APPENDIX H

LANDSCAPE CHARACTER AND VISUAL IMPACT ASSESSMENT

Prepared by

spackman
mossop
michaels

Prepared for

EMM
creating opportunities

Segment Factory, Polo Flat for Snowy 2.0

Landscape Character and
Visual Impact Assessment

Revision D
25 September 2019

Prepared by

spackman mossop michaels

115 Flinders Street Surry Hills
Sydney NSW 2010 Australia
T: 02 9361 4549
spackmanmossopmichaels.com

Prepared for

EMM
creating opportunities

Ground Floor, 20 Chandos Street,
St Leonards NSW 2065
T: 9493 9500
emmconsulting.com.au

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List of Abbreviations

CSSI	Critical State Significant Infrastructure
DPIE	Department of Planning, Industry and Environment
DSM	Digital Surface Model
EIS	Environmental Impact Statement
FGJV	Future Generation Joint Venture
GLVIA	Guidelines for Landscape & Visual Impact Assessment
KNP	Kosciuszko National Park
LCVIA	Landscape Character Visual Impact Assessment
LCZ	Landscape Character Zones
LLOS	Linear Line of Sight Analysis
NPWS	National Parks and Wildlife Service
RLOS	Radial line of Sight Analysis
RMS	Roads and Maritime Services
SEARs	Secretary's Environmental Assessment Requirements
TBM	Tunnel Boring Machine
ZTV	Zone of Theoretical Visibility

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Introduction

Section 01

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01 Introduction

1.1 Overview

Snowy Hydro Limited (Snowy Hydro) proposes to develop Snowy 2.0, a large-scale pumped hydro-electric storage and generation project which would increase hydro-electric capacity within the existing Snowy Mountains Hydro-electric Scheme (Snowy Scheme). This would be achieved by establishing a new underground hydro-electric power station that would increase the generation capacity of the Snowy Scheme by almost 50%. Snowy 2.0 would link the existing Tantangara and Talbingo reservoirs within the Snowy Scheme through a series of underground tunnels and hydro-electric power station.

Snowy 2.0 has been declared to be State significant infrastructure (SSI) and critical State significant infrastructure (CSSI) by the NSW Minister for Planning under Part 5 of the NSW Environmental Planning and Assessment Act 1979 (EP&A Act). CSSI is infrastructure that is deemed by the NSW Minister for Planning and Public Spaces to be essential for the State for economic, environmental or social reasons. An application for CSSI must be accompanied by an environmental impact statement (EIS).

Separate applications are being submitted by Snowy Hydro for different phases of Snowy 2.0, including Exploratory Works for Snowy 2.0 (the Exploratory Works) and Snowy 2.0 Main Works (the Main Works).

The first phase of Snowy 2.0, the Exploratory Works (Application Number SSI 9208), includes an exploratory tunnel and portal and other exploratory and construction activities primarily in the Lobs Hole area of the Kosciuszko National Park (KNP). Exploratory Works has been assessed in a separate EIS and is subject to an approval issued by the former NSW Minister for Planning on 7 February 2019. Construction for Exploratory Works has already commenced.

The second phase of Snowy 2.0, the Snowy 2.0 Main Works (Application Number SSI 9687), covers the major construction elements of Snowy 2.0, including permanent infrastructure (such as the underground power station, power waterways, access tunnels, chambers and shafts), temporary construction infrastructure (such as construction adits, construction compounds and accommodation), management and storage of extracted rock material and establishing supporting infrastructure (such as road upgrades and extensions, water and sewage treatment infrastructure, and the provision of construction power). Snowy 2.0 Main Works also includes the operation of Snowy 2.0. The EIS for Snowy 2.0 Main Works was submitted to the NSW Department of Planning, Industry and Environment (DPIE) in September 2019.

A separate application has also been submitted for a proposed factory that would manufacture precast concrete segments that would line the tunnels being excavated for Snowy 2.0 (Application Number SSI 10034). This Landscape Character and Visual Impact Assessment (LCVIA) has been prepared by Spackman Mossop Michaels (SMM) as a stand-alone report that supports the EIS for the proposed segment factory.

On 26 June 2019, Snowy Hydro referred the proposed segment factory (Reference Number 2019/8481) to the Commonwealth Minister for the Environment under the provisions of the Commonwealth Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act). On 13 August 2019, the proposed segment factory was determined by the Acting Assistant Secretary Assessments and Waste Branch of the Commonwealth Department of the Environment and Energy (DEE), as delegate to the Minister, to be 'not a controlled action' and therefore does not require further assessment or approval under the EPBC Act.

1.2 The proposed segment factory

The tunnels for Snowy 2.0, including the exploratory tunnel for Exploratory Works and underground tunnels linking Tantangara and Talbingo reservoirs for the Main Works, would be excavated, for the most part, using tunnel boring machines (TBMs) and would be lined using precast concrete segments. These segments are proposed to be manufactured at the proposed segment factory to be located on the south-eastern side of Polo Flat (the site), which is an industrial area located to the east of Cooma.

The proposed segment factory would contain a building for the casting and curing of the segments, uncovered storage areas for raw materials and segments, vehicle parking areas and associated offices and workshops.

Main inputs for the segments include aggregate, sand, cement and rebar steel. Primary outputs include the segments which would be transported to the TBM launch sites for Exploratory Works and Main Works within KNP.

The construction phase of the proposed segment factory would last about five months utilising a workforce of about 30 people. Construction would take place six days a week (from Monday to Saturday) and for 10 hours per day.

The factory would operate over a period of about 3.5 years utilising a workforce of about 125 people. It would be operational 24 hours a day, seven days a week.

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The proposed segment factory would be constructed and operated by Future Generation Joint Venture (FGJV) which has been contracted by Snowy Hydro to construct Snowy 2.0.

At the completion of the construction of Snowy 2.0, the proposed segment factory would be decommissioned.

Further details of the proposed segment factory are provided in Chapter 2 of this report.

1.3 Location of the site

The site of the proposed segment factory is located on the south-eastern side of Polo Flat, predominantly on the southern part of the land owned by Snowy Hydro. The site is located to the east of Polo Flat Road and to the north of Carlaminda Road.

Figure 1.1 shows the location of the site in a regional context and Figure 1.2 shows the site in its local context.

The site contains the following land parcels:

• southern part of Lot 14 in Deposited Plan (DP) 250029 – also known as 9 Polo Flat Road, Polo Flat;

• Lot 3 in DP 238762 – also known as 33 Carlaminda Road, Polo Flat; and

• an unmade road corridor, directly south of the aforementioned lots.

Except for a few buildings located on the southern part of Lot 3 in DP 238762, the site is vacant and dominated by grassland. A third order watercourse flows in a north-westerly direction through the middle of the site.

Lot 14 in DP 250029 is a large parcel of land which contains a private airfield predominantly located in the middle and northern part of the land. This airfield was originally established in 1921 and further developed in the late 1950s and 1960s to service the Snowy Scheme. It became the base for the Snowy Mountains Hydro-electric Authority's (the predecessor to Snowy Hydro) flying unit and aircraft. The land was sold by Snowy Hydro in 1998 where it continued use as a private airfield. Snowy Hydro purchased the land again in early 2019.

The site is surrounded by industrial development to the west and predominantly rural land to the south and east. To the north of the site is the remainder of Lot 14 in DP 250029 which contains the private airfield, and other industrial development. Snowy Hydro's private airfield contains a main north-south aligned runway, hangers and offices. It also contains an above ground fuel tank for the refuelling of planes and helicopters.

Lot 3 in DP 238762 contains a communications tower which ceased use (ie transmission) in August 2019.

There is an isolated industrial operation containing a residence located about 150 metres (m) to the south-east of the site, and an abattoir located about 350 m to the east.

The nearest residence is a rural residence located about 450 m to the south-south-east of the site. The nearest residences within Cooma are located about 1 km to the west of the site.

1.4 Proponent

Snowy Hydro is the proponent for the proposed segment factory. Snowy Hydro is an integrated energy business – generating energy, providing price risk management products for wholesale customers and delivering energy to homes and businesses. Snowy Hydro is the fourth largest energy retailer in the NEM and is Australia's leading provider of peak, renewable energy.

As previously stated, the proposed segment factory would be constructed and operated by FGJV which has been contracted by Snowy Hydro to construct Snowy 2.0.

1.5 Purpose of this report

This LCVIA supports the EIS for the proposed segment factory. It documents the landscape character and visual impacts of the segment factory project area outlined in Figure 1 and assesses the following:

- The existing natural landscape including landform, geology, water and vegetation
- The existing cultural landscape including heritage values, land uses, infrastructure and recreation
- The landscape character and character zones
- The sensitivity of the setting
- The magnitude of change as a result of the proposed elements
- The visual impact of all proposed surface elements.

The scope of assessment will also discuss:

- Measures to mitigate visual impacts of proposed elements.

1.6 Assessment guidelines and requirements

This Landscape Character and Visual Impact Assessment (LCVIA) has been prepared in accordance with the Secretary's Environmental Assessment Requirements (SEARs), issued by the DPIE on 31 July 2019.

The SEARs must be addressed in the EIS. Table 1 lists the matters relevant to this assessment and where they are addressed in this report.

Relevant SEAR's	Reference in this report
Amenity: - visual impacts of the project, including lighting impacts and potential impacts on views from sensitive receivers and key vantage points in the public domain;	Section 05 - Visual Impact Assessment
Land: - a strategy to manage the progressive rehabilitation of the land disturbed by the project;	Section 06 - Mitigation Measures

Table 1. Relevant Secretary's Environmental Assessment Requirements (SEAR's)

1.6.1 Planning Context

A number of policies, planning documents and guidelines have been developed by various agencies that assist in the environmental assessment of the project.

