

Chapter 11: Miscellaneous Matters

Miscellaneous Matters

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11. Miscellaneous Matters

This chapter addresses a number of other miscellaneous matters associated with the operation of a wind farm, namely:

- Telecommunications and electromagnetic interference (EMI)
- Aviation safety
- Obstacle safety lighting
- Shadow flicker
- Blade glint

With respect to the above Pacific Hydro has endeavoured to identify all potential impacts so that a range of mitigation measures can be adopted during the wind farms design, construction and operational stages that will avoid or reduce any potential interference or nuisance created by the development of the wind farm.

11.1 Telecommunications and the potential effects of Electromagnetic Interference

An investigation has been carried out in order to identify and assess any Electromagnetic Interference (EMI) that may occur as a result of the wind farm operations. In order to do this Pacific Hydro has:

- Consulted with relevant telecommunications licensees to identify any potential constraints
- Identified relevant television and radio broadcasting tower sites
- Developed a range of mitigation measures to reduce or eliminate impacts (See Section 11.1.1)

EMI occurs when electromagnetic signal strength / quality is disrupted or degraded¹. As with all tall structures, wind turbines may potentially interfere with television, radar, radio and microwave signal reception. Factors that can influence the extent and nature of EMI can include a turbine's location, the transmitter and receiver's location, signal type and frequency and the area's topography². The likelihood of interference can however be eliminated or reduced through a number of simple mitigation measures³.

¹ Buckley, S 2005, Wind Farms And Electromagnetic Interference – Dispelling The Myths.

² Radio Advisory Board of Canada (RABC) and Canadian Wind Energy Association (CanWEA). 2007, *Technical Information and Guidelines on the Assessment of the Potential Impacts of Wind Turbines on Radiocommunication, Radar and Seismo acoustic Systems*

³ Sustainable Energy Australia Pty Ltd. 2004, *The Electromagnetic Compatibility and Electromagnetic Field Implications for Wind Farming In Australia*. Available URL: http://www.w-wind.com.au/downloads/CBP10_EMCEMF.pdf (viewed 5/03/2012).

Television Reception - Analogue television broadcasting signal⁴ may experience interference due to scattering and reflection. Forward scattering may occur as the blades cast a shadow over the receiver causing fluctuations in picture quality, this occurs where a wind turbine is located between the broadcasting tower and a dwelling. This type of interference does not normally extend beyond 5km⁵.

Backwards scattering may occur if the television signal is reflected by the blades causing a difference in phase and amplitude to the main signal. This may result in a type of image interference known as ghosting. Reflection can occur where the signal is reflected off an object before it is received by an antenna, causing the signal to be delayed in time. As the transmitting signal phase timing is affected, the picture image may appear doubled⁶. This type of interference does not generally extend beyond 500m from a turbine⁷.

Although digital TV signals suffer fewer interruptions from signal reflection (such as ghosting), than analogue signal, a reduction in service quality may occur from time to time due to reflected signals⁸ at a much lower extent than analogue.

Radio - Near field electromagnetic waves produced by a turbine and its electrical components can cause interference to AM/FM radio signal quality when a turbine is located within close proximity (less than 50m) to an antenna (known as near field effects). The likelihood of disruption to AM/FM radio signal quality or strength is therefore negligible and limited to those within tens of metres of a turbine¹. Electromagnetic Compatibility Standards compliance ensures any such impacts from turbines are negligible². As no houses are located at this distance and the closest home is over 1.5km away from a turbine, radio interference is not considered further in this chapter.

Microwave Links - Interference may occur when point to point microwave link are diffracted due to turbines in the direct path (line of sight) between two radio microwave stations¹ (generally operating in frequencies above a GHz). To avoid any potential interference, a clearance distance from the line of sight microwave link may need to be established for links that pass near a turbine².

Differential Geographical Positioning System (DGPS) - DGPS technology helps farmers navigate around individual paddocks when seeding or fertilising. GPS systems used for precision agriculture often receive both a direct satellite transmission and a signal from a differential transmitter station. The differential signal can be disrupted due to the direct obstruction between

⁴ Known as point to area

⁵ Ofcom 2009, Tall structures and their impact on broadcast and other wireless services, Available URL http://licensing.ofcom.org.uk/binaries/spectrum/fixed-terrestrial-links/wind-farms/tall_structures.pdf (viewed 4/2/2012)

⁶ Radio Advisory Board of Canada (RABC) and Canadian Wind Energy Association (CanWEA) 2007, Technical Information And Guidelines On The Assessment Of The Potential Impacts Of Wind Turbines On Radiocommunication, Radar and Seismoacoustic Systems

⁷ Ofcom 2009, Tall structures and their impact on broadcast and other wireless services, Available URL http://licensing.ofcom.org.uk/binaries/spectrum/fixed-terrestrial-links/wind-farms/tall_structures.pdf (viewed 4/2/2012)

⁸ Ofcom 2009, Tall structures and their impact on broadcast and other wireless services, Available URL http://licensing.ofcom.org.uk/binaries/spectrum/fixed-terrestrial-links/wind-farms/tall_structures.pdf (viewed 4/2/2012)

the line of sight between differential transmitter station and differential receiver. Both stations will continue to receive the satellite transmissions as normal.

