

17. Landscape character and visual amenity

This chapter provides a summary of the landscape and visual impact assessment undertaken for the Project. A copy of the full assessment report is provided in Appendix K.

17.1 Methodology

An analysis of aerial photography and existing mapping information, including GIS and topographic maps, was undertaken to identify representative publicly accessible viewpoints, potentially affected receptors and potential local landscape character and visual context areas for site assessment purposes.

A site evaluation was then undertaken in December 2008 to verify the results of the desktop study and provide more detailed information about the site and likely impacts. Publicly accessible and representative viewpoints were confirmed, recorded and photographed.

A qualitative assessment of landscape and visual impacts of the project was then undertaken (see Section 17.1.1).

Simulations were also prepared to represent changes (potential impacts) to landscape character and/or visual amenity that were considered important by the assessment.

Appendix K explains further how the impact, sensitivity and level of significance were assigned.

17.1.1 Qualitative assessment of impacts

Landscape impact

Landscape impacts refer to the relative capacity of the landscape to accommodate changes to the physical landscape of the type and scale that would occur as a direct result of the Project, through the introduction of new features or loss/modification of existing features. Impacts have been assessed from publicly accessible viewpoints and consider (through professional judgement) the scale, or magnitude, of change including:

- ▶ The extent to which the change (modification, removal and / or addition) of landscape features alters the existing landscape character;
- ▶ The extent of area within which the effect is evident;
- ▶ The duration of the effect (short / medium / long term, permanent/temporary);
- ▶ The physical state (or condition) of the landscape and its intactness from a visual, functional, and ecological perspective. This includes consideration of the condition of landscape elements (*eg.* groups of features within the soft landscape including roadside planting, open space, recreational facilities, creek lines, tree, bush blocks), or features (*e.g.* prominent eye-catching elements such as a distinctive building, significant mature specimen tree, lookout point, etc) and their contribution to landscape character. Individual features and elements make up the character of a place and influence how the landscape is experienced; and
- ▶ The likely effectiveness of any proposed mitigation.

Assessment definitions used to describe this assessment are presented below in Table 17.1.

Table 17.1 Assessment of landscape impact

Landscape Impact	Definition
Large	A substantial / obvious change to the landscape due to total loss of, or change to, elements, features or characteristics of the landscape. Cannot be mitigated.
Moderate	Discernible changes in the landscape due to partial loss of, or change to the elements, features or characteristics of the landscape. May be partly mitigated.
Small	Small / minor changes in the landscape due to minor loss of, or change to the elements, features or characteristics of the landscape. Change may be mitigated.
Negligible (no perceivable impact)	Almost imperceptible or no change in the view as there is little or no loss of / or change to the elements, features or characteristics of the landscape.

Visual impact

Visual impacts arise from changes in views of the landscape that occur as a result of the project. Visual impact is determined through the objective assessment of *sensitivity* of the visual receptors (i.e. residents, transport route users, outdoor recreational users) and the magnitude (scale) of the change in view. Sensitivity is dependent upon receptors': location; the importance of their view; their activity (i.e. working, recreating, passing through) and expectations; available view, and; the extent of screening of this view. Factors that have been considered in assessing the magnitude of change in view/visual amenity of receptors include:

- ▶ Interest in the visual environment and their distance/angle of view to the source of the impact.
- ▶ The extent of screening / filtering of the view.
- ▶ Magnitude of change in the view (i.e. loss/addition of features that change the view's composition).
- ▶ Integration of changes within the existing view (form, mass, height, colour and texture).
- ▶ Duration of the effect (temporary/ permanent, intermittent/ continuous).
- ▶ Effectiveness of proposed mitigation.

Receptor sensitivity definitions used to describe this assessment have been outlined in Table 17.2.

Table 17.2 Assessment of receptor sensitivity

Sensitivity	Definition
High	Occupiers of residential properties with long viewing periods, within close proximity, whose interest is focussed upon their surrounding landscape and its amenity, and who value their landscape setting. Users of outdoor recreational facilities including nature reserves, and nature recreation (walking, horse riding trails, water based activities such as swimming and fishing) where their attention is focussed on the landscape and its amenity. These viewers go to such sites specifically for their perceived value of its views and amenity.