Those related to the LCVIA are:

- The *Burra Charter* (The Australia ICOMOS charter for places of cultural significance)
- NSW Heritage Office - Design in Context 2005
- *Land and Environment Court Photomontage Policy, 2013*
- *Environmental Impact Practice Note: Guideline for Landscape Character and Visual Impact Assessment* (LCVIA) Note EIA-N04 by Roads and Maritime Services (2018)
- *NSW Climate Change Framework*
- *Road Design Guide* (Roads and Maritime Services) and relevant Austroads Standards
- *State Environmental Planning Policy No. 55 – Remediation of Land*
- *Australian Standard 4282* (AS4282) Control of Obtrusive Effects of Outdoor Lighting

1.6.2 Background Studies

In addition to the above documents, the following were also reviewed and contributed to this assessment:

- *Cooma-Monaro Local Environmental Plan 2013*
- *Snowy 2.0 Main Works Scoping Report October 2018*
- *Snowy 2.0 Main Works Historic Heritage report 2019*
- *Snowy 2.0 Main Works Recreational User Impact Assessment 2019*
- *Snowy 2.0 Operational Impacts, Recreation and Social Impacts, 2019*
- *Snowy 2.0 Community Survey Outcomes, 2019*
- *Rehabilitation Strategy Snowy 2.0, 2018, SMEC*
- *Snowy 2.0 Rehabilitation, 2019, SLR*

1.7 Assessment Methodology

1.7.1 Introduction

Two guidelines for landscape and visual impact, have been used for the methodology of this assessment. These are:

- *Environmental Impact Practice Note: Guideline for Landscape Character and Visual Impact Assessment* (LCVIA) Note EIA-N04 by Roads and Maritime Services (2018)
- *Guidelines for Landscape and Visual Impact Assessment* (GLVIA) Third Edition (2013), prepared by the Landscape Institute and Institute of Environmental Management and Assessment.

The Roads and Maritime Services Practice Note is a well-developed and widely used visual impact assessment methodology in NSW, predominantly on transport infrastructure.

The GLVIA is the United Kingdom industry standard and authoritative guide on the principles of landscape and visual impact assessment. It provides a useful comparison to the Roads and Maritime Practice Note and includes a detailed and relevant tool for assessing cumulative impact and guidance on assessment incorporating climate change. The impact grading matrix below and the cumulative impact assessment found in section 06, have both been adopted from the GLVIA for this assessment.

There are two main components within these visual assessment methodologies, Landscape Character Assessment and Visual Impact Assessments, which are described below.

1.7.2 Landscape Character Assessment

Landscape character can be described as: 'The combined quality of built, natural and cultural aspects that make up an area and provide its unique sense of place' (Roads and Maritime Services, 2013).

The assessment of landscape character involves the identification of the different landscape character zones within the proposal area (defined by distinctive combinations of elements), and an assessment of the sensitivity and magnitude of the proposal on each zone.

The study area and areas adjacent have been broken down into zones that categorize the character and spatial qualities to assist with the assessment. The methodology for this involved analysing aerial imagery to distinguish different vegetation communities and growth patterns as well as topography, geology, water and infrastructure.

A site visit confirmed the boundary of each zone through experiencing the landscape on foot, in boat and in car.

Sensitivity refers to how susceptible the character of the setting is to the proposed change. Informed by background research, a judgement is made as to the quality of the landscape, its cultural and historical importance to the community, scenic quality, and overall composition of the place and its users. This can also be considered as the landscape's inherent capacity to absorb change. For example, an area with a pristine natural character will be more sensitive to change than an area that has existing man-made infrastructure such as a road or building.

Magnitude refers to the type of proposal and its compatibility with the existing landscape character. The scale, form and material composition of elements, as well as their location or setting, all have a bearing on the magnitude of the physical presence of the proposal. For example, a large above ground building will have a greater magnitude of change than an access road through the same landscape.

Landscape character impact is the combination of the sensitivity and magnitude of change caused by the proposal in accordance with the Impact Assessment Grading Matrix in Table 2.

1.7.3 Visual Impact Assessment

The assessment of visual impact requires the selection of a number of viewpoints of the proposal. A range of viewpoints are selected from various locations, distances and directions within the visual catchment of the proposal.

Selection of viewpoints

The selection of viewpoints begins with a desktop assessment of the ZTV's for each proposed permanent element. The selection of each viewpoint must fall within the visual catchment defined by the ZTV and is based on an eye level of 1.5m above the ground. Each viewpoint is then adjusted to fall within a probable area of observation. This can be a road, residential housing, a walking track, lookout, etc. After all viewpoints have been defined, a site visit is undertaken.

The locations of proposed elements of the Polo Flat Segment Factory are visited and documented by staff onsite. High definition photographs are taken of each proposed site for permanent elements and focal length and elevation is recorded. The use of an accurate geographical positioning systems (GPS) is used to verify each of the viewpoints. The GPS is accurate to within 10m.

Visual impact assessment

A description of the selected viewpoint and assessment of the sensitivity and impact of the proposal, in terms of magnitude is then carried out.

The visual impact of the proposal from each viewpoint is assessed using the sensitivity of the setting and the magnitude of change.

Sensitivity is the measure of the visual quality and importance of the view and is dependent on the distance between the observer and the proposal, the activity category of observer and the elements of the proposal that are visible.

Magnitude of change to existing views refers to the nature and scale of the proposal, and the extent and proximity of the view to it. Magnitude represents the contrast in scale, form and type of proposal to the location and context to which it is to be placed.

Visual impact is the combination of the sensitivity and magnitude rating in accordance with the Impact Assessment Grading Matrix in Table 2.

1.7.4 Mitigation Measures

Mitigation measures are a series of strategies, principles or treatments recommended to ameliorate the identified landscape character and visual impacts of the project. They may include ways to lessen the magnitude of the proposed works and to maximise the integration with the surrounding setting. They may also include treatments to key view corridors to reduce contrast and/or screen the proposal from certain viewpoints.

		MAGNITUDE			
		HIGH	MODERATE	LOW	NEGLIGIBLE
SENSITIVITY	HIGH	HIGH	HIGH-MODERATE	MODERATE	NEGLIGIBLE
	MODERATE	HIGH-MODERATE	MODERATE	MODERATE-LOW	NEGLIGIBLE
	LOW	MODERATE	MODERATE-LOW	LOW	NEGLIGIBLE
	NEGLIGIBLE	NEGLIGIBLE	NEGLIGIBLE	NEGLIGIBLE	NEGLIGIBLE

Table 2. Landscape character and visual impact rating matrix (Source: EIA-N04 Guidelines, 2018)

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Project Description

Section 02

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02 Project Description

2.1 Project Overview

2.1.1 Introduction

It is proposed to construct and operate a factory on the site in Polo Flat, refer to Figure 1, to supply precast concrete segments that would line the tunnels for Snowy 2.0.

The construction phase of the proposed segment factory would last about five months utilising a workforce of about 30 people. The operational phase would last about 3.5 years utilising a workforce of about 125 people. The proposed segment factory would be decommissioned at the completion of operation.

2.2 Construction

2.2.1 Main activities

The following main activities would be undertaken for the construction of the proposed segment factory:

- Demolition and removal of buildings and decommissioned telecommunications tower on the southern part of site,
- Clearing, removal of topsoil and vegetation (topsoil excavated would be stockpiled on site for later use if deemed suitable),
- Undertaking earthworks to establish level surfaces
- Establishment of primary access road,
- Installation of site services (power, water and communications),
- Establishment of site surfaces (ie concrete, asphalt and cement soil), and
- Construction of site facilities and buildings, including precast building, concrete batching plant (CBP), workshops, offices, parking areas, storage areas and associated facilities.

2.2.2 Earthworks

Excavation would be carried out at the site to provide level surfaces, establish the access road and create the required trenches for drainage.

Where possible, excavated material would be reused on site for filling and compaction (including benching areas of the site where required). Where there is a deficit of excavated material, additional material would be sourced from local quarries.

2.2.3 Traffic movements

Construction vehicle movements will comprise construction worker's light vehicles and heavy vehicles transporting equipment, building and construction materials, waste, and fill material if required.

Figure 1. Study Area Plan

There would also be a small number of oversized vehicles transporting large equipment to the site.

It is estimated that on average, there would likely be about 30 one-way light vehicle movements and 15 one-way heavy vehicle movements per day during the construction phase. During the peak of construction, it is estimated that there would likely be a maximum of about 40 (4 per hour, based on a 10hr day) one-way light vehicle movements and 25 one-way heavy vehicle movements per day.

2.2.4 Construction time-frame and hours

The construction phase of the proposed segment factory would last about five months (estimated to commence in March 2020 subject to obtaining the required approvals). Construction would be undertaken from Monday to Saturday for 10 hours per day. Notwithstanding this, access to the site would generally only occur from 7 am to 6 pm.

2.2.5 Workforce

A workforce of about 30 people would be required to construct the proposed segment factory.

2.3 Operations

2.3.1 General

The segments would be produced by casting concrete (made in the CBP) in reusable steel moulds which would then be cured in a chamber. Following curing, the segments would be temporarily stored onsite before being transported to the TBM launch sites within KNP.

The casting and curing would be undertaken in the precast building. Storage of the segments would predominantly be undertaken in uncovered storage areas.

Main inputs for the segments include aggregate, sand, cement, water and steel rebar.

Approximately 130,500 segments would be manufactured over the operational period.

2.3.2 Site layout

The layout of the proposed segment factory is shown in Figure 2. Details of the site layout are provided below and in Table 3.

i. General layout

The CBP and precast building (which contains a casting room and curing chamber) would be located at the southern end of the site. Open storage areas would be located predominantly to the north of the building on the northern part of the site.

