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18. Landscape and Visual Amenity

18.1 Introduction

This section of the EIS provides an assessment of the likely impacts on landscape character and visual amenity resulting from the Project. The impacts are considered within the context of the existing landscape and visual environment and the changes that are likely to occur from the Project.

This assessment considers all locations from where the affected area is likely to be seen. This area is defined as the Hinze Dam Visual Catchment and is supported by maps and photographs of the existing landscape and three-dimensional simulations.

18.1.1 Methodology

The adopted methodology for undertaking the landscape character and visual impact assessment includes:

- analysis of the existing landscape and visual environment through:
  - describing the landscape character of the visual catchment including the aspects of landform and land use, which is supported by analysis of topographic landscape information. Where appropriate, reference has been made to the relevant planning framework and context, the Gold Coast Planning Scheme;
  - classifying of the visual catchment into landscape character units; the distinct areas that share common landscape features and characteristics; and
  - describing the existing visual amenity of the visual catchment supported by photographs that illustrate existing outlooks from viewing locations, a computer generated visual exposure analysis, and identification of sensitive visual receptors.
- undertaking an assessment of the likely landscape and visual impacts through:
  - identifying the sources of potential landscape and visual impacts associated with the Project works;
  - providing a description of landscape and visual impacts for each landscape character unit and identified sensitive receptor, having regard to criteria such as scenic quality, visual and landscape sensitivity, and the significance of likely impacts; and
  - presentation of three-dimensional simulations, showing the likely visual impact of the Project following completion of the construction works; and
- providing mitigation measures proposed to avoid, reduce, remedy or offset negative visual impacts resulting from the Project.

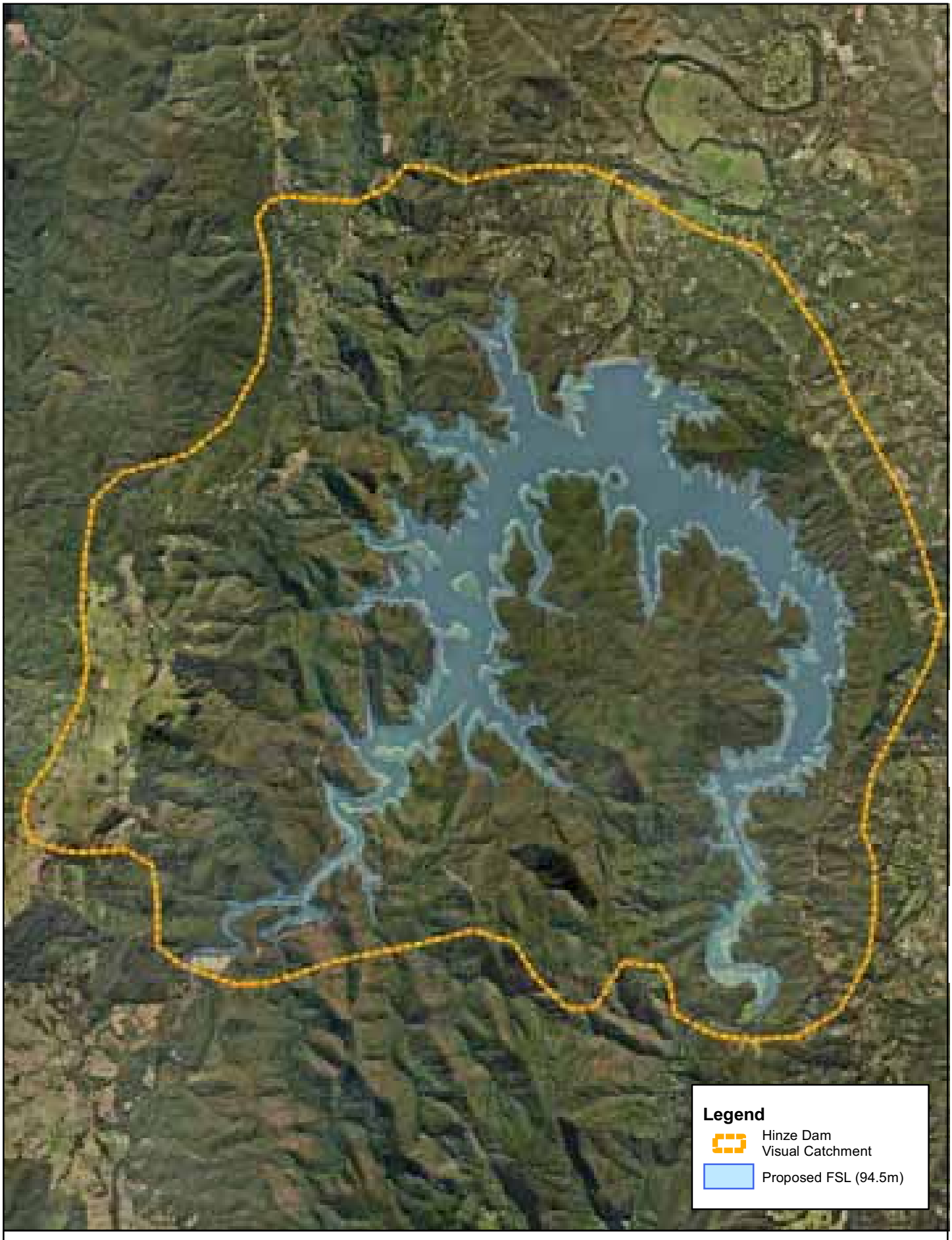
18.1.2 Hinze Dam Visual Catchment

Visual impacts resulting from the works will likely extend beyond the CID boundary, and therefore a visual catchment (referred to as the 'Hinze Dam Visual Catchment') has been adopted. The visual catchment includes areas from which there is a view of any part of the proposed development (LI & EMA 2002).

The extent of the Hinze Dam Visual Catchment has been defined as:

- the suburb of Gilston to the north;
- Worongary (Advancetown-Mudgeeraba Road) Road and Gold Coast-Springbrook Road to the east;
- Beechmont Road to the west; and
- the northern boundaries of Numinbah State Forest Reserve to the south.

Figure 18-1 outlines the extent of the Hinze Dam Visual Catchment.



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Scale - 1:60,000

Projection: MGA Zone 56

Figure 18-1

Hinze Dam
Visual Catchment

Hinze Dam Stage 3 EIS

18.2 Description of Existing Landscape and Visual Environment

The Hinze Dam is located within the Gold Coast hinterland. Advancetown Lake, created by Hinze Dam, is bordered by the Tallai Range to the east, Nerang-Murwillumbah Road to the west and Gold Coast-Springbrook Road to the south. The hinterland is characterised by low density rural residential style development, vegetated ridgelines, varying topography, and scenic outlooks.

The following sections provide a description of the aspects of the existing environment which contribute to the landscape character and visual amenity of the Hinze Dam Visual Catchment.

18.2.1 Landscape Character

The following sections provide a description of the landscape character, being the existing land uses and landform, which contribute to the distinct landscape character of the Hinze Dam Visual Catchment. For assessment purposes the visual catchment has been subdivided into land character units representing distinct character areas sharing common features and characteristics.

Land Use

The Hinze Dam Visual Catchment is dominated by a mix of open space systems and conservation areas. These areas are fragmented by the main dam waterbody, Advancetown Lake, and two distinct arms extending upstream along the main contributing waterways of Nerang River and Little Nerang Creek. The built dam infrastructure and associated recreational facilities are located primarily within the northern portion of the visual catchment, however some smaller facilities are scattered throughout the visual catchment.

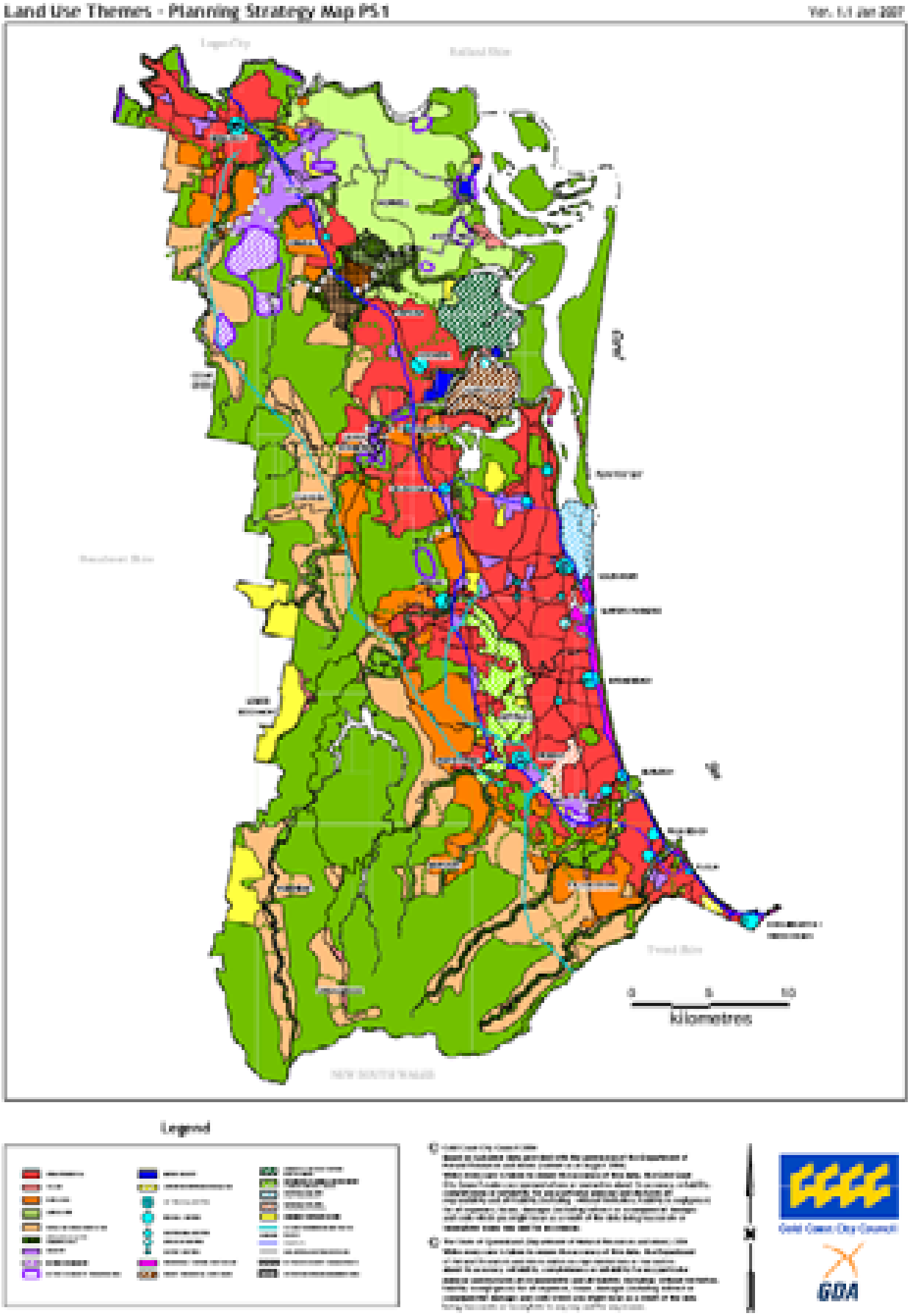
The area surrounding the Project site is semi-urban, with a mix of rural residential and low density urban development on the northern and eastern sides of the Dam, and low density rural residential development on the western side of the Dam. South of the Project site land use is dominated by open space/conservation areas dedicated in State Forest and National Park areas. Small scale commercial uses and rural based land uses are scattered throughout the visual catchment. The existing land uses within the visual catchment are described in greater detail in **Section 6**.

Under the Gold Coast Planning Scheme, the pattern of Land Use Themes for the City of Gold Coast is shown on Planning Strategy Map PS-1 (**Figure 18-2**). The Hinze Dam Visual Catchment is included in the Open Space/Nature Conservation Land Use Theme.

The following extract from the Part 3, Division 3, Chapter 2 of the Gold Coast Planning Scheme provides an overview of the intent for lands included in the Open Space/Nature Conservation Land Use Theme.

> *The Open Space/Nature Conservation Land Use Theme is primarily focused on the hinterland, including vital connection corridors to the coast, and on the coastal marine park area. These corridors may have both conservation and recreation functions, requiring appropriate management to minimise any incompatibilities. The Open Space/Nature Conservation Land Use Theme therefore encompasses a wide range of habitats, reflecting the importance of the designated areas for maintaining biodiversity as part of the overall strategy for achieving ecological sustainability.*
>
> *In some areas, such as the hinterland ranges and foothills…the **preservation of landscape and other open space values** will be of equal or greater significance. Council will not favour any inappropriate development forms that erode the natural open space or recreation values of areas designated within the Open Space/Nature Conservation Land Use Theme.*
>
> *Where development occurs within these areas, it will be expected to clearly demonstrate the implementation of sustainable measures and practices, including the **minimisation of impacts upon** ecological processes and **scenic amenity values**.*

Figure 18-2 Planning Strategy Map PS-1



The intent referred to above provides strong guidance in determining the impact and mitigation strategies for the Project in terms of identifying a in retaining visual amenity values. These have been strongly relied on in undertaking assessment of visual impact. Issues relating to land use impacts are discussed in further detail in **Section 6**.

Landform

The dominant landform within the visual catchment is the expansive Advancetown Lake and the arms of the Nerang River and Little Nerang Creek which extend upstream. Immediately surrounding the impoundment area, topography varies from moderate to very steep slopes, most of which are vegetated. Vegetation within the visual catchment ranges from rainforest communities which line the steep gullies down to the waters edge, to dry eucalypt forest found in the more moderately sloping areas.

The existing landform in the northern part of the visual catchment has been substantially modified by the development of the existing dam wall, associated infrastructure and recreation facilities. In addition, past quarrying activity adjacent to the dam wall has resulted in the creation of a noticeable topographic feature where benched rock faces are clearly visible and there is a distinct absence of vegetation cover which strongly contrasts with the background setting.

Lower-lying areas in the Nerang River Valley are situated north of the dam wall. Vegetation cover is less significant in this valley, which is bisected by the Nerang River. Riparian vegetation is significant along the banks of the Nerang River. Given the topography of the Nerang River Valley, set lower than surrounding areas, there are limited views to the Project site and specifically to locations where construction activity is likely to occur.

The most distinct topographic feature in the visual catchment is Pages Pinnacle, an exposed pinnacle of igneous rock. Pages Pinnacle is located south of the dam wall where vegetation is dense and relatively intact. This feature is not easily accessible to the public and therefore does not present any opportunities for views over the Project site.

Surrounding ridgelines within the visual catchment have been developed for rural residential purposes, accessed principally via Beechmont Road in the west and The Panorama in the east. A number of residences overlook the Project site, including the areas where construction activity will occur. Less significant views to the site (i.e. glimpses) are also provided along the elevated parts of Nerang-Murwillumbah Road in the west.

Landscape Character Units

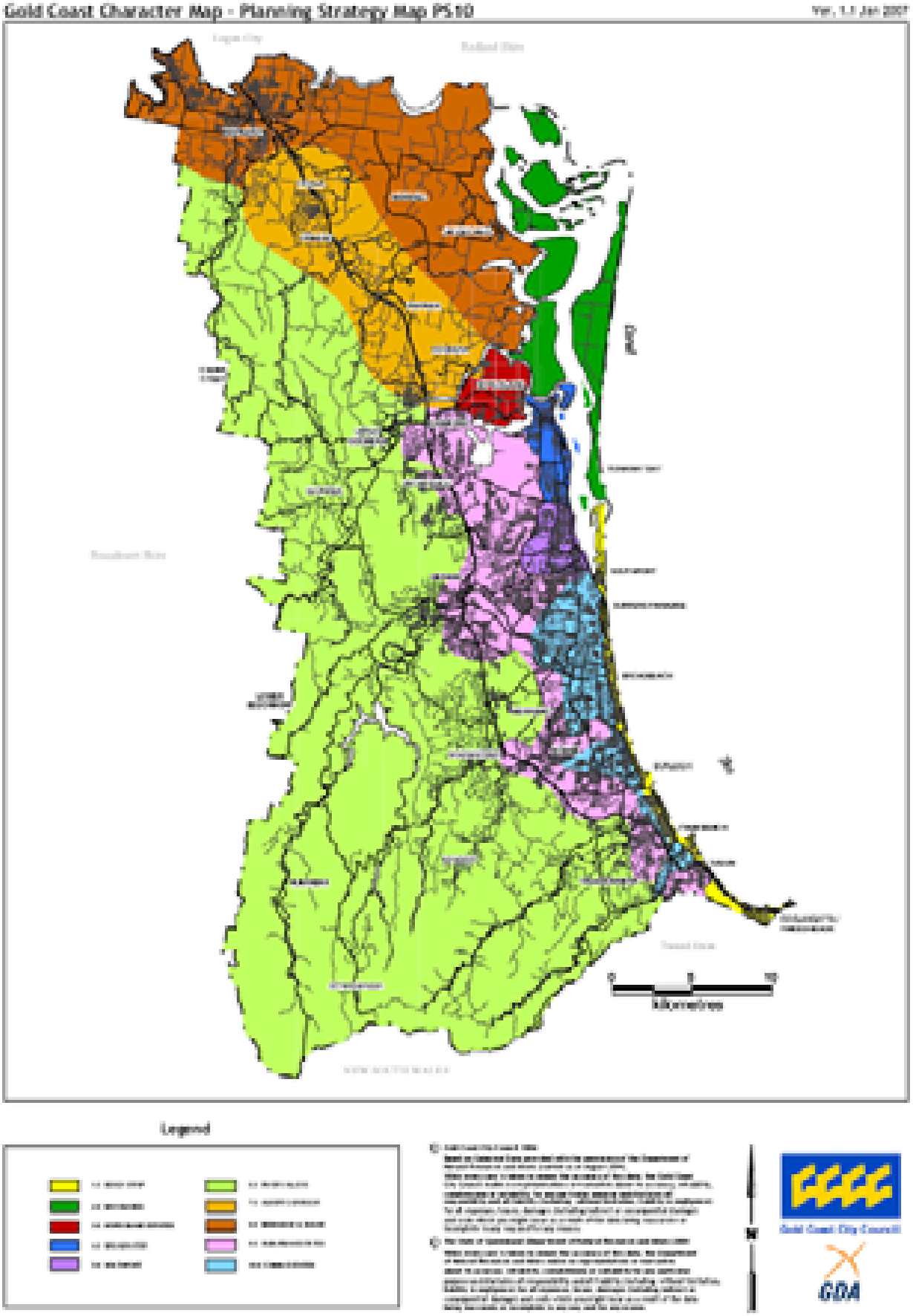
The *Gold Coast City Landscape Strategy* (2000) has been adopted by the Gold Coast City Council, with Part 1 of the strategy '*Landscape Character: Guiding the Image of the City'* included as a Planning Scheme Policy under the Gold Coast Planning Scheme.

The landscape strategy seeks to identify in broad terms the important landscape elements that contribute to the landscape character of the city. The Gold Coast City Local Government Area has been divided into ten (10) landscape character areas. Under Part 1 of the Strategy, the Hinze Dam Visual Catchment is included in the River Valleys Character Area as identified on the Gold Coast Character Areas Planning Scheme Map – SP10 (**Figure 18-3**).

Elements that contribute to the overall landscape character of the River Valley character areas are identified in the landscape strategy, with the general character of the this character area described as:

> *The River Valleys character area is the 'green' behind the 'gold' – the hinterland of the Gold Coast. It is comprised of two distinct land use types – rural land and the protected natural areas. These areas are generally accessed by one main road that winds up through farmlands and the natural hillsides of several valleys.*

- **Figure 18-3 Gold Coast Character Areas Planning Strategy Map – SP10**



As part of this assessment, the Hinze Dam Visual Catchment has been further subdivided into Landscape Character Units (LCUs). LCUs are the distinct character areas which share common features and characteristics. Elements which combine to create a landscape type include landform, location, vegetation, land use and available views to and from the area.

The Landscape Character Units that have been identified within the Hinze Dam Visual Catchment are detailed in **Table 18-1** and on **Figure 18-4.** The classification of the visual catchment into individual units enables a more rigorous assessment of landscape and visual impacts.

Table 18-1 Landscape Character Units

Landscape Character Units	Description of Character Elements
LCU1 Dam infrastructure and recreation areas	■ Topography within the LCU ranges from flat ground to steep slopes. ■ Moderate tree cover within this LCU, primarily associated with the existing recreation areas. ■ Human alteration to the landscape is clearly evident given the visually prominent dam wall and spillway. The small-scale built infrastructure of the recreation area includes car parking facilities, cafe, and other amenities which contrast with the character of surrounding natural area. ■ Some areas of land near to the dam wall have also been previously cleared and compacted for the establishment of site offices, workshops and other ancillary facilities that were utilised as part of the previous Stage 2 upgrade works.
LCU2 Quarry	■ Significant changes to topography have resulted from quarrying activities that were undertaken as part of the Stage 2 upgrade works. The resulting landscape contrasts markedly with surrounding areas due to the high visibility of exposed benched rock faces. ■ There is also a notable absence of vegetation in the LCU as a result of previous quarrying activities. ■ There are minimal built structures within the LCU apart from a boat ramp and small shelter.
LCU3 Advancetown lake and Nerang River and Little Nerang Creek arms	■ The water body is the principal land use within the visual catchment. ■ Permanent built structures are limited to pontoons and buoys associated with rowing activities located in the main Advancetown Lake water body, and two intake towers, one located in the main Advancetown Lake water body and a second located further upstream in the eastern arm of the impoundment area ■ Boat ramps allow the general public to access the waterbody which provides access to certain areas within the visual catchment which may otherwise not be available when viewed from the dam wall and recreation area. ■ There is no vegetation cover within the LCU, however an exposed band of cleared vegetation and dead/dying trees are visible when the impoundment is below FSL.
LCU4 Downstream Nerang River rural valley	■ Topography within the LCU is generally low-lying. ■ There is minimal vegetation cover on rural/pastoral land holdings, however more substantial riparian vegetation is prevalent along the banks of the Nerang River. ■ Rural activities are scattered throughout the LCU ■ Built form generally comprises rural residences set on large blocks, accessed by local roads. Many residences include ancillary structures associated with rural activities such as sheds, workshops etc
LCU5 Steep slope scenic vegetation communities	■ Topography within the LCU is generally very steep. ■ Vegetation cover is dense and comprises remnant eucalypt forest and small areas of rainforest and wet sclerophyll forest which have significant habitat and linkage functions. ■ Minimal human disturbance and built form is limited in this LCU, and is limited to recreation trails in some locations.
LCU6 Core lakeside habitat vegetation communities	■ Topography within this LCU is generally very steep. ■ The area is characterised by the distinct topographic feature, Pages Pinnacle, which is generally visible from most outlooks in the visual catchment. ■ Vegetation cover is dense and comprises remnant eucalypt forest and small areas of rainforest and wet sclerophyll forest which have significant habitat and linkage functions. ■ Very little to no human disturbance is evident within the LCU as this area is generally inaccessible.
LCU7 Disturbed lakeside vegetation communities	■ Topography varies from moderate to steep within the LCU. ■ Vegetation cover ranges from disturbed non-remnant areas to dense remnant forest areas. ■ Built form in the LCU is limited to Nerang-Murwillumbah Road and a number of rural residential properties. However, only glimpses of the impoundment area are available to motorists travelling along Nerang-Murwillumbah Road and from rural residential properties due to the presence of existing vegetation.

Landscape Character Units	Description of Character Elements
	■ The western boat ramp is located in the southern portion of the LCU and provides access to the waterbody. ■ Numerous access points to the impoundment area but public access not available except to boat ramp and model planes.
LCU8 Disturbed grassland and scattered trees	■ Topography within this LCU is generally flat but becomes steeper heading towards Core lakeside habitat vegetation. ■ Significant human disturbance from previous grazing activities has occurred in this area and there is a notable absence of mature vegetation cover. Vegetation is limited to grasses and scattered trees with some evidence of weed infestation ■ There is little to no built structures within the LCU.
LCU9 Ridgelines with rural residential development	■ Topography within this LCU is generally steep. ■ Large rural residential allotments have been developed along the tops of the ridgelines and adjoin dense forest, particularly at The Panorama and Red Oak Drive in the east, and at Beechmont Road and Bottlebrush Lane in the west. ■ Residences have significant views overlooking both the dam infrastructure area and towards the coastline

18.2.2 Visual Amenity

The following sections provides a description of the aspects that contribute to the existing visual amenity of the visual catchment, including the visual exposure of the existing dam infrastructure and existing outlooks within the visual catchment. Sensitive visual receptors have also been identified.

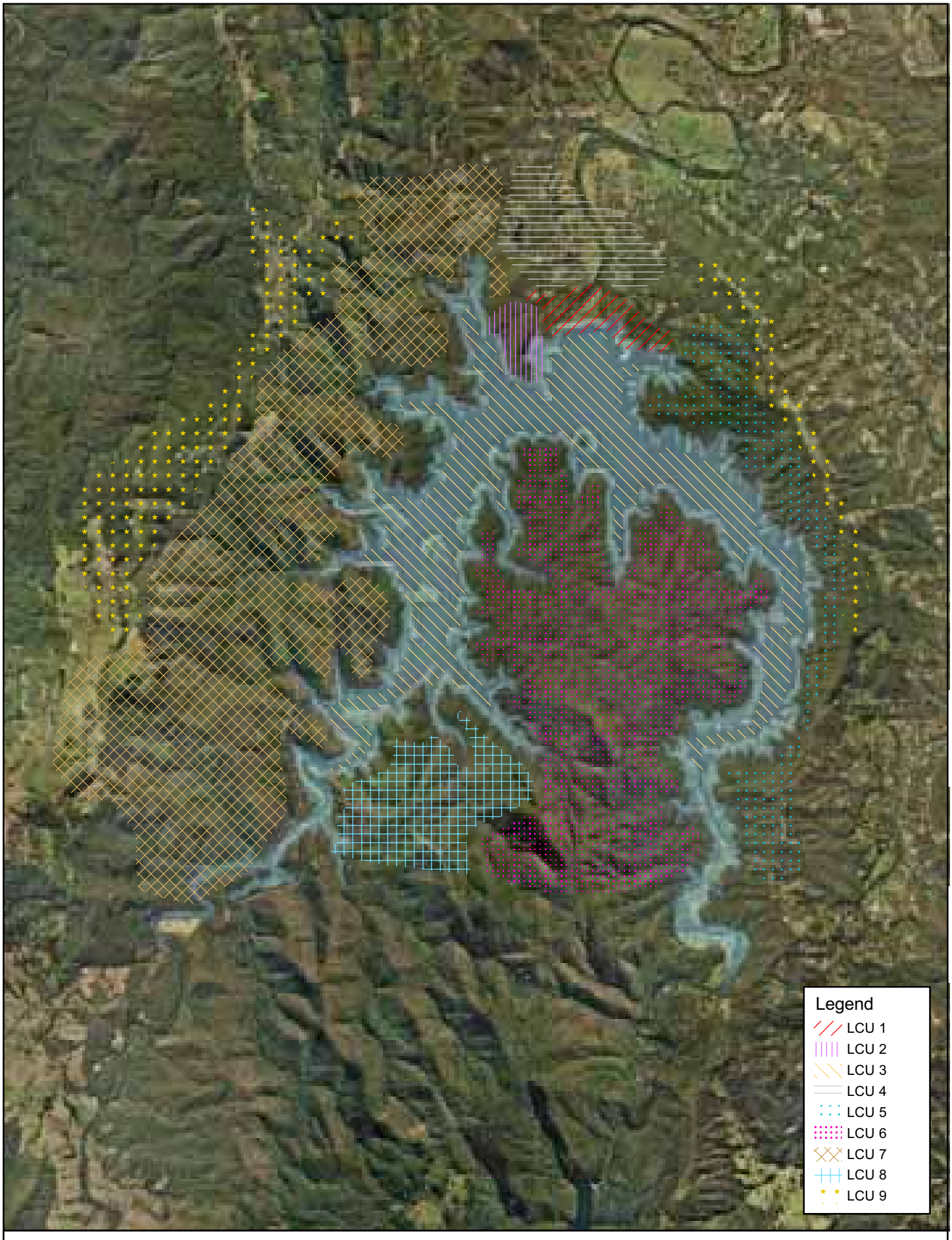
Visual Exposure

Visual exposure is defined as "a measure of the extent to which a place in the landscape is seen from important public viewing locations (e.g. roads, recreation areas) and other fixed viewing locations such as private residences (Preston, 2001).

The visual exposure of the existing dam infrastructure from the key vantage points are shown on **Figures 18-5a to 18-5e**. The mapping of visual exposure has been generated by analysing a digital elevation model (DEM) and identifying the 'seen area' from particular vantage points (e.g. lookouts, picnic spots, roads). The maps provided show the seen area from:

- the dam wall and recreation area;
- Beechmont Road and Bottletree Lane to the west of the dam;
- The Panorama and Red Oak Drive to the east of the dam;
- Duncan Road; and
- the Nerang River Rural Valley – Mottee Court and Toula Court.

Other areas within the visual catchment are opportunistic as many are inaccessible to the general public. The publicly accessible areas within the visual catchment which have potential views of the dam infrastructure are shown in **Figure 18-6**.



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Scale - 1:60,000

Projection: MGA Zone 56

Figure 18-4

Landscape Character Units (LCUs)

Hinze Dam Stage 3 EIS

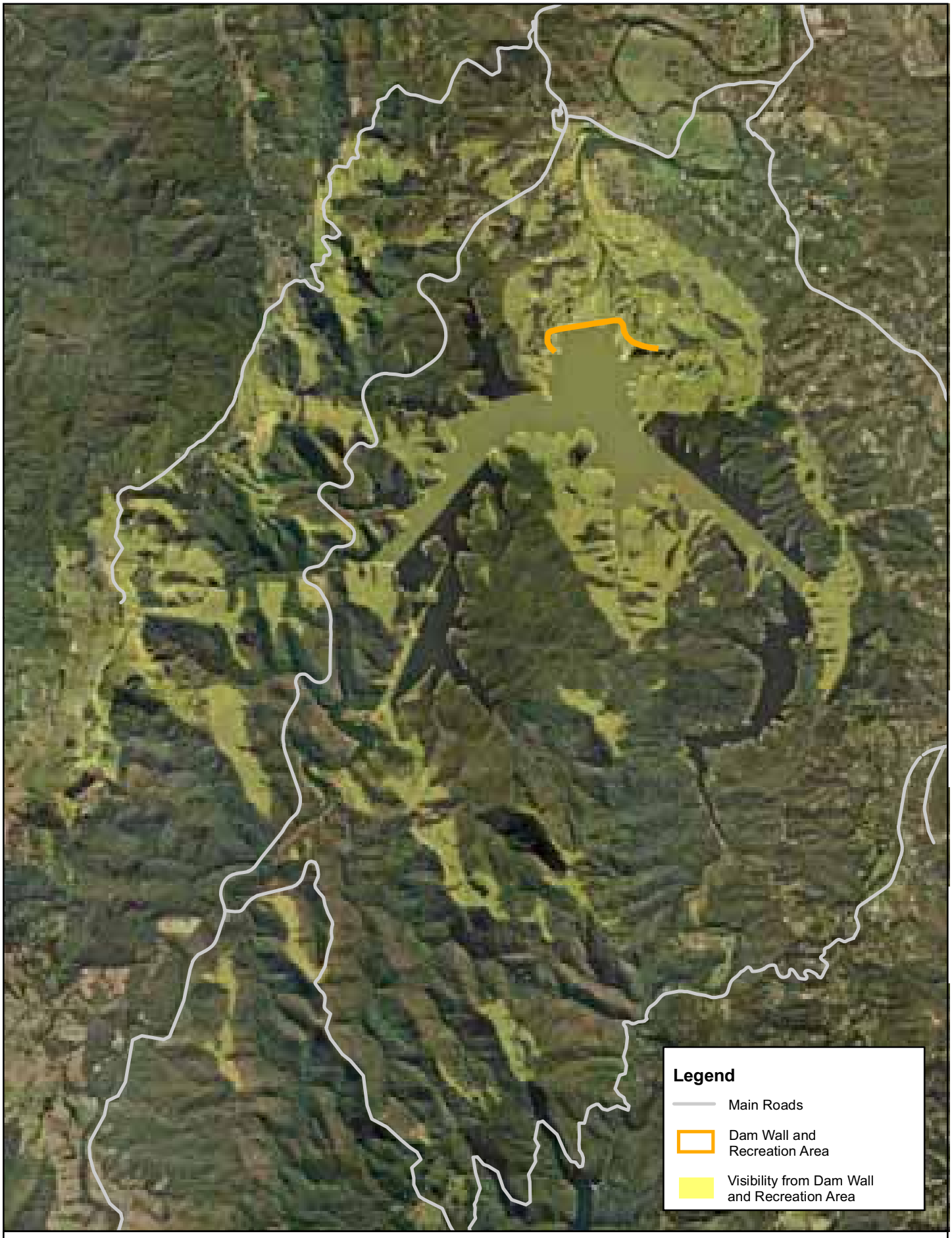

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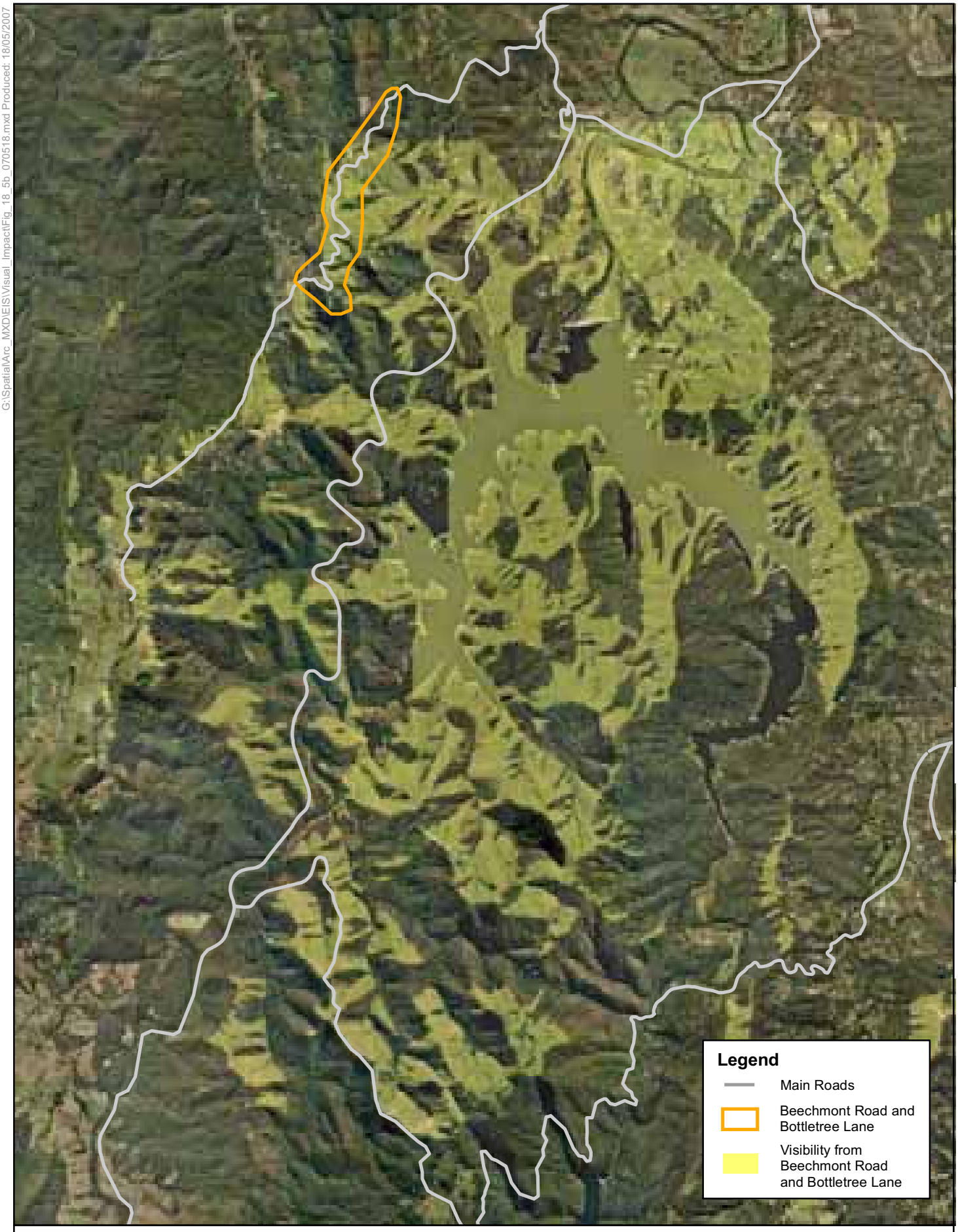
Figure 18-5a

Visual Exposure
Dam Wall and Rec Area

Hinze Dam Stage 3 EIS



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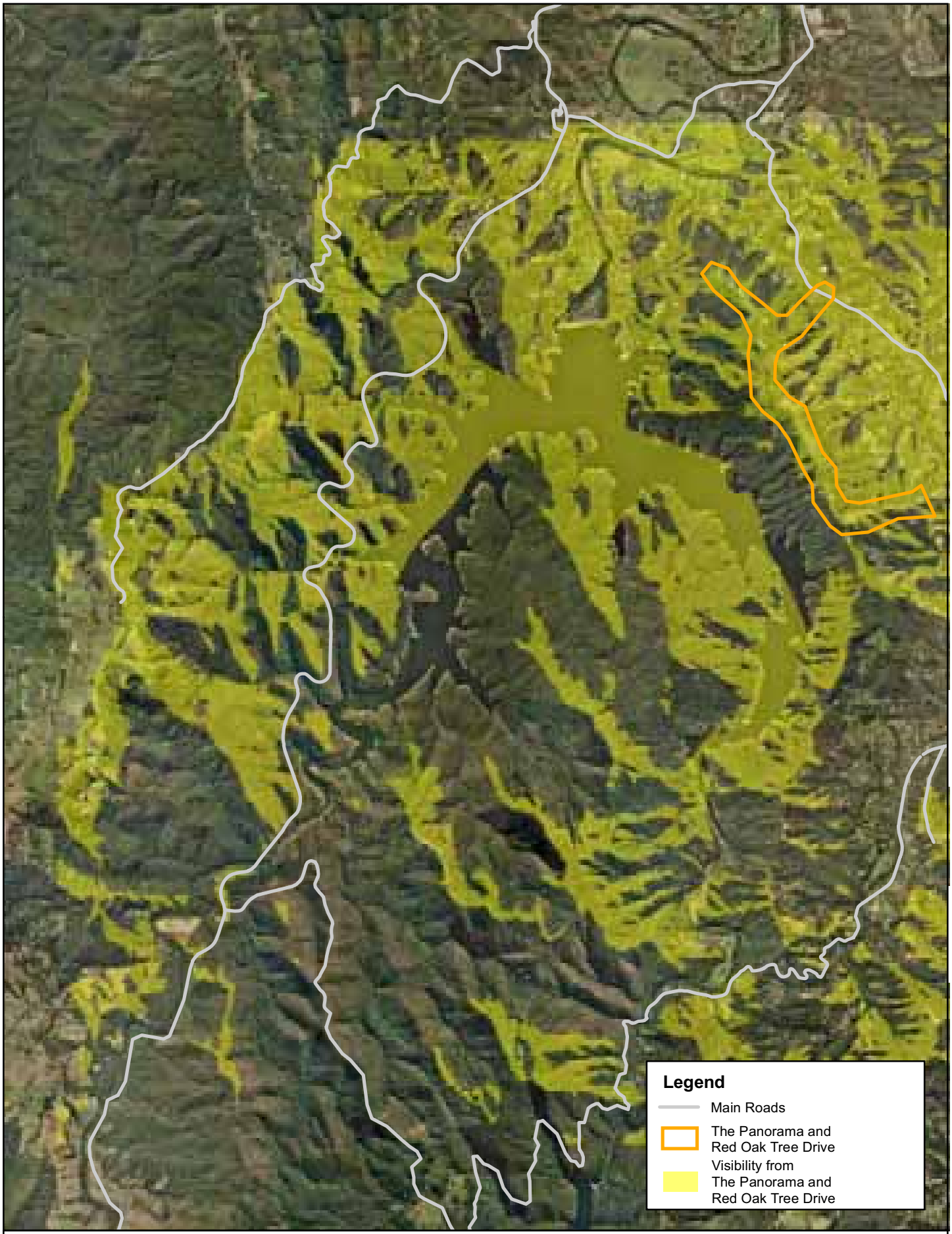
Projection: MGA Zone 56

Figure 18-5b

Visual Exposure Beechmont Road and Bottletree Lane

Hinze Dam Stage 3 EIS



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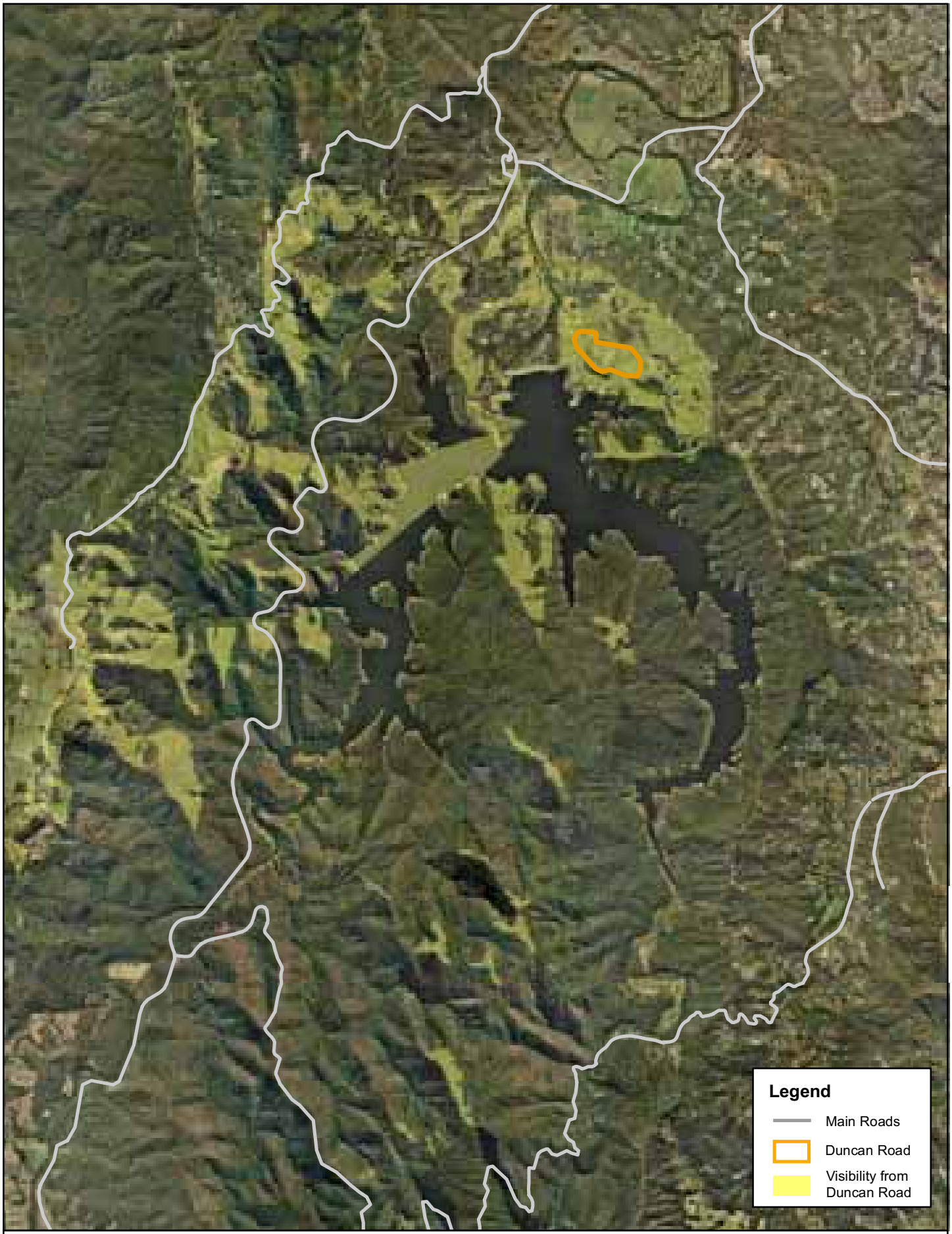
Projection: MGA Zone 56

