Hunter Power Project Proposed increase in stack height: Landscape character and visual impact assessment

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Project name: Hunter Power Project
Project no: IS354501
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1. Introduction

1.1 Background

The Hunter Power Project (the Project) was approved as SSI-12590060 by the then Minister for Planning and Public Spaces on 17 December 2021. The approved Project involves the development of a gas-fired power station comprising two open cycle gas turbine (OCGT) generators with a nominal capacity of up to 750 megawatts (MW), an electrical switchyard and associated supporting infrastructure. The gas turbines would primarily be fired on natural gas with the use of diesel fuel as a backup. The Project will operate as a "peak load" generation facility supplying electricity at short notice when there is a requirement in the National Electricity Market (NEM).

Since the Project's approval, a main equipment supplier has been engaged by Snowy Hydro and the detailed design has progressed. The main equipment supplier and their specialist stack designer and manufacturer have determined that 60 m high turbine exhaust stacks are required to comply with the project noise criteria specified in the Infrastructure Approval conditions and Environment Protection Licence 21627.

The purpose of this Memorandum is to assess the landscape character and visual impact associated with the proposed increase in the height of the exhaust stacks from approximately 36 m (noting that stacks of 40 m were assessed in the visual assessment supporting the Hunter Power Project Environmental Impact Statement (Jacobs, 2021a) (the Project EIS), to 60 m above ground level.

1.2 Landscape character and visual impact

A landscape character and visual impact assessment (LCVIA) was undertaken for the Project EIS (Jacobs, 2021b) to assess the potential visual impacts of the Project. The LCVIA described the existing and proposed visual environment and assessed the significance of potential operational visual impacts from sensitive receivers. Mitigation measures were limited to lower-level infrastructure and treatments to building facades. The levels of assessed impacts did not appear to warrant mitigation measures.

The assessment determined the overall visual impact of the Project to be low-negligible. This was due partly to the Project being consistent and compatible with the land use provisions for the area in which the Project was proposed, which is either existing or planned industrial use, and partly to views from the public and private realm either being screened or filtered by mature vegetation and localised topography, or views are from such a distance that the Project would be a small element in the background of views.

Contextually and as described in the EIS, the former Kurri Kurri aluminium smelter is the site upon which the Project is located. When the smelter was in operation there was one stack of 140 m in height, two stacks at 70 m, as well as a 55 m high water tower.

1.3 The approved Project

The approved Project allows for the construction of the following:

- Industrial frame gas turbines in Open Cycle configuration as described above, with turbine exhaust stack heights of approximately 36 m
- 132 kV electrical switchyard
- Water storage tanks and other water management infrastructure
- Fire water storage tanks and firefighting equipment such as hydrants and pumps
- Maintenance laydown areas
- Diesel fuel storage tank(s) and truck unloading facilities
- Site access roads and car parking
- Office/administration, amenities, workshops/storage areas.

Indicative elevations that show the layout, appearance and heights of the Project's infrastructure are shown below in Figure 1.

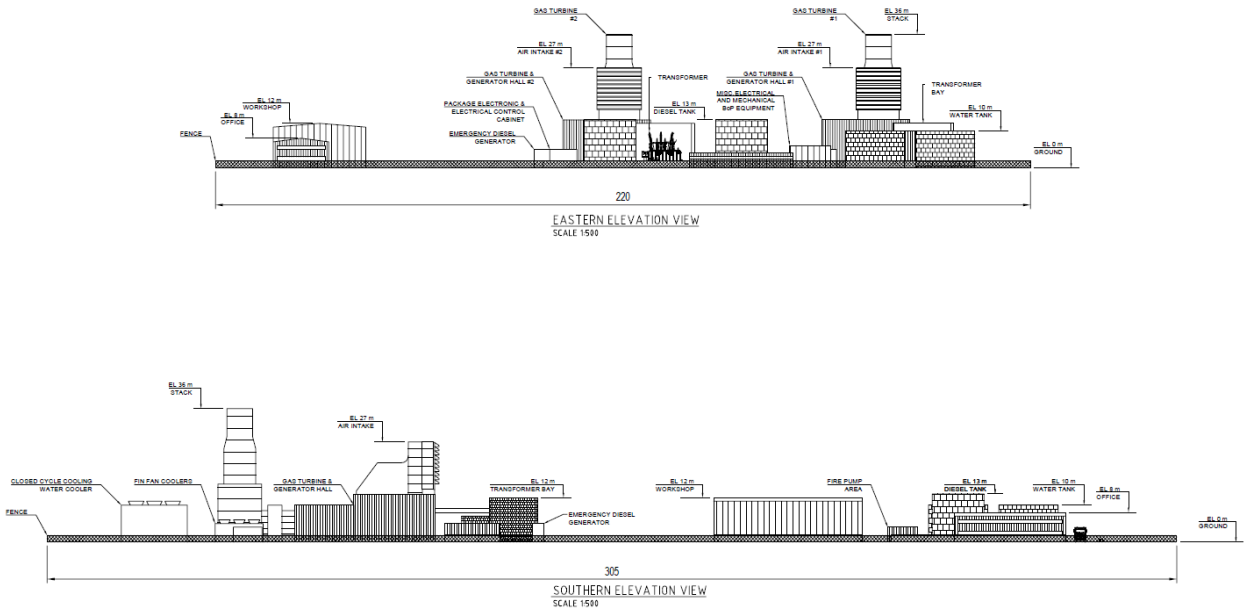


Figure 1: Cross section of approved Project

1.4 The proposed Project modification

The Project would remain entirely within the footprint of the approved Project, which includes the former location of the electrical switchyard that serviced the Hydro Aluminium Kurri Kurri aluminium smelter. The overall layout and form of the Project would remain largely similar as that which was assessed in the Project EIS. Based on the above, the only change in views relevant to the assessment of visual impacts is the proposed increase in height of the exhaust stacks from 40 m to 60 m above natural ground.

The following section will review the changes to the extent of the viewshed and zones of visual influence, before re-examining land-uses and sensitive receptors in proximity to the Project.

2. Assessment

2.1 Viewshed

The LCVIA defined the theoretical extent of the study area as the distance at which the stack would occupy 0.5° in the vertical field of view when visible in full, and not screened by topography, vegetation, or buildings. That is, the stacks would occupy less than 1° in the vertical viewing plane.

2.2 Zones of visual influence

The LCVIA also relied upon Zones of Visual Influence (ZVI) to assist in the consideration of visual prominence of vertical structures over varying distances. The calculations used to determine the viewshed or study area were used to determine ZVI. ZVI are one criteria that contributes to the overall assessment of views and visual impact.

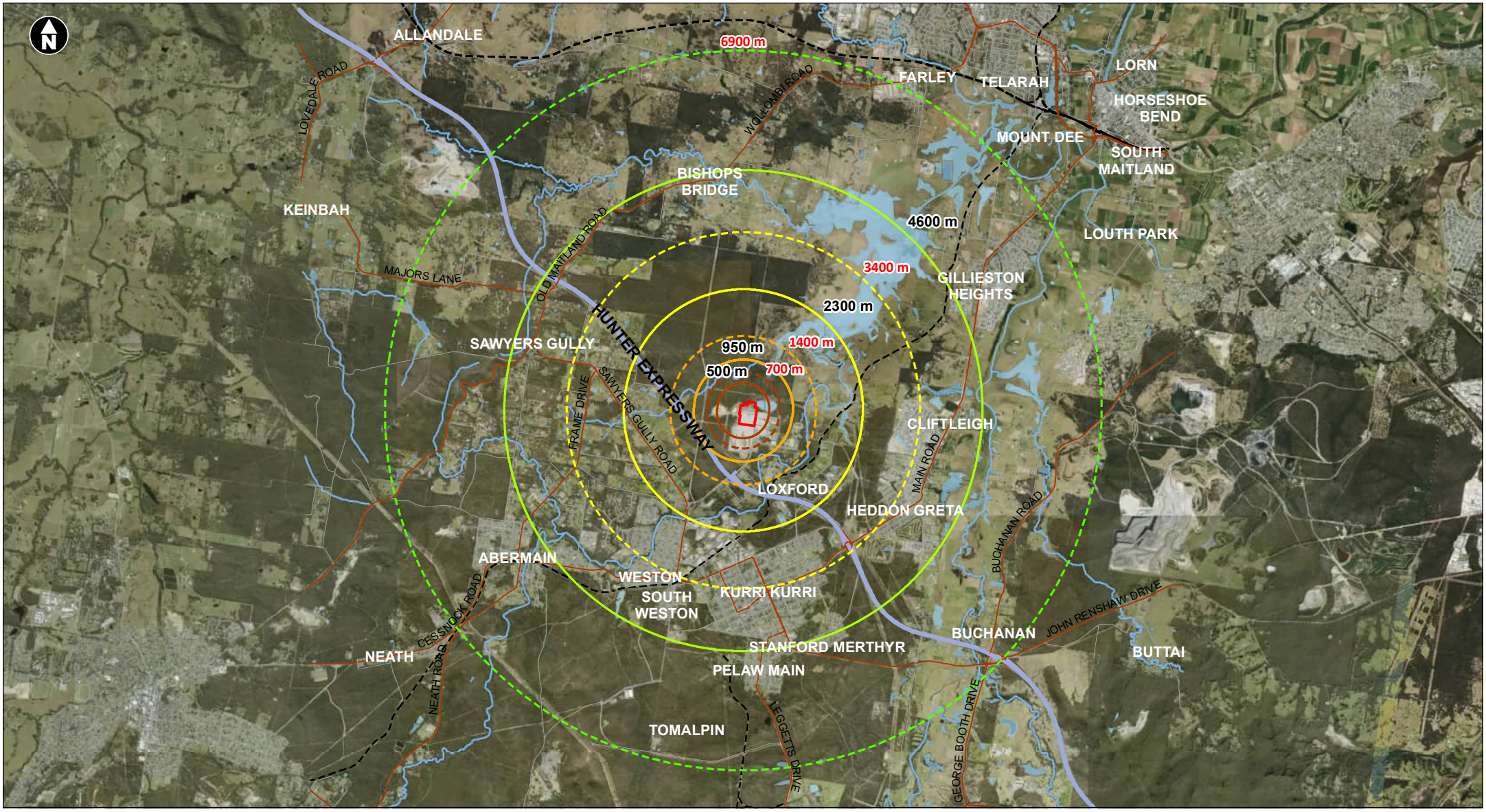
Table 1 compares the theoretical extent of the Viewshed or study area and Zones of Visual Influence between the assessed exhaust stack heights of 40 m and the proposed increase to 60 m.