Radar Interference - Electricity transmitted from a turbine can appear as interference on radar. A radar can potentially be impacted on by either direct or doppler interference. Direct interference can result in a false image or a shadowing of an area. Doppler interference can produce a false target by the rotation motion of the turbines blades. These types of inference can be influenced by the size and height of the turbines, blades rotation rate, spacing and number of turbines and type of turbine materials⁹.

A desktop investigation of the Australian Communications and Media Authority (ACMA)'s radio-communications licenses register was carried out to locate all transmitting and receiving towers¹⁰ within 25km of the site and in turn identify potential impacts registered licensees due to EMI. Consultation with registered licensees helped to determine and assess any potential interference to telecommunications services within the area (See Table 11.1:).

11.1.1 Television Broadcasting

Analogue Signal

The location of a wind farm may influence the potential for television analogue signal interference to occur where turbines are located within close proximity of a broadcasting tower¹¹ or to dwellings and are located between a dwelling and the line of sight of the broadcasting tower's signal.

Residences near the wind farm site fall within the Adelaide TV 1 License Area Plan (LAP) area (See Figure 11.1) and should still be able to receive a range of national, commercial and community stations from a retransmission broadcasting tower located in Truro (over 13 km north of the site) licensed to the Mid Murray Council¹². Subject to their location and intervening topography, some local dwellings may also fortuitously receive television reception from a retransmission tower located in Angaston (located over 11 km north west of the site) and licensed to the Barossa Council.

Predictive modelling using the criterion that forward scatter does not generally extend beyond 5km from a turbine at a particular sector angle of $\pm 15\text{-}20^\circ$ from the broadcasting tower and backwards scatter at a range beyond 500m¹³, confirms that the likelihood that any residences would experience any signal interference from the Mid Murray retransmission towers is low.

Digital signal

Although digital TV is currently being rolled out nationally, residents within the vicinity of the wind farm site currently still receive analogue TV. Switchover to digital TV is expected to occur on or

⁹ Lemmon, J.J, Carroll, J.E., Sanders, F.H. & Turner, D. 2008, NTIA Technical Report TR-08-454. Assessment of the effect of Wind Turbines on Air Traffic Control Radars. Department of Commerce. United States of America.

¹⁰ Broadcasting, point to point and multipoint links.

¹¹ A clearance of at least 2 km is recommended for repeater television transmitters.

¹² Broadcasting five Analogue TV channels ADS63, ABS66, SBS69, NWS60 and SAS57.

¹³ Ofcom 2009, Tall structures and their impact on broadcast and other wireless services, Available URL http://licensing.ofcom.org.uk/binaries/spectrum/fixed-terrestrial-links/wind-farms/tall_structures.pdf (viewed 4/2/2012).

before 31 December 2013¹⁴. The proposed wind farm site consists of elevated ridgelines which may potentially influence signal quality and strength to neighbouring dwellings. Dwellings west of the site may experience variable Digital TV coverage after the switchover. Dwellings east of the site may potentially experience no, or variable, coverage due to the surrounding terrain¹⁵.

Both Mid Murray and Barossa Councils were consulted in order to identify relevant broadcasting licences and transmitting tower locations.

Digital television signals are considered more robust than analogue are not known to experience the same extent of interference from reflected signals as analogue¹⁶ and form part of a mitigation program.

TV Mitigation Measures

Prior to construction, Pacific Hydro will engage a consultant to undertake a television reception analysis to identify any specific houses that may experience interference and then undertake a specific survey of those houses potentially impacted in order to establish the quality of TV reception. Post construction, in the event that the wind farm is deemed to have caused deterioration in radio or television reception, then a number of remedies can then be applied. Pacific Hydro is committed to investigating any complaints of TV interference and applying one of the following measures:

- (1) Adjusting TV antenna directly towards the transmitter
- (2) Relocating of antenna to achieve a better signal to noise ratio
- (3) Installing a more directional or higher gain antenna for those residences that have been impacted
- (4) Installation of an amplifier
- (5) Installing a digital set top box
- (6) Installing cable / satellite TV ¹⁷

¹⁴ Australian Government n.d. Department of Broadband, Communications and the Digital Economy, Are you ready for digital TV? Myswitch. Available URL <http://www.digitalready.gov.au/when-do-i-switch/mySwitch.aspx> (viewed 13/02/2012).

¹⁵ Australian Government n.d. Department of Broadband, Communications and the Digital Economy, Are you ready for digital TV? Myswitch. Available URL <http://myswitch.digitalready.gov.au/default.aspx?search=5353> (viewed 13/02/2012).

¹⁶ Ofcom 2009, Tall structures and their impact on broadcast and other wireless services, Available URL http://licensing.ofcom.org.uk/binaries/spectrum/fixed-terrestrial-links/wind-farms/tall_structures.pdf (viewed 4/2/2012).

¹⁷ Australian Wind Energy Association n.d. Fact Sheet 10. Wind Farming, Electromagnetic Radiation And Inference.

11.1.2 Microwave Links

Microwave broadcasting transmitters and receivers were mapped, in order to identify any potential constraints. Table 11.1: contains the list of registered licensees consulted and a summary of their comments. 16 registered radio communications licensees were identified within a 25km radius of the site. After mapping the transmitting tower locations, no point to point links were identified crossing the site.

A point to multipoint link registered to the Bureau of Meteorology (BOM) used for transmitting and receiving rain gauge data from Sedan Hill¹⁸ was identified within the site boundary approximately 280m from the nearest turbine (KEY-12). Consultation with the BOM determined that the closest turbines were not close enough to interfere with their installation. No mitigation measures are therefore required.

11.1.3 Radar Interference and Operational airspace

Aeronautical / Defence Radar

Pacific Hydro consulted with CASA, Airservices Australia, Department of Defence (DoD) and the Royal Australian Air Force early on in the planning stage, with respect to aeronautical / defence radar, communications and navigational aids.

In addition, a desktop search of CASA's registered aerodromes was conducted to identify any potential impacts to aeronautical / defence radar systems.

One radar licence was identified during the desktop search of the ACMA, licensed to Airservices Australia (ASA) and located approximately 20km north east of the site. Consultation with ASA identified a non-directional beacon at Stonefield Airfield, however ASA do not expect any interference to occur as a result of the wind farm (refer to Table 11.2).

Of note, Pacific Hydro also engaged independent specialist aviation consultants, HART Aviation to undertake an aviation assessment, including the investigation of local aircraft movements and the locations of nearby airfields, to determine the potential impact on aviation operations of the proposed Keyneton Wind Farm and the need or otherwise for obstacle lighting (See Section 11.3 below).

Weather Radar

The BOM has two dedicated weather radars within 150km of the site. Sellicks Hill approximately 100km south west of the site and the Adelaide (Buckland Park) doppler radar approximately 63km west of the site, both radars have an optimal radar coverage of up to 200km.

In consultation with Pacific Hydro, BOM did not identify any likely potential interference to their radars. In order to reduce the potential for any interference to their weather radars Pacific Hydro will inform BOM of the turbine "as constructed" locations to ensure weather forecasters can identify and distinguish the wind farm static weather radar signature.

Radar and Operational Airspace Mitigation Measures

¹⁸ Approximately 50m away from the nearest turbine

Wind farms can potentially impact navigational instruments and equipment. However, it is unlikely that the proposal will impact the identified, unlicensed landing strips, as they rely on visual rather than instrumental assisted landings. Flights rely on visibility and are weather dependant. Pacific Hydro will also provide the turbine height and location details “as constructed” to Airservices Australia (ASA) for inclusion in their Notice to Airmen (NOTAM) charts and to RAAF for inclusion in their Tall Structure Database prior to construction.

No impacts were identified by ASA with respect to their radar located approximately 20km north east of the site. The turbines do however have the potential to cause varying levels of echoing to be returned to the radar as displayed clutter. Pacific Hydro will therefore inform ASA of the turbine locations prior to construction¹⁹.

Pacific Hydro will also inform BOM of the turbine exact locations to ensure weather forecasters can recognise the wind farm weather static radar signature (if any) and reduce any potential weather tracking²⁰ interference.

11.1.4 Differential GPS

Potential interference may occur in the event that turbines are within the direct line of sight of this transmitter and the farm based receiver. This effect will vary as the tractor mounted receiver moves about the property.

Differential GPS Mitigation Measures

Prior to construction a survey of GPS users at the wind farm site will be carried out in order to identify the transmitter locations and associated risk of interference. The pre-construction survey will identify the following:

- Users in local area at risk of interference i.e. locations where turbines are located between the transmitter and receiver
- Identify quality of existing reception and areas where reception is not received
- Remediation options (e.g. provision of repeater stations)

11.1.5 Summary of Potential EMI Effects

Due to the location of the wind farm, in relation to local TV transmitters, potential interference to local resident's television reception is considered to be low. Despite this Pacific Hydro will carry out a pre-construction survey of TV reception in the area and investigate any reported instances of

¹⁹ Burgess, D W., Crum, T and Vogt, R J 2008, Impacts of wind farms on WSR-88D Operations. Preprints, 24th Int. Conf. on Interactive Information Processing Systems (IIPS) for Meteorology, Oceanography, and Hydrology, New Orleans, LA, Amer. Meteor. Soc., Paper 6B.3. as cited in paper by Vogt, R.J., Crum. TD and Sandifer, M J n.d. A Way Forward Wind Farm – Weather Radar Coexistence.

²⁰ Burgess, D. W., Crum, T and Vogt, R. J. 2008 Impacts of wind farms on WSR-88D Operations. Preprints, 24th Int. Conf. on Interactive Information Processing Systems (IIPS) for Meteorology, Oceanography, and Hydrology, New Orleans, LA, Amer. Meteor. Soc., Paper 6B.3. as cited in paper by Vogt, R.J., Crum. T.D and Sandifer, M. J n.d. A Way Forward Wind Farm – Weather Radar Coexistence.

interference and undertakes to rectify any interference attributable to the wind farm. No point to point licensed microwave links cross the site. Consultation with the BOM will continue. Any potential interference to differential GPS will be further investigated prior to construction. Measures will be put in place to firstly ensure turbines do not interfere with GPS Systems and secondly to rectify any interference that may occur.

Although it is considered unlikely that the wind farm will interfere with radar and navigational radar Pacific Hydro will continue to inform BOM, ASA and RAAF of the proposals progress and the turbine's "as constructed" location and height details.

Fibreglass and epoxy like materials used in modern turbine blades help to significantly reduce the effects from EMI. Impacts from EMI waves produced by the turbine generators themselves should not significantly impact signal quality and strength, as they will comply with AS/NZS :4251.2:1999 Electromagnetic Emissions Standard.

11.2 Aviation Safety

In order to meet its duty of care obligations and assess whether the proposed wind farm would impact on any civil or military aviation activities and operations occurring within the vicinity of the site, Pacific Hydro has carried out the following:

- Reviewed aviation guidelines and policy (refer to Section 11.2.1)
- Identified the location of any certified or registered aerodromes (refer to Section 11.2.1)
- Consulted and sought advice from a number of aviation stakeholders (refer to

- Table 11.3)
- Engaged Hart Aviation to undertake an Aviation Safety Assessment

HART Aviation undertook an aviation assessment, including investigating local aircraft movements and locations of nearby airfields, to determine the potential impact on aviation operations of the proposed Keyneton Wind Farm and the need or otherwise for obstacle lighting.

11.2.1 Aviation Guidelines and Policy

The following issues have been considered within the aviation assessment.

Notification to CASA

"Civil Aviation Safety Regulations (CASR 139.365) requires the proponent of a structure greater than 110m AGL to notify CASA. CASA is then required to assess the impacts and determine if the structure is hazardous to aircraft activities because of its location, height or lack of marking or lighting²¹".

Pacific Hydro has notified CASA of the proposed development. No written comment or advice has been received regarding the proposal.

Marking or lighting of obstacles

"The Civil Aviation Safety Authority's statutory power to mark and light an obstacle under CASR 139 only applies within the vicinity (approximately 30km) of a registered aerodrome²²".

Outside this extent the proponent must assess risks to aviation and provide mitigation against aviation hazards, such as notification to ASA, RAAF-AIS, NOTAM and other Aviation stakeholders.

Notifications of tall structures

CASA²³ directs proponents to notify RAAF-AIS of a tall structure if it is:

- 30 metres or more AGL-within 30 kilometres of an aerodrome; or
- 45 metres or more AGL elsewhere.

Pacific Hydro has notified RAAF-AIS of its existing 50m met masts and the proposed wind farm development.

Obstacle Limitation Surfaces (OLS)

Civil Aviation Regulations 1988 Part 9, provides for the marking or removal of hazardous objects within the OLS of any aerodrome. Structures that generally fall outside a radius of 15km from an aerodrome do not penetrate an aerodrome's OLS.

The proposed development is located well beyond 15km of an aerodrome and as such will not penetrate on any certified or registered aerodrome's OLS.

Visual Flight Rules (VFR) Operations

²¹ AC 139-08(0)-Reporting of tall structures.

²² Comment made via email by Luke Pilichiewicz 27 October 2008, CASA District Aerodrome Inspector Adelaide, regarding the withdrawal of CASA's Obstacle Marking and Lighting of Wind Farm AC 139-18(0).

²³ CASA's AC 139-08(0)-Reporting of tall structures.

The turbine's blade tip height will not penetrate the Lowest Safe Flying Altitude for aircraft undertaking VFR operations²⁴ in the area. The proposal should be clearly visible to pilots and not pose a risk to such operations.

Instrument Flight Rules (IFR) and Night VFR Operations

Civil Aviation Regulations require Night VFR aircraