

7. Social and Economic Considerations

This chapter assesses the impacts of the proposed transmission line on the quality of life along the corridor, visual impacts of the line, and the benefits associated with increased employment and expenditure in the region.

7.1 Land Ownership

During the preliminary project stages of assessing possible transmission line corridors (discussed in Chapter 3), detailed studies were undertaken on three corridor options located in the north, central and southern parts of the study area. Land ownership was one of the many factors considered in assessing the options. One measure of land ownership that was considered at this preliminary stage was the number of dwellings that could be identified within each corridor option. In that respect it was noted that the original northern corridor contained 57 private dwellings, with a northern corridor variation (Ulan and Beryl) containing 91 and the Wollar Variation containing 47. The southern corridor contained 69 private dwellings and the central corridor 85. The Northern Corridor Wollar Variation was ultimately selected.

The easements required for the proposed transmission line will affect 57 private landowners. This is the bulk of the route and comprises land held in private ownership as individuals, or as companies (both private and public). This category includes mining interests, which notably accounts for 25.5 km or 22% of the total line length of 117 km. Approximately 26 km or 30% of the line route across private land runs parallel to an existing lower voltage transmission line.

The small proportion of non-private ownership, around 2% of the route length, is made up of a total number of 98 separate sites. This publicly owned land is held by Department of Lands (Dubbo Office), Forests NSW, Mid-Western Regional Council, Rural Lands Protection Board and the Department of Primary Industries and Mineral Resources. TransGrid's Property Group is undertaking investigations of these publicly owned lands to identify any existing native title rights and interests. The lands investigated include a water reserve, a traveling stock route, a State Forest, a Trig Station, a number of creeks and creek access, Crown Land and land held by entities related to the Crown.

7.2 Surrounding Land Uses and Impacts

The proposed transmission line is located in an agricultural region. The principal existing land uses in the region are:

- ☐ agriculture activities including grazing and horticulture;
- ☐ tourism;
- ☐ residential development including towns, villages and rural residential areas;

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- ☐ recreational uses including National Parks and Nature Reserves;
 - ☐ forestry; and
 - ☐ extractive industries.

7.2.1 Mining and Resources Recovery

The line traverses the Ulan to Wilpinjong coal belt. The location of the line in this section has required detailed discussions with several mining interests including Ulan Coal, Excel Mining (Wilpinjong Coal Project) and White Mining (Moolarbin Coal Project). The proposed alignment shown in the Project Route Plans has been agreed with these separate mining interests. Factors that were taken into account included:

- ☐ Avoid future coal sterilisation;
- ☐ Minimise impacts on existing mine infrastructure;
- ☐ Avoid interaction with future mine infrastructure; and
- ☐ Minimise the impacts on any ancillary activities such as habitat compensation areas.

These factors were satisfied primarily by locating the line as close as possible to the existing railway line and Ulan-Wollar and Ulan Roads creating a confined service corridor. The line deviates from this corridor only when the Wilpinjong Creek and road/rail narrow and bend around a spur leaving no room without risk of impacting the sensitive creek line. There is also a minor deviation to allow for future deviation of Ulan-Wollar road to allow for future infrastructure associated with Moolarbin Coal Project.

7.2.2 Agricultural Suitability

The Department of Agriculture defines agricultural stability in five classes, taking into account biophysical parameters (climate, topography, soils) social factors (labour availability, land tenure) and economic considerations (production potential, long-term viability, return on capital and present land use).

Class 1: includes arable land suitable for intensive cultivation where constraints to sustained high levels of agricultural production are minor or absent.

Class 2: Arable land suitable for regular cultivation for crops, but not suited to continuous cultivation. It has a moderate to high suitability for agriculture but edaphic (soil factors) or environmental constraints reduce the overall level of production and may limit the cropping phase to a rotation with sown pastures.

Class 3: Grazing land or land well suited to pasture improvement. It may be cultivated or cropped in rotation with sown pasture. The overall production level is moderate because of edaphic or environmental constraints. Erosion hazard, soil

structural breakdown or other factors, including climate, may limit the capacity for cultivation and soil conservation or drainage works may be required.

Class 4: Land suitable for grazing but not for cultivation. Agriculture is based on native pastures or improved pastures established using minimum tillage techniques. Production may be seasonally high but the overall production level is low as a result of major environmental constraints.

Class 5: Land unsuitable for agriculture, or at best suited only to light grazing. Agricultural production is very low or zero as a result of severe constraints, including economic factors which prevent land improvement.

An additional class may occasionally be used where land has some special feature which allows a special crop to be grown (eg. bananas and other tropical horticultural tree crops).

Transmission lines in general have little effect on grazing land. Some restrictions are placed on certain machinery used in cropping and cultivation while some horticultural activities may also be affected. Therefore, Class 1 and 2 land are more relevant when assessing the impact on agriculture.

Extensive areas of moderate to steep hill country are classified as Class 4 land. These lands are suitable for grazing, but not for cultivation, while Class 5 land is only suitable for rough grazing or is land not suited to agriculture. Class 5 lands are confined to steep, mountainous country.

The majority of the land along the line is classified Class 3 - grazing land, and there would be no impediment to the ongoing land use as a result of the proposed transmission line.

Impacts of the Proposed Line

With the majority of the line passing through grazing and forested country, the precise location of structures has been determined in consultation with landholders.

During the construction of the transmission line, a number of potential impacts on agricultural practices are possible. Potential impacts may include:

- ☐ damage to soil structure and vegetation cover due to the use of heavy transportation machinery, particularly under wet conditions;
- ☐ damage to existing crops due to machinery;
- ☐ impacts of helicopters on trees during stringing (associated with the possible removal of flowers or fruit);
- ☐ soil erosion due to excavation associated with structures and access tracks;
- ☐ impacts on planning of future cropping re layout and additional plantings;
and

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- ☐ general easement restrictions such as the height of machinery that can be used under the line.