Table 1: Zones of visual influence of the approved Project and the proposed change

Vertical angle of view	Zones of Visual Influence	Approved Project Distance from the gas turbine exhaust stacks (approx. height 40 m)	Proposed Change Distance from the gas turbine exhaust stacks (approx. height 60 m)
<0.5	Visually insignificant – Extent of the Project viewshed A very small element in the viewshed, which is difficult to discern and will be invisible in some lighting or weather circumstances.	>4.6 km	>6.9 km
0.5-1.0	Noticeable, but will not be prominent in the landscape The degree of visual intrusion will depend on the landscape sensitivity and the sensitivity of the viewer; however, the Project will not dominate the landscape.	2.3 km - 4.6 km	3.4 km – 6.9 km
1.0-2.5	Noticeable and can be prominent in the landscape The degree of visual intrusion will depend on the landscape sensitivity and the sensitivity of the viewer.	950 m - 2.3 km	1.4 km – 3.4 km
2.5-5.0	Highly visible and will usually be prominent in the landscape The degree of visual intrusion will depend on the Project's visibility in views from the landscape and factors such as foreground screening.	500 m – 950 m	700 m – 1.4 km
>5.0	Will always be visually prominent in the landscape Dominates the landscape in which it is sited.	<500 m	<700 m

The theoretical extent of the study, or distance at which the exhaust stacks would occupy 0.5° in the vertical field of view will extend from 4.6 km for the approved Project to 6.9 km for the proposed increased stack height. That is, if the stacks were visible in full, and not screened by topography, vegetation, or buildings, they would be less than 1° in the vertical viewing plane.

The area, or distance at which the exhaust stacks have the potential to be a visually prominent feature in views, would only increase from 500 m to 700 m. All land within this radius is situated within the existing industrial estate or is designated as future industrial estate. Figure 2 2 shows the extent of the viewshed or visual study area in green, with the zones of visual influence in yellow, orange and red for the approved Project (in solid lines) and proposed change (in dashed lines). The following section will re-examine the study area and nearby land-uses.



Project site

ZVI buffers (m) - LCVIA assessment
- 500
- 950
- 2300
- 4600 (Approved project viewshed)

ZVI buffers (m) - Proposed change assessment
- 700
- 1400
- 3400
- 6900 (Proposed change viewshed)

- Motorway
- Main roads
- Roads
- Railway
- Waterbodies

0 2 4 km

1:100,000 at A4
Coordinate System: GDA2020 MGA Zone 56

Data sources:
Jacobs 2020
Metromap (Aerometrex) 2020
NSW Spatial Services

Figure 2 Proposal Viewshed and Zones of Visual Influence

Date: 11/05/2022 Path: J:\IE\Projects\04_Eastern\IS354500\22_Spatial\GIS\Directory\Templates\Figures\KurriKurriEIS\Specialists\VisualAssessment\HunterPowerModificationAssessment\IS354501_KKOCGT_MA_VA_F001_ZVI_R1.mxd
Created by : AA | QA by : KI

2.3 Existing land-use and sensitive receptors

The approved Project is located in Loxford in the Hunter Valley region and the Cessnock City Council local government area (LGA).

This area, and the associated sensitivity was assessed and included in the LCVIA study area for the approved Project. The sensitivity is determined based on existing features such as the planning provisions, land-use, topography, and vegetation. The landscape sensitivity of the area within this expanded zone ('*Noticeable and can be prominent in the landscape - The degree of visual intrusion will depend on the landscape sensitivity and the sensitivity of the viewer*') will not alter as a result of the Project.

Kurri Kurri is approximately 3.0 km to the southwest and is the closest township to the Project. The following section will review existing land uses and sensitive receptors relevant to views and visual impact of the proposed change. These have not changed since the LCVIA but are repeated here for context.

Approved development site

- The approved Project is within a brownfield site, extensively disturbed by past industrial development.
- Existing land use zoning is Rural Landscape zone which allows for sustainable primary industry production, extensive agriculture, and the preservation of the agricultural, mineral and extractive production potential of the land.
- Although the underlying zoning is Rural Landscape, the former and designated future land use is for industrial facilities.
- The Proposed change would remain entirely within the approved development footprint which includes part of the former Kurri Kurri aluminium smelter.

Nearby residential areas

- The closest residential dwellings to the Project are located along Dawes Avenue, Loxford. These dwellings are in areas zoned Rural Landscape, approximately 1.25 km to the south and south-east of the approved Project.
- The closest residential zoned land is the suburban areas of Kurri Kurri approximately 3 km south and south-west of the approved development.

Other land use

- The areas immediately south of the Project site include the former Kurri Kurri aluminium smelter and the M15 Hunter Expressway.

Vegetation, topography, and hydrology

- Existing vegetation in the areas to the north, east, and west comprise native vegetation. This vegetation will partially screen or filter views in the direction of the approved Project and the proposed change.
- Land further east and north of the project site comprises low-lying cleared farming land. These areas are not considered to be sensitive to visual change.
- Waterways include swamp Creek, Black Waterholes Creek, and the Swamp Creek wetlands to the east and north, and Black Waterholes Creek to the northeast.
- Nearby waterbodies to the north-east of the approved development include constructed wetlands established as part of the former Kurri Kurri aluminium smelter site.
- The increased viewshed or study area associated with the proposed change would include the nearby townships of Gillieston Heights and Abermain. These locations are approximately 5 km from the Project. At this distance, if visible, the exhaust stacks would not be a visually prominent feature in views.

Other areas and land uses within the increased viewshed comprise heavily vegetated forested areas where there would be no visibility of the Project or the proposed change due to screening provided by existing vegetation.

Where there are views in the direction of the Project, these views would include other constructed elements or visible features that are closer to the viewing location and more visually prominent. If the proposed change to the project were visible, it would be at such a distance that the stacks would form a background element in the views.

The sensitivity was assessed and included in the LCVIA study area for the approved Project and the expanded area was determined based on existing features such as the planning provisions, land-use, topography, and vegetation. The landscape sensitivity of the area within this expanded zone ('Noticeable and can be prominent in the landscape - The degree of visual intrusion will depend on the landscape sensitivity and the sensitivity of the viewer') will not alter as a result of the Project.

The following section will review the change in theoretical Project visibility for the proposed change, in the areas surrounding the Project.

2.4 Seen area analysis

A Seen Area Analysis (SAA) identifies locations where the Project may be visible from the surrounding areas. However, visibility of the Project depends on a number of factors not considered by SAA. Additional considerations include potential intervening vegetation, existing structures or minor topographic changes that may filter or screen views of the Project.

The SAA for the Project has been revised for the proposed change to 60 m tall exhaust stacks. Areas modelled for potential visibility have been offset an additional 1.8 m to represent the height of an average person standing in the landscape.

The SAA demonstrates that there would be no additional sensitive or significant locations with a view to the Project where theoretical visibility is predicted. The areas where the proposed change would be potentially visible are limited to areas where the approved Project was already theoretically visible. This is due partly to the Project being in a low-lying area, and generally flat terrain of the areas surrounding the Project. The SAA and broad areas of theoretical visibility are shown for the approved Project and proposed change in Figure 3 below.

The areas which will retain partial visibility include Kurri Kurri township, areas within Sawyers Gully, Gillieston Heights, Heddon Greta, and other areas within the rural landscape which were considered in the LCVIA prepared for the Project EIS. Gillieston Heights to the north east is in an area where there is little to no predicted visibility of the proposed increased stack height. Abermain to the south west is towards the outer extent of the study area. From this location, the project would be in the background of views that include built form and visual modifications in Kurri Kurri.

The following section will review the proposed increase in stack heights through selected views where theoretical visibility of the Project was predicted.

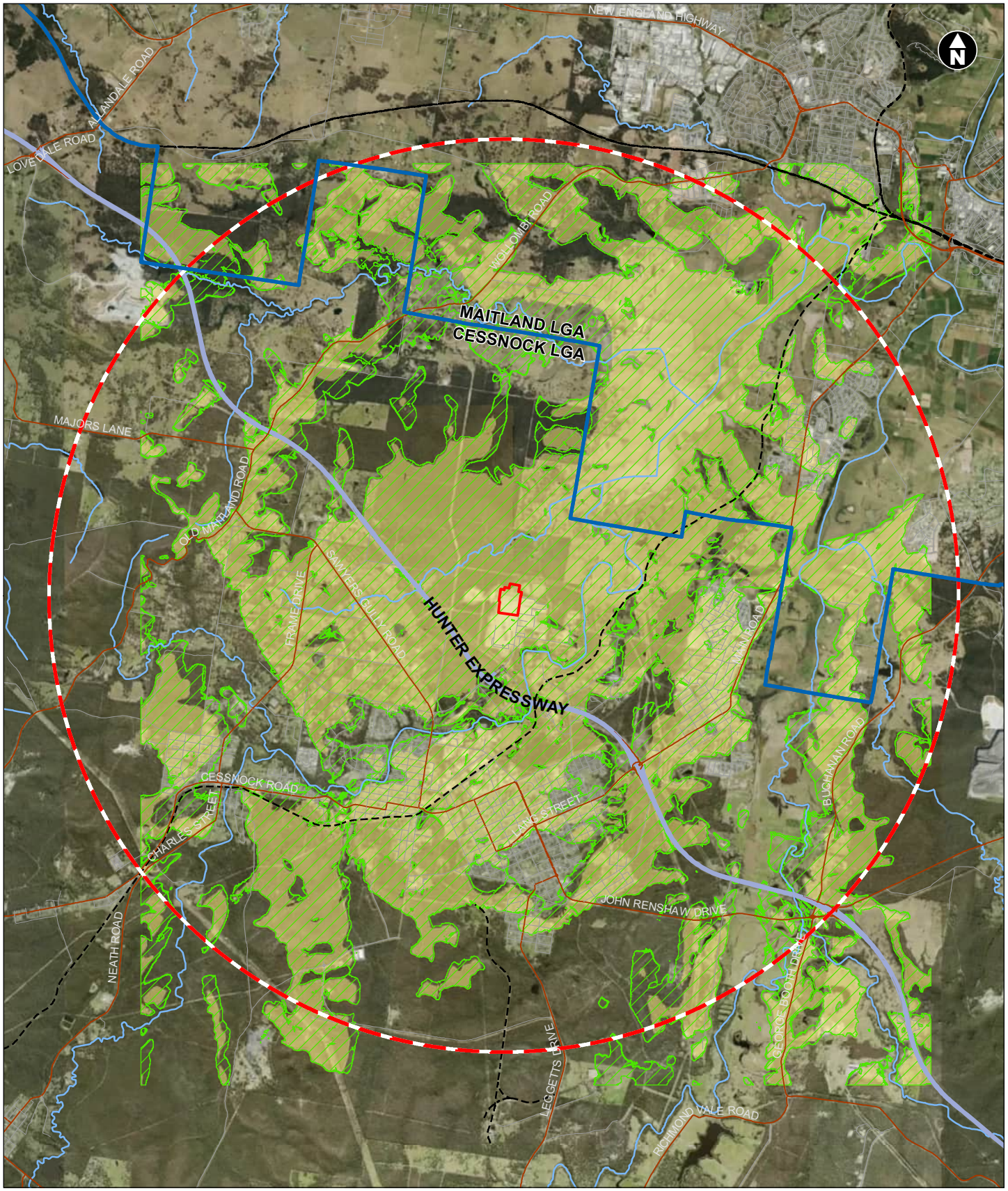


Figure 3 Seen Area Analysis

2.5 Viewpoint assessment

Section 9 of the LCVIA (Jacobs, 2021b) assessed the potential visual impact of the approved Project from representative viewpoints from the public realm. The SEARs (24/12/2020) required the LCVIA to 'an assessment of the likely visual and landscape character impacts of the project on the amenity of the surrounding area and private residences in the vicinity of the project.'

Viewpoints were selected to demonstrate the range of views, key user groups, landscape settings and private residences in the areas surrounding the Project, where the Seen Area Analysis (SAA) predicted theoretical visibility of the Project.

Thirteen viewing locations were selected as being representative of view which included a range of viewing angles, distances and settings from roadways, townships and residential areas. Table 2 below summarises the assessed levels of visual impact of the approved Project from each location.

Table 2: Viewpoint assessment of the approved Project

Viewpoint	Visual impact of the approved Project (Stack height of 40 m)
Major Road Viewpoints	
VP M1 – Cessnock Road	Nil-Negligible
Local Road Viewpoints	
VP L1 – Hart Road	Negligible-Low
VP L2 – McLeod Road	Low-Moderate
VP L3 – Metcalfe Lane / Sawyers Gully Road	Low-Moderate
VP L4 – Bowditch Avenue	Low
VP L5 – Ravensfield Lane	Negligible
VP L6 – Sawyers Gully Road	Negligible
VP L7 – Cartwright Street	Low
Township Viewpoints	
VP T1 – Mitchell Avenue/Lang Street	Low
VP T2 – Lang Street/Heddon Street	Low
VP T3 – Mitchell Avenue/Northcote Street	Low
VP T4 – Centre Oval	Nil
VP T5 – Bill Squires Park	Nil-Negligible

Figure 4 shows the viewpoint locations assessed in the LCVIA for the approved 40 m stack height which are summarised in the table above. For consistency, these same viewpoints are re-examined to consider the visual implications of the proposed 20 m increase to the approved stack height. Figure 4 also shows the amended Zones of Visual Influence for the proposed amended stack height that is the subject of this review.

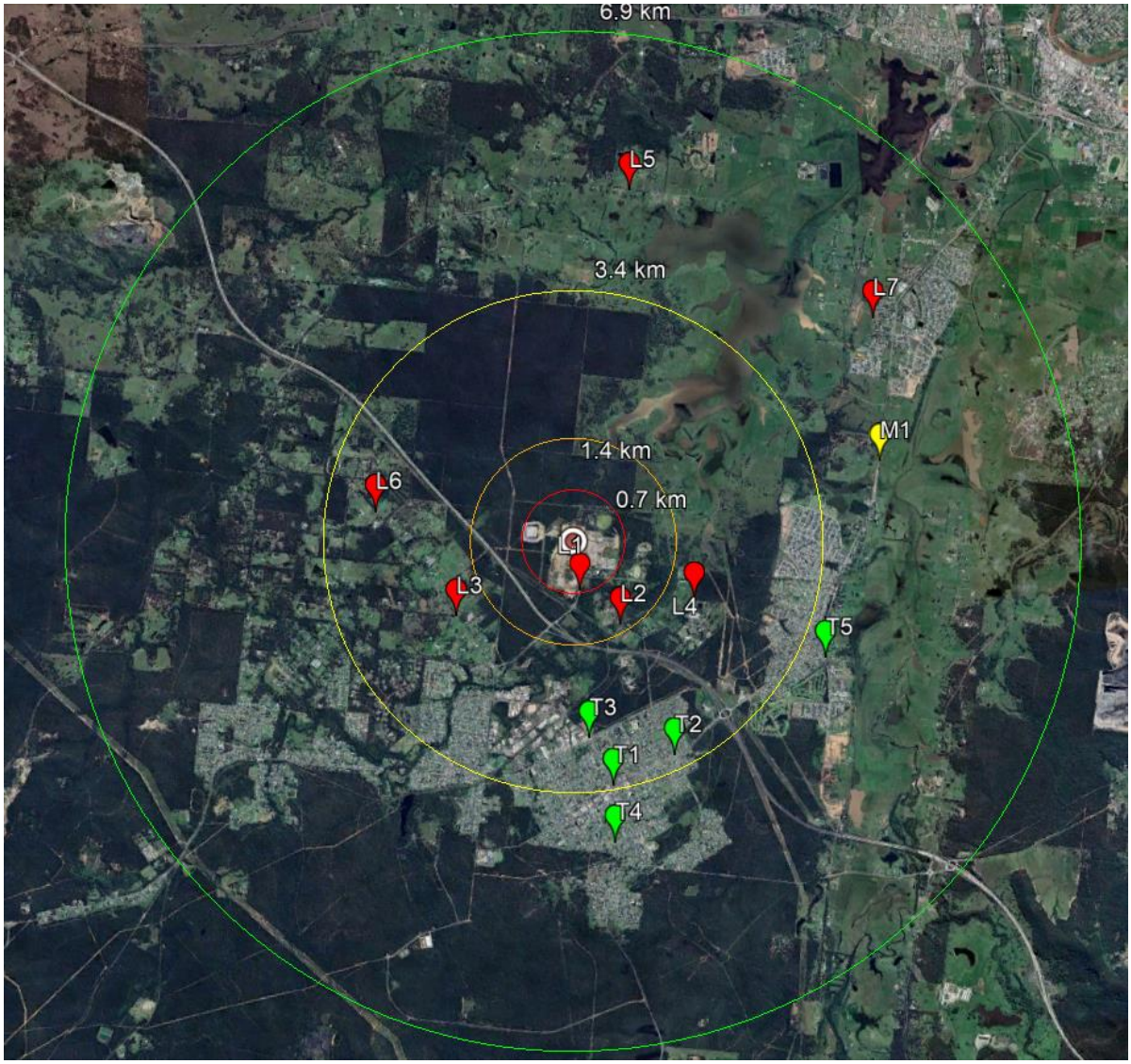


Figure 4 Viewpoint location and ZVI's for the proposed 60 m stack height

Figure 4 shows that the selected viewpoints located in areas that are generally clear of vegetation where there is the potential for views in the direction of the Project or in townships where the majority of people in the region are likely to reside.

Further, the comparative SAA which compared the patterns of the theoretical visibility between the approved 40 m stack height, and this proposed amendment to 60 m high demonstrated that there would be no new regions of visibility, rather the margins of areas where theoretical visibility was previously predicted has slightly increased.

Locations to the south, west and north of the project are in areas that include areas of contiguous or remnant vegetation. Although the SAA, which is based on topography alone, predicted patterns of visibility in these areas, site inspections demonstrate that existing vegetation screens views across the landscape and in the direction of the Project. This was supported by the view assessed from Viewpoint L6 in the original LCVIA.

Areas within the study area to the northeast and east include farming land and forests. As outlined above, existing vegetation limits views from these locations. The LCVIA determined that farming areas include few dwellings and are not sensitive to visual change. As these areas are towards the outer extent of the study area, even if the Project were to be visible, it would be a small element, situated in the background of views. New

areas within the townships of Kurri Kurri to the south and Gillieston Heights to the northeast included in the larger study are in areas where project visibility was not predicted or in areas where the Project would be screened by built form, topography and vegetation.

For the above reasons which include viewpoints that are representative of the visual and landscape character and no new areas of visibility, the viewpoints which were assessed in support of the approved Project LCVIA are still relevant.

This section will review the change in views and visual impact from each of the thirteen viewpoints assessed in the LCVIA. A comparative photomontage has been prepared for Viewpoint L1 showing the approved stack heights of 40 m and the proposed 20 m increase to 60 m. Although this view and the surrounding area is sensitive, a photomontage was prepared from this location in the LCVIA for the approved Project.

Wireframe or wireline views of the proposed 60 m high stack heights have been prepared from viewpoints T1, T2, T3 and viewpoint L3 to further support the re-examination of views. The wireframe or wireline views are the technical models that form the basis of rendered photomontages. These were not developed into final photomontages as the Project was not visible.

Viewpoints are assessed in the same order as the LCVIA for the approved Project.

2.5.1 Viewpoint M1 – Cessnock Road

Viewpoint is located along Cessnock Road, just north of the bridge across the Testers Hollow floodplain, approximately 4.1 km east of Project.

Due to limited visibility and for safety reasons in capturing views, this was the only viewing location from major roads included in the LCVIA.

Cessnock Road connects Newcastle and Maitland to north, and Kurri Kurri to the south.

Cessnock Road crosses Testers Hollow, a floodplain that enables long range views across low lying floodplains towards the Project.

Figure 5 shows the view looking south along Cessnock Road to west towards the Project.

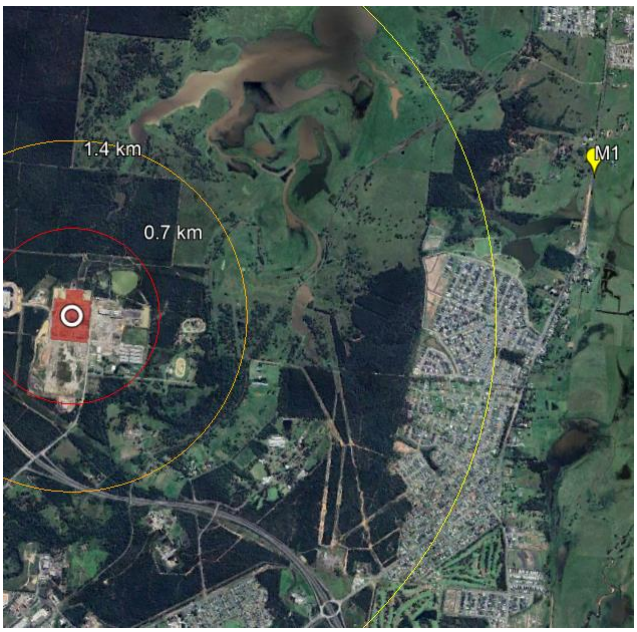


Figure 5 VP M1 - Cessnock Road looking south west toward the Project

Views toward the Project from Cessnock Road are partially screened and filtered by the low rise to the west of the road and existing vegetation within intervening paddocks and flood plains.

From locations further south, views would be partially screened or filtered by roadside vegetation, oblique to the direction of travel and at such as distance that the proposed 60 m high stacks would be a background element. As the Project would be screened in views from this location, the visual impact would be Nil. From locations further south, the visual impact would be Negligible.

VP M1 – Cessnock Road		
Distance to Project	4.1 km south west	Noticeable, but will not dominate the landscape
Landscape Unit	Landscape Unit 3 / 5	Moderate sensitivity
Viewer Numbers	Arterial Road	High viewer numbers
OVERALL VISUAL IMPACT	**NEGLIGIBLE-NIL**	

2.5.2 Viewpoint L1 – Hart Road

Viewpoint is located on Hart Road within an existing industrial estate, approximately 500 m south of the nearest Project boundary.

Surrounding land-uses include industrial and utility buildings, the footprint of the former aluminium smelter site and high voltage transmission lines to the west, north and south. The Kurri Kurri Speedway is located approximately 650 m to the east.

The former Kurri Kurri aluminium smelter site to the west has been cleared of infrastructure, with remaining offices, sheds, structures, material stockpiles and water tank remaining to the east.

Figure 6 shows the photomontage of the view which includes the approved Project which includes the Project and the 40 m high exhaust stacks.

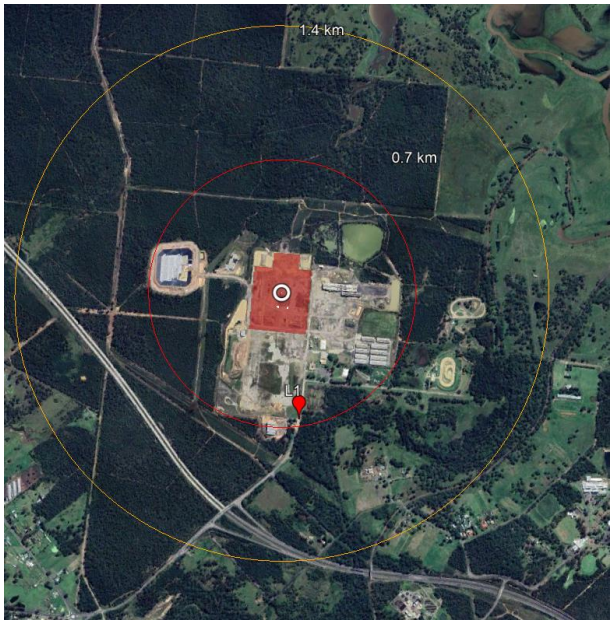


Figure 6: Viewpoint L1 - Photomontage showing the 40 m exhaust stacks of the approved Project

Vegetation in the forested areas to the west and north of the site can be seen in the background of the view which filters or screens most nearby views from areas to the west. Figure 7 shows a photomontage of the proposed 20 m increase to the approved stack height.

Figure 7: Viewpoint L1 - Photomontage showing the 60 m exhaust stacks of the proposed change

The 60 m stack height in the comparative photomontage would be a noticeable change in views, however, would not alter the level of assessed impact. This is due partly to the low sensitivity of this location and the

surrounding area to visual change, the future land-use expectations and minimal discernible change between the approved and proposed view demonstrated in the photomontages.

The previous level of assessment was Nil – Negligible. The approved Project includes landscape screening along the eastern perimeter, which would soften views toward the Project from the extension of Hart Road.

For these reasons, the visual impact at this location would remain unchanged from the original assessment of Negligible-Low.

VP L1 – Hart Road		
Distance to Project	500 m north	Highly visible and will be prominent the landscape
Landscape Unit	Landscape Unit 6	Low sensitivity
Viewer Numbers	Local Road	Low viewer numbers
OVERALL VISUAL IMPACT	**NEGLIGIBLE – LOW**	

2.5.3 Viewpoint L2 – McLeod Road

Viewpoint L2 is from a level crossing along McLeod Road, Loxton.

Macleod Road, which is truncated south of the Kurri Kurri Speedway and industrial estate provides access to several residential dwellings situated to the south of these areas.

The nearest project boundary is approximately 1 km to the northwest. The exhaust stacks are approximately 1.2 km further to the northwest.

Figure 8 below shows the view looking northwest toward the Project.

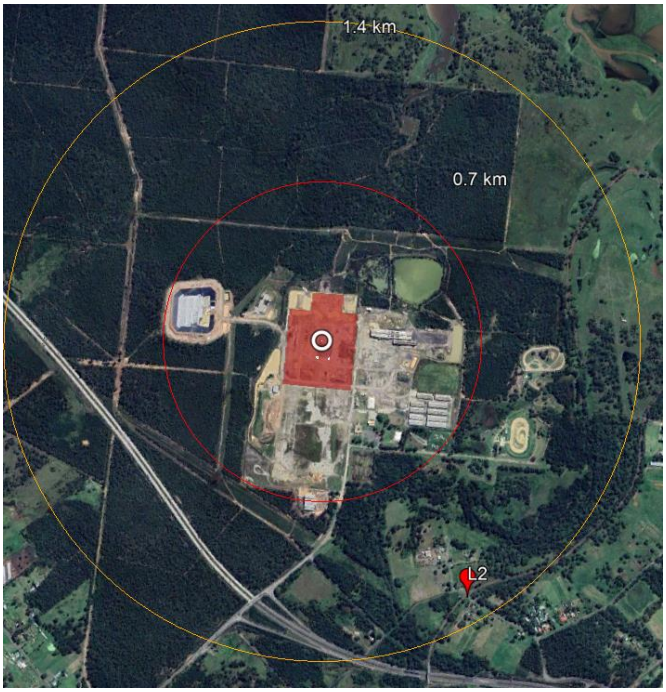


Figure 8 VP L2 - McLeod Road looking north west toward the Project

This landscape character comprises rural living (forested flats and gullies), views on approach to the residential dwellings include the freight rail line and above ground transmission lines following the road reserve. Existing vegetation in the forested areas seen in the background of the view separates residential dwellings from the industrial estate and provided visual screening to the north. At this distance, existing vegetation would screen or filter views of the proposed 60 m exhaust stacks. If visible, the stacks would be in the background of views that include other vertical elements and would not be visually dominant features.

The previous level of assessment was Low-Moderate. In the current setting, the visual impact at this location would be Nil where the stacks are screened, to low where partially visible above existing vegetation.

It is understood that this area forms part of a proposed rezoning of former Hydro Aluminium land and industrial precinct to the northwest, to include higher density residential development. Any such proposal and future settlement would be cognisant of the proposed development as it would be an established element.

VP L2 – McLeod Road		
Distance to Project	1 km north west	Noticeable and dominate the landscape
Landscape Unit	Landscape Unit 2a	Moderate sensitivity
Viewer Numbers	Local Road	Low viewer numbers
OVERALL VISUAL IMPACT	**NIL - LOW**	

2.5.4 Viewpoint L3 - Metcalfe Lane / Sawyers Gully Road

Viewpoint L3 is located at the intersection of Metcalfe Lane and Sawyers Gully Road approximately 1.6 km to the southwest of the approved Project.

This location provides useful context for the proposed increase in the approved 40 m stack height by 20m to 60m.

A wireframe or wireline image of the proposal has been prepared from this location.

Figure 9 shows the historical view from this location which includes the former 140 m high tower and two 70m high towers that were part of the former smelter at the same site.

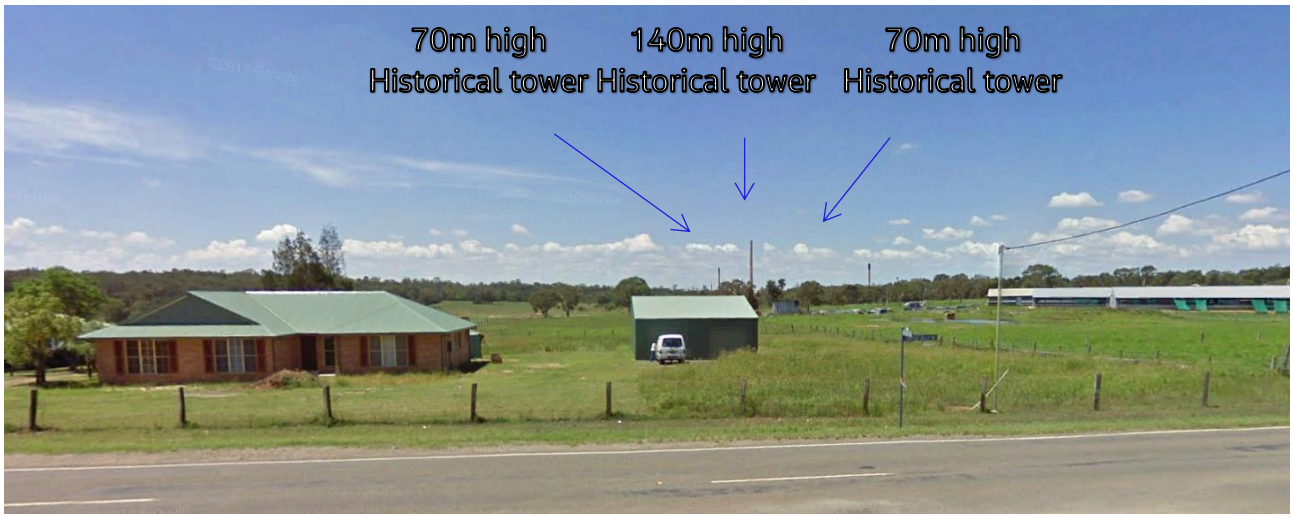


Figure 9 Historical view from Metcalf Lane / Sawyers Gully Road

The larger tower seen in the view was 140 m. The two smaller towers seen to the left and right were 70 m in height, or 10 m lower than the proposed increase. Figure 10 below shows the view looking northeast toward the Project.

Figure 10 Existing view from Metcalfe Lane / Sawyers Gully Road looking north east

Existing views to the east include large shedding and silo's, telecommunications, and radio towers. The forested area in the background of views is in the area to the west of the project and screens views to the Project site.

Figure 11 shows a wireframe view of the project with the proposed 60 m stack height superimposed into the view.

Figure 11 Wireframe view from Metcalfe Lane / Sawyers Gully Road looking north east

The location of the approved development and the proposed 60 m stack height would be located directly behind the dwelling seen central to the view. Figure 12 shows an enlargement of the wireframe view focussing on the area of the approved project and proposed increase in stack height.

Figure 12 Enlargement

When enlarged, it is evidence that the approved development and the proposed 60 m stack would be partially screened or filtered by existing vegetation seen in the background of the view. This is supported by the historical view from a similar location which shows the larger 140 m and 70 m high stacks of the former development to the south.

The previous level of assessment was Low – Moderate. With the benefit of Project imagery from this location, the visual impact for road users at this location is reduced to Nil to Negligible. The visual impact for residential viewers is reduced to negligible to low. This revised assessment of the taller 60 m high structures, which is based on project imagery relative to the view demonstrates that the LCVIA which supported the lower heights of the approved development was a conservative assessment.

VP L3 – Metcalfe Lane / Sawyers Gully Road		
Distance to Project	1.6 km north east	Noticeable, and can dominate the landscape
Landscape Unit	Landscape Unit 2a	Moderate sensitivity
Viewer Numbers	Local Road	Moderate viewer numbers
OVERALL VISUAL IMPACT	**NIL - NEGLIGIBLE**	

2.5.5 Viewpoint L4 - Bowditch Avenue

Viewpoint is located along Bowditch Avenue approximately 1.6 km to the east of the approved Project. This area is currently characterised by the cleared farmland and forested areas. It is recognised that cleared farming land to the west is part of the area subject to a proposed rezoning and future development masterplan.

Kurri Kurri Tafe is largely surrounded by forested areas is to the southeast of this viewpoint. Bowditch Avenue is a local gravel road which is truncated further to the north. This viewpoint is through a break in roadside vegetation permitting views to the west and in the direction of the Project. Figure 13 below shows the view looking northwest toward the Project.

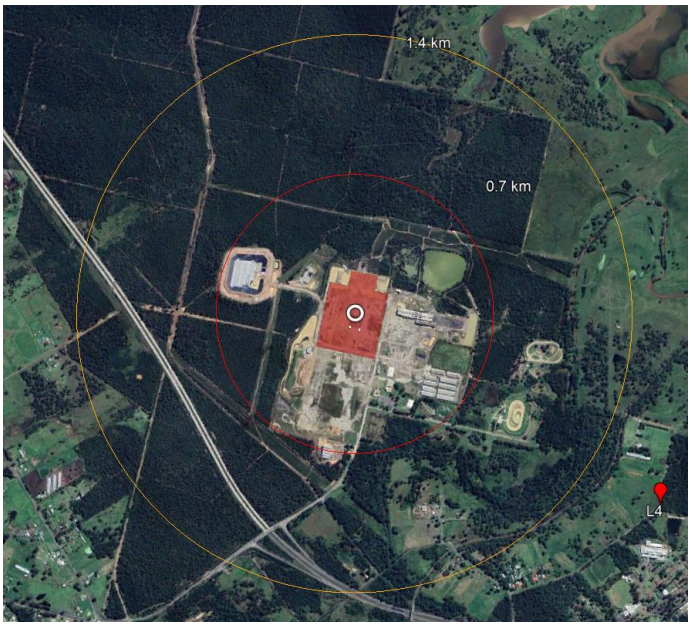


Figure 13 VP L4 - Bowditch Avenue looking north west toward the Project

Vegetation in the road verges, paddocks and conservation areas restricts views to the west and the direction of the Project. Where breaks in vegetation do permit views, they include residential dwellings, shedding and high-voltage transmission lines. The freight rail line exists in the background of this view but is largely screened from view by vegetation.

The proposed increase of the approved 40 m high stacks to 60 m would not be a noticeable change in views. This is due to the overall distance to the stacks, intervening topography and the scale of vegetation in the surrounding landscape which would partially screen or filter views of the 60 m high stacks. This is supported by the wireframe view included in the preceding viewpoint which is a similar distance and setting to this view, as well as historical imagery which shows only the larger 140 m stack being visible. The previous level of assessment was Low. For the reasons outlined above, the amended visual impact at this location is assessed as Nil.

VP L4 – Bowditch Avenue		
Distance to Project	1.6km north west	Noticeable, and can dominate the landscape
Landscape Unit	Landscape Unit 4/5	Low-Moderate sensitivity
Viewer Numbers	Local Road	Low viewer numbers
OVERALL VISUAL IMPACT	**NIL**	

2.5.6 Viewpoint L5 - Ravensfield Lane

Viewpoint L5 is from Ravensfield Lane approximately 4.6 km to the north of the approved Project.

Ravensfield Lane is a local gravel road which terminates approximately 1.2 km to the east. Accordingly, there are low viewer numbers, mainly regular travellers accessing residential dwellings in the surrounding farming areas.

This landscape is characterised as cleared farmland, (hills and rises) with scattered trees and the occasional dwelling.

Figure 14 below shows the view looking south where a break in vegetation permits views across the landscape.

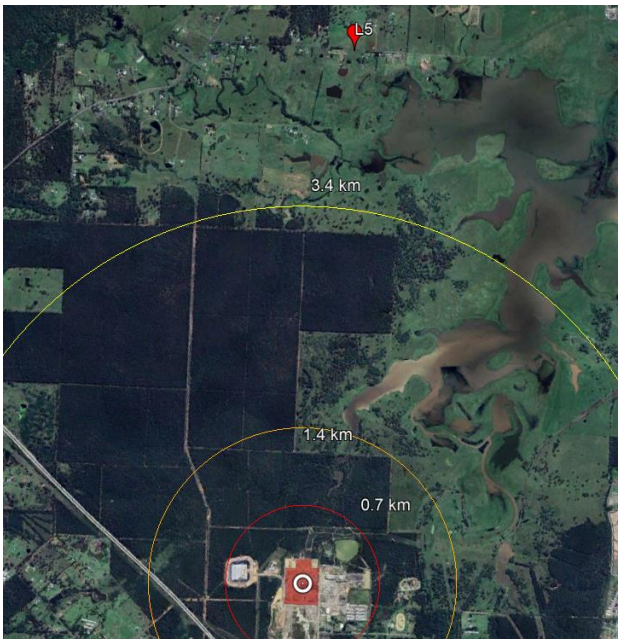


Figure 14 VP L5 - Ravensfield Lane looking south toward the Project

Vegetation within this landscape has largely been cleared for agricultural purposes, in contrast with surrounding forested areas. The topography falls to the south and away from this view towards the Project site. The southern side of the valley includes forested areas that intervene in views toward the Project site. The nearer of these forested areas exists upon a rise which assists in elevating the existing vegetation to screen or filter views toward the Project from this location.

At a distance of approximately 4.6 km, the exhaust stacks, if visible would reside in the background of views and would be a minute element in views. Due to distance the limited visual prominence of the 60 m high exhaust stacks, the visual impact at this location would remain as Negligible.

VP L5 – Ravensfield Lane		
Distance to Project	4.6 km south	Noticeable, but will not dominate the landscape
Landscape Unit	Landscape Unit 2b/5	Low-Moderate sensitivity
Viewer Numbers	Local Road	Low viewer numbers
OVERALL VISUAL IMPACT	**NEGLIGIBLE**	

2.5.7 Viewpoint L6 – Sawyers Gully Road

Viewpoint is located along Sawyers Gully Road approximately 2.5 km to the west of the Project.

This viewpoint, which has been selected from a location where roadside and other vegetation permits views in the direction of the Project.

This view is representative of rural residential areas to the west of the Hunter Expressway and forested areas to the west of the Project.

Figure 15 shows the view looking east toward the Project Site.

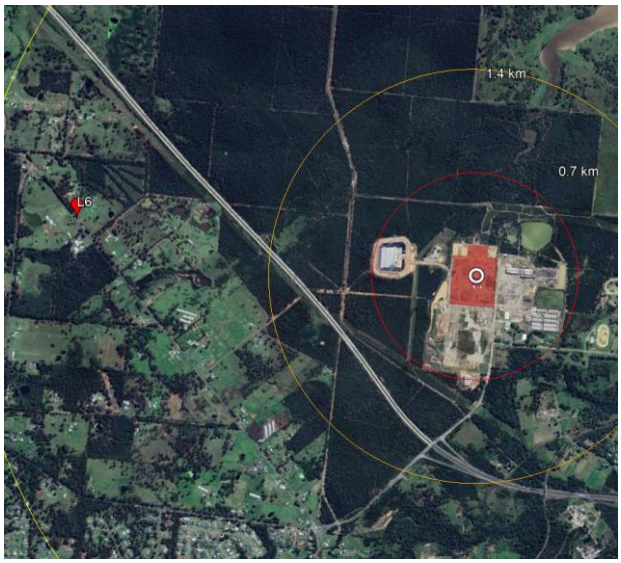


Figure 15: VP L6 – Sawyers Gully Road looking east toward the Project Site

This landscape is characterised as rural living (forested flats and gullies). Residential dwellings and small farm properties exist in a relatively patchwork forested setting.

The previous level of assessment was Negligible. With the benefit of additional project imagery, the assessed level of visual impact is reduced from negligible to Nil. This is due partly to the distance from the Project, and screening provided by nearby topography and vegetation.

VP L6 – Sawyers Gully Road		
Distance to Project	2.5 km east	Noticeable, and can be prominent in the landscape
Landscape Unit	Landscape Unit 2a	Moderate sensitivity
Viewer Numbers	Local Road	Low viewer numbers

OVERALL VISUAL IMPACT	**NIL**

2.5.8 Viewpoint L7 – Cartwright Street

Viewpoint L7 is located along Cartwright Street, to the west of a residential development at Gillieston Heights.

The nearest Project boundary is approximately 4.8 km to the southwest. At the time the LCVIA was prepared, this viewpoint was located at the outer extent of the visual study area. The larger study area for the proposed 60 m stack height now includes viewpoint L7.

Figure 16 below shows the view looking southwest toward the Project site.

Figure 16 VP L7 – Cartwright Street looking southwest toward the Project site

At this location, the landscape character is a mix of the edge of suburban residential development to the east (Gillieston Heights), which overlooks some farmland and in some locations the floodplain valley. The presence of residential dwellings heightens the sensitivity at this location.

The topography at this location is relatively raised, as the street reaches a crest. This crest allows some views to distant landscape features, filtered through vegetation.

From residential areas, vegetation in private gardens, roadsides and paddocks to the south will partially screen or filter views in the direction of the Project. Due to the elevated nature of some residential dwellings along this road, they may allow views above the surrounding foreground vegetation toward the Project site.

The proposed 60 m exhaust stacks may be visible above vegetation and topography in the intervening landscape areas. However, even if visible, the Project will be at such a distance that the higher stacks would not be a prominent feature in the landscape or views.

For the reasons outlined above, the assessed visual impact at this location will remain Low.

VP L7 – Cartwright Street		
Distance to Project	4.8 km southwest	Noticeable, but will not be prominent in the landscape
Landscape Unit	Landscape Unit 1	Moderate sensitivity
Viewer Numbers	Local Road	Low viewer numbers
OVERALL VISUAL IMPACT	**LOW**	

2.5.9 Viewpoint T1 - Mitchell Avenue / Lang Street

Viewpoint T1 is located at the intersection of Lang Street and Mitchell Avenue roughly central to Kurri Kurri.

This viewpoint is approximately 3.2 km south of the nearest Project boundary, slightly elevated and from a key location for locals and visitors to the town. Wireframe or wireline view has been prepared of the approved project with the proposed 60 m high exhaust stacks to assist with understanding the potential visual scale and prominence of the Project from this location.

Figure 17 shows the view looking north toward the Project that was included in the EIS in support of the approved Project.

This view was selected as, when on site, it was representative of the typical views for pedestrians and other users who would move through or along this area.

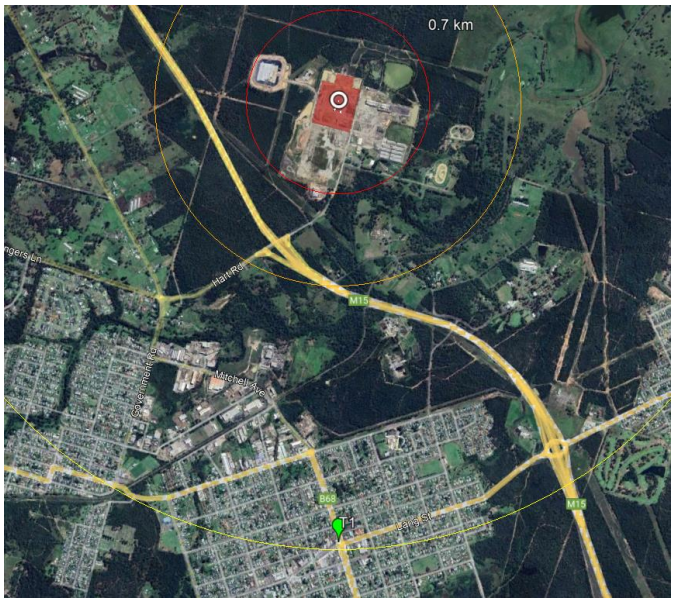


Figure 17 Existing view looking north from Mitchell Avenue / Lang Street

This view shows the scale and context of ground level views from pedestrian areas roughly central to town. Views in the direction of the Project include elements that are typical of an urban setting such as electrical distribution infrastructure, street lighting, road signage, buildings and vegetation.

Figure 18 shows the same view with a wireframe model of the approved Project and the proposed 60 m high exhaust stacks superimposed into the view.

Figure 18 Wireframe model - Mitchell Avenue / Lang Street looking north toward the Project

Figure 19 shows an enlargement of the wireframe view focussing on the area of the Project.

Figure 19 Enlargement focussing on the Project

From this location, the Project would be located directly behind the existing galvanised light pole and below the road signage roughly central to this view. From other locations to the east and west, it is evident that

existing vegetation and other urban elements would be of a scale that the Project would be screened from views. Even if visible, the Project would be at such a distance that it would be only a small element in views.

Figure 20 shows an enlargement of a similar view focusing on the former towers at the same site. This view was shown at Figure 3-4 in the LCVIA of the approved Project.

Figure 20 Historical View (enlargement) viewed from Mitchell Avenue

This image was an obvious enlargement, which focussed on the Historical towers that have now been removed. Figure 21shows the scale of the 140 m and 70 m high towers relative to the full context of the view from a similar location the view seen in **Figure 17** and Figure 18.

Figure 21 Historical View showing historical towers from Mitchel Ave – Lang Street (EIS Viewpoint T2)

Although towers at both 140 m and 70 m in height at the Project location were visible, they were not visually dominant features or elements in views, even the much larger 140 m high structures. This was partly due to distance, the orientation of views and context when viewed in a setting that includes many other constructed elements and features in views.

The previous level of assessment was Low. With the benefit of Project imagery, it is evident the LCVIA of the approved development was a conservative assessment. Through a re-examination of views, and as demonstrated by the former structures at this location, the visual impact of the proposed increase of the approved stack height from 40 m to 60 m would be negligible where visible. From most locations, there would be no visual impact due to screening provided by topography, buildings and vegetation in views towards the Project. From locations where the stacks may be visible, the visual impact would be negligible.

As stated above, this location was selected as being representative of the use patterns for pedestrians and other users of this location. Views further north and beyond the sign would be lower in elevations, where existing features such as vegetation, fencing and neighbouring dwellings would be more prominent, further screening views of the Project.

VP T1 – Mitchell Avenue / Lang Street		
Distance to Project	3.2 km north	Noticeable, but will not dominate the landscape
Landscape Unit	Landscape Unit 1	Moderate sensitivity
Viewer Numbers	Main Road – Town Centre	Moderate-High viewer numbers
OVERALL VISUAL IMPACT	**NEGLIGIBLE – NIL**	

2.5.10 Viewpoint T2 – Lang Street / Heddon Street

Viewpoint L2 is located within a low lying residential area the east of Kurri Kurri, approximately 3 km south of the nearest Project boundary.

This location is representative of views from lower lying residential areas, local roads oriented towards the north and users of Lang Road which is a major road leading into the centre of Kurri Kurri from the east.

This location is slightly elevated enabling views along Heddon Street from Lang Road and is therefore considered to a conservative basis on which to assess representative views from this area.

Figure 22 shows the view looking north from the intersection of Lang Street and Heddon Street towards the Project.

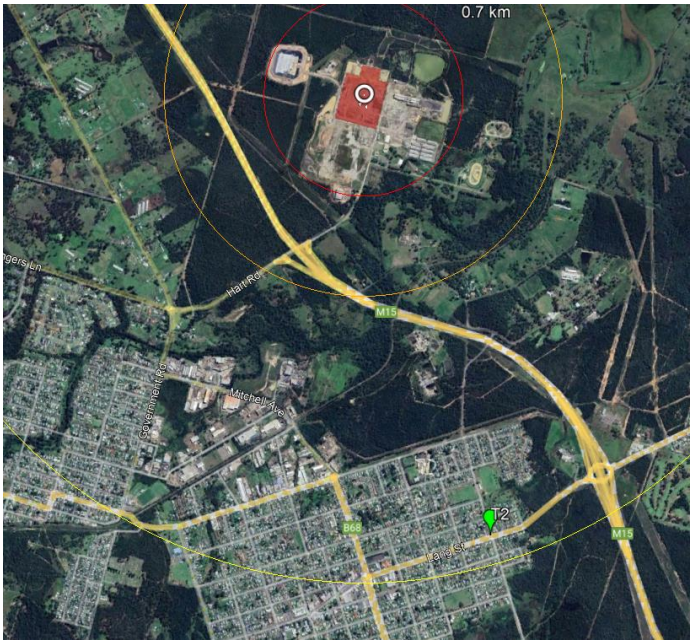


Figure 22 View looking north along Lang Street / Heddon Street

Heddon Street is a wide local road. Views to the north include overhead transmission lines and light poles, roadside vegetation with residential dwellings oriented towards the street with a range of fencing and vegetation in private landscape areas.

Vegetation seen in the background of the view is located in the forested areas to the north of Kurri Kurri and south of the industrial area in which the approved project is located. Figure 23 shows the same view with a wireframe model of the approved project and the proposed 60 m stack heights superimposed into the view.

Figure 23 Wireframe of the view looking north along Lang Street / Heddon Street

With the benefit of Project imagery, is it clear that the approved development and the proposed 60 m high stacks would be located behind vegetation in the background of this view and screened.

The previous level of assessment was Low. For the reasons outlined above, the assessed level of visual impact has been reduced from the conservative assessment of negligible if visible to Nil where screened.

VP T2 – Lang Street / Heddon Street		
Distance to Project	3km north	Noticeable, but will not dominate the landscape
Landscape Unit	Landscape Unit 1	Moderate sensitivity
Viewer Numbers	Main road / local road	Moderate viewer numbers
OVERALL VISUAL IMPACT	**NIL - NEGLIGIBLE**	

2.5.11 Viewpoint T3 – Mitchell Avenue / Northcote Street

Viewpoint T3 is located at the intersection of Mitchell Avenue and Northcote Street towards the northern edge of Kurri Kurri.

This viewpoint is located approximately 2.5 km south of the nearest Project site boundary.

This location is representative of the northern residential areas of Kurri Kurri, road users and pedestrians.

This viewpoint is located along a main thoroughfare through town and would expect moderate-high viewer numbers.

Figure 24 below shows the view looking north toward the Project site.

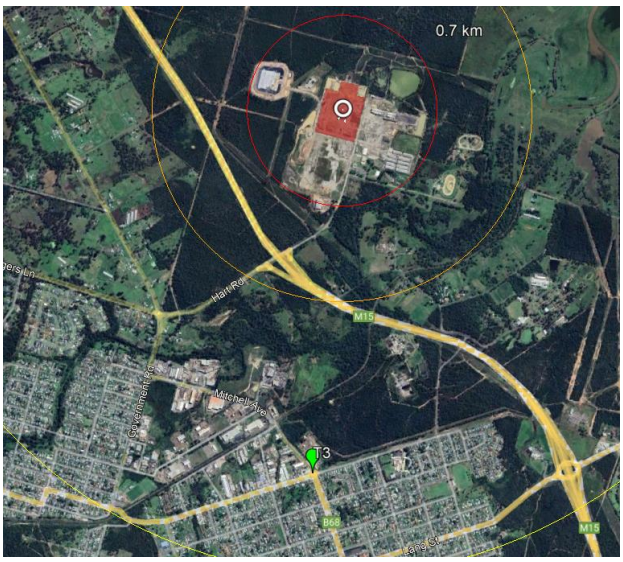


Figure 24: Existing view looking north from the intersection of Mitchell Avenue / Northcote Street

Views to toward the Project include the industrial area of Kurri Kurri, electrical transmission infrastructure, buildings associated with the light industrial areas and service station. These features are set against a vegetated backdrop established by the forested areas to the north of the town and south of the industrial estate in which the approved project is to be located.

Figure 25 Wireframe view looking north from the intersection of Mitchell Avenue / Northcote Street

The Project would be located behind the existing shedding seen to the right of the image adjacent to the white sign. Figure 26 shows an enlargement of the wireframe view focussing on the area of the approved Project and the proposed 60 m high exhaust stacks.

Figure 26 Enlargement

From this location and most areas in proximity to this view, the Project site would be screened by existing buildings and shedding, or intervening vegetation in the landscape to the south of the Project.

For completeness, Figure 27 shows a Historical View immediately (Google Earth Street View) north of the intersection of Mitchell Ave and Northcote Street. This location is adjacent to the view included at VP T3 In the LCVIA and those review above.

Figure 27 Historical View immediately north of the intersection of Mitchell Ave and Northcote Street

This view includes the historical 140 m high stack height visible to the right of the large strainer pole roughly central to the view. The two smaller, 70 m high structures also present at the time this view was captured are not visible. This view further supports the observations that the proposed 60 m high stack that is the subject of this amendment would not be visible.

The previous level of assessment was Low. With the benefit of Project imagery, is it clear that the approved development and the proposed 60 m high stacks would be located behind vegetation in the background of this view and screened.

For the reasons outlined above, the assessed level of visual impact has been reduced from the conservative assessment of negligible if visible to Nil where screened.

VP T3 – Mitchell Avenue / Northcote Street		
Distance to Project	2.5 km north	Noticeable, and can be prominent in the landscape
Landscape Unit	Landscape Unit 1 / 6	Low-Moderate sensitivity
Viewer Numbers	Main road	Moderate-High viewer numbers
OVERALL VISUAL IMPACT	**NEGLIGIBLE - NIL**	

2.5.12 Viewpoint T4 - Centre Oval

Viewpoint T4 is from the southern boundary of Centre Oval, near Coronation Street. The oval and sports filed is from an elevated location towards the southern residential areas of Kurri Kurri, approximately 3.8 km south of the nearest Project boundary.

This location was selected as the sports fields allow clear views towards the Project that are not obstructed by dwellings, fencing and vegetation in neighbouring dwellings and the surrounding streets.

Figure 28 below shows the view looking north across the oval toward the Project.

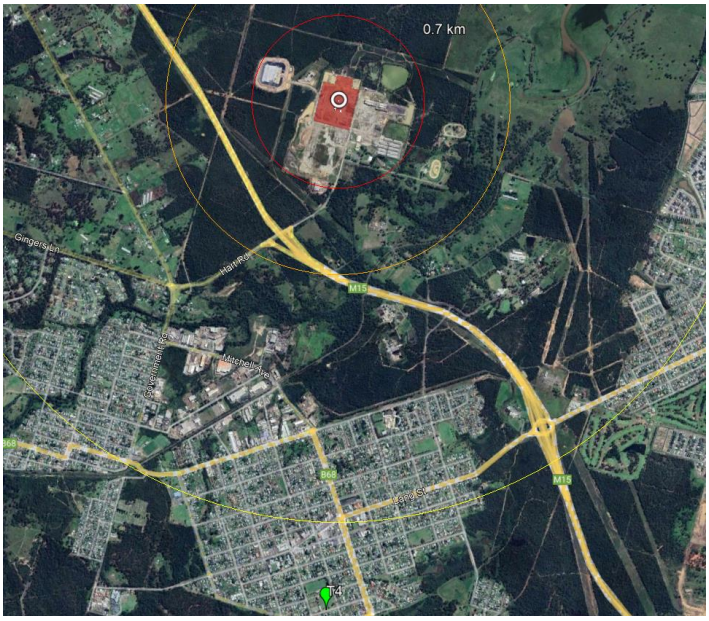


Figure 28 VP T4 - Centre Oval looking north toward the Project

At this location, the Project would be located to the north behind vegetation, built form and topography. The main street of Kurri Kurri, Lang Street, is situated on a rise that intervenes in views toward the Project from this viewpoint.

Due to these intervening features, here will be no visibility of the Project from this location. The level of assessed visual impact remains to be Nil.

VP T4 – Centre Oval		
Distance to Project	3.8 km north	Noticeable, but will not dominate the landscape
Landscape Unit	Landscape Unit 1	Moderate sensitivity
Viewer Numbers	Local Road / Recreation Reserve	Moderate viewer numbers
OVERALL VISUAL IMPACT	**NIL**	

2.5.13 Viewpoint T5 – Bill Squires Park

Viewpoint T5 is located at Bill Squires Park towards the southeast of Heddon Greta.

This viewpoint is from an elevated locations approximately 3.6km southeast of the nearest Project boundary and is representative of nearby residential and open space areas.

This location was selected as the reserve allows clear views towards the Project that are not obstructed by dwellings, fencing and vegetation in neighbouring dwellings and the surrounding streets.

Figure 29 below shows the view looking north west toward the Project.

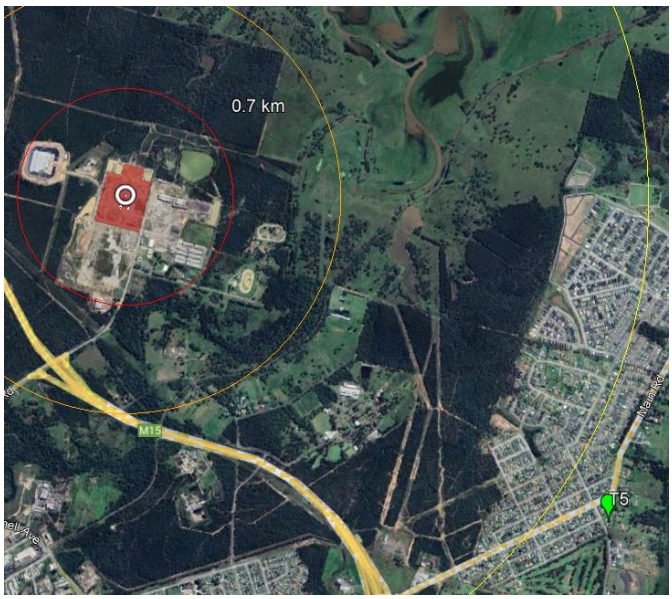


Figure 29 VP T5 - Bill Squires Park looking north west toward the Project

At this location, the Project would be situated behind the houses and foreground vegetation and screened from views. With the benefit of Project imagery presented in the preceding views, the overall distance to the Project and scale of existing features in the view, is it apparent that the approved development and the proposed 60 m high stacks would be located behind vegetation in the background of this view and screened.

Due largely to the overall distance the Project, the assessed level of visual impact will be Negligible where visible, reducing to Nil where screened, consistent with the previous assessment.

VP T5 – Bill Squires Park		
Distance to Project	3.6 km north west	Noticeable, but will not dominate the landscape
Landscape Unit	Landscape Unit 1	Moderate sensitivity
Viewer Numbers	Local Road / Recreation Reserve	Moderate viewer numbers
OVERALL VISUAL IMPACT	**NEGLIGIBLE - NIL**	

3. Conclusion

The preceding analysis has determined that the change in views and visual impact between the approved Project comprising exhaust stacks up to 40 m in height, and the proposed increase in height to 60 m, would be generally Negligible to Nil.

With the benefit of Project imagery, is it evident that the LCVIA which supported the approved development was a conservative assessment.

The comparative photomontage, which was prepared from a nearby location where the approved project was clearly visible, demonstrated the visual impact would not alter as a result of the proposal to increase the approved 40 m stack height to 60 m.

Wireframe views were prepared from several other locations which were representative of the range of character settings, viewing angle and distances. These views demonstrated that the approved development and the proposed 60 m high stacks would be located behind vegetation in the background of this view and screened.

These findings were tested against historical imagery which included former towers ranging from 70 m to 140 m in height at the same location, which supported the Project imagery superimposed onto existing views.

For this reason, the assessed level of visual impact of the 60 m stacks has been reduced from most locations assessed in the LCVIA of the approved Project.

4. References

Jacobs (2021a) Hunter Power Project Environmental Impact Statement. Prepared for Snowy Hydro Limited. 22 April 2021.

Jacobs (2021b) Hunter Power Project Landscape Character and Visual Impact Assessment. Prepared for Snowy Hydro Limited. 01 April 2021.