Site offices and workshops would be located in the south western corner of the site.

ii. Ingress and egress

Vehicle ingress and egress to the site would be provided on a new access road which would connect to Polo Flat Road. The access road would be constructed on an existing informal service road located in the unmade road corridor immediately north of Carlaminda Road.

iii. Raw materials storage

Cement silos, and aggregate and sand storage areas for the CBP would be located adjacent to the CBP. Storage would be sized to hold approximately three days production.

Other raw materials include steel rebar and concrete admixtures which would be stored in, or adjacent to, the precast building.

iv. Parking

Two large parking areas are proposed in the south western and south eastern corners of the site. Parking in the south western area would be used for light vehicles, trucks and buses. Parking in the south eastern part of the site would be used for trucks.

v. Drainage

A drain diversion will be constructed around the eastern perimeter of the site to divert water from the third order watercourse. The drain diversion would be constructed to match the general width and depth of the existing watercourse.

A detention basin would be provided to the north of the size to collect surface flows from the site. Overflows from the detention basin would be directed into the drain diversion.

2.3.3 Utility connections

The proposed segment factory would be connected to utility mains, including electricity, water, wastewater and gas.

2.3.4 Segment inputs

As previously stated, main inputs for the precast concrete segments include aggregate, sand, cement and steel rebar. These main inputs would likely be sourced from locations in proximity to site and/or from quarries near Canberra.

In addition to these main inputs, several accessories are also required to produce the segments, such as reinforcement cages, steel fibres, gaskets and inserts. These inputs would likely be sourced from Canberra.

2.3.5 Segment transport

Following casting, curing and storage, the segments would be transported to the TBM launch sites within KNP.

2.3.6 Traffic movements

Operational vehicle movements will comprise light vehicles (worker's vehicles and service vehicles) and heavy vehicles required for the transportation of the main inputs for the segments (primarily aggregate, sand, cement and steel rebar) and for the transportation of the segments from the site to the TBM launch sites within KNP.

2.3.7 Staff and manpower

A workforce of about 125 people would be required to operate the proposed precast segment factory. Most of this workforce would be sourced locally from the Snowy Mountains Regional LGA and surrounding localities.

2.3.8 Hours of operation

It is proposed to operate the proposed segment factory 24 hours a day, seven days a week. It is estimated that the factory would operate for a period of about 3.5 years.

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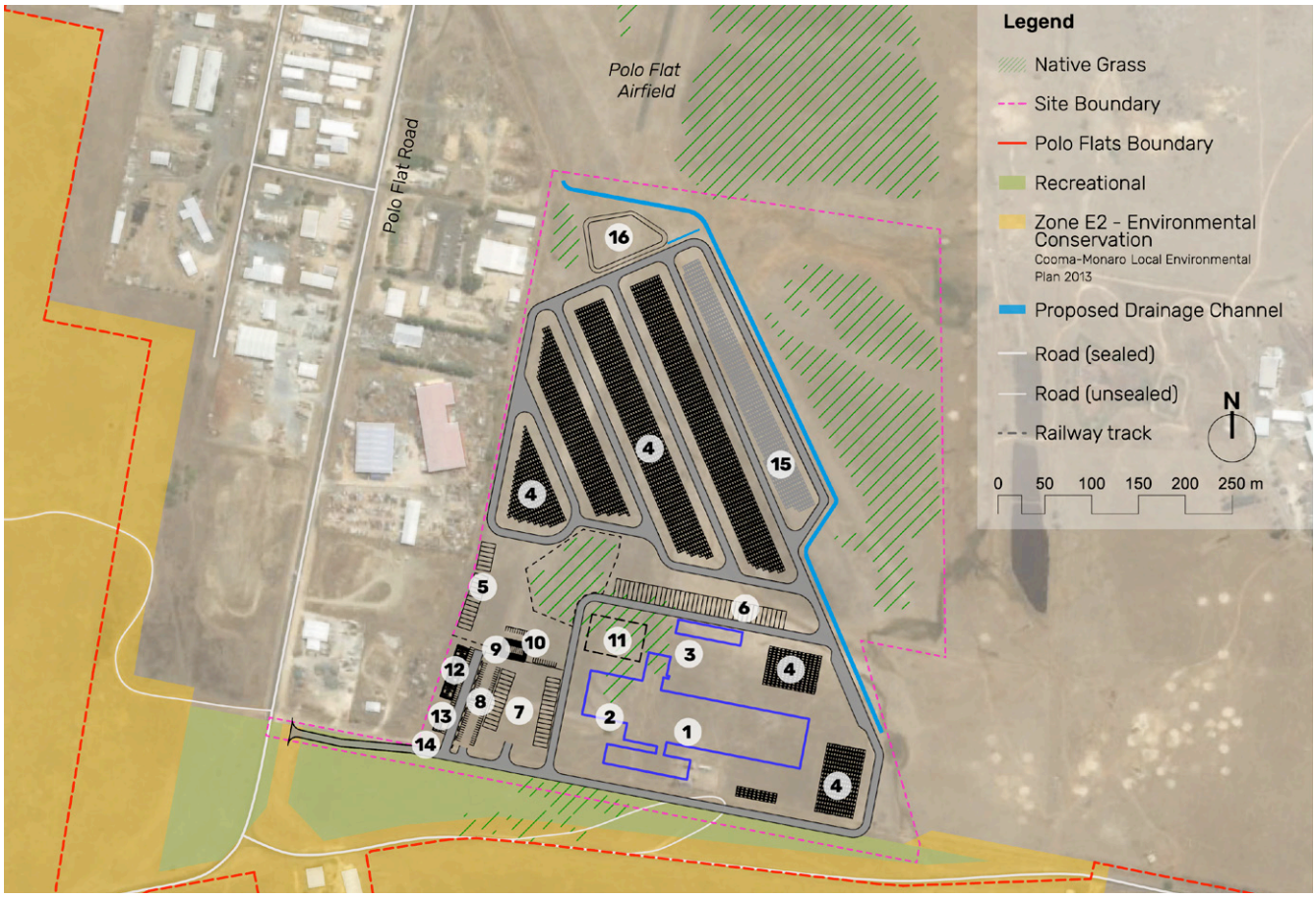
2.4 Decommissioning

As previously stated, the proposed segment factory would be decommissioned at the completion of construction of Snowy 2.0.

No.	Element	Height	Footprint	Access	Surface Treatment
01	Segment Factory	16.5m (Concrete batching plant including casting room and curing chamber) 10m (Temporary segment storage)	Approx. 31,600sqm	New Access Road connecting to Polo Flat Road. No public access	Proposed site surfaces include concrete, asphalt and cement soil to support the construction of site facilities and buildings, including precast building, concrete batching plant (CBP), workshops, offices, parking areas, storage areas (for raw materials and also precast segments) and associated facilities. A detention basin to the north of the site and a diversion drain is proposed to the eastern perimeter of the site. Refer to Figure 2 below.

Table 3. Operational Elements



1. Precast Yard
2. Precast Office/Warehouse
3. Concrete Batch Plant
4. Segment Storage
5. Truck Parking
6. Trailer Parking
7. Bus Stop & Parking
8. External Private Parking
9. Mechanical & Plant Workshop
10. JV Light Vehicle Workshop & Parking Area
11. Aggregates Area (~1500mq)
12. Offices Area
13. First Aid
14. Guard Area
15. Emergency Storage Area
16. Detention Basin

Figure 2. Site Plan of the Proposed Segment Factory

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Contextual Analysis

Section 03

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03 Contextual Analysis

3.1 Natural Landscape

The town of Cooma is located in the sub-alpine region of the Monaro, an elevated rolling grassland plateau. Polo Flat is located on the eastern industrial outskirts of Cooma within the Polo Flat industrial area and part of the site has been used for aviation purposes since 1921. The site consists of buildings associated with its former and current land use and a mix of native and exotic grasslands. Both the natural and cultural landscapes and setting are discussed within this contextual analysis.

Beyond the Industrial areas along the western side of the site, the natural landscape of Polo Flat, is characterised by low growing grasslands and undulating hills. South of Carlaminda Road and also west of the existing Polo Flat industrial area is a large area of grassland identified for Environmental Conservation (LEP 2013). To the east of the study area, industrial character is also seen in the form of Monbeef Abattoir and to the south east of the study area is Cooma Landfill, a solid waste disposal site.

To the north of the site, the flat and gently sloping land is utilised for a privately operated airfield which is currently owned by Snowy Hydro, and further north is the Cooma Monaro Race Club.

To the west of Cooma, the landscape is characterised by higher undulating and forested hills including areas of Crown Land Reserve associated with North Ridge Reserve.

3.1.1 Site

The site area is approximately 31,600 m2 and comprises the following land parcels:

- Southern part of Lot 14 in Deposited Plan (DP) 250029 – also known as 9 Polo Flat Road, Polo Flat;
- Lot 3 in DP 238762 – also known as 33 Carlaminda Road, Polo Flat; and
- An unmade road corridor, directly south of the aforementioned lots.

The site is located towards the south eastern side of Polo Flat and positioned north of Carlaminda Road and east of Polo Flat Road. Refer to Figure 2 for a site contextual plan. Access to the Segment Factory is off the Snowy Mountains Highway near the south-eastern entrance to Cooma, via Polo Flat Road.

3.1.2 Landform

Natural undulating hills throughout Cooma and the surrounding areas are the dominant landform feature adjacent to the study area. The landform within the study area and the surrounding area has two distinctive characters. The first is the flat open gently sloping land that is open to the north and adjacent in the industrial area west of the study area, allowing for visual exposure through the existing airport to the study area.

The second, is the rolling hills that rise up to the east toward Monbeef Abattoir and to the west beyond the industrial area at Radio Hill, providing a semi enclosed setting with limited distance views to and from.

The landform is dissected by a watercourse from the south east to the north west of the site, as seen in Figure 3.

3.1.3 Geology

Cooma is positioned on the elevated plateau between Namadgi ranges to the north, the Kosciuszko Ranges to the west and the Kybean Range to the east. The elevation of the project area is approximately 820m above sea level.

The geology of the site is mapped as Quaternary alluvium with small areas of Tertiary basalt on the western and southern edges.

3.1.4 Soil

The site has mostly residual soils formed on lower slopes of basalt and dacite. There is also an unnamed drainage feature, with some minor alluvium.

Generally, soil types identified onsite include three categories:

- Majority of site is made up of gentle sloping residual basalt soils. (0.1m-0.5m deep)
- Northern side of the drainage line and eastern hills consist of shallower soils (<0.5m deep)
- Southern areas consist of clay textured soils that are deeper in profile (>1m deep)

The soils are classified as having moderate limitations to cropping.

3.1.5 Hydrology

The site generally slopes towards the drainage line in the middle of the site where a watercourse flows from the south east to the north west of the site. The creek is a third order water course and has clay base with intermediate rocks and patches of vegetation within the creek. There are no permanent water bodies on site however localised flooding occurs in the lower portions of the site as seen in Figure 3.

3.1.6 Vegetation

The previous land-use of the site as an airfield and livestock grazing has impacted on the site's natural environment. This has resulted in significant change to the native grassland structure and composition and there is little fauna habitat.

Non-native grassland dominate the site. There are some patches of degraded natural temperate grassland (PCT 320 – Kangaroo Grass - Redleg Grass forb-rich temperate tussock grassland of the northern Monaro, ACT and upper Lachlan River regions of the NSW South Western Slopes Bioregion and South Eastern Highlands Bioregion), listed as Natural Temperate Grassland of the South Eastern Highlands, a critically endangered ecological community (CEEC) under the *EPBC* Act.

This vegetation community consists of native grasses such as Kangaroo Grass (*Themeda australis*), Redleg Grass (*Bothriochloa macra*), Wallaby Grasses (*Rytidosperma spp.*) and other native grasses. These species occur naturally on clay soils, and would have been prevalent, along with grassy woodlands, prior to European settlement.

Existing grasslands zoned E2 are mapped in Figure 3. There are only limited shrubs and no tree cover on the site. Further information regarding Biodiversity has been addressed within the Biodiversity report within the EIS.

3.2 Cultural Landscape

3.2.1 Pre-settlement

Aboriginal people have utilised the Monaro for over 20,000 years. As is evident from these archaeological records and non-visual spiritual meanings and associations of various natural elements of the landscape. Aboriginal language groups including the Wolgalu or Wogul group of the high country and Ngarigo group of the tablelands occupied these areas prior to European settlement.

3.2.2 Grazing Livestock

The discovery of the Monaro as suitable lands for grazing livestock dates back to early Australian explorers and had a significant impact on the formation of settlers in the early towns of Cooma, Numeralla and Bredbo.

The study area's previous land-use includes livestock grazing, altering the site's natural environment and significantly impacting its native grassland structure.

3.2.3 Industry and Infrastructure Land Use

It was the development of the Snowy Mountains Scheme in 1949 which accelerated the development of industry and infrastructure of Cooma and Polo Flat .

The site is identified as *General Industrial* (LEP 2013), as is the land located directly to the west of the site. A wide range of industries and services are operating within the Polo Flat area with predominant industries including; construction and trade services and supplies, manufacturing, vehicle repairs and maintenance. As well as this, located to the east of the study area is the Monbeef Abattoir.

The Polo Flat airfield was originally established in 1921 and later upgraded to serve as the base for the Snowy Mountains Hydro-electric Authority's flying unit to service construction of the Snowy Scheme. The airfield still operates and continues to be used by private aircraft, including light planes and helicopters. The private airfield contains a main north-south aligned runway, hangars and offices as well as fuel tanks.

3.2.4 Recreation and Cultural Features

The site is located along the eastern outskirts of Cooma, with recreational areas including parks, open space and trails generally located within closer proximity to Cooma. A number of sporting and recreational clubs are located on land to the north of Polo Flat.

Approximately 1km to the south west of the site, Cooma Creek reserve offers open space and walking trails through the town. This trail also provides broader regional connections to other parks and walking trails.

Located north of Polo Flat is a large area identified as Public Recreation (LEP 2013). This area supports the Cooma Monaro Race Club and the Phoenix Model Aero Club. The Polo Flat airfield is located north of the site.

A number of significant cultural features are located within 1.5km of the site and listed on the Cooma-Monaro Regional Council LEP (Cooma-Monaro LEP). None are in the proposed segment factory site. Locally listed heritage items include:

- Mine – Bushy Hill: an old gold mine dating from 1897 (this site is also listed on the Non-Statutory archive Register of the National Estate)
- Nissen Hut: A large curved-roofed building clad in corrugated iron possibly dating to the 1950s
- Nissen Huts: Two large curved-roofed building clad in corrugated iron possibly dating to the 1950s
- Woolshed.

The following item is a State listed heritage item as identified in the Cooma-Monaro Regional Council LEP (Cooma-Monaro LEP) and located approximately 1km south west of the site.

- Railway Bridge: A single-lane timber trestle railway bridge over Polo Flat Road.

03

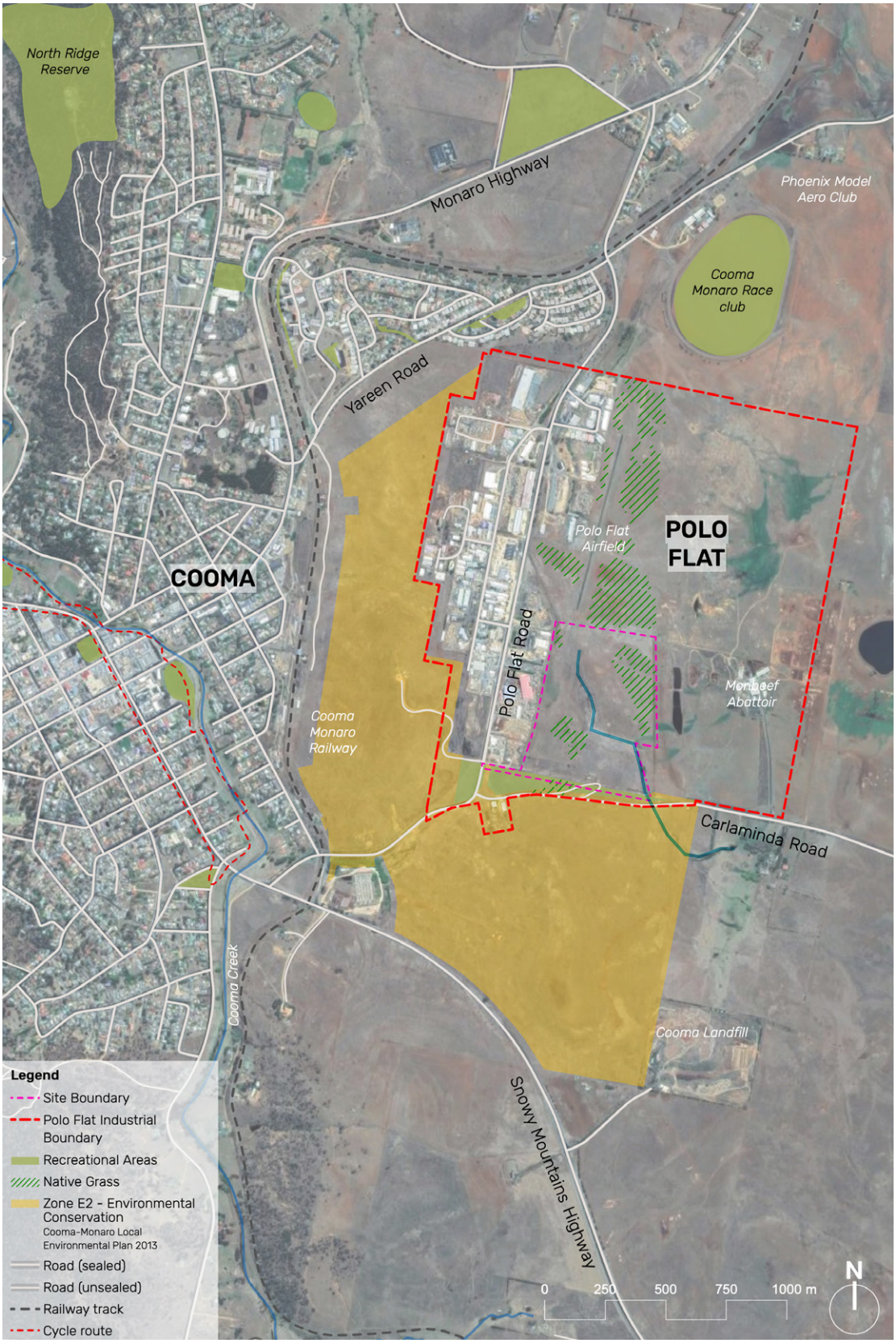

Figure 3. Site Context Plan

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Landscape Character Assessment

Section 04

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04 Landscape Character Assessment

4.1 Landscape Character Overview

The landscape character of the study area is the product of the natural and cultural elements that have shaped it. Landform and vegetation, views and vistas, settlement patterns, land uses and built structures within and adjoining the study area all contribute to the landscape character.

The landscape character also considers historical layering or 'time depth' in the form of material remains of the past. These surviving features and their settings reflect the past interactions between people and places, which combine to present a visual record of the historical uses of the zones.

4.2 Landscape Character Zones

Within the study area, four distinct landscape types have been identified (Figure 4) and are defined as Landscape Character Zones (LCZs).

Each LCZ reflects broadly homogeneous visual characteristics, particularly in terms of vegetation and landform.

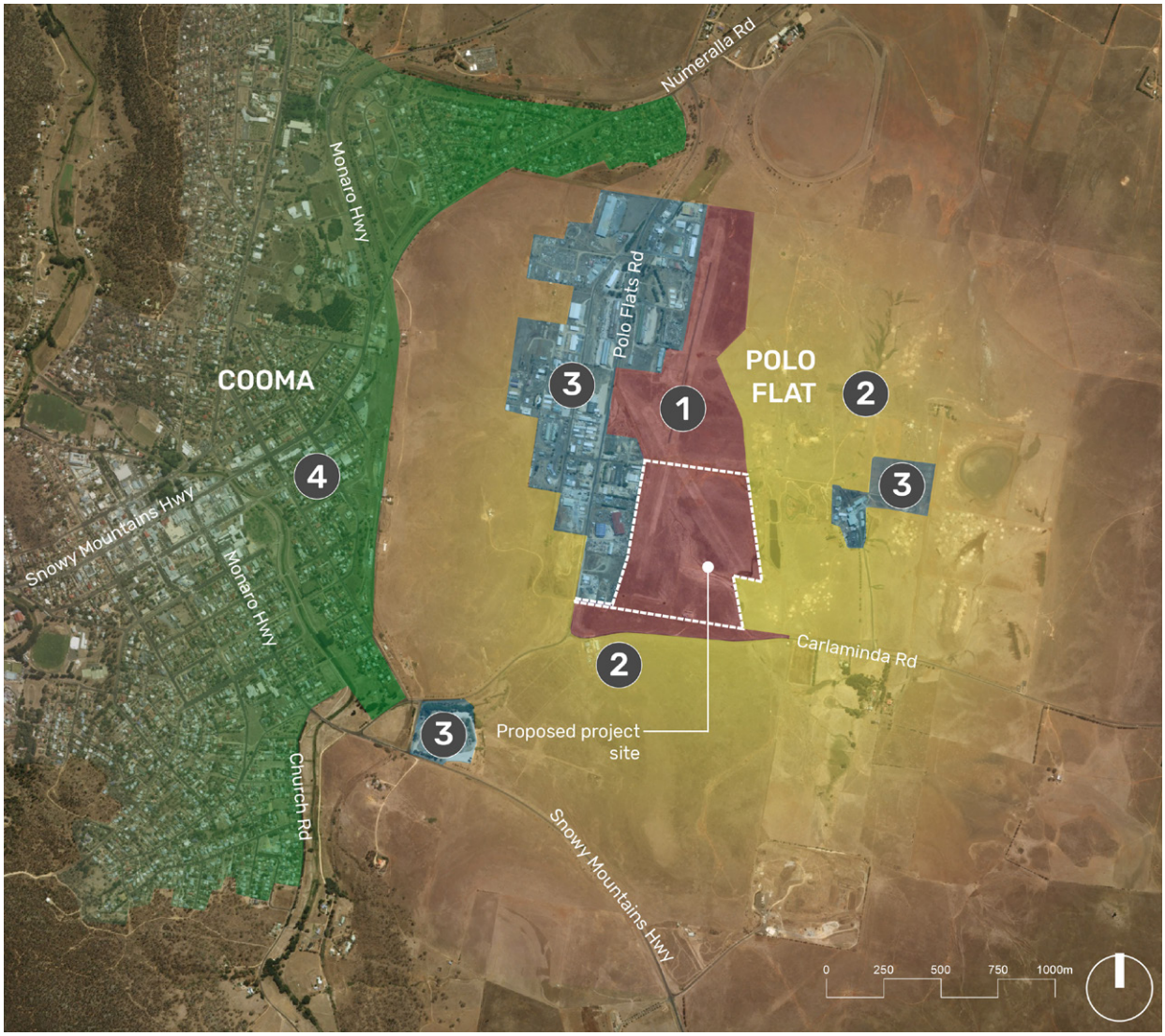

Figure 4. Landscape Character Zones surrounding the study area

04

The analysis has identified four Landscape character zones covering the project site and adjoining areas:

- LCZ 1 - Cooma/Polo Flat Airport
- LCZ 2 - Polo Flat surrounding grasslands
- LCZ 3 - Polo Flat Road Industrial Area
- LCZ 4 - Cooma township

The following provides a description of each Landscape Character Zone.

4.2.1 LCZ 1 – Cooma/Polo Flat Airport

Landscape Character Zone 1 (LCZ 1) is comprised of the Cooma/Polo Flat private airport and the project site is located entirely within this zone.

The flat topography of LCZ 1 enables the use of this location as an airstrip. The character is open with low scattered tussock vegetation. Due to a lack of tree cover it is visually exposed.

Native vegetation including fauna habitats, have been modified by activities including land clearing, livestock grazing and weed invasion. Vegetation consists of native and non-native grasses.

Within LCZ 1 there are no known Aboriginal objects or historical sites. There are several examples of built form, primarily structures required for the airport operations. There is no pedestrian or cycle facilities.

The zone is predominantly experienced through vehicular use along Carlaminda Road and Yareen Road by vehicles travelling 80km/h and to a lesser degree, industrial businesses along Polo Flat Road.

The ability of the zone to absorb visual change is low due to the exposed nature of the existing landscape character. Although some existing built elements screen views to the zone, these buildings are generally restricted to the western edge of the Polo Flat industrial area, and as a result the landscape character sensitivity rating is MODERATE.

Landscape character sensitivity:

MODERATE

Figure 5. LCZ 1 - View northwest from Carlaminda Road toward Cooma/Polo Flat Airport

04

Figure 6. LCZ 1 - View north from Yareen Road toward Polo Flat Road

Figure 7. LCZ 1 - View east from Polo Flat Road toward Cooma/Polo Flat Airport

04

4.2.2 LCZ 2 – Polo Flat surrounding grasslands

Landscape Character Zone 2 (LCZ 2) presents a large zone surrounding the private airfield and the industrial area along Polo Flat Road. It immediately adjoins the project site and has been included due to the potential for it to be affected by the project. LCZ 2 is characterised by an extensive, undulating landscape with vegetation consisting mostly of native and non-native grasses.

LCZ presents itself as an undulating set of hills stretching across to Cooma in the west and Carlaminda in the east.

Within the zone, there are pockets of tree planting that indicate property boundaries, however the vegetation character is predominantly a grassland landscape with areas of farming and rural residential zoning that sit adjacent to Carlaminda Road.

Southeast of the study area is the Cooma landfill site, housing the disposal of solid waste. The landfill site has been used since the mid 1970's.

Other visual evidence of infrastructure within the zone include the high voltage transmission lines and cattle fencing bordering Carlaminda Road that each juxtapose the openess of the landscape.

The zone is experienced predominantly through vehicular use along the Snowy Mountains Highway and Carlaminda Road, Numeralla Road and the northern end of Polo Flat Road. There is no pedestrian facility nor shoulder for cyclists beside the road.

Polo Flat Road is a bypass of Cooma for traffic travelling between the Monaro Highway and the Snowy Mountains Highway which comprises local and regional traffic, including motorists travelling between Canberra and the South Coast.

The ability of the zone to absorb visual change is varied due to its large size. Due to the general open character, visual change would not be readily absorbed or concealed. The presence of infrastructure that supports electricity lines, industrial uses and transport movements are seen throughout the zone and have an effect on the character sensitivity. However the exposed undulating landform increased the range of views of this LCZ a sensitivity rating of MODERATE.

Landscape character sensitivity:

MODERATE

Figure 8. LCZ 2 - Undulating hills of Polo Flat and views to the south from Carlaminda Road

04

Figure 9. LCZ 2 - View southbound on Snowy Mountain Highway

Figure 10. LCZ 2 - View southwest from Carlaminda Road
Homestead with mixed tree plantings, a dominant visual feature of the Monaro.

04

4.2.3 LCZ 3 – Polo Flat Industrial Area

Landscape Character Zone 3 (LCZ 3) is located in fragmented areas adjacent to the Cooma/Polo Flat. It immediately adjoins the project site and has been included due to the potential to be affected by the project. It includes to the north, the airport, west (and north) of the study area and includes the industrial area along Polo Flat Road and Holland Road, Monbeef Abattoir and the Cooma Saleyards. LCZ 3 is characterised by low level industrial buildings, wide sealed lanes and unsealed verges.

The large road reserve allows for B-Doubles to access this area which directly impacts its character. As a result of a wider road corridor, and low level buildings, the character of this LCZ is open, wide and exposed to views west toward Cooma. With the exception of several areas along the Polo Flat Road corridor, where screening trees are located, vegetation within LCZ 3 consists of low level unmaintained native and non-native grasses.

There are several examples of built form within this character zone including buildings associated with industrial uses, storage and parking areas that contribute to its industrial character. Some of these industrial uses include; Elgas Cooma, Cooma Auto Wreckers, Cooma Equipment Hire and Cooma Hardware.

Directly to the east of the study area, atop a hill is the Monbeef abattoir and its facilities to house livestock. To the south west, beyond the industrial area, sits the Cooma Saleyards also providing a fragmented industrial setout within the surrounds of the study area.

There are no pedestrian facilities within this zone, as the predominant use of the road network is through vehicular access. The two major road corridors that link the industrial area to Cooma are Yareen Road to the north and Snowy Mountain Highway to the south.

The footprint of the built elements within the natural undulation of the surrounding landscape contrasts dramatically, resulting in an ability of the zone to absorb visual changes that are of a similar nature. For these reasons, the overall landscape sensitivity for LCZ 3 is LOW.

Landscape character sensitivity:

LOW

Figure 11. LCZ 3 - View southbound on Polo Flat Road

04

Figure 12. LCZ 3 - View Northbound on Polo Flat Road

Figure 13. LCZ 3 - View northeast along Polo Flat Road toward the Cooma/Polo Flat Airport

04

4.2.4 LCZ 4 – Cooma Township

Landscape Character Zone 4 (LCZ 4), Cooma Township, presents a large area of residential housing west of the study area. LCZ 4 is characterised by low density residential housing along undulating hills, that result in views to surrounding hills and over undulating grassland.

The zone boundary stretches from Numeralla Road in the north to Church Road in the south, bordering on the Cooma Monaro Railway and Museum to the east.

Vegetation is a mix of native trees and exotic deciduous trees that provide visually strong landscape elements and avenue planting along many of the streets within Cooma.

The majority of the character zone is made up of built elements, including residential housing, churches, commercial buildings and tourism facilities. These elements add to the character of Cooma as a typical rural town with low density housing.

There have been several cycle ways constructed in Cooma in the late nineties.

Connections between Cooma Creek, the Rotary Oval and north of Cooma township have been provided with cycle links due to the higher concentration of residential developments.

The zone is experienced predominantly through vehicular use along Sharp Street and the Monaro Highway. There is very little pedestrian facility within the residential portions of this character zones nor shoulder for cyclists beside the road. Toward the north of Cooma, the undulating hills throughout this LCZ provides views south and southeast toward Polo Flat and the proposed segment factory.

The ability of the zone to absorb visual change is varied due to its large size, topography and existing mitigation provided due to current industrial activity adjacent to Cooma. However, the dominant residential land use of this zone results in the landscape character sensitivity rating is High.

Landscape character sensitivity:

HIGH

Figure 14. LCZ 4 - View down Chapman Street, Cooma, northeast toward Central Cooma and Polo Flat

04

Figure 15. LCZ 4 - View southwest on Polo Flat Road toward residential settlements on the fringe Cooma

Figure 16. LCZ 4 - View east along Sharp Street toward Polo Flat

04

4.3 Landscape Character Impact Assessment

The following section presents the landscape character assessment for the four zones surrounding the project site.

Landscape Character Zone		Sensitivity
LCZ 1	Cooma/Polo Flat Airport	MODERATE
LCZ 2	Polo Flat surrounding grasslands	MODERATE
LCZ 3	Polo Flat Industrial Area	LOW
LCZ 4	Cooma Township	HIGH

Table 4. Landscape Character Zone Sensitivity Summary

4.3.1 Landscape Character Impact of the Segment Factory on LCZ 1: Cooma/Polo Flat Airport

The entire project area is located within this landscape character zone.

Magnitude

The project introduces quite a large industrial footprint and height into a landscape that currently is open and underdeveloped. Although the works are located adjacent to an existing industrial setting, the scale of the works are substantial and takes up half of the Landscape Character Zone.

Overall, the assessment indicates that the magnitude of the project would be Moderate. This facility will be temporarily used for a period of 3.5 years, 24 hours per day, 7 days a week, and as such will have affect the character during the day and at night through light spill and noise generated from the factory.

Landscape Character Impact

The assessment indicates that the landscape character impact of the project in this zone is likely to be Moderate.

Landscape Character Impact Assessment LCZ 1	
Sensitivity	MODERATE
Magnitude	MODERATE
LANDSCAPE CHARACTER IMPACT	MODERATE

Table 5. Landscape Character Zone 1 Impact Assessment

4.3.2 Landscape Character Impact of the Segment Factory on LCZ 2: Polo Flat surrounding grasslands

The LCZ sits adjacent to the proposed project site.

Magnitude

There are no works within this LCZ. However changes to the LCZ are through increases to traffic, noise and lighting. As a result of factory operations, 24 hours per day, 7 days a week access would be required through LCZ 2, although only a small portion of the LCZ would be affected, resulting in a LOW magnitude.

Landscape Character Impact

The assessment indicates that the landscape character impact of the project in this zone is likely to be Low-Moderate.

Landscape Character Impact Assessment LCZ 2	
Sensitivity	MODERATE
Magnitude	LOW
LANDSCAPE CHARACTER IMPACT	MODERATE-LOW

Table 6. Landscape Character Zone 2 Impact Assessment

04

4.3.3 Landscape Character Impact of the Segment Factory on LCZ 3: Polo Flat Industrial Area

The LCZ sits adjacent to and in the surrounding area overlooking the design elements proposed, including the storage area, precast yard, office area and parking areas.

Magnitude

There are no works within this LCZ. However changes to the LCZ are through increases to traffic, noise and lighting whilst the project is in operation. As a result of factory operations, 24 hours per day, 7 days a week access would be required through LCZ 3, although this would be consistent with industrial land uses in LCZ 3 and therefore not adversely alter the existing character, resulting in a LOW magnitude.

Landscape Character Impact

The assessment indicates that the landscape character impact of the project in this zone is likely to be LOW.

Landscape Character Impact Assessment LCZ 3	
Sensitivity	**LOW**
Magnitude	**LOW**
LANDSCAPE CHARACTER IMPACT	**LOW**

Table 7. Landscape Character Zone 3 Impact Assessment

4.3.4 Landscape Character Impact of the Segment Factory on LCZ 4: Cooma Township

The LCZ sits west of the study area and is visible given the rising topography that looks over the proposed segment factory.

Magnitude

There are no works within this LCZ. However changes to the LCZ are through increases to traffic, noise, visual impacts and lighting, although only a small portion of the LCZ would be affected, resulting in a LOW magnitude.

Landscape Character Impact

The assessment indicates that the landscape character impact of the project in this zone is likely to be MODERATE.

Landscape Character Impact Assessment LCZ 4	
Sensitivity	**HIGH**
Magnitude	**LOW**
LANDSCAPE CHARACTER IMPACT	**MODERATE**

Table 8. Landscape Character Zone 4 Impact Assessment

4.4 Landscape Character Impact Summary

The landscape character impact assessment of the Polo Flat segment factory is summarised in Table 9.

Landscape Character Zone		Sensitivity	Magnitude	Impact
LCZ 1	Cooma/Polo Flat Airport	**MODERATE**	**MODERATE**	**MODERATE**
LCZ 2	Polo Flat surrounding grasslands	**MODERATE**	**LOW**	**MODERATE-LOW**
LCZ 3	Polo Flat Road Industrial Area	**LOW**	**LOW**	**LOW**
LCZ 4	Cooma Township	**HIGH**	**LOW**	**MODERATE**

Table 9. Landscape Character Zone Impact Schedule

The entire project extents fall within LCZ 1 and although the impacts are generally Moderate in the Landscape Character Zones, the extent of the impact would only be temporary, approximately 3.5 years until the completion of the Snowy 2.0 project.

Adjoining LCZ's during this period will be affected by increased traffic, noise and lighting as a result of this operation, with only LCZ 3, having a Low impact due to its existing landuse and character being similar to that of the proposed works.

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Visual Impact Assessment

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05

Visual Impact

Assessment

5.1 Overview

The assessment of visual impact requires the selection of a number of observer points of the study area. A range of points were selected from various locations, distances and directions within the visual catchment of the proposed segment factory.

As outlined in section 1.4.2, the ZTV for the project was defined through the analysis of visual catchments and DSM models. Within this ZTV, a number of observer points were selected to assess the potential visual impacts of the project, refer Figure 17.

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5.1.1 Polo Flat Observer Locations

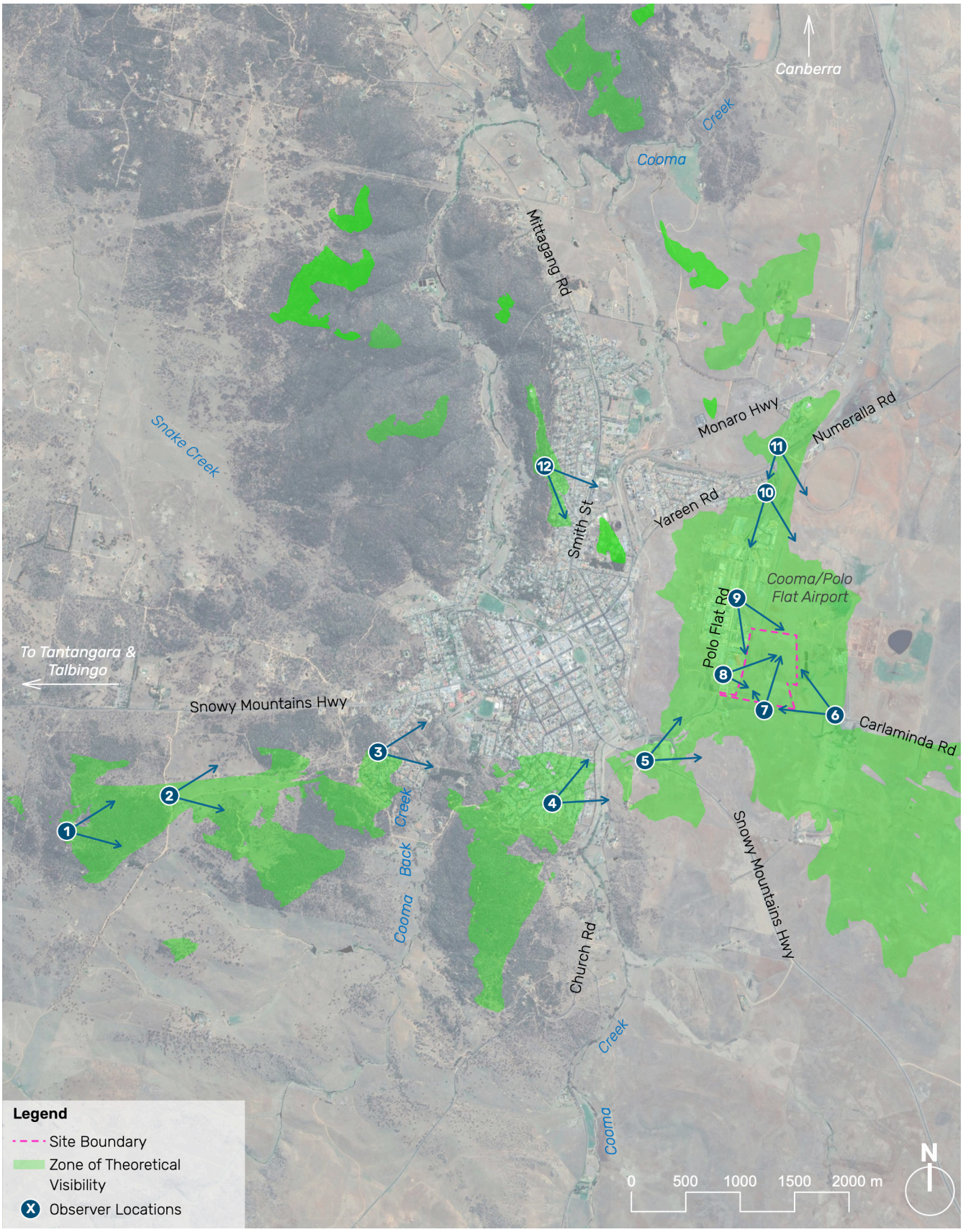

Figure 17. Visual Impact Assessment Viewpoint Locations

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5.1.2 Visual Impact Observer Location Summary

No.	Location	LCZ	Direction of View	Visible Project Elements	Potential Viewers	Notes
1	Mount Gladestone Lookout	West of LCZ 4	East	Segment Factory	Visitors using the Mount Gladestone Lookout.	Observer location partially screened by Radio Hills
2	Greendale Road, Cooma	LCZ 4	East	Segment Factory	Residential properties along Greendale Road.	Observer location partially screened by existing trees
3	Chapman Street	LCZ4	East	Segment Factory	Residential properties in South West Cooma.	Observer location partially screened by existing trees
4	Culey Avenue, Cooma	LCZ4	North-East	Segment Factory	Residential properties in South West Cooma.	Observer location partially screened by existing trees
5	Snowy Mountains Highway, Cooma	LCZ3	North-East	Segment Factory	Vehicles accessing Cooma to the north and Nimmitabel to the South via Snowy Mountains Highway & Residential properties along Snowy Mountains Highway.	Observer location partially screened by Saleyards and existing trees
6	Carlaminda Road	LCZ2	West	Segment Factory	Vehicles accessing Cooma to the west and Carlaminda to the east via Carlaminda Road & Residential properties along Carlaminda Road.	Observer location partially screened by undulating hills.
7	Carlaminda Road	LCZ2	North	Segment Factory	Vehicles accessing Cooma to the west and Carlaminda to the east via Carlaminda Road & Residential properties along Carlaminda Road.	Observer location is exposed with open views to the site
8	Polo Flat Road Southern Section	LCZ3	East	Segment Factory	Vehicles accessing the Polo Flat industrial area and businesses along Polo Flat Road.	Observer location is exposed with open views to the site
9	Polo Flat Road Central Section	LCZ3	South-East	Segment Factory	Vehicles accessing the Polo Flat industrial area and businesses along Polo Flat Road.	Observer location is exposed with open views to the site
10	Yamba Crescent, Cooma	LCZ4	South	Segment Factory	Residencies along Yamba Crescent	Observer location partially screened by existing trees and industrial properties.
11	Polo Flat Road Northern Section	LCZ2	South	Segment Factory	Vehicles accessing the Polo Flat industrial area, Cooma, businesses and residencies along Polo Flat Road	Observer location partially screened by existing trees and industrial properties.
12	Cooma North Reserve near Doondoo Place	LCZ4	South-East	Segment Factory	Walkers and residencies along the fringes of Cooma North Reserve	Observer location partially screened by existing trees

Table 10. Viewpoint summary

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5.1.3 Viewpoint 01

Location:

Mount Gladestone Lookout, looking east toward Cooma and Polo Flat

Existing Conditions:

Several dense trees frame vistas from the lookout over Cooma and the beyond flats. Views toward Deua and Wadbilliga National Parks. Natural undulating plains beyond the town of Cooma with lines of tree plantings denoting built elements.

Receptor:

Visitors using the Mount Gladestone Lookout.

View type:

Long distance view.

Landscape Character Zone:

- LCZ 4

Design Elements:

- 01 - Segment Factory

Sensitivity	Magnitude	Impact
HIGH	LOW	MODERATE
The sensitivity of the view is high due to the elevated picturesque view. The open landscape in the centre of the view has little potential to absorb the change.	The visual effect of the project on this view would be low and would primarily be experienced at night due to light spill. The factory itself would be partially screened by existing industrial buildings and landform undulation.	

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5.1.4 Viewpoint 02

Location:

Greendale Road, Cooma, looking east toward Cooma and Polo Flat

Existing Conditions:

Agricultural lands adjacent to a residence, delineated with mature tree plantings along the boundary lines that also screen the Polo Flats industrial distance in the background.

Receptor:

Residential properties along Greendale Road.

View type:

Foreground view.

Landscape Character Zone:

- LCZ 4

Design Elements:

- 01 - Segment Factory

Sensitivity	Magnitude	Impact
MODERATE	LOW	**MODERATE-LOW**
The combination of varied topography and vegetation cover makes this view moderately sensitive to change.	The primary visual effect on this view would be as a result of 24/7 operation. The factory itself would be hard to discern due to distance and intervening land form and vegetation.	

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5.1.5 Viewpoint 03

Location:

Chapman Street, Cooma, looking east toward Polo Flat

Existing Conditions:

Local residencies that are situated atop a high point in Cooma Township overlooking Cooma and Polo Flat

Receptor:

Residential properties in South West Cooma.

View type:

Background view.

Landscape Character Zone:

- LCZ 4

Design Elements:

- 01 - Segment Factory

Sensitivity	Magnitude	Impact
HIGH	LOW	MODERATE
The combination of a large number of residential viewers with varied topography and vegetation cover makes this view highly sensitive to change.	The primary visual effect on this view would be as a result of 24/7 operation. The factory itself would be partially screened by land form and vegetation.	

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5.1.6 Viewpoint 04

Location:

Culey Avenue, Cooma, looking north-east toward Polo Flat

Existing Conditions:

Local residencies within Cooma adjacent to Polo Flat

Receptor:

Residential properties in South West Cooma.

View type:

Background view.

Landscape Character Zone:

- LCZ 4

Design Elements:

- 01 - Segment Factory

Sensitivity	Magnitude	Impact
HIGH	LOW	MODERATE
The combination of a large number of residential viewers with varied topography and vegetation cover makes this view highly sensitive to change.	The primary visual effect on this view would be as a result of 24/7 operation. The factory itself would be hard to discern due to distance and intervening land form and vegetation.	

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5.1.7 Viewpoint 05

Location:

Snowy Mountains Highway, Cooma, looking northeast over the Saleyards toward Polo Flat

Existing Conditions:

Local residency along Snowy Mountains Highway that looks across to Cooma Saleyards, with a mix of native and exotic mature tree plantings.

Receptor:

Vehicles accessing Cooma to the north and Nimmitabel to the South via Snowy Mountains Highway & Residential properties along Snowy Mountains Highway.

View type:

Background view.

Landscape Character Zone:

- LCZ 3

Design Elements:

- 01 - Segment Factory

Sensitivity	Magnitude	Impact
LOW	LOW	LOW
This view is a visually cluttered combination of existing land use and vegetation. Detracting elements include the Sale Yard holding pens and flood lighting, as well as power lines. This view would have a low sensitivity to change.	The primary visual effect on this view would be as a result of 24/7 operation. The factory itself would be screened by vegetation and the ridgeline and therefore would have a LOW magnitude.	

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5.1.8 Viewpoint 06

Location:

Carlaminda Road looking west toward Polo Flat

Existing Conditions:

Open agricultural lands, industry associated with irrigation and Monbeef, built elements including power and a mature treeline on the background ridge.

Receptor:

Vehicles accessing Cooma to the west and Carlaminda to the east via Carlaminda Road & Residential properties along Carlaminda Road.

View type:

Background view.

Landscape Character Zone:

- LCZ 2

Design Elements:

- 01 - Segment Factory

Sensitivity	Magnitude	Impact
MODERATE	LOW	**MODERATE-LOW**
The combination of varied topography the rural setting with views toward the attractive mountains backdrop and the undulating landform makes this view moderately sensitive to change.	The primary visual effect on this view would be as a result of 24/7 operation through traffic access, noise and light spill	

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5.1.9 Viewpoint 07

Location:

Carlaminda Road looking north toward the Cooma/Polo Flat Airport

Existing Conditions:

Open flat plains with natural grasslands bordered by industrial businesses to the west, built elements including fencing and power poles and an existing building onsite.

Receptor:

Vehicles accessing Cooma to the west and Carlaminda to the east via Carlaminda Road & Residential properties along Carlaminda Road.

View type:

Foreground view.

Landscape Character Zone:

- LCZ 2

Design Elements:

- 01 - Segment Factory

Sensitivity	Magnitude	Impact
MODERATE	HIGH	**HIGH-MODERATE**
The view provides open plains that cannot absorb change easily. The attractive rolling grasslands with farm buildings provide a foreground to the scenic mountain backdrop. This combination of varied topography, the rural setting and proximity to similar land use on the western fringes, makes this view moderately sensitive to change.	The magnitude of the view is High due to the large footprint and height of the factory and storage area that will be seen from this observer viewpoint. The new works would be prominent and substantially uncharacteristic with the existing visual character from the view.	

05

5.1.10 Viewpoint 08

Location:

Polo Flat Road looking east toward the Cooma/Polo Flat Airport

Existing Conditions:

Industrial storage areas, built elements including fencing, power poles and storage containers.

Receptor:

Vehicles accessing the Polo Flat industrial area and businesses along Polo Flat Road.

View type:

Background view.

Landscape Character Zone:

- LCZ 3

Design Elements:

- 01 - Segment Factory

Sensitivity	Magnitude	Impact
LOW	MODERATE	**MODERATE-LOW**
The view from this observer point over natural grassland, the existence of built elements and the proximity to existing industrial landuse in the east and influences the sensitivity. This view would have a low sensitivity to change.	The magnitude of the view is Moderate due to the large footprint of the factory and storage area that will be seen from this observer viewpoint. While the new works would be prominent, it would not be substantially uncharacteristic with the existing visual character from the existing view.	

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5.1.11 Viewpoint 09

Location:

Polo Flat Road looking south-east toward the Cooma/Polo Flat Airport

Existing Conditions:

Fringes of an industrial area to the south, built elements including fencing, power poles and an airstrip to the east.

Receptor:

Vehicles accessing the Polo Flat industrial area and businesses along Polo Flat Road.

View type:

Foreground view.

Landscape Character Zone:

- LCZ 3

Design Elements:

- 01 - Segment Factory

Sensitivity	Magnitude	Impact
MODERATE	MODERATE	**MODERATE**
This view is located within an existing industrial area however is still predominantly an underdeveloped mix of rolling hills and areas degraded by industrial uses. The open exposed topography offers limited potential for screening, resulting in the view being moderately sensitive to change.	The whole project would be visible. Due to a combination of many horizontal project elements and distance reducing the size of the project elements, the magnitude would be moderate.	

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5.1.12 Viewpoint 10

Location:

Yamba Crescent, looking south toward the Polo Flat industrial area & Cooma/Polo Flat Airport

Existing Conditions:

Local residencies looking south east, partially screened by mature exotic trees. Build elements including fencing and buildings associated with industrial land use.

Receptor:

Residencies along Yamba Crescent

View type:

Background view.

Landscape Character Zone:

- LCZ 4

Design Elements:

- 01 - Segment Factory

Sensitivity	Magnitude	Impact
HIGH	MODERATE	HIGH-MODERATE
The combination of a large number of residential viewers with varied undulating topography and a mix of industrial buildings and sheds makes this view highly sensitive to change.	This element will be partially screened by the mature vegetation that exists between the residencies and the existing industrial presence. The primary effect on this view would be as a result of 24/7 operation through light spill.	

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5.1.14 Viewpoint 11

Location:

Polo Flat Road looking south toward the Polo Flat industrial area & Cooma/Polo Flat Airport

Existing Conditions:

Local residencies in the vicinity to the south with mature native and exotic trees. Built elements including buildings associated with industrial land use and power poles.

Receptor:

Vehicles accessing the Polo Flat industrial area, Cooma, businesses and residencies along Polo Flat Road.

View type:

Foreground view.

Landscape Character Zone:

- LCZ 2

Design Elements:

- 01 - Segment Factory

Sensitivity	Magnitude	Impact
LOW	LOW	LOW
The sensitivity of the view is Low given the ability for this viewpoint to absorb change being high. The view from this observer point over mixed vegetation, undulating topography, the interplay with existing industrial landuse in the distance, adjacent to the new works influences the sensitivity.	The magnitude of the view is low due to the existing screening by vegetation between the proposed factory and the observer point. The new works would not be substantially uncharacteristic with the existing visual character from the existing view. The primary effect on this view would be as a result of 24/7 operation through light spill.	

05

5.1.15 Viewpoint 12

Location:

Cooma North Reserve near Doondoo Place looking south-east toward the Polo Flat industrial area & Cooma/Polo Flat Airport

Existing Conditions:

Dense native and exotic trees within the reserve, rugged terrain of dense forest screening the Polo Flat area. Residencies that sit nestled in below the tree canopies.

Receptor:

Bush walkers within Cooma North Reserve & Residencies along the fringes of Cooma North Reserve.

View type:

Long distance view.

Landscape Character Zone:

- LCZ 4

Design Elements:

- 01 - Segment Factory

Sensitivity	Magnitude	Impact
MODERATE	LOW	**MODERATE-LOW**
The combination of a large number of residential viewers with a mix of attractive woodlands and rolling topography contrasting with the quality of the building stock detracts from the view. Making this view moderately sensitive to change.	The magnitude of the view is low due to the existing screening by dense vegetation between the proposed factory and the observer point. The primary visual effect on this view would be as a result of 24/7 operation through light spill.	

05

5.2 Visual Impact Assessment Summary

The visual impact assessment of the Polo Flat Segment Factory, found that the project would result in a range of visual impact ratings on the selected 12 viewpoints including:

• Two viewpoints would have Low visual impact

• Three viewpoints would have Moderate-Low visual impact

• Five viewpoints would have Moderate visual impact

• Two viewpoints would have High-Moderate visual impact

Higher impact ratings occur in closer proximity and where there is no screening from landform, vegetation or dwellings to clearly expose the project in this greenfield setting; where earthworks and landform changes would be prominent; or 3 dimensional project elements such as buildings, fencing or the batching plant are clearly visible.

The Low to Moderate-Low ratings occur in areas of lower sensitivity, for example the Polo Flat industrial area.

Based on this assessment a series of landscape and urban design mitigation strategies have been developed, in order to assist in the mitigation of the proposed factory and associated elements. These are discussed in the Chapter 6.

5.2.1 Visual Impact summary of Polo Flat Segment Factory

Viewpoint Number	Sensitivity	Magnitude	Impact
1	HIGH	LOW	MODERATE
2	MODERATE	LOW	MODERATE-LOW
3	HIGH	LOW	MODERATE
4	HIGH	LOW	MODERATE
5	LOW	LOW	LOW
6	MODERATE	LOW	MODERATE-LOW
7	MODERATE	HIGH	HIGH-MODERATE
8	LOW	MODERATE	MODERATE-LOW
9	MODERATE	MODERATE	MODERATE
10	HIGH	MODERATE	HIGH-MODERATE
11	LOW	LOW	LOW
12	MODERATE	LOW	MODERATE-LOW

Table 11. Visual Impact summary

Mitigation Strategies

Section 06

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06 Mitigation Strategies

6.1 Introduction

This section presents a series of measures to prevent, avoid, reduce and where possible, offset or remedy the potential landscape character and visual impacts of the project, in order to maintain the amenity, recreation value and conservation value of Cooma and Polo Flat.

Best practice impact mitigation follows a hierarchy that should be applied at each stage of a project and includes

- Prevention/avoidance
- Reduction
- Offset
- Remedy.

Prevention or avoidance is generally a more effective and therefore better option to reducing the potential impacts of a project than remediation following construction, or compensation, either locally or elsewhere. Prevention or avoidance is most effectively achieved during the design phases of the project, though construction processes can also influence the extent, duration and magnitude of impacts experienced during the construction phase.

For both the design and construction phases, measures and processes need to ensure both their effectiveness in mitigating adverse effects and their appropriateness in terms of fit with the existing landscape and visual character.

Mitigation measures for Polo Flat Segment Factory can fall into two categories:

- Primary measures
- Secondary measures

Primary measures are preventative measures and are best developed through an iterative design process that embeds the need for visual and landscape character impact mitigation into the project design process.

Secondary measures address residual adverse impacts that remain after primary measures have been incorporated into the design. They include measures to offset or remedy the identified impacts.

6.2 Primary Mitigation Measures

A number of primary mitigation measures have been incorporated in the project design. They include decisions made concerning site selection, access, layout and the locations and design of infrastructure elements. Potential landscape character and visual impacts are one of a wide series of constraints considered during this process.

6.3 Secondary Mitigation Measures

The following outlines a series of measures recommended for consideration and possible integration during further design development of the project, in order to minimise the impacts identified in Section 04 and Section 05.

Materials and finishes

As the proposal introduces additional built elements and hard surfaces into Polo Flat, it is important that they are designed to complement, and where possible, recede into the surrounding landscape, in order to maintain the amenity and visual values of the area.

Examples include:

- The use of non-reflective paint should to avoid glare and surface reflectivity as they increase the visual prominence of structures
- The use of dark colours is preferred as they are usually better absorbed within natural areas. Greens should be avoided. Greys and charcoal colours generally provide less visual contrast to the colours of the Australian landscape and complement the hues of the alpine environment
- The use of textures in particular of large surfaces reduces the contrast between built elements and the surrounding (textured) natural environment and reduces the potential for glare. Examples include shot-blasting or ribbing of concrete to create shadows and patterns and can result in reducing the perceived scale of new elements

Lighting

- Design lighting (including flood lighting) during both construction and operation to avoid spill that might affect sensitive areas or receivers.
- Design lighting in accordance with AS4282-1997 Control of obtrusive effects of outdoor lighting to minimise light spill and adverse impacts from 24/7 operation.