Sensitivity	Definition
	Communities that place value upon the landscape and enjoyment of views of their landscape setting.
Medium	Workers on farms with a focus on their activity / work, and that may have discontinuous/intermittent views of the study area. Outdoor recreation facility users (i.e. sporting ovals, tennis courts, cricket nets, children's play equipment) where their attention is focussed upon a particular activity (i.e. sport). Occupiers of residential properties with long viewing periods, at a distance from or screened from the study area.
Low	Road users in motor vehicles, trains or on transport routes that are passing through/adjacent to the study area and therefore have short term views and are generally not focussed on the landscape. Viewers indoor at their place of work/volunteering where they are engaged and focussed on a particular activity (e.g. the Bushfire Brigade).

Significance of impact

For the purposes of this report, predicted impacts as a direct result of the project have been described according to their significance (severity). Significance of impact has been determined in accordance with Table 17.3. Only impacts judged to be of '*major significance (adverse)*' or '*highly significant (adverse)*' have been considered as 'significant' for the purposes of this project. Significance of impact may be beneficial or adverse.

Table 17.3 Significance of Impact

		Landscape Impact			
		Large	Moderate	Small	Negligible
Visual Sensitivity	High	Major Significance	High Significance	Moderate Significance	Minor Significance
	Medium	High Significance	Moderate Significance	Minor Significance	Not significant
	Low	Moderate Significance	Minor Significance	Not significant	Not Significant
	Negligible	Minor Significance	Not significant	Not significant	Not significant

17.2 Existing environment

17.2.1 Existing visual character of the study area

Situated in the Southern Highlands of New South Wales, the Project is proposed to be constructed from Wingecarribee Reservoir, at approximately 670 m AHD to locations at Goulburn, between approximately

640 m and 720 m AHD. The proposed pipeline route is situated in flat to gently undulating terrain for the entirety of its length.

There are limited opportunities for long distance views in the region due to the topography; however these do occur at some locations, including high points on Red Hills Road, Marulan. The flat terrain surrounding the proposed pipeline corridor is in contrast to the steep valleys of the Shoalhaven and Kangaroo River valleys to the south, the steep escarpments surrounding Wollongong and Shellharbour to the east and the Blue Mountains to the north.

Over the 83 km length of the Project, a variety of land use types are encountered, although the majority of the pipeline is through agricultural grazing land. At the eastern end of the Project, the pipeline would run through smaller rural-residential properties and is located close to the southern outskirts of the town of Moss Vale.

Heavily vegetated bushland areas are encountered around Hanging Rock, Red Hills Road and Carrick, with timber plantations located at several sites in this area, however these plantations are generally not in close proximity to the pipeline alignment.

At the western end of the Project, the pipeline would run in close proximity to residential and rural residential properties on the outskirts of the town of Goulburn. Much of the pipeline is proposed to be situated within or directly adjacent to existing service easements. In most cases, these easements are currently cleared of trees.

There is significant variation in typical local vegetation along the 83 km length of the pipeline, with much of this variation due to land use and topography. Much of the route is located in cleared agricultural land, of primarily grasses and improved pasture. Coverage of trees and shrubs in these areas is typically sparse and scattered. Windbreak planting is common along property boundaries, particularly in the eastern section of the Project and consists of a variety of native (e.g. eucalypts) and introduced species (e.g. pines). Where the Project alignment follows existing service easements, these are typically cleared of all vegetation apart from grasses; however in some locations along these easements, regenerating low vegetation is present. In some locations, these cleared easements are flanked by areas of dense indigenous bushland. Pockets of remnant vegetation communities exist, some of which are recognised as endangered ecological communities (EEC).

17.2.2 Potential visual receptors

The main sensitive receivers in the vicinity of activities required for the construction and operation phases of the Project are considered to be mostly residential receivers located along the proposed pipeline corridor. Residential dwellings along the proposed pipeline are typically located on rural properties where housing densities are extremely low. The exception to this, are rural residential properties located along the edge of Goulburn and to the north of Exeter. A small collection of standard residential lots are located to the north of the proposed pipeline corridor near Moss Vale and with some standard residential lots located in the vicinity of the pipeline around Goulburn.

Approximately 60 dwellings are located within 100 metres of the proposed pipeline, with 26 of these located within 50 metres. Two dwellings located approximately 5 metres from the alignment. These dwellings are located on a property located off the Hume Highway west of the second crossing of the Wollondilly River and a standard residential lot located at Goulburn south west of the Goulburn Racecourse.

A few non-residential sensitive receivers have been identified as being located in the vicinity of the proposed pipeline, these land uses are:

- ▶ Tudor House School which is located approximately 1 km to the north of the proposed pipeline near Moss Vale;
- ▶ South Goulburn Primary School which is located approximately 500 m east of the proposed pipeline on the western side of Goulburn; and
- ▶ Illawarra Institute Goulburn TAFE which is located approximately 800 m east of the proposed pipeline on the western side of Goulburn.

17.3 Key visual features of the Project

17.3.1 Pump station

The proposed pump station would be located adjacent to the existing raw water pump station at the Wingecarribee Reservoir. The pump station would occupy an area of approximately 8 m by 15 m and the building would be approximately 5 m tall.

This landscape, with the dam wall and maintained pasture shows much evidence of human modification. The proposed pump station building would be visible within the landscape but would not appear out of character with the existing buildings and infrastructure.



Figure 17.1 The existing pump station located at the Wingecarribee Reservoir.

17.3.2 Pipeline

In the vicinity of the Hume Highway, to the north west and south east of the Highway, views of the pipeline corridor would be experienced by local road users, farm workers and farmers, and the residents of rural properties. The latter are considered to be sensitive receptors as their interest is focussed on the surrounding landscape and its amenity. A description of the visual and landscape characteristics is provided in Table 17.4. Representative views are provided in Figure 17.2.



1. **Glenquarry** (view north on Iona Park Road)



2. **Werai-Moss Vale** (View west from Mount Broughton Road. Proposed pipeline alignment follows powerline easement)



3. **Sutton Forest-Exeter** (View east from Old Argyle Road. Proposed pipeline alignment runs parallel to existing powerline easement)



4. **Paddy's River** (View south west from Inverary Road, Paddy's River. Proposed pipeline alignment follows existing gas easement. Proposed crossing of Paddy's River seen in foreground).

Figure 17.2a **Representative views of the pipeline route across each sector.**



5. **Marulan** (View north east from Red Hills Road, Marulan. Proposed pipeline alignment follows



6. **Towrang** (View east from Towrang Road. Scattered rural residences and scattered

existing gas easement)



7. **Murray's Flat** (View north from end of Murray's Flat Road. Railway line and agricultural land shown with steep, vegetated hillside as backdrop)

vegetation in agricultural landscape shown)



8. **Goulburn** (View north east from Racecourse Drive showing Goulburn Racecourse)

Figure 17.3b **Representative views of the pipeline route across each sector.**

Table 17.4 Summary of baseline conditions for visual and landscape values experienced along the pipeline by pipeline sector

Sector	Landforms	Vegetation	Land Use	Visual context
Glenquarry	Characterised by flat to gently undulating terrain between Moss Vale and the Wingecaribee Reservoir.	Dominated by a rural cleared landscape that is typified by cleared grazing land with scattered trees and shrubs. These areas are highly modified through previous clearing of vegetation, and grazing activities. Windbreak planting is common along property / paddock boundaries in this sector, as is roadside vegetation.	Rural-residential and small rural properties on the outskirts of the town of Moss Vale. Rural land use in this area is dominated by agricultural grazing with some agricultural production occurring, including vineyards. The Wingecaribee Reservoir, at the far eastern end of this sector, is a water storage dam that forms a part of the Sydney water supply. This reservoir is the water source for the Project. Unanderra – Moss Vale railway line.	Modified agricultural landscape, scattered vegetation with views over rolling hills available from some locations within the sector. The views within the Glenquarry sector are experienced by: • Rural residential properties scattered through the study area; • Residents on the eastern outskirts of Moss Vale; • Activity focussed outdoor farm workers / farmers; • Road users, including those on the Illawarra Highway; and • Railway travellers on the Unanderra – Moss Vale railway line.

Sector	Landforms	Vegetation	Land Use	Visual context
Weraï-Moss Vale	Flat to gently undulating landscapes (south of Moss Vale), becoming more undulating towards the Meryla State Forest.	Dominated by a rural cleared landscape that is typified by cleared grazing land with scattered trees and shrubs. Areas of dense native vegetation are present on private land and in the Meryla State Forest in the south east of the sector.	Rural residential and rural land uses including agriculture practices such as livestock grazing and pasture improvement. Small township of Weraï Meryla State Forest which is used for recreation.	Modified landscape characterised by agricultural uses, agricultural landscape, scattered vegetation, with the densely vegetated hills of the Meryla State Forest forming background views from some locations within the sector. Views are experienced by: • Rural and rural residential properties scattered through the study area; • Activity focussed outdoor farm workers / farmers; • Road users; and • Railway travellers on the Southern Highlands railway line.
Sutton Forest - Exeter	Flat to gently undulating terrain.	Rural cleared landscape typified by cleared grazing land with scattered trees and shrubs. Highly modified through previous clearing of vegetation, and grazing activities. Areas of dense native vegetation present on private land and windbreak planting is common. A mix of native and introduced vegetation as street planting and in private residential gardens in town of Exeter.	Rural residential and rural properties. Rural land uses includes agricultural practices such as livestock grazing and pasture improvement. The town of Exeter is located in this sector and comprises residential properties, a railway station, school and several commercial premises; however this town is not located in close proximity to the proposed pipeline. Hume Highway Southern Highlands Railway	Modified agricultural landscape, scattered vegetation, the densely vegetated, with some clear felling in the Penrose State Forest and streetscape views in the town of Exeter. Views within the Sutton Forest - Exeter sector are experienced by: • Rural and rural residential properties scattered through the study area; • Residential properties in the town of Exeter with long viewing periods; • Activity focussed outdoor farm workers / farmers; • Road users, including those on the Hume Highway; and • Railway travellers on the Southern Highlands railway line.

Sector	Landforms	Vegetation	Land Use	Visual context
Paddy's River	Gently undulating and hilly terrain. Several river valleys run through the area.	Densely vegetated, indigenous bushland. The Penrose State Forest, predominately planted with introduced pine trees and intersected by logging tracks, is a heavily modified landscape Rural landscape of cleared grazing land with scattered trees and shrubs	Timber harvesting purposes (including part of the Penrose State Forest). This forest is also used for nature based recreation activities such as walking and mountain biking. Cleared and uncleared rural properties. A quarry operates to the south of the Hume Highway at Hanging Rock. A gas easement runs across the length of this sector, and has been cleared. This easement is largely surrounded by dense bushland. The Hume Highway also runs through this sector.	Modified agricultural landscape, scattered vegetation, heavily vegetated areas (including Penrose State Forest), and timber harvesting areas that have either been clear-felled or have new plantings. The quarry on the southern side of the Hume Highway is screened from view by dense vegetation and topography. Views within the Paddy's River sector are experienced by: • Rural and rural residential properties scattered through the study area; • Activity focussed outdoor farm workers / farmers / quarry workers; • Those recreating in the Penrose State Forest e.g. walkers, mountain bike riders (however views to the proposed alignment from this location are screened by vegetation); and • Road users, including those on the Hume Highway.

Sector	Landforms	Vegetation	Land Use	Visual context
Marulan	Gently undulating and hilly terrain. River valleys in the south of the sector drain towards the steep escarpments of the Shoalhaven River. Ridgelines along Red Hills Road, to the north of the Hume Highway, provide elevated, long distance viewing opportunities.	Dense native bushland, cleared agricultural rural land, and scattered patches of native vegetation.	Residential, rural-residential, and rural properties. The town of Marulan has residential development, a railway station and a number of small commercial buildings. The village of Tallong has a small cluster of residences and some small commercial buildings. There is a rural residential area to the north of the town that is surrounded by dense vegetation. A cleared gas easement runs for the length of this sector. Much of this easement is surrounded by patches of dense bushland. The Hume Highway and the Southern Highlands railway line also runs through this sector.	Modified agricultural landscape, scattered vegetation, densely vegetated bushland and streetscape views in the towns of Marulan and Tallong (however these towns are not within visual proximity of the Project). Some long distance views are available from elevated ridgelines along Red Hills Road. Views within the Marulan sector are experienced by: • Rural and rural residential properties scattered through the study area; • Residential properties in the town of Marulan and Tallong with long viewing periods; • Activity focussed outdoor farm workers / farmers; • Road users, including those on the Hume Highway; and • Railway travellers on the Southern Highlands railway line

Sector	Landforms	Vegetation	Land Use	Visual context
Towrang	Flat plains and undulating to hilly terrain. The Brayton Park area, in the north east of the sector is a flat area through which the Wollondilly River runs. A steep ridge line, rising 280m above the river dominates the north west of the sector.	A mix of dense native bushland, cleared agricultural rural land, and scattered patches of native vegetation.	Rural-residential and rural properties. A cleared gas easement runs for the length of this sector. Much of this easement is surrounded by patches of dense bushland. The Hume Highway and the Southern Highlands railway line also runs through this sector.	Views are composed of a modified agricultural landscape, scattered vegetation, densely vegetated bushland and views to the steep terrain to the north west of the sector. This steep ridgeline provides a dominant backdrop in views to the north west. Views within the Towrang sector are experienced by: • Rural and rural residential properties scattered through the study area; • Activity focussed outdoor farm workers / farmers; • Road users, including those on the Hume Highway; and • Railway travellers on the Southern Highlands railway line

Sector	Landforms	Vegetation	Land Use	Visual context
Murray's Flat	The Wollondilly River. The terrain in the north east of the sector is dominated by a steep ridge line that rises from the Wollondilly River valley to more than 800m AHD and continues northwards. A similar ridgeline is located between the Hume Highway bypass and the town of Goulburn. The remainder of the sector is characterised by flat to gently undulating terrain.	Characterised by cleared agricultural land, with areas of dense native bushland present in the north east and the south west of the sector.	Rural-residential and rural properties. Irrigated agricultural production occurs on several properties near the Wollondilly River. The eastern outskirts of the town of Goulburn, including residences, a sporting oval, Goulburn Speedway and a council-run irrigated farm. The Hume Highway and the Southern Highlands railway line run through this sector.	Views are composed of a modified agricultural landscape, scattered vegetation, densely vegetated bushland and views to and from the steep terrain to the north west of the sector. Views within the Towrang sector are experienced by: • Rural and rural residential properties scattered through the study area; • Activity focussed outdoor farm workers / farmers; • Road users, including those on the Hume Highway; and Railway travellers on the Southern Highlands railway line

Sector	Landforms	Vegetation	Land Use	Visual context
Goulburn	The town of Goulburn is located at the confluence of the Wollondilly and Mulwaree Rivers. Gently undulating to flat terrain. A ridgeline rises east of the Goulburn Hilly terrain to the north west of the town, beyond Lake Sooley, and to the north east, beyond Murray's Flats.	Urban landscape planting dominating in Goulburn. The area surrounding the town is largely cleared agricultural grazing land. The Goulburn Woodlands Reserve, on the northern outskirts of the town, is also located in this sector. The reserve is accessed from Progress Street and is classified as an Endangered Ecological Community (EEC).	Goulburn is a large regional town with residential areas, a sizeable commercial district, light industry, schools, a hospital, racecourse and correctional centre. The town provides support services to a large rural district and, as one of the largest rural centres on the Hume Highway, which now bypasses the town, it is regularly visited by those travelling between Melbourne and Sydney. The Southern Highlands railway line runs through this sector.	Views are composed of township / residential views, a modified agricultural landscape, scattered vegetation, and some patches of densely vegetated bushland. Views within the Goulburn sector are experienced by: - Residents of Goulburn township with residential, suburban streetscape views (however the pipeline alignment would not be visible to the vast majority of Goulburn residents) - Residents of rural residential properties surrounding Goulburn with long viewing periods; - Activity focussed outdoor farm workers / farmers; - Road users, including those on the Hume Highway and those travelling through the town; - Railway travellers on the Southern Highlands railway line



17.4 Impact assessment

17.4.1 Construction

The construction of the project would generate temporary visual impacts during the construction period. Impacts would be experienced at the sites for the structures and along the length of the pipeline corridor. During construction works, exposed soils would be visible, along with machinery and equipment required for construction, and the structures under construction.

Viewers that would experience a change in their visual environment are generally likely to view construction activities from a short distance, through scattered vegetation across the gently undulating topography of flood plain areas along the pipeline corridor. Construction activities would be viewed mostly within the context of a largely modified agricultural landscape with existing transport and services corridors.

Construction of the project has the potential to generate visual impacts, primarily due to the proximity and presence of sensitive residential receptors and changes in the landscape within the landscape. However, impacts would be temporary and limited to the construction period.

Activities that would represent a physical change in the existing landscape during construction are as follows:

- ▶ Site lay down areas, site facilities, site office, material (e.g. spoil) and pipe storage areas, haul roads, access roads along a right of way.
- ▶ Temporary fencing and access gates.
- ▶ Site clearance works incorporating: removal and stockpiling of vegetation; breaking out and restoration of existing hard surfacing (eg. road tarmac, rail crossing); and earthworks.
- ▶ General construction activities including: the addition of hoarding and protective fencing and signage; excavations; earthworks; site preparation; construction of the pipeline; construction and fit out of pump station, scour and air valves; soil stripping; soil stockpiling; trenching; drilling and blasting; installation of new pipeline infrastructure and any associated landscaping elements.
- ▶ Off-route impacts on landscape may also arise from physical changes and additional traffic to surrounding road network utilised during construction (eg. loss / trimming of trees to cater for increased road capacity and sight distance, road widening).

The construction site would generally be experienced by a range of viewers, including:

- ▶ Residents with prolonged viewing opportunities that value the amenity of their landscape setting.
- ▶ Moderate numbers of motorists with a passing interest in their visual environment on the Hume Highway, Illawarra Highway, local roads and private roads.
- ▶ Outdoor workers (including farmers, maintenance workers) with a moderate interest in their environment.
- ▶ Nature recreation and activity focussed users (i.e. walking, mountain biking, ball sports and sports pavilion users) and tourists that value the local visual amenity.



Receptors that would experience a change in their visual environment are generally likely to view construction activities from a short distance, through scattered vegetation across varying topography, as described, along the project corridor. Hilly terrain and areas of dense bushland would restrict and screen the scope of views in some areas. Construction activities would be viewed within the context of a largely modified agricultural or bushland landscape with existing transport and service easement corridors.

However, as there are a number of residential receptors within close proximity of the proposed alignment (some of which are immediately adjacent to the proposal), this suggests that they are of high sensitivity.

The main visual impacts likely to be experienced during construction would include:

- Stockpiles (vegetation, topsoil, spoil);
- Vegetation clearance;
- Earth works, construction and installation of project elements;
- The presence of construction vehicles and workers;
- The pipeline construction corridor (up to 20 m wide);
- Open cut creek crossings;
- Additional vehicular traffic generated by construction workers, materials delivery and disposal along adjacent transport routes and associated traffic management;
- Temporary traffic management;
- Rehabilitation / revegetation works;
- Movement of construction machinery, workers and large scale construction equipment;
- Fenced equipment storage compounds and the presence of major and minor site facilities such as temporary offices and washrooms; lay down areas; pipe stockpiles and associated hard standing;
- The location of these had not been determined at the time of writing this report;
- Off-route impacts (to the surrounding road network) utilized during construction such as traffic calming measures and additional vehicles;
- Vehicles moving materials to/from site, and between construction sites; and
- Workers travelling to/from work, and moving between different areas of the site.



Figure 17.4 View east from Towrang Road showing scattered rural residences and vegetation in an agricultural landscape



Figure 17.5 Indicative photomontage visualisation showing construction phase works from Towrang Road

17.4.2 Operation

Route wide landscape impacts during operation

The following landscape impacts would result scheme wide during operation:

- ▶ A new treeless linear pipeline corridor of 10m width;
- ▶ Wider easements where service easements (e.g. gas, electricity) already exist;

- Replacement / reinstatement landscape planting during the establishment period immediately post construction;
- Permanent loss of some landscape elements/features;
- Permanent loss of some vegetation; and
- Addition of associated above ground pipeline infrastructure / structures including pump station, maintenance access, signage, air and scour valves and any potential pipe bridges over river crossings.

Route wide visual impacts during operation

The majority of receptors identified within the desktop and site assessments would be motorists travelling along roads that cross the proposed pipeline corridor and residents that live in proximity to the project. Other receptors would include agricultural workers and passive and activity focussed recreation users. During operation, the pipeline would generally be an underground linear feature within a largely modified rural environment, much of which already features a cleared service easement. Landform surrounding the scheme and the elevation of built structures would be the key determinants of visibility of the project.

Vegetation clearance would have a localized influence. Views of the project would generally be limited to close receptors and those crossing the pipeline corridor on roads.

Route wide elements or processes that would be visible and/or intrude upon existing visual amenity would include:

- The pump station site at Wingecarribee Reservoir;
- The treeless pipeline corridor width itself of 10 m;
- Occasional access by maintenance vehicles and workers (vegetation, weed & pest management and repair works);
- Replacement planting and any landscape mitigation works (including earthworks); and
- Air valves and scour valves at regular intervals along the pipeline.

Landscape changes outlined above would impact upon the composition of the view.

Summary of visual and landscape impacts

The landscape and visual impacts on the representative viewing locations within each sector along the pipeline have been assessed for the operational phase of the Project. A summary of the assessments is provided in Table 17.5.

Table 17.5 Summary of visual and landscape impacts

Sector	Visible project elements	Landscape impact	Visual impact	Significance of impact
Glenquarry (Wingecarribee Reservoir)	Pump Station: Rectangular building, approximately 8 x 15 m in size, 5 m height. Pipeline: Pipeline (300-	Low adverse landscape impact	The sensitivity of these receptors is assessed as being of low	Not Significant

Sector	Visible project elements	Landscape impact	Visual impact sensitivity	Significance of impact
	375 mm diameter, located underground) and associated infrastructure, scour valves, air valves.			
Glenquarry (Iona Park Road)	Pipeline: Pipeline (300-375 mm diameter, located underground) and associated infrastructure, scour valves, air valves. Clearing of the corridor including roadside trees and scattered trees within would occur during the construction phase, however vegetation clearance would be minimised as far as practicable. This impact would carry on into the operations phase.	Minor adverse landscape impact	The sensitivity of these receptors (residence in close proximity to works) is assessed as being of high sensitivity .	Moderate Significance
Weraí (Mount Broughton Road)	Pipeline (300-375 mm diameter, located underground), scour valves, air valves. Proposed pipeline alignment would follow the existing high voltage (HV) electricity easement.	Negligible adverse landscape impact	The sensitivity of these receptors is assessed as being of medium sensitivity .	Not Significant
Sutton Forest-Exeter (Old Argyle Road)	Pipeline (300-375 mm diameter, located underground), scour valves, air valves, and stop valves. Proposed pipeline alignment would run to the south of the existing high voltage (HV) electricity easement.	Small adverse landscape impact	The sensitivity of these receptors is assessed as being of medium sensitivity .	Minor Significance
Paddy's River (Inverary Road)	Pipeline (300-375 mm diameter, located underground, scour valves. Creek crossing earthworks and rock beaching. Proposed pipeline alignment would follow the existing gas easement.	Negligible adverse landscape impact	The sensitivity of these receptors is assessed as being of low sensitivity	Not Significant
Marulan (Red	Pipeline (300-375 mm	Small	The	Minor



Sector	Visible project elements	Landscape impact	Visual impact	Significance of impact
Hills Road)	diameter, located underground), scour valves, air valves. Proposed pipeline alignment would follow the existing gas easement.	adverse landscape impact	sensitivity of these receptors is assessed as being of medium sensitivity	Significance
Towrang (Towrang Road)	Pipeline (300-375 mm diameter, located underground, scour valves, air valves). Proposed pipeline alignment would follow the existing gas easement. Major waterway crossing (Wollondilly River)	Negligible adverse landscape impact	The sensitivity of these receptors is assessed as being of high sensitivity	Minor Significance
Murray's Flat (Murray's Flat Road)	Pipeline (300-375 mm diameter, located underground), scour valves, air valves. Proposed pipeline alignment would run between the existing gas easement and the rail corridor.	Negligible adverse landscape impact	The sensitivity of these receptors is assessed as being of medium sensitivity	Not Significant
Goulburn (Racecourse Drive)	Pipeline (300-375 mm diameter, located underground), scour valves, air valves.	Small adverse landscape impact	The sensitivity of these receptors (particularly residents) is assessed as being of medium sensitivity	Minor Significance
Goulburn (Goulburn Woodlands Reserve)	Pipeline (300-375 mm diameter, located underground) New cleared easement through Goulburn Woodlands Reserve	Moderate adverse landscape impact	The sensitivity of these receptors (particularly residents) is assessed as being of high sensitivity	High Significance



17.5 Summary of impacts

The construction of the Project would generate visual impacts during the construction period. Impacts would be experienced at the sites for the structures and along the length of the pipeline corridor. Construction impacts would be primarily due to the proximity and presence of sensitive residential receivers. However, the impacts would be temporary and limited to the construction period.

Operational impacts of the project would occur as a result of:

- ▶ The introduction of new structures in the landscape at the pump station and associated access arrangements;
- ▶ The linear pipeline corridor, which would need to remain free of trees and shrubs to maximum of approximately 10 m wide; and
- ▶ Addition of associated pipeline infrastructure/structures, including maintenance access, signage, air and scour valves, which would increase the number of permanent static elements.

The pump station and the pipeline easement would be the main visual elements of the project and would have moderately significant adverse landscape and visual impacts.

17.6 Mitigation measures

17.6.1 Construction phase

A CEMP would be prepared for the Project detailing plans and systems to be put in place to minimise potential environmental impacts of the construction works and without causing undue disruption to existing receptors. The CEMP would allow works to be carried out in accordance with statutory legislation, to an acceptable quality and to keep disruption to a minimum.

The CEMP would contain the following standard project controls relating to the management of landscape character and visual amenity:

- ▶ Avoid loss or damage to landscape features, including minimisation of vegetation clearance, particularly in environmentally sensitive areas (e.g. forest, creek crossings, trees that contribute to landscape setting, endangered habitat). Where possible, protect trees prior to construction and/or trim trees to avoid total removal. This includes vegetation that makes a significant and positive contribution to landscape character and/or has significant value in terms of biodiversity;
- ▶ Temporary hoardings, barriers, traffic management and signage would be removed when no longer required;
- ▶ Lighting of compounds and works sites would be restricted to negotiated working hours and those that are necessary for safety and security only;
- ▶ Storage facilities, construction plants, stockpiles and access roads would be located away from residences and recreational areas, where practicable;
- ▶ Materials and machinery would be stored tidily during the works;
- ▶ Roads providing access to site compounds and works areas would be maintained free of dust and mud as far as reasonably practicable;

- ▶ Where possible spoil would be re-used on site. Alternatively, upon completion of construction, all remaining spoil and construction materials would be removed to a suitable location;
- ▶ Appropriate soil erosion prevention techniques would be employed and maintained until the area is restabilised;
- ▶ Appropriate measures will be taken in order to minimise airborne dust and associated visual impacts;
- ▶ 'Making good' at the end of construction would include grading of earthworks to tie into the existing site contours to ensure new earthworks integrate as seamlessly as practicable with the existing landform;
- ▶ Where pipeline valves must be located in close proximity to residences and there is a resulting adverse impact on landscape character or the visual amenity of residents, consider screening of valve structure using low shrubs and grasses; and
- ▶ Vegetation rehabilitation, replacement planting and encouragement of natural regeneration to the pipeline corridor extents (i.e. to the edge of the 10 m tree clearance zone) and at key locations *outside* the pipeline easement (to be negotiated with land owners). This would optimise visual protection of receptors from above ground structures (i.e. screening and integration). New planting would consider appropriateness to local character and to enhance local biodiversity and habitat value.

Pump station

The proposed pump station cannot be completely mitigated from visual impacts due to the nature and location within the landscape; however it would be located adjacent to existing infrastructure and as such the overall impact is expected to be low.

The detailed design would include the provision of a landscape management plan that would aim to reinforce local landscape character and sense of place, environmental values (e.g., biodiversity, habitat value, water quality, soils, ecological systems) visual amenity and local distinctiveness. The landscape management plan would outline management of trees and landscape across the site, post construction, reinforcing enhancement and rehabilitation strategies. This may include: tree works; mulching; reinstatement and site preparation; and; treatment of weed control areas.

This landscape plan would address the requirements of the Wingecarribee Shire Council's Development Control Plan (DCP) No. 53, related to the 'Siting, Design and Landscaping of Rural Developments' for the pump station due to its location at the Wingecarribee Reservoir.

17.6.2 Operation phase

Impacts associated with the operation of the Project are limited to the ongoing rehabilitation of the pipeline construction corridor. As such, the mitigation measures are limited to the following:

- ▶ Maintain and monitor sediment and erosion control post construction until such time that the impacted area has stabilised through vegetation or otherwise; and
- ▶ Continue rehabilitation of the pipeline construction corridor to meet agreed rehabilitation standards.