Detailed discussions will continue to be held with the landholders regarding the location of access routes and the timing of access and construction. Access routes will be located to minimise inconvenience and damage to crops and paddock layouts, and this will be determined in consultation with the landholders. Landholder advice regarding wet weather conditions should be heeded, to prevent bogged vehicles damaging the soil on properties.

Where access tracks are no longer required following construction, and if requested by the landholder, the tracks will be rehabilitated.

The proposed line will not cause any significant decline in agricultural productivity due to the following factors:

- ☐ the operation of the line will have little effect on the behaviour, health or productivity of livestock;
- ☐ there will be no erroneous easement restrictions that would materially affect current agricultural or horticultural pursuits; and
- ☐ maintenance and the need for line access would be infrequent and this would not interfere with general livestock or pasture management.

There will be some minor impacts on agricultural activities during the construction phase as a result of the movement of vehicles, construction workers and associated machinery along the transmission line corridor. These activities will result in minor and temporary loss of pasture production and some inconvenience to landholders who choose to relocate stock for the duration of the activities.

7.2.3 Weed Controls

The control of noxious weeds during the construction phase has been a major issue raised by the community. A separate weed investigation covering each tower site was undertaken as part of the EIS to identify and assess weed infestation along the route. The results of this investigation are provided in the Project Environmental Management Plan contained at the end of the EIS Volume 1. The following management strategy has been designed specifically for this project and with two main objectives, namely:

- ☐ To reduce weed infestation within the easement; and
- ☐ Avoid the spread of weeds to other properties during construction.

The Noxious Weeds Act 1993 provides a framework for the state wide control of noxious weeds. The weed control program is to be implemented at every location which is disturbed by the activities associated with the transmission line.

Three separate weed management strategies have been developed to cater for different sections of the line. These include existing weed infested properties, areas to be cleared and hence vulnerable to infestation and currently un-infested agricultural land which may have the potential to be impacted by weed seed as a consequence of construction process. The respective strategies are detailed in the following sections, while the nominated protocol for each tower location is provided in the Project EMP.

Existing Weed Infested Properties

There are a number of properties along the alignment that are currently experiencing a weed infestation problem. It is important that the construction program assists in alleviating this problem as far as practicable while at the same time, avoid the spread of these weeds to other properties. For weed infested properties, the following protocol will be followed:

- ❑ At least 28 days prior to construction activities commencing, each weed infested tower site, access track and work area will be sprayed with a general none specific herbicide such as “Grazon” or “Roundup Bioactive” in accordance with manufacturers specifications. This will kill all vegetative material including any pasture grass or natives which may be present.
- ❑ At least 14 days prior to construction activities commencing, areas where soil disturbance will be necessary, such as the tower sites will be again sprayed with an approved soil residual herbicide to kill dormant seeds. The application rate will be determined in accordance with manufacturers specifications to ensure residual effect of no longer than 3 months. This application will be undertaken in close consultation with land owners and alternative treatments that will achieve the same result may be considered if necessary.
- ❑ Immediately prior to construction vehicles entering the property, TransGrid’s Environmental Management Representative will inspect the property to ensure that all visible weeds have been killed. The EMR will determine the need for any additional treatment such as ripping and mulching the site.
- ❑ Construction vehicles working on these properties should remain dedicated to these areas until each work phase is complete. Vehicles which must travel between an identified weed infested property to another property must be clean prior to entering the new property.
- ❑ Once construction activities have ceased, all areas previously sprayed will be sown with a sterile cover crop of oats or rye depending on season. The purpose of this will be to cleanse the paddock prior to sowing the final seed mix. Depending on agricultural activity, the cleansing crop can be co-ordinated with normal cropping and the same species used. For example, if the affected paddock is to be sown with Barley at the same time, this could also be used for the construction area as well.

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- ❑ No later than 12 months after construction has been completed, the final seed mix should be sown. The mix will be determined in consultation with the land owner and will be designed to meet the landowners future intentions for the affected land. This may include an improved pasture mix or native grasses compatible with the surrounding paddocks and grazing stock usage. For cropped land, the seed mix may remain as cereals but not necessarily sterile.

Ongoing maintenance of the treated areas will be required for two years following completion of construction. Maintenance in the form of additional sowing, fertiliser application and spot spraying may be required. Once the work site has been assessed as being weed free and the affects of the construction works have been concluded, no further weed suppression will be necessary.

It should be noted that the long term management of each property will depend on the owner. Subsequent weed invasion will occur if surrounding paddocks remain weed infested. TransGrid's responsibilities do not extend to maintaining areas outside the easement.

Woodland Areas

Whether currently impacted by weeds or not, areas which require clearing will necessitate a change in vegetation structure from woodland to grassland. The clearing process will involve soil disturbance and provide an ideal environment for weed invasion. For these areas, the following protocol has been developed:

- ❑ At least 14 days prior to clearing, the works area should be inspected for weeds, in particular woody weeds and aggressive weeds such as lantana and blackberry. These should be spot sprayed with "Grazon" or equivalent in accordance with manufacturers specifications.
- ❑ Equipment involved in clearing will remain on each property until completed. The equipment will then be washed prior to moving to the next property.
- ❑ Following the completion of the construction works, the cleared area should be sown with a grass seed mix comparable with the surrounding vegetation systems. In general this will include native grasses, however there are some lightly wooded areas to be cleared which currently operate as grazing properties. These areas can have a mix of native and improved pasture and so the easement will be sown in accordance with landowner requirements. Seasonal requirements may affect the actual time for seeding of areas to maximise success of stabilising grasses.
- ❑ Cleared vegetation which will be windrowed may be either burnt or chipped depending upon property owner, seasonal and regulatory requirements. If burnt, the ash can be spread over the cleared area as part of the rehabilitation program. However, if it is chipped it should be removed from site unless otherwise requested by the property owner. This is because mulching

destroys soil nutrients and structure and, once broken down, becomes a high erosion and weed invasion risk.

- ❑ Within 12 months of construction completion, the easement will be inspected and spot spraying of weeds may be undertaken.

Un-infested Construction Sites

The primary objective for these areas is not to introduce weeds to the construction site. This will be achieved by employing two simple methods:

- ❑ Only recently cleaned vehicles may enter the property.
- ❑ Immediately following completion of the construction program, the disturbed area will be sown with a seed mix comparable to the surrounding land.

As with weed infested sites, weed free properties will be inspected 12 months following completion of construction to determine their weed status. This will include inspections of the paddocks surrounding the construction sites to determine if there has been an increase in weed infestation as a result of the project.

7.2.4 Urban Development and Industry

The local population in the vicinity of the line live in both rural and urban settings. The main urban centres along or near the transmission line are Wollar, Wellington, Ulan, Gulgong, Goolma and the denser rural residential development at Cadonia Estate. The population in the region has increased substantially in recent years, resulting in an increase in services and facilities, all of which require additional electricity.

A range of primary and manufacturing industries also operate in the area. These include mining, engineering, steel fabrication and commercial services. In addition, a number of government departments operate in the major town centres.

Rural and urban impacts have been considered in terms of amenity and visual quality. During the route location phase the community made it clear that there was a strong desire for the proposed line to be located away from both population centres and individual residences. The community perceived that there may be a deterioration in visual amenity, issues of safety, health effects associated with EMF, and a reduction in property values along the line.

The proposed line will have some impact on the existing view catchments of towns, villages and subdivision areas.

7.2.5 Agriculture and Horticulture

Numerous agriculture pursuits are carried out in the region, including cattle and sheep grazing, vineyards, crop production and nurseries. The proposed transmission line will not impact or hamper any of these agricultural activities.

7.2.6 Forestry

The only State Forest to be impacted by the proposed transmission line is the Cope State Forest. The proposed line will run along the perimeter of Cope State Forest, just within the tree line for approximately 900 m.

The alignment parallels the existing 132 kV line and although the easement lies within the State Forest boundary, some minor vegetation clearing will be necessary. Approval will be required for the construction and operation of the proposed 330 kV transmission line through the Cope State Forest. The assessment provided in this EIS will form the basis of subsequent approvals from NSW State Forests.

7.2.7 Recreation and Tourism

Tourism is an important feature of the region, attracted by the wineries and vineyards, scenic beauty, National Parks (Goulburn River National Park) and European history of towns such as Wollar and the former goldrush town of Gulgong. Numerous hotels, motels, bed and breakfasts, guesthouses and caravan parks offer accommodation in the region.

Gulgong

Gulgong remains a tourist attraction today as a highly picturesque and well-preserved display of a goldmining settlement. The town consists of single-storey weatherboard, iron, stone and brick buildings with old-fashioned iron-lace verandahs, tiny wooden cottages, horse troughs and hitching rails. The generally antiquated and intimate air also arises from the narrow winding streets which developed as bullock tracks connecting the major mining claims.

Places of interest and tourist attraction in Gulgong include:

- ☐ The Gulgong Pioneers Museum - displays remnants of social and industrial history.
- ☐ The Henry Lawson Centre and Wallaby Track pay tribute to the great Australian poet who lived in the town as a young boy.
- ☐ Red Hill Reserve, Mining Museum and Field Study Centre - A memorial at Red Hill Reserve marks the site of Tom Saunders' original 1870 strike which sparked the goldrush that was the making of Gulgong. An open-air mining museum has been established on the site which includes an old poppet head and shaft, a stamper, a windlass and other pieces of mining equipment.
- ☐ Flirtation Hill Lookout - affords fine views north to Barney's Reef Hills, east to the Great Dividing Range, Home Rule to the south-east and Mudgee to the south.
- ☐ ANZAC Park - has free electric barbecues, toilets and childrens' play facilities. The bandstand is one of the earliest tributes to the ANZACs being erected in 1916, just a year after Gallipoli.

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- ☐ The Drip – a scenic track to a picturesque picnic area.
 - ☐ Hands on the Rock – displays Aboriginal Hand stencils dating back hundreds of years.
 - ☐ Goulburn River National Park – popular for its scenic beauty.
 - ☐ The Gulgong Folk Festival is held in December/January, the annual show in March, the Henry Lawson Festival in June.

The proposed transmission line will not have a significant impact on any of the above.

Wellington

Wellington is the second oldest town west of the Blue Mountains and is a very typical Australian country town. The main street is wide, the town has a large number of monuments to local people.

Tourist attractions and places of interest in Wellington include:

- ☐ Historic Town Walk – a well designed walking tour around town points out the historic places of interest.
- ☐ Oxley Museum – a typical country town museum displaying furniture and equipment from the early 19th century.
- ☐ St John the Baptist's Anglican Church – is the towns oldest surviving church, built in 1867.
- ☐ Montefiores and the Lion of Waterloo Hotel – remaining buildings of a private village known as Montefiores, established in 1840.
- ☐ Cemetery – a huge cemetery containing old headstones dating back as far as 1825.
- ☐ Horse Riding – supervised horse rides at Burrell Creek Trail Rides with scenic views and trips to the nearby Macquarie River.
- ☐ Lake Burrendong – the lake is three and a half times the size of Sydney Harbour, built between 1946 and 1967 to irrigate farmland to the west of the town.
- ☐ Burrendong Arboretum – a 167 ha botanic garden containing 2000 species of Australian trees and wildflowers.
- ☐ Sport and Recreation Centre – contains a large swimming pool, tennis courts, football and cricket fields, sailing, canoeing and other aquatic activities.

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- ☐ Wellington Caves – ancient fossil remains have been found in the caves, today they are a popular tourist attraction.
 - ☐ Bakers Swamp Gallery – located in a 100 year old limestone house.
 - ☐ Mt Arthur Reserve – contains Mt Arthur, the reserve covers 1,300 ha of bushland.
 - ☐ Nangara Gallery – contains a large collection of Aboriginal artefacts from around Australia.
 - ☐ Cobb & Co Heritage Trail – explores the terrain covered by the Cobb & Co route between Bathurst and Bourke.

