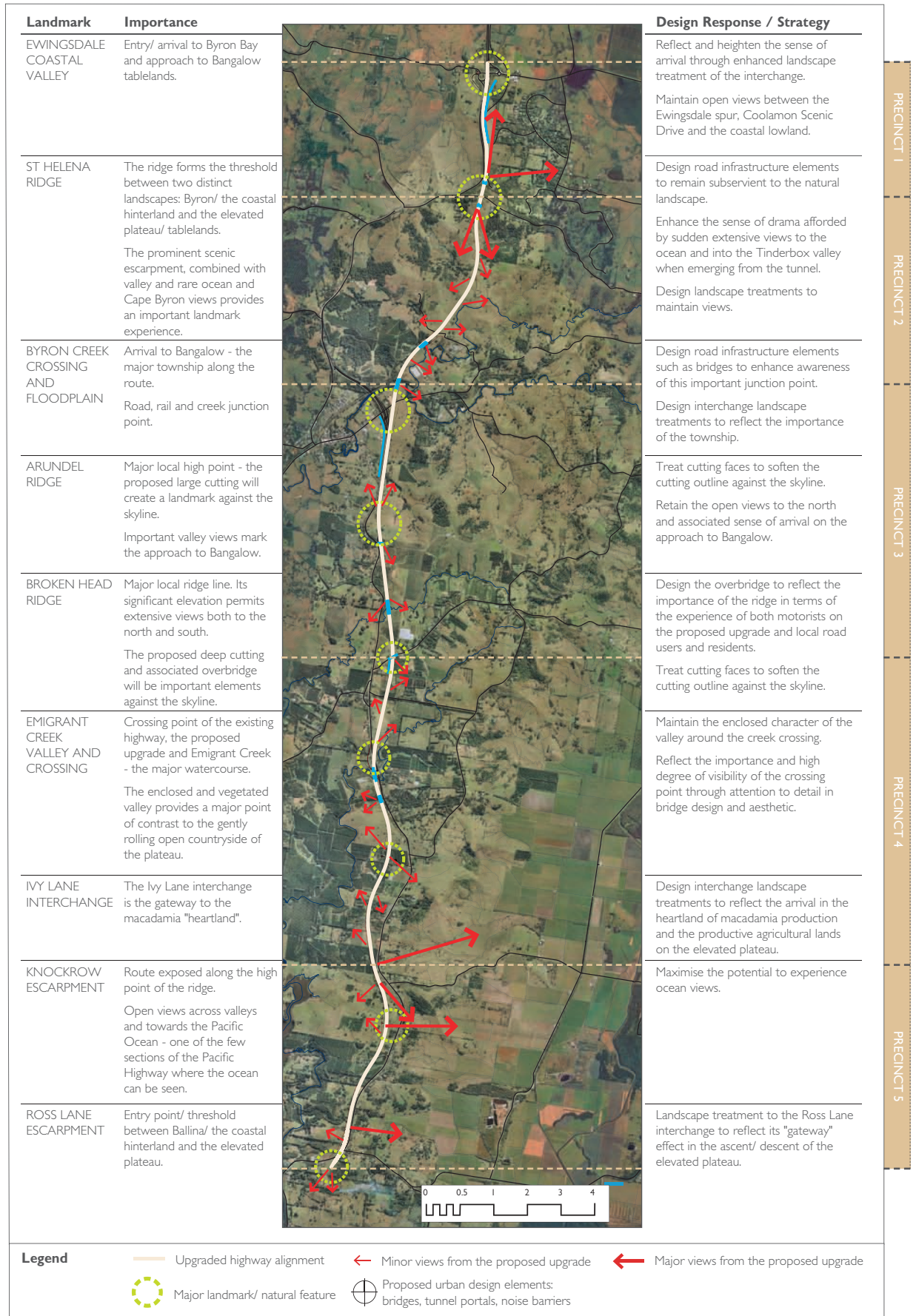
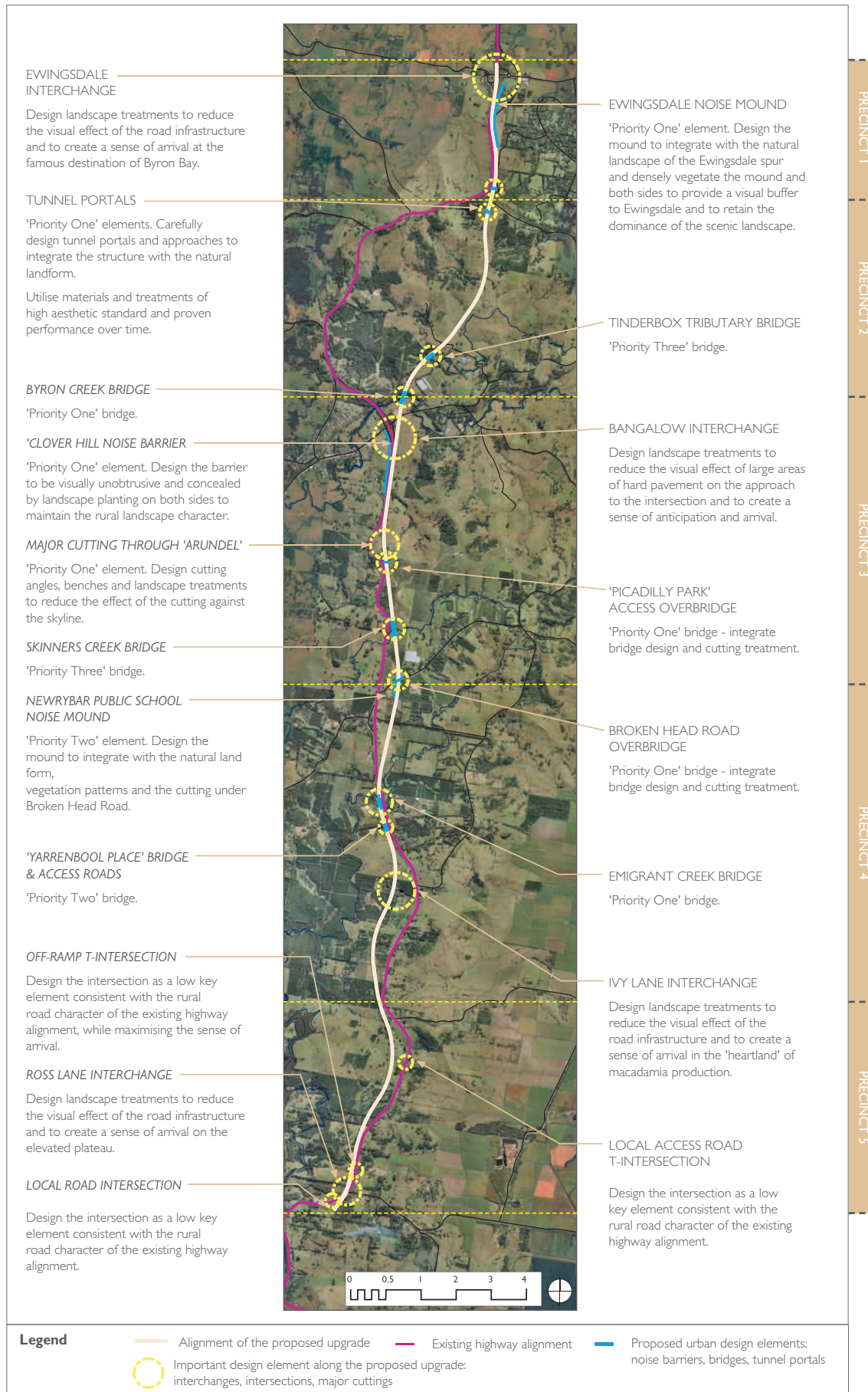


Figure 18.13 - Urban and landscape design strategic concept – road infrastructure elements



Design ‘Priority One’ element

The combination of a landmark location, the large size of the structure, the high degree of visual exposure and limited potential for screening or landscaping to reduce the visual effect, warrant an approach whereby the design aesthetic and integration of the structure with the surrounding landscape is the key consideration.

Design ‘Priority Two’ element

The size of the structure, the moderate degree of visual exposure and the limited potential for screening, combine to warrant a moderate level of design detail, with an even balance between design aesthetic and cost effectiveness.

Design ‘Priority Three’ element

The relatively low number of viewers and the potential to mitigate the visual effect of the structure with landscape planting permit a more purely functional design, giving priority to cost-effective design.

Working Paper 11 – Urban design, landscape and visual assessment includes a section called urban design elements, that provides specific guidelines for the various elements that would comprise the proposed upgrade.

18.4.3 Corridor landscape strategy

The corridor landscape strategy provides an approach to the planting and other landscape treatments within the road corridor (**Figure 18.14**). The strategy has been developed based on the existing pattern of planting/ vegetation and open landscapes in the area. Consistent with the *Pacific Highway urban design framework*, the corridor landscape strategy aims to augment existing vegetation patterns to provide an interesting and varied road user experience consisting of opening and enclosed views, as well as to minimise the visual contrast between the upgraded highway corridor and the surrounding rural landscape. However, it is important to note that the corridor landscape strategy was developed at a large-scale, strategic level and therefore provides a general guide or principle to be followed in highway landscaping works. Future design development and associated detail site investigation may determine that exceptions to the strategy are warranted in certain locations along the route, such as to emphasise (or conceal) particular features, views or conditions in areas along the proposed upgrade.

Figure 18.14 - Urban and landscape design strategic concept – corridor landscape strategy