Figure 18-5c

Visual Exposure
The Panorama and
Red Oak Tree Drive

Hinze Dam Stage 3 EIS



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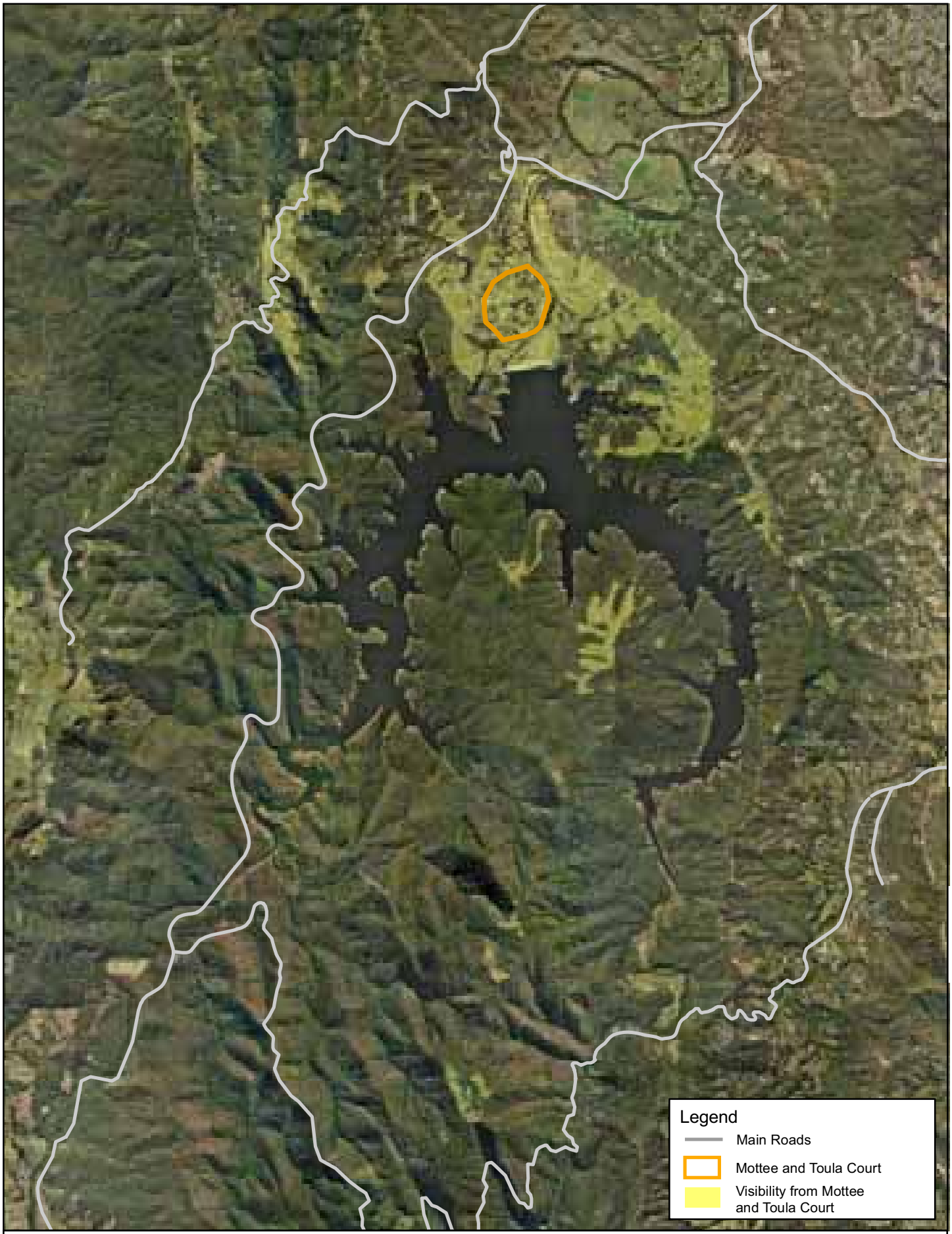
Projection: MGA Zone 56

Figure 18-5d

Visual Exposure
Duncan Rd

Hinze Dam Stage 3 EIS



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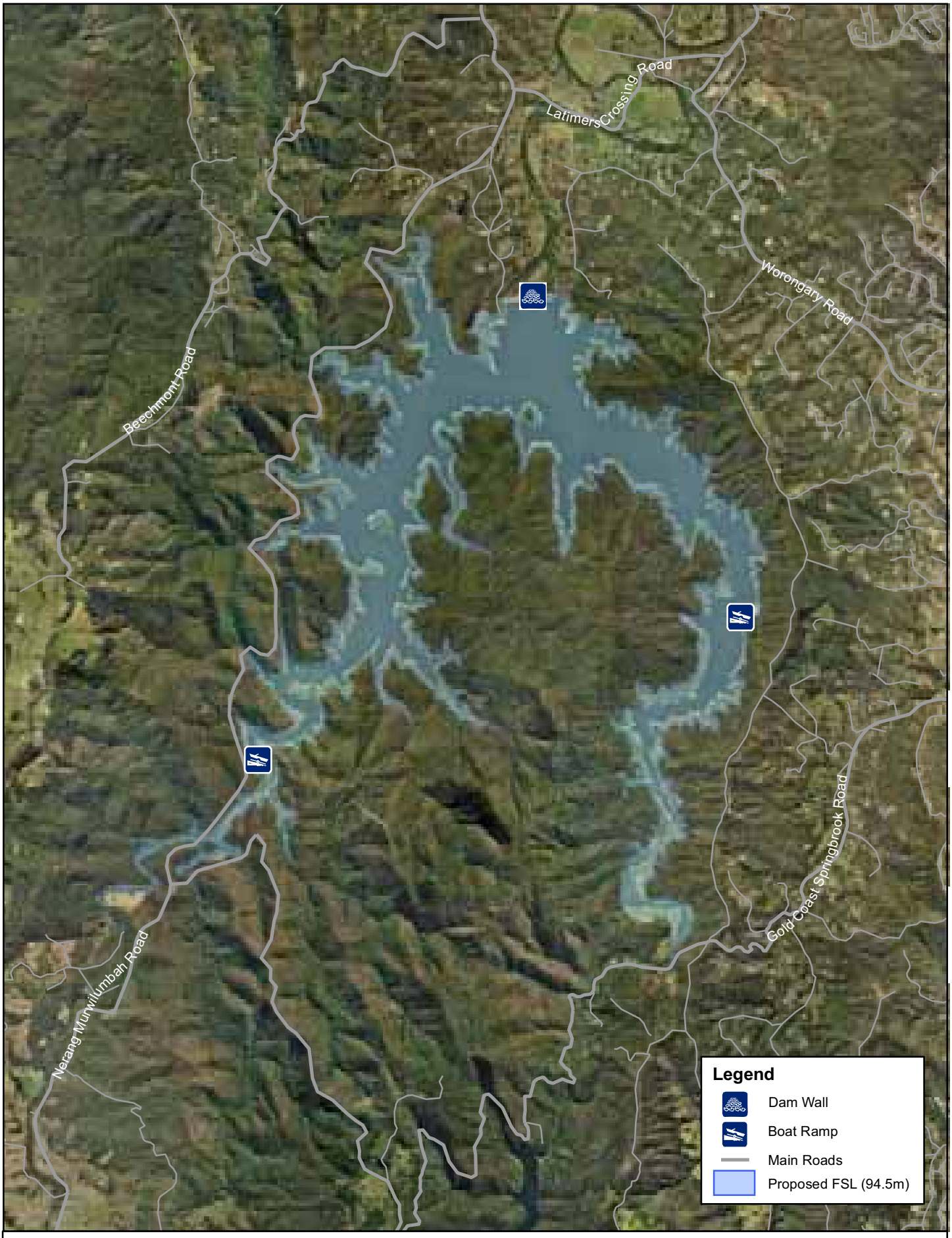
Projection: MGA Zone 56

Figure 18-5e

Visual Exposure
Mottee and Toula Courts

Hinze Dam Stage 3 EIS



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Scale - 1:60,000

Projection: MGA Zone 56

Figure 18-6

Public Access

Hinze Dam Stage 3 EIS

Existing Outlooks

An assessment of the existing outlooks for each of the landscape character units has also been undertaken. A photographic record and description for each of these is detailed below.

LCU1 Dam infrastructure and recreation areas

View of dam wall

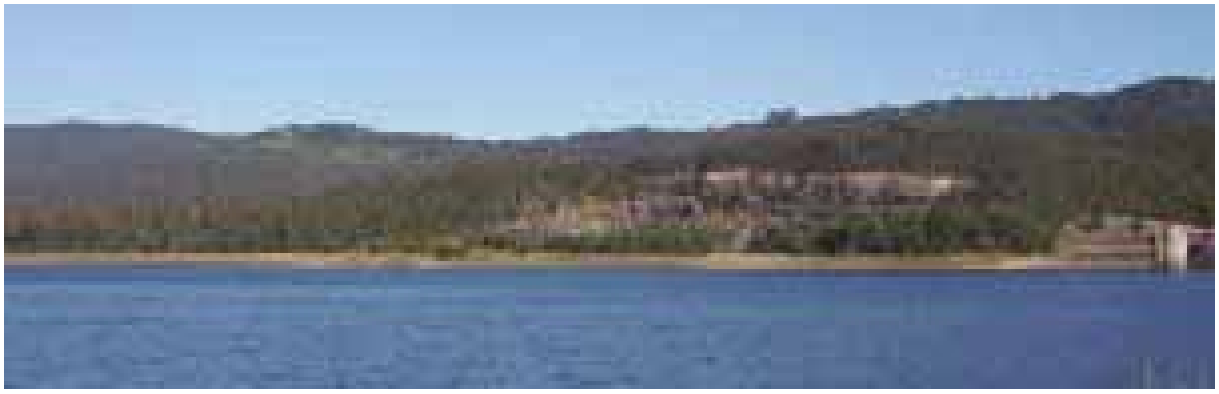
View of recreation area

Description

- The dam wall is a distinct topographic feature and is highly visible from within the northern portion of the visual catchment. The dam wall also provides expansive views across the Advancetown Lake water body and of surrounding vegetated ridgelines.
- Whilst the dam wall contrasts strongly with the natural surroundings of the locality, it is also viewed as a landmark of regional significance demonstrating a significant built/engineering achievement.
- The recreation area adjacent to the dam wall contrasts with the surrounding more 'natural' areas due to less dense vegetation cover in this area. Built infrastructure is small scale and appropriate to the use of the site and does not dominate views of the recreation area.
- The recreation area also provides opportunities for expansive views across the Advancetown Lake water body and of surrounding vegetated ridgelines.

LCU2 Quarry

View of exposed benched rock faces



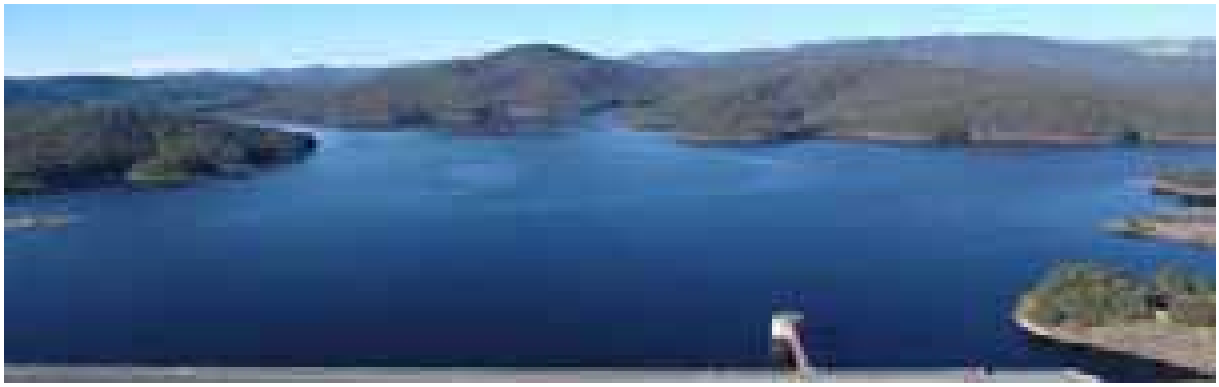
Oblique view of quarry area highlighting extent of cleared vegetation

Description

- The exposed benched rock faces from previous quarrying activities contrast with the natural surroundings.
- The rock faces are highly visible from surrounding landmarks and elevated areas.
- Additional quarrying of this area required as part of the Project works will result in further expansion of this area and may therefore increase the visibility exposed rock faces.
- The quarry is not accessible to the public and therefore there are no views are currently provided out from this site.
- Following completion of the recreation works views will be available from a lookout proposed from the ridge behind the quarry.

LCU3 Advancetown lake and Nerang River and Little Nerang Creek arms

Oblique view of main Advancetown Lake waterbody



Description

- The waterbody is the dominant land use in the visual catchment and contributes to it's overall high scenic amenity.
- The waterbody also provides opportunities for water-based recreation activities and this in turn provides opportunities to view areas which are otherwise difficult to access or not available to the public. This is particularly true for areas further upstream along the eastern and western arms of the impoundment.

LCU4 Downstream Nerang River rural valley

View overlooking Nerang River valley from dam wall

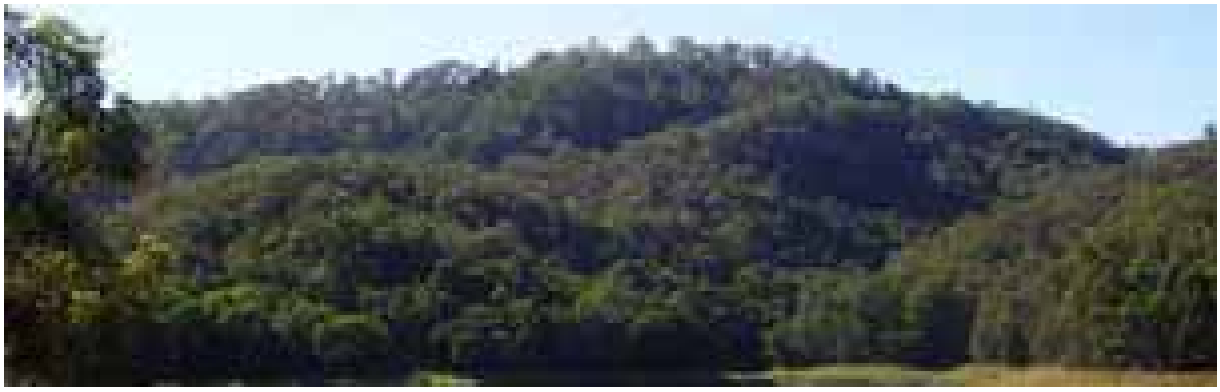
View to dam wall from Toola Court

Description

- The Nerang River rural valley is highly visible from the dam wall. Vegetation is most prominent along the banks of the river.
- Rural residences in the Nerang River valley have a predominantly rural outlook, however some residences, particularly those located at Mottee Court and Toola Court, have views of the top of the existing dam wall.
- The visual prominence of the dam wall is likely to increase as a result of the wall being raised.

LCU5 Steep slope scenic vegetation communities

View of steep slope vegetated area from recreation area

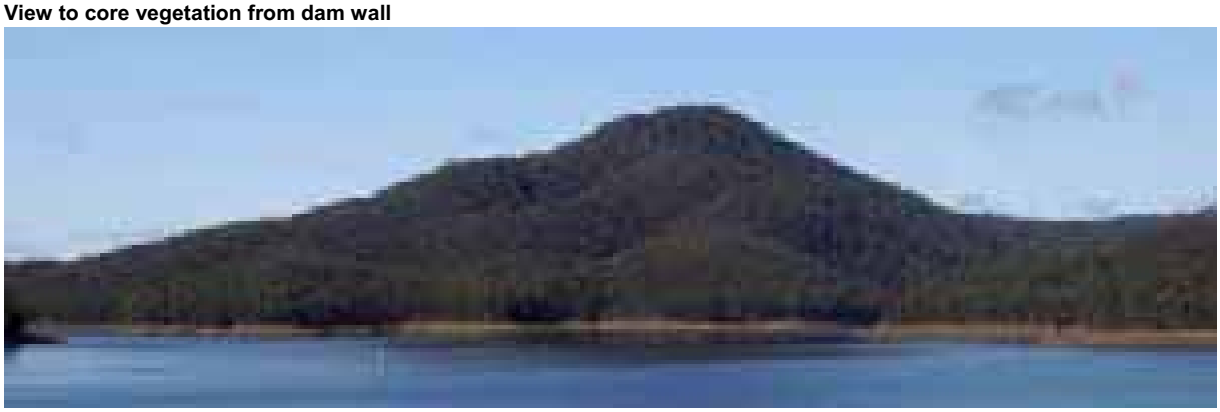


Description

- The steep vegetated ridgelines on the eastern side of the impoundment area are generally visible from the majority of locations within the visual catchment
- This area is generally inaccessible to the public apart from a number of recreation trails and from the eastern boat ramp

LCU6 Core lakeside habitat vegetation communities

View to core vegetation from dam wall



Description

- Significant habitat vegetation is located centrally within the visual catchment and is generally inaccessible to the public.
- The topography of this are ensures that the core vegetation area is clearly visible when viewed from the dam wall and most other locations within the visual catchment.
- Pages Pinnacle is a significant landscape feature located within this LCU.

LCU7 Disturbed lakeside vegetation communities

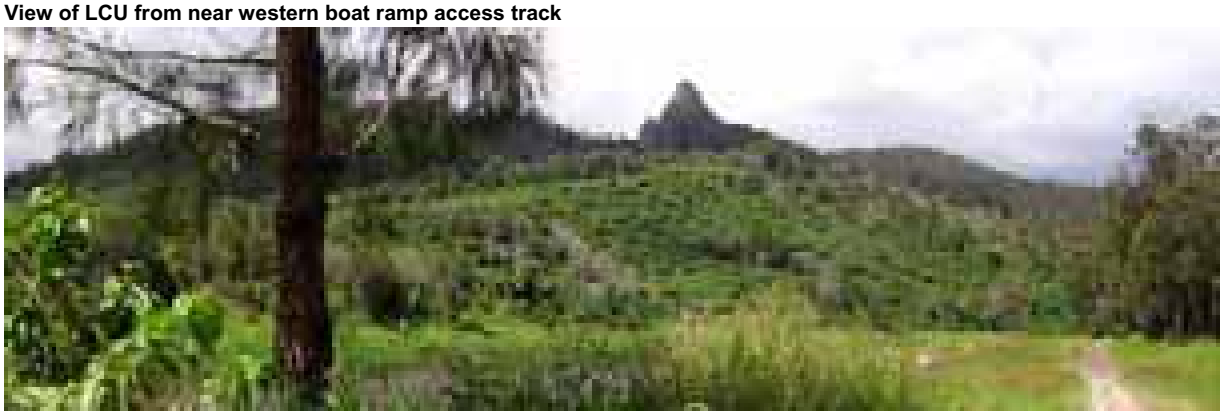
View towards LCU from western arm of lake

Description

- Vegetation type, cover and maturity vary within the LCU as a result of previous disturbance, including fire and clearing.
- The visibility of the LCU is generally limited to motorists travelling on Nerang-Murwillumbah Road and to those accessing the water body via the existing boat ramps.
- Access into this area is currently limited to the boat ramp and the site used by the model flying club.

LCU8 Disturbed grassland and scattered trees

View of LCU from near western boat ramp access track



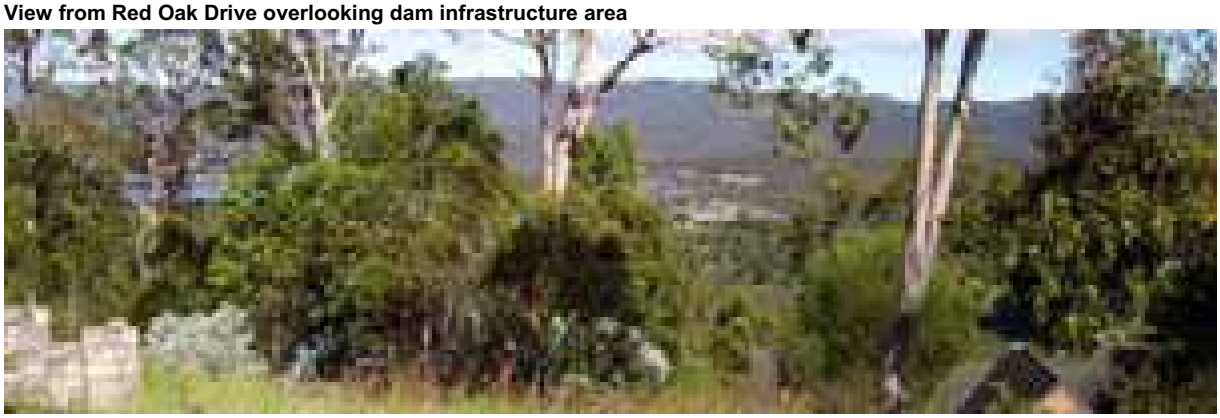
Description

- Vegetation cover within the LCU limited to grasses and scattered trees.
- The LCU is highly disturbed given previous disturbance from grazing, clearing and the impacts of fire.
- Significant topographic feature, Pages Pinnacle, is highly visible from this location.

LCU9 Ridgelines with rural residential development

View to dam wall from Beechmont Road

View from Red Oak Drive overlooking dam infrastructure area



Description

- Fixed viewing populations with views outlooks over the dam infrastructure areas are primarily located off Beechmont Road and Bottletree Lane in the west and off The Panorama and Red Oak Drive in the east.
- The views from this area include foreground views of the dam and a longer viewing horizon encompassing the surrounding mountains.
- Views of the impoundment area and the dam infrastructure available through the vegetation.

Sensitive Visual Receptors

Sensitive visual receptors include locations where the proposed works are visible to the general public, residents, visitors, and other groups of viewers. A description of identified sensitive visual receptors including the type of viewers affected, an estimate of their numbers and duration of view etc is detailed in **Table 18-2**. Identified sensitive visual receptors are also shown on **Figure 18-7.**

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Scale - 1:60,000

Projection: MGA Zone 56

Figure 18-7

Sensitive Visual Receptors

Hinze Dam Stage 3 EIS

Table 18-2 Sensitive Visual Receptors

Identified Sensitive Visual Receptors	Description
Beechmont Road and Bottletree Lane residences	■ Fixed viewers with generally unobstructed views over the site and to the coastline ■ The views of the dam and associated infrastructure are foreground views with longer views to the coast ■ Construction activity will be highly visible from this location, particularly the raising of the dam wall and of clay borrow area.
The Panorama and Red Oak Drive residences	■ Fixed viewers with clear views over the site to the west and to the coastline to the east ■ Construction activity will be visible, including quarrying activity and clay borrow area which will be highly visible in addition to the raising of the dam wall.
Nerang-Murwillumbah Road including rural residences	■ Motorists travelling along Nerang-Murwillumbah Road have glimpses of the impoundment area but generally do not have views to construction areas ■ Rural residences are fixed viewers with partial views to the dam wall and general construction areas
Duncan Road residences	■ Fixed viewers which do not have existing views to the dam infrastructure areas or quarry. ■ These residences will have views of clay borrow area ■ Views of the saddle dam construction area and of the completed saddle dam are also expected from some of the residences on Duncan Road
Nerang River Valley, including Mottee and Toola Courts, rural residences	■ Fixed viewers with partial views of the top of the dam wall. ■ Residences are likely to have views of some construction activities associated with the dam wall raising.

18.3 Landscape and Visual Impact Assessment

The potential visual impacts have been considered in the context of the landscape sensitivity of the surrounding areas from which they may be visible. Descriptions of the likely landscape and visual impacts are supported by a series of photomontages which illustrate the way in which the proposal would relate to the existing topography and other features of the visual catchment.

18.3.1 Sources of Potential Landscape and Visual Impacts

The construction and operation activities of the Project likely to have significant visual impacts include:

- raising of the existing dam wall by up to 15m and construction of a new saddle dam which will increase the visual prominence of these structures;
- relocation of the existing lakeside recreation area;
- establishment of site offices, storage/stockpile areas, lay down areas. These will be located at existing cleared areas that were previously used as part of the Stage 2 upgrade works, however these areas are to be expanded which will require further clearing. Lighting of these areas at night will also be required for security reasons during construction;
- quarrying of the existing quarried area to provide construction materials. This will expand the area of exposed rock and will require additional clearing;
- establishment of a clay borrow area to provide construction material which will require clearing; and
- clearing around the dam below the new FSL and for site construction works in the vicinity of the dam wall.

These aspects of the Project are discussed in **Table 18-3**.

Table 18-3 Significant Visual Impacts

Existing Views	Construction Views	Operation Views
Dam Wall and Recreation Area		
■ Dam wall and small saddle dam ■ Intake tower ■ Existing recreation areas to the east of the dam wall and below the dam wall ■ Vegetated recreation areas	■ Dam wall will be raised by 15m ■ Existing recreation area will be inundated ■ New saddle dam construction ■ Construction facilities such as sheds, workshop, concrete batching plant and crusher	■ Dam wall will appear taller and wider. In addition, a new saddle dam will be visible. ■ New recreation area, incorporating new built structures ■ Revegetation of disturbed areas
Quarry		
■ Quarry face from Stage 2 construction works ■ 'lagoon' area below the quarry face ■ Scattered vegetation	■ Expansion of the quarry ■ Vegetation clearing	■ This will result in significant topographic changes in addition to broad scale removal of existing vegetation. ■ Larger exposed quarry face
Clay Borrow Area		
■ Vegetated area to the east of Gilston Road ■ Open parkland with scattered trees to the east of Gilston Road	■ Removal of clay for dam wall and saddle dam construction ■ Vegetation clearing	■ Clay borrow area will result in clearing and topographic changes ■ Revegetation of disturbed areas

18.3.2 Views of Dam and Associated Infrastructure

To assist in the assessment of the view of the dam and associated infrastructure photomontages have been prepared from four sensitive receivers:

- houses located on Duncan Road (**Figure 18-8**);
- Red Oak Drive (**Figure 18-9**);
- houses located at the end of Mottee Court (**Figure 18-10**); and
- Beechmont Road (**Figure 18-11**).

It should be noted that the views offered by the photomontages represent uninterrupted viewing of the dam and do not take account of vegetation and buildings that in most instances partially screen or restrict the view of the dam.

Figure 18-8 Duncan Road Photomontage

- **Figure 18-9 Red Oak Drive Photomontage**

- **Figure 18-10 Mottee Court Photomontage**

- **Figure 18-11 Beechmont Road Photomontage**

18.3.3 Description of Landscape and Visual Impacts

The visual impacts of the Project have been determined by evaluating the aspects that have potential for impacts on the landscape character units and identified sensitive receptors.

Impact Assessment Methodology

Each landscape unit has been assessed in accordance with the following parameters:

- Landscape character;
- Scenic quality;
- Visual and landscape sensitivity; and.
- Effects over time.

Each of these parameters is addressed in **Table 18-4**. These parameters are also addressed in the assessment of impacts on identified sensitive receptors.

Table 18-4 Impact Assessment Parameters

Element	Description/Parameters for Assessing landscape and Visual Impacts
Landscape character	The Hinze Dam Visual Catchment has been divided into Landscape Character Units, which are distinct character areas that share common features and characteristics. Descriptions of each Landscape Character Unit have been included in Section 18.2.1.
Scenic quality	Scenic quality measures the degree to which the aesthetics of a landscape are valued from a human perspective. Highly favoured landscapes are those that are relatively natural and vegetated, especially those with water features, dramatic topography, and contrasting character. Landscapes least preferred are those with a high degree of human disturbance, as well as landscapes with few trees and landforms that are flat and unvaried. It should be noted, however, that these assumptions are general and do not hold true for all viewers or all landscapes. Four rankings have been used as part of this assessment. Definitions of the rankings are as follows: ■ **High** – scenic quality well above average in terms of surrounding landscape, with the landscape valued highly by most viewers as being unique and beautiful and/or offering impressive views; ■ **Moderate** – scenic quality average in terms of surrounding landscape type that could be expected to be of some value to most viewers as being fairly pleasant to look at; ■ **Low-Moderate** – scenic quality below average in terms of the surrounding landscape, representing a landscape type most viewers would find rather uninteresting; ■ **Low** – scenic quality well below average in terms of the surrounding landscape, representing a landscape type most viewers would find uninteresting, and in some cases, unattractive. (Wright 1973; State Pollution Control Commission 1981; and Colleran and Gearing 1980 in Tugun Bypass Alliance, 2004)
Visual and Landscape Sensitivity	The sensitivity of the visual and landscape environment has been considered as part of this assessment. It is considered that locations with high and/or fixed viewing populations and that are visually prominent and/or elevated are generally the most sensitive to visual impacts. Sensitivity also increases as the position of the viewer becomes closer. (LI & EMA 2002)
Effects – Construction and/or Operation	Landscape and visual impacts can be either permanent or temporary (short, medium or long term) (LI & EMA 2002). Impacts can be expected to be highest during and immediately following construction, with some impacts diminishing over time.

Landscape and Visual Impacts

Having consideration to the impact assessment parameters detailed in **Table 18-4** the likely landscape and visual impacts on the LCUs and identified sensitive receptors have been identified. **Table 18-5** describes the visual impacts from and to each of the landscape character units and incorporates mitigation measures. The landscape and visual impacts in relation to the sensitive receptors are described in **Table 18-6**.

Table 18-5 Landscape and Visual Impacts – Landscape Character Units

Landscape Character Units	Landscape character	Scenic Quality	Visual and Landscape Sensitivity	Proposed Changes and Likely Impacts – Construction	Proposed Changes and Likely Impacts – Operation	Mitigation
LCU1 Dam infrastructure and recreation areas	■ Scenic recreational area adjacent to dam wall ■ Significant built infrastructure	**To LCU:** Moderate – LCU contains large built infrastructure that contracts with the natural landscape. **From LCU:** High – LCU offers impressive views of surrounding areas.	■ Sensitive receptors surrounding the site have views over the dam infrastructure and recreation area. ■ Long term impacts are also likely to be seen by significant numbers of visitors to the site.	■ Raising of the dam wall and saddle dam will permanently change the topography of the LCU, by increasing the height and width of these walls. ■ Sensitive receptors, particularly off Beechmont Road in the west and off The Panorama in the east will have views of dam wall construction. ■ Workshops, site offices etc will be located on cleared and compacted sites used previously as part of Stage 2 upgrade. These areas will be expanded which will require additional clearing. ■ Existing recreation areas downstream of the dam will form part of the construction site. ■ Vegetation clearing required to accommodate the new full supply level will visible from this LCU.	■ Extensive new saddle dam will, due to the increased levels, be more visually prominent. ■ Recreation area is to be relocated as the existing lakeside park will be inundated. This will significantly alter the character of the LCU. ■ New recreation area will provide for long-term enhancement of the construction area through planting and vegetation works.	■ Recreation Masterplan provides an opportunity to replace and enhance the existing recreation area. ■ Dam wall raising should be consistent with the existing structure i.e. similar construction materials, colours etc. ■ Vegetation should be cleared to accommodate the full supply level in areas that are visible from this LCU.
LCU2 Quarry	■ Significantly altered landscape with noticeable absence of vegetation ■ Landform and topography contrast with surrounding areas	**To LCU:** Low – LCU is unattractive when compared with surrounding areas. **From LCU:** High – LCU offers extensive views of surrounding areas.	■ Quarry is visible from sensitive receptors surrounding the site. ■ Expansion of the quarried area will further increase the visibility of this area.	■ Quarrying will result in further benching of slopes and exposed rock faces. ■ Clearing of existing vegetation will expose red coloured soils.	■ Part of the quarry site will be rehabilitated and landscaped for the construction of the new recreation area and facilities. ■ Exposed rock faces will be visible upon completion of construction works, however the extent of cleared area may appear different from current.	■ The quarry is to be progressively rehabilitated. ■ Higher dam water levels will inundate the low area in front of the quarry. This will result in a more visually appealing view of the quarry area.

Landscape Character Units	Landscape character	Scenic Quality	Visual and Landscape Sensitivity	Proposed Changes and Likely Impacts – Construction	Proposed Changes and Likely Impacts – Operation	Mitigation
LCU3 Advancetown lake and Nerang River and Little Nerang Creek arms	■ Scenic water body offering water-based recreational opportunities. ■ Minimal human disturbance.	**To LCU:** High – Unique landscape which provides opportunities for extensive water and vegetation views. **From LCU:** High – LCU offers extensive views of surrounding areas.	■ The waterbody is accessible by recreational users. ■ Views of the waterbody are available from elevated areas surrounding the site. ■ Recreational users also have extensive views of the surrounding natural landscape from the activities undertaken on the dam.	■ Construction activity within the waterbody will be limited to upgrade of intake towers and removal of pontoons and course buoys. ■ Some areas of the dam will be inaccessible for recreation activities. ■ There will be a loss of views of this LCU from the dam wall and lakeside recreation areas due to closure of the site. ■ Vegetation clearing required to accommodate the new full supply level will visible from this LCU and from areas that view this LCU.	■ The water level in the impoundment will increase by about 10m in height which will result in the inundation of land surrounding the impoundment. ■ The waterbody will appear virtually the same however higher water level may be noticeable in certain locations. ■ Views around and across the impoundment will not change significantly as a result of the increase in water level. ■ There may be some dead or dying vegetation in areas that have not been cleared to accommodate the new full supply level.	■ Dead/dying vegetation which becomes inundated and is visible from prominent viewing locations is to be cleared.
LCU4 Downstream Nerang River rural valley	Landscape characterised by large land holdings that include rural activities with a residential component.	**To LCU:** Moderate – landscape average for rural residential locality with views fairly pleasant. **From LCU:** Moderate – landscape average for rural residential locality with views fairly pleasant. Some views of the built infrastructure of the dam.	■ Fixed viewing populations which already have partial views of existing dam infrastructure.	■ Construction activity associated with raising the dam wall is likely to be visible from rural residential properties during construction. ■ There may be some visibility of areas that are required to be cleared for the construction works.	■ Visibility of the upper portion of the dam wall will increase.	■ Dam wall raising should be consistent with the existing structure i.e. similar construction materials, colours etc. ■ Rehabilitation of cleared areas should be undertaken.

Landscape Character Units	Landscape character	Scenic Quality	Visual and Landscape Sensitivity	Proposed Changes and Likely Impacts – Construction	Proposed Changes and Likely Impacts – Operation	Mitigation
LCU5 Steep slope scenic vegetation communities	■ Topography varying from moderate to steep with dense forest. ■ Human disturbance limited to hiking, horse riding trails.	**To LCU:** High – unique landscape which has been subject to little human disturbance. **From LCU:** Moderate-high – Limited views over the impoundment area and of the dam infrastructure and surrounding natural environment.	■ There is limited accessibility to this area by the public. ■ Access available from the horse riding trails and the boat ramp at the intake tower. ■ There are limited opportunities to view the dam infrastructure and the impoundment. ■ Surrounding sensitive receptors have existing views to steep slope vegetation of this LCU.	■ There will be limited construction works occurring in this LCU but the construction of the new intake tower and associated access road and the construction of the boat ramp will be visible from some limited areas surrounding the dam. ■ Vegetation clearing required to accommodate the new full supply level will visible from some surrounding areas.	■ The raising of the intake tower may result in minor increases in its visibility from surrounding areas.	■ Rehabilitation of cleared areas should be undertaken.
LCU6 Core lakeside habitat vegetation communities	■ Topography varying from moderate to steep with intact dense forest. ■ Includes the notable topographic feature Pages Pinnacle.	**To LCU:** High – unique landscape which has been subject to little human disturbance. Pages Pinnacle is a significant topographic feature of this LCU. **From LCU:** High – LCU offers extensive views of surrounding areas.	■ There is no accessibility to this area by the public. ■ Core lakeside vegetation highly visible from surrounding sensitive receptors.	■ Vegetation clearing required to accommodate the new full supply level will visible from this LCU and from areas that view this LCU. ■ There will be a loss of views of this LCU from the dam wall and lakeside recreation areas due to closure of the site.	■ The water level in the impoundment will increase by about 10m in height which will result in the inundation of land within this LCU. ■ The waterbody will appear virtually the same however higher water level may be noticeable in certain locations. ■ There may be some dead or dying vegetation in areas that have not been cleared to accommodate the new full supply level.	■ Dead/dying vegetation which becomes inundated and is visible from prominent viewing locations is to be cleared.
LCU7 Disturbed lakeside vegetation communities	Topography varying from low-lying to steep slopes which has been subject to previous disturbance.	**To LCU:** Moderate – glimpses through vegetation to impoundment from Nerang-Murwillumbah Road and rural residences.	■ Moderately sensitive visual and landscape environment, only some fixed viewing populations.	■ Upgrade of western boat ramp will be minor and short term construction works. No public access to the boat ramp will be available during the upgrade. ■ Vegetation clearing works undertaken as part of the construction of the boat ramp.	■ The water level in the impoundment will increase by about 10m in height which will result in the inundation of land within this LCU. ■ The waterbody will appear virtually the same however higher water level may be noticeable in certain locations.	■ Dead/dying vegetation which becomes inundated and is visible from prominent viewing locations is to be cleared. ■ Landscaping and vegetation rehabilitation works to be undertaken

Landscape Character Units	Landscape character	Scenic Quality	Visual and Landscape Sensitivity	Proposed Changes and Likely Impacts – Construction	Proposed Changes and Likely Impacts – Operation	Mitigation
		From LCU: Moderate – Some views over the impoundment area and surrounding natural environment.		■ Vegetation clearing required to accommodate the new full supply level will be visible from this LCU and from areas that view this LCU.	■ There may be some dead or dying vegetation in areas that have not been cleared to accommodate the new full supply level.	around the boat ramp.
LCU8 Disturbed grassland and scattered trees	■ Low lying and flat topography in comparison to surrounding areas. ■ Land has been subject to previous grazing activity, vegetation clearing and consists of grasses and scattered trees.	**To LCU:** Low-moderate – average views given previous disturbance, however Pages Pinnacle adds interest. **From LCU:** Moderate – Some views over the impoundment area and surrounding natural environment.	■ Moderately sensitive visual and landscape environment. ■ There is no accessibility to this area by the public. ■ Views to this location only available from western boat ramp and from the water.	■ Vegetation clearing required to accommodate the new full supply level will be undertaken within this LCU. ■ Vegetation clearing will be visible from areas that view this LCU.	■ The water level in the impoundment will increase by about 10m in height which will result in the inundation of land within this LCU. ■ The waterbody will appear virtually the same however higher water level may be noticeable in certain locations. ■ There may be some dead or dying vegetation in areas that have not been cleared to accommodate the new full supply level.	■ Dead/dying vegetation which becomes inundated and is visible from prominent viewing locations is to be cleared.
LCU9 Ridgelines with rural residential development	Large rural residential allotments located on ridgelines which have expansive views to the coastline and of the dam.	**To LCU:** High – LCU offers extensive views of surrounding areas. **From LCU** High –impressive views to dam infrastructure and of impoundment.	■ Highly sensitive visual environment. ■ Refer to Table 18-6 for visual impact assessment from sensitive receptors.	■ There will be no construction works occurring in this LCU. ■ Construction of the infrastructure in the vicinity of the dam wall will be visible from some parts of this LCU. ■ Vegetation clearing required to accommodate the new full supply level will visible from some parts of this LCU.	■ The waterbody will appear virtually the same however higher water level may be noticeable in certain locations. ■ There may be some dead or dying vegetation in areas that have not been cleared to accommodate the new full supply level.	■ Dead/dying vegetation which becomes inundated and is visible from this prominent viewing location is to be cleared.

Table 18-6 Landscape and Visual Impacts – Sensitive Receptors

Sensitive Receptors	Existing Outlook	Scenic Quality	Visual and Landscape Sensitivity	Proposed Changes and Likely Impacts – Construction	Proposed Changes and Likely Impacts – Operation	Mitigation
Beechmont Road (including Bottletree Lane) residences	Views overlooking the dam infrastructure area and impoundment and to the east to the coastline.	High – impressive views over the dam infrastructure and impoundment area and distance views.	Fixed viewing populations with views of areas of construction.	Clearing associated with clay borrow area and construction activity associated with raising of the dam wall will be highly visible.	■ Permanent visual impacts are likely as the appearance of the dam infrastructure and recreation area will differ from current. ■ Exposed rock and cleared areas associated with borrow area will also be visible in the short to medium term until rehabilitation works create a canopy cover.	■ The clay borrow area is to be progressively rehabilitated. ■ Dead/dying vegetation which becomes inundated and is visible from this prominent viewing location is to be cleared.
The Panorama (including Red Oak Drive) residences	Views overlooking the dam infrastructure area and impoundment and to the east to the coastline.	High – impressive views over the dam infrastructure and impoundment area.	Fixed viewing populations with views of areas of construction.	Clearing associated with clay borrow area and quarry will be highly visible in addition to construction activity associated with raising of the dam wall.	■ Permanent visual impacts are likely as the appearance of the dam infrastructure and recreation area will differ from current. ■ Exposed rock and cleared areas associated with the clay borrow area and quarry will also be visible.	■ The quarry and clay borrow area are to be progressively rehabilitated. ■ Construction of the lakeside park and associated landscaping works will assist in mitigating views of the quarry from this sensitive receptor. ■ Dead/dying vegetation which becomes inundated and is visible from this prominent viewing location is to be cleared.
Nerang-Murwillumbah Road including rural residences	Glimpses to impoundment from Nerang-Murwillumbah Road and rural residences.	Moderate – glimpses to impoundment from Nerang-Murwillumbah Road and rural residences.	Moderately sensitive visual and landscape environment, only some fixed viewing populations.	Works associated with the construction of the western boat ramp will be visible from this road.	■ The raised water levels of Hinze Dam Stage 3 will increase the water views available from the road. ■ Clearing associated with the new full supply level may open further views to the water from the road.	■ Dead/dying vegetation which becomes inundated and is visible from this prominent viewing location is to be cleared.

Sensitive Receptors	Existing Outlook	Scenic Quality	Visual and Landscape Sensitivity	Proposed Changes and Likely Impacts – Construction	Proposed Changes and Likely Impacts – Operation	Mitigation
Duncan Road residences	No views of existing dam infrastructure or impoundment.	Moderate – landscape average for rural residential locality with views fairly pleasant.	Fixed viewing populations with views of clay borrow area.	Construction activity associated with the clay borrow area, haul roads and saddle dam will be visible.	■ Permanent visual impacts are likely as the appearance of the dam infrastructure and recreation area will differ from current. ■ Exposed earth and cleared areas associated with borrow area will also be visible in the short to medium term until rehabilitation works create a canopy cover. ■ Views of the raised saddle dam will be visible from this location.	■ The clay borrow area are to be progressively rehabilitated.
Nerang River Valley (including Mottee Court and Toola Court rural) residences	Some residences have views of the top of the existing dam wall.	Moderate – landscape average for rural residential locality with views fairly pleasant.	Fixed viewing populations with views of dam wall.	Construction activity associated with raising the dam wall will be visible.	■ The top of the dam wall will become more visually prominent as a result of the increased height of the wall.	■ Dam wall raising should be consistent with the existing structure i.e. similar construction materials, colours etc.

18.4 Mitigation Measures

The following sections outline the construction and operation mitigation measures to be implemented to minimise the visual impacts resulting from Project works. These mitigation measures have incorporated those detailed in **Table 18-5** and **Table 18-6**.

Mitigation strategies proposed include:

- Provision of a communication program targeted to residents in Advancetown and Gilston, and provision of a complaints response system;
- Effective management of negative impacts on amenity e.g. movement of vehicles, personnel and materials to and from the site;
- Advice to community and recreational organisations regarding restrictions to site access during construction; and
- Maximising activity and amenity values once the dam site is reopened.

18.4.1 Construction

- Existing vegetation should be retained on site and only removed where necessary. In particular, a buffer should remain between the clay borrow area and Duncan Road;
- Waste generated during construction should be collected and stored neatly on the construction site and removed from site as soon as possible;
- Dam wall raising materials should be consistent with the existing structure i.e. similar construction materials, colours etc;
- Ensure that areas where vegetation is removed for construction activities that the areas are rehabilitated at the end of the construction works;
- Dead/dying vegetation which becomes inundated and is visible from this prominent viewing location is to be cleared; and
- Locate night lights as required for safety and security, but ensure lights are focussed on the areas required, with shields around the globes to limit extraneous light where necessary. Lighting of the site should conform to the following Australian standards:
  - AS1158 – Road lighting; and
  - AS 4282 – Control of the obtrusive effects of outdoor lighting.

18.4.2 Operation

- Ensure that waste generated during operation is collected and stored neatly on-site and removed as soon as possible;
- Rehabilitation of the quarry and clay borrow area should be completed as site works are completed. Rehabilitation should incorporate a selection of indigenous and fast growing plant species that are endemic to the site; and
- Locate night lights as required for safety and security, but ensure lights are focussed on the areas required, with shields around the globes to limit extraneous light where necessary. Lighting of the site should conform to the following Australian standards:
  - AS 1158 – Road lighting; and
  - AS 4282 – Control of the obtrusive effects of outdoor lighting.