The proposed transmission line will not impact on local tourism or recreation in the region.

7.3 Visual Amenity

An important consideration in the original route options selection process was visual impacts. There were essentially three corridors considered with some variations. The Southern Corridor would have had the highest visual impact due to the tourism in the area, number of houses and properties, and the clusters of rural-residential settlements in the corridor and within the visual catchment. This was followed by the Central Corridor. The Northern Corridor options had the least visual impact.

The proposed route represents the Northern Corridor Option but was subsequently further refined with the deviation around Cadonia Estate rural residential area. The primary reason for this variation was visual impacts.

Visual impact has therefore played a key role in the selection of the final route alignment for the proposed Wollar to Wellington 330 kV transmission line. The following sections detail the assessment of visual impacts for the project.

7.3.1 Existing Landscape Elements

The transmission line crosses a number of different landscape elements including:

- ☐ Broad acre cropping (flat to gently undulating topography);
- ☐ Grazing (native and improve pasture on flat to gently undulating topography);
- ☐ Grazing on undulating to hilly terrain;
- ☐ Woodland on gently undulating to steeply undulating terrain; and

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- ❑ Infrastructure such as roads, railways, mine related and other transmission lines.

The visual impacts of the line differ according to each landscape, distance from the viewing point, intervening tree or topographic screening and backdrop. To assist in understanding the types of impacts, a series of photo montages have been prepared at various locations along the proposed alignment. These are provided in Volume 3 as Photo Montages 1 to 10.

Commencing at the Wollar switching station, the line traverses open grazing country towards the wooded slopes on the western side of the valley. The line will be visible for short sections from Barigan Road south of Wollar and then again from Wollar Road, particularly near the crossing point. Montage 1 shows structures 18 and 19 as viewed from Wollar Road. This is a sealed road which forms part of the scenic drive through Munghorn National Park, between Mudgee and Wollar.

The line then travels north through open grazing land to Slate Gully Road. The line has been located as close as possible to the existing vegetated background to assist with screening the line. It is also proposed to paint the towers green in this location. A series of photo montages have been prepared (Montages 2a, 2b and 2c) which show views of the line from various vantage points including the closest residence and from Slate Gully Road itself.

There are six residents along this road, some having elevated views from the western side of the valley while others have a closer, direct and at grade view. There is some intervening vegetation screening around some dwellings, but the tower structures feature prominently in the landscape. Distance to residences ranges from 400 m to over 1,000 m with two residences located on the western side of Slate Gully Road being the most highly impacted.

Impact mitigation strategies proposed include:

- ❑ Locating the line as close as possible to the vegetated western slope to assist in backdrop screening;
- ❑ Using dulled conductors;
- ❑ Painting structures numbers 22.1, 23, 24, 25, 26 and 27 green to further assist in screening the towers; and
- ❑ With land owner consent, provide supplementary planting outside the easement to provide intervening screen effect.

The latter strategy will require further negotiation with the land owner and residents and will form part of the final Project Management Plan commitments.

The line then crosses the Ulan-Wollar Road which is shown on Montage 3. In order to cross the road and railway line at a near 90⁰ angle requires three tension

structures, two of which need to be located close to the road. The structure depicted in Montage 3 will be clearly visible to all vehicles travelling between Wollar and Ulan. Although not heavily trafficked, there are no available mitigation strategies available at this location.

The line then essentially follows the road and railway corridor to Ulan Coal Mine. Although visible from the Ulan-Wollar Road, there are several areas of road verge vegetation offering screening and with existing and future mine proposals, the line will represent a minor addition to the landscape.

Montage 3 also shows the view through the Wilpinjong Environment and Conservation Area. Although the area is currently open grassland country and no trees will need to be removed for the transmission line, the area is planned to be revegetated to a woodland community to enhance faunal habitat and movement by linking with remnant vegetation. For this reason, TransGrid will allow Excel Mining to plant suitable native vegetation within the easement so long as conductor clearance is not compromised.

Montage 4 shows the view towards the Ulan Mine surface coal handling infrastructure. The transmission line will only be partially visible from the road due to intervening roadside vegetation and the line does not represent a major new element into the landscape.

As the line travels west parallel to the Ulan Road, views from Ulan Township and public school will be available. These views are depicted on Montage 5. Although there are other similar elements such as the road, railway line and smaller power lines, the new transmission line will be clearly visible. There are few options available to screening the line at this location due to the proximity with other infrastructure.

Ulan Public School is approximately 450 m to the north of the alignment which is still considered foreground views. There is some intervening vegetation around the school, however for the most part, the line will be clearly visible.

The transmission line alignment then crosses Cope Road where some clearing will be necessary. The tower positions are partially shielded however the vegetation clearing will be noticeable to vehicles travelling along Cope Road west of Ulan.

The line then parallels the existing 132 kV Beryl to Ulan transmission line as well as a smaller 22 kV feeder line to Ulan. For this section of the line, the visual impacts will be minor as the cleared easement already exists along with other high voltage transmission structures.

The crossing of Blue Springs Road is shown on Montage 6. Although the line still parallels the existing 132 kV line, there will be a minor incremental increase in visual impact. Some additional vegetation clearing will be necessary and there will be no opportunities to provide meaningful additional vegetation screens.

The lines then diverge when the existing 132 kV line heads to Beryl Substation and the proposed Wollar to Wellington line continues in a westerly direction. The crossing of Barneys Reef Road and then the Castlereagh Highway are shown on Montage 7. Given topographic constraints and the need to maintain conductor clearance over the roads, at least one structure needs to be located close to the road. These structures will be clearly visible to motorists travelling on these roads.

The line then travels over largely cleared agricultural land and has been located to maximise distance from residences. There are several crossings of unsealed feeder roads with the largest being Mebule Road which is shown on Montage 8. At this location, the towers are located 200 m to the east and 300 m to the west. The eastern tower is located almost below the road in the valley while the western tower is located on a ridge. The western tower will be visible for a short section along Mebule Road given its more prominent position. There are no opportunities to screen these towers given the need to maintain conductor clearance.

The line then rejoins the existing 132 kV line from Wellington to Beryl at Mount Molly. Although the parallel option was considered superior, it does impact on properties located along the Uamby Creek Valley. Montage 9 shows the closest residence impacted by the line at Mount Molly. This residence is approximately 260 m away from the proposed line while the existing 132 kV line is 230 m away. Although the line is largely screened from Uamby Creek Road due to existing vegetation outside the easement, there will be additional visual impacts on the Mount Molly Homestead. Given the elevated position of the existing and proposed transmission line, there are no means to further screen the line from the homestead.

The proposed line then traverses undulating terrain with some vantage points from roads. The main one is the crossing of Twelve Mile Road shown on Montage 10. The structures have been located approximately 150 m either side of the road so the towers are not immediately obvious to travellers on Twelve Mile Road. From here the line travels across undulating terrain into Wellington Substation. The section represents the deviation around the Cadonia Residential Estate which was chosen to reduce visual impacts.

7.3.2 Assessment Criteria

In assessing the visual impacts of the proposed line, the visual catchment around the corridor was mapped according to the visual sensitivity of the areas within the catchment and the nature of the development. The visual catchments are shown of **Figures 7a to 7o**.

The visual effect of the proposed transmission line is the result of a complex combination of factors including:

- ☐ the existing visual environment;
- ☐ final visual characteristics of the proposed works;

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- ☐ distance;
 - ☐ topography;
 - ☐ vegetation cover;
 - ☐ visual contrast generated;
 - ☐ number of viewers;
 - ☐ duration of view;
 - ☐ angle of view; and
 - ☐ visual sensitivity.

Existing visual elements - the nature of the existing visual characteristics of the landscape is an important element in considering the impacts of the proposed works.

If the transmission line occurs in an area where there is currently no line, it introduces a new element into the landscape and the potential visual impacts are significantly greater. Placement of a new line in cleared or partly cleared areas results in moderate to low visual impacts due to the variation in form and texture of the visual background. In areas of scattered timber the impacts are low due to the screening effects of the timber. These impacts diminish quickly with distance.

If clearing is required, particularly in areas of dense cover, the impacts become high since the visual contrasts generated in such areas are generally stark and highly noticeable over longer distances. Other issues include the characteristics of backdrop behind the line, and the degree to which the transmission blends into the landscape. The prominence of the transmission line within the landscape also plays a role with structures on dominant ridges and hills being more visible.

Visual characteristics of proposed transmission line - The characteristics of the physical components of the proposed transmission line, when compared with the existing landscape elements, contribute to the visual impact of the development.

The proposed line will primarily consist of lattice structures up to 38 m high in some cases, supporting fibreglass insulators, twin conductors and two earthwires. Conductors and earthwire will be treated during manufacture to produce a dull finish to minimise light reflection and make them more difficult to see. Exact heights of the structures are site dependent and determined on the basis of the local terrain and the loadings on the line. The normal height will be less than 30 m.

Distance - In terms of the visual impact, areas closest to a transmission line are generally subject to the highest degree of visual impact, since the line is clearly visible from such areas.

In general terms, the further the line is located from a point, the lower the visual impact will be. Within the visual catchment view lengths have been divided into foreground (0-0.5 km), within which the transmission line would form a prominent feature in the landscape, middleground (0.5-2 km), within which the transmission line can be readily seen but would not be highly prominent, and background (2-5 km), within which the transmission line is difficult to perceive, even to those who are aware of its location.

Under average light conditions, when the line is located below the sky line and the view to it is unimpeded, the supporting structures and conductors are highly visible within 0.5 km of the line. The line is moderately visible between 0.5 km and 1 km from the line and visible between 1 and 2 km from the line. Over distances greater than 2 km, irrespective of the angle of view, the line becomes difficult to perceive, even to an observer who is aware of the location of the line. If the line is silhouetted against the sky, the visual impacts become greater, particularly at distances less than 1 km from the line.

Topography

- ❑ **High elevations** - Where the line traverses or crosses areas of high elevation, such as ridges, it can be silhouetted against the sky and will consequently have a high visual impact in the area.
- ❑ **Mid-slopes** - when transmission lines are located on mid-slopes, the visual impacts are generally low, due to the varied backdrop of the hillside, which camouflages the line, making it more difficult to see. The line is also prevented from being silhouetted against the sky, again minimising the visual impacts.
- ❑ **Valley floors** - in hilly country, transmission lines placed within valley floors generally have a low visual impact, since the line is tucked into the landscape and is screened from view by the surrounding hills.
- ❑ **Alluvial plains** - when a transmission line crosses an alluvial plain it may have a high, moderate or low visual impact, depending on the distance of the viewer from the line and the nature of intervening visual elements. If the view is uninterrupted, the impacts may be high, since the line is highly visible and possibly silhouetted against the sky. If there is intervening vegetation, the visual impacts are likely to be low, since the line will be screened from view, even over short distances.

Vegetation cover - the amount and nature of existing vegetation in the landscape is very important when determining the visual impact of a transmission line. If the landscape is cleared, the line can be visible for considerable distances. In this case the visual impacts will be high close to the line but will still lessen with distance.

Where scattered vegetation occurs, the impacts are generally low, since scattered vegetation can both camouflage and screen the transmission line. This is also the case when the line is located adjacent to woodland as the timber provides a background screening effect.

If clearing is required for the transmission line in an area of dense vegetation, the visual impacts will be high, as a result of the introduction of a highly contrasting element (ie. the transmission line corridor) into the landscape.

Number of viewers affected - when determining the visual impacts of a transmission line the number of viewers the line will have is taken into consideration. Visual impacts are regarded as higher when a greater number of people are affected by the line.

Duration of view - the duration of viewing also contributes to the visual impacts of a transmission line. Static views (i.e. from residences, recreational areas and tourist lookouts) are regarded as more important than transitory views (i.e. from roads).

Angle of view - Visual impacts also depend on the locations and angles from which the line is viewed. The greater proportion of given vista the transmission line occupies the greater the impact. This is determined by the angle of view and the distance of the line from the viewer.

Visual Sensitivity - visual sensitivity is a measure of the perceived visual impacts on the visual environment, or the ability of an area to absorb the visual impacts of a development. For example, the following environments would be regarded as having different visual sensitivities even though actual impacts may not vary greatly - industrial areas and wilderness areas. The proposed line will have the greatest potential visual impact in areas of high visual sensitivity.

7.3.3 Visual Impacts

The following categories of visual impact were established for the visual assessment, based on the assessment criteria outlined above.

- ☐ high visual impact;
- ☐ moderate visual impact;
- ☐ low visual impact; and
- ☐ negligible visual impact.

The categories above have been used in **Table 7.1** to determine the general visual impacts of the proposed works on the environment. The visual impacts of the proposed development are shown in **Figures 7a-7o** in Volume 3. The existing nature of the environment, the distance from which the line is viewed and the vegetation cover of the area are clearly shown in the table. Other criteria include the duration and angle of view (highway views will be intermittent and of short duration), visual sensitivity and the number of viewers (more viewers look at the line from residential areas than from agricultural areas). While these criteria are not all shown in the tables, they were taken into consideration when determining the mapping of the visual impacts.

Maps of the visual impact along the route of the nominated alignment are shown in **Figures 7a-o**. With respect to the visual impacts on residential dwellings, the mapping of specific residential areas is restricted to urban settlements or rural clusters, defined as concentrations of 5 or more residences in approximately 20 ha or less.

Table 7.1 - Visual Impacts - New Corridor Created

Landscape Element	Distance								
	Foreground Views 0-500 m			Mid ground Views 500-2000 m			Background Views 2000-5000 m		
	Vegetation Cover			Vegetation Cover			Vegetation Cover		
	Open	Scatt- ered	Dense	Open	Scatt- ered	Dense	Open	Scatt- ered	Dense
Highway	M	L	M	M	L	M	N	N	L
Urban areas	H	H	H	M	L	M	N	N	N
Rural residential	H	H	H	M	L	H	N	N	L
Alluvial plain	H	M	H	M	L	H	N	N	L
Mid-slopes	H	H	H	M	L	H	N	N	L
High elevations	H	H	H	H	M	H	N	N	L

H - High visual impact

M - Moderate visual impact

L - Low visual impact

N - negligible visual impact

The greatest potential for visual impact along the line will occur where the line passes close to residents such as along Slate Gully Road. A total of six options were considered in this area and the final alignment places the line as close as possible to the existing treed hillside on the western side of the valley. Mitigation measures proposed are described in Section 7.3.4.

7.3.4 Mitigation Measures

To reduce the visual impacts of the transmission line on the landscape, a number of techniques will be employed. The primary technique was maximising the distance between the line and residents along the route. This was achieved through planning at the route options analysis stage and further refining of the preferred alternative. Other specific measures include the following:

- ☐ colouring all towers green in the Slate Gully Road valley to make them blend in as much as possible with the surrounding landscape;
- ☐ treating the conductors during manufacture to produce a dull finish, minimising light reflection. This will make the conductors more difficult to see. This will be undertaken along the entire length;
- ☐ with the consent of the landowner and in consultation with residents along Slate Gully road, planting selective tree screens designed to reduce direct views towards the line;

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- ❑ placing structures on properties in consultation with landholders to ensure that the visual impacts on individual property owners are minimised; and
 - ❑ Avoiding woodland in the route options and final location of the line which reduces the overall visual effect of the final project.

7.4 Social Impacts

Community profiles for each of the affected local government areas are summarised in Table 7.2.

Comparison of recent census data shows that there has been a steady increase in the population of Mudgee Shire, Merriwa has remained stable while there has been a slight decline in Wellington. A similar pattern has been observed in the employment figures for these areas.

The Mudgee has experienced higher employment growth in the region but there has been an overall drop in unemployment across the region. There has been a general increase in manufacturing industries and service industries and this trend is expected to continue.

The construction of the proposed transmission line will provide some local employment as well as assist local businesses, particularly equipment servicing, contractors, fuel and supplies. It is anticipated however, that the majority of the labour required will be supplied by the successful contractor.

The construction phase will not have a significant positive or negative influence on the local economy or social structure. However, the provision of a reliable electricity supply will benefit both existing and future industries as well as the community.

Table 7.2 – Population Summary of Affected Local Government Areas (Based on Australian Bureau of Statistics Census Data)

	Wellington			Merriwa			Mudgee		
	2001	1996	1991	2001	1996	1991	2001	1996	1991
Total Population	8,239	8,648	9,197	2,339	2,421	2,352	17,682	17,074	16,267
Male	4,045	-	-	1,196	-	-	8,910	-	-
Female	4,194	-	-	1,143	-	-	8,772	-	-
Indigenous Origin	1,075	1,012	749	39	37	12	415	319	131
Male	527	479	353	21	26	9	227	175	61
Female	548	533	396	18	11	3	188	144	70
Median Age	39	36	34	40	38	35	37	35	33
Birthplace									
Australia	7,3165	7,900	8,561	1,1993	2,030	2,182	15,167	14,898	14,621
UK	141	165	210	69	75	80	568	639	590
New Zealand	43	30	46	20	17	18	183	140	158
Netherlands	30	25	28						
South Africa				7					
Italy					11	9			
Germany							78	98	98
Ancestry									
Australian	4,421	-	-	1,072	-	-	8,391	-	-
English	2,788	-	-	908	-	-	6,733	-	-
Irish	803	-	-	274	-	-	2,026	-	-
Marital Status									
Married	3,269	3,530	3,893	1,013	1,034	1,105	7,399	7,385	7,286
Separated	245	267	225	59	63	52	502	451	340
Divorced	440	409	338	144	90	85	1,018	837	619
Widowed	539	555	626	133	148	135	993	985	891
Never Married	1,744	1,658	1,756	491	431	432	3,586	3,200	2,977
Labour Force									
Employed	2,843	2,936	3,051	929	915	972	7,007	6,321	5,992
Unemployed	307	391	617	74	79	91	604	802	1,064
Occupation									
Managers/Admin	594	626	676	222	252	271	918	840	905
Professionals	371	372	322	69	69	68	864	780	605
Assoc Professionals	304	290	201	59	72	44	689	617	394
Trade & related	341	334	396	133	117	122	995	925	938

Table 7.2 – Population Summary of Affected Local Government Areas (Based on Australian Bureau of Statistics Census Data)

	Wellington			Merriwa			Mudgee		
	2001	1996	1991	2001	1996	1991	2001	1996	1991
Clerical/sales/service	361	372	264	87	83	67	816	746	511
Labourers	325	344	356	174	136	182	1,1224	866	748
Industry Employment									
Manufacturing	157	155	115	47	35	21	808	639	561
Construction	127	181	147	61	33	33	380	287	278
Retail/Trade	386	378	378	85	66	86	1,086	1,017	844
Property & Business	162	144	95	26	20	15	394	327	258
Education	226	215	207	57	59	61	483	423	345
Health/Community	328	323	260	45	51	38	544	555	431
Median Weekly Income	\$200-299	\$200-299	\$160-199	\$200-299	\$200-299	\$200-299	\$300-399	\$200-299	\$200-299
Travel to Work									
Train	0	-	-	0	-	-	3	-	-
Bus	9	-	-	7	-	-	13	-	-
Bus & Train	0	-	-	0	-	-	0	-	-
Car	1,556	-	-	459	-	-	4,440	-	-
Bike/walked	235	-	-	101	-	-	542	-	-
Families									
Couple w/ Children	880	-	-	262	-	-	2,128	-	-
Couple w/out Child	859	-	-	281	-	-	1,806	-	-
Single Parents	426	-	-	71	-	-	628	-	-
Other	46	-	-	6	-	-	83	-	-
Dwellings									
Separate Houses	2,956	2,907	2,977	888	829	800	5,783	5,439	4,998
Semi/terrace/townhs	58	91	90	3	0	12	240	199	231
Flat/unit	87	99	127	18	28	22	339	315	250
Other dwelling	76	89	92	16	18	27	261	214	234

7.5 Employment Generation

The operation of the proposed transmission line will not result in any direct significant long term employment opportunities for the local community in the operational phase.

The construction workforce will be a skilled team employed to carry out specialised work. It is anticipated that the workforce employed to undertake this work will include local contractors. This would be for activities such as earthworks, materials provision, installation of gates, construction of access tracks and fence erection.

Local materials will be used for improving the surface of access tracks and pouring concrete foundations. Maintenance facilities and consumables would also be sourced locally.

The construction workforce would also contribute to the local economy through purchasing their food and other daily requirements, which would usually be supplied through towns and villages in the region for up to 18 months.

Some contribution has already occurred in the route solution and EIS preparation stages.

7.6 Accommodation

Arrangements for accommodation would vary according to the preferred practice of the contractors undertaking the work. For those requiring temporary housing, adequate housing is available in local hotels, motels, rented premises or caravan parks. Contractors sometimes set up their own camp or a base for accommodation and material handling.

7.7 Social Amenity Issues

The character of the area along some of the line will not be altered where the proposed line will utilise existing infrastructure easements such as other transmission lines, roads and railway lines as far as possible. In other areas, the corridor will traverse predominantly grazing and rural land where there will be a greater impact.

During the construction of the line there may be some localised effects due to noise and traffic but these will be limited in nature and short term in duration. The impact of traffic on the local community during the operation of the line would be minimal with traffic movements limited to regular line maintenance vehicles.

7.8 Access Issues

Access to each transmission line structure location will be required for plant and equipment necessary for the construction of the line and its ongoing maintenance. Wherever possible, existing roads and tracks will be used, after consent for use of access has been obtained. Where existing access is currently not available, new tracks will be constructed. The location of access has been discussed with each landowner to minimise impacts and maximise the usefulness of the tracks.

Once the construction of the transmission line has been completed, tracks will be removed and rehabilitated, where no longer required by the owner. Tracks required for maintenance will remain.

7.9 Property

7.9.1 Land Use Effects

The proposed transmission line will have few impacts on agricultural activities as described in Section 7.2.2. With the implementation of the recommended mitigation measures, the potential for agricultural activities to be adversely affected will be minimised.

Land located within the proposed transmission line easement may be used for agricultural activities such as grazing and horticulture provided that a minimum 2.5 m clearance between the transmission lines and plantation trees is maintained at all times.

Grazing and cropping land will not suffer any significant decline in productivity as the proposed easement will not be fenced. The supporting structures will occupy an insignificant amount of the total easement area and the land under the line can be cultivated by mechanical means provided that care is taken with machinery used. There is no evidence suggesting that the line will have any adverse effect on the behaviour or productivity of livestock. Maintenance personnel will only need access to the line infrequently and their activities will not interfere with normal agricultural activities.

The visual impact of the transmission line as a new element in the landscape will diminish over time and will become insignificant in most situations.

7.9.2 Compensation Issues

The establishment of an electricity line and access easement confers the right to construct, operate and maintain a transmission line and ensures that future development does not impede access to the line. TransGrid obtains easements for all their transmission line routes and permanent access requirements. Where private lands are crossed by the transmission line or there are permanent access requirements for the line, it is the policy of TransGrid to purchase easement rights by negotiation with the landholder.

TransGrid are finalising compensation agreements with affected landowners by the use of Option Agreements. The Option Agreements allow TransGrid and its

contractors to access properties pending the formal acquisition of easement rights. To date, all access for the purposes of survey and environmental investigations has been undertaken with land owner permission. Compensation for easement acquisition and activities associated with the construction of the transmission line has been assessed by registered valuers, Property Valuation Services. Property consultant Creer Benchmark has been available to discuss the basis of the assessment with landowners throughout the process.

The valuers are qualified members of the Australian Institute of Valuers and are registered to practice as valuers by the Valuers' Registration Board. Compensation is assessed in accordance with the Land Acquisition (Just Terms Compensation) Act 1991, and has regard to the actual affect of the transmission line and access requirements on the current market value of the property.

Once a landholder has agreed to accept compensation, an option fee is paid. After the project is approved, the compensation amount is paid when the easement is registered on the title, with TransGrid meeting reasonable professional fees incurred by the landholder in the process (if any).

Any damage incurred during the construction of the transmission line e.g. damage to fencing, crops, pasture or access roads would be repaired to the landowner's satisfaction, otherwise a monetary settlement would be negotiated. Once all construction and rehabilitation activities are carried out, the landowner would be asked to sign a Damage Release.

An easement would be acquired by compulsory acquisition only where it proves impossible to settle the matter by negotiation, or in cases where the existing Title prevents the normal registration of the easement by way of transfer and grant. Such action does not affect the landowner's right to receive compensation, which in these cases would be determined by the Valuer General, also in accordance with the Land Acquisition (Just Terms Compensation) Act 1991.

In general, the easement right acquired allows TransGrid to construct, maintain, secure and operate the transmission line in the defined easement area. Some limitations are placed on the landholder in regard to the erection of structures or undertaking of activities that could interfere with the operation and security of the line.

7.10 Transmission Line Easements

When working in the vicinity of the easement care needs to be taken, particularly when handling long metal irrigation pipes, ladders, scaffolding poles etc. This also applies to using equipment which, while safe when shut down, may be potentially dangerous when brought into operation.

Within an easement it is not permitted to:

- ☐ construct houses, buildings or other substantial structures;
- ☐ install fixed plant and equipment;

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- ☐ store flammable liquids or explosives;
 - ☐ place garbage, refuse or fallen timber;
 - ☐ fly kites or model aircraft.

In general the space on an easement can be used provided that:

- ☐ unrestricted access is available to transmission structures at all times;
- ☐ adequate precautions are taken to protect transmission structures from accidental damage.

In some cases, such as where the transmission line runs over a gully or depression where the clearance is greater than usual, restrictions on part of an easement may be relaxed. Written advice should be sought from TransGrid to determine if this is the case in any particular instance.

The easements can generally be used to:

- ☐ carry out normal agricultural activities such as grazing and farming;
- ☐ grow trees or shrubs provided sufficient clearance from the transmission line is maintained;
- ☐ store non-flammable materials to a maximum height of 2.5 m;
- ☐ erect minor structures such as clothes hoists, barbeques etc, providing clearances are maintained and metallic parts are earthed;
- ☐ operate mobile plant and equipment provided that sufficient clearances are maintained.

To avoid safety hazards, written permission is required from TransGrid before the following activities can be carried out:

- ☐ burning off;
- ☐ operating mobile plant and equipment where clearances are in doubt;
- ☐ installing utility services such as electricity or water;
- ☐ erecting electric and non electric fencing;
- ☐ constructing outbuildings, sheds, garages etc where there is not suitable site clear of the easement area;
- ☐ erecting unroofed verandahs and pergolas attached to residences;
- ☐ developing public sporting and recreational facilities;
- ☐ carrying out earthworks, dam construction and quarrying activities;

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- ☐ developing subdivisions for residential or industrial purposes;
 - ☐ installing and using irrigation equipment;
 - ☐ constructing roads or tennis courts;
 - ☐ constructing in-ground or above-ground swimming pools where there is no suitable site clear of the easement;
 - ☐ excavating ground.

In each of the above cases, the structure may be removed if written approval is not granted beforehand.

7.11 Television and Radio Interference

Television and radio reception in the primary service area of transmitting stations is normally unaffected by transmission lines. Some momentary fading of radio reception may be experienced in a car passing underneath transmission lines, particularly if the radio signal strength is low. In fringe areas, experience has shown that a properly erected and adjusted aerial generally overcomes any potential reduction in quality of television or radio reception arising from proximity of the transmission line. If a problem does occur, it can usually be rectified by minor modification to the aerial. If problems persist, TransGrid can carry out modifications to improve reception in an area.

7.12 Electrical Safety

Various safeguards will be incorporated into the design of the transmission line to ensure the safety of the community and of construction and maintenance staff. The transmission line will be constructed in accordance with the Electricity (Overhead Line Safety) Regulations, 1991 and appropriate Australian Standards which will minimise the potential for accidental mechanical failure. Properly designed and maintained transmission lines are unlikely to contribute to hazards such as lightning strikes or bushfires. Regular maintenance patrols will ensure that clearance requirements between the conductors and surrounding vegetation are maintained. Patrols would be specifically mounted during spring and summer months for this purpose.

Transmission line safety is maintained by applying certain restrictions regarding the erection of structures and undertaking of certain activities within the easement, as described above. These safeguards will ensure the community's well being. To prevent the build up of static charges, fences and gates in the vicinity of the transmission line are earthed. Irrigators of the high pressure gun type would not be permitted to be used in the easements in such a way that a dense jet of water could strike the conductors. Because electric fence wires can be insulated for ground some restrictions on the use of electric fences may also be required in some cases.

Unauthorised activities such as climbing on the towers and flying kites near the line are discouraged by drawing attention to potential hazards through education programs.

Sensitive monitoring apparatus and high speed circuit breakers will be installed for the transmission line to ensure that any faults, such as those which might be caused by lightning strikes or by vandalism are immediately detected and the line de-energised.

The proposed line will ensure that the electricity supply of the western New South Wales areas is secure, enabling the continued population growth in the area to occur without jeopardising the supply of electricity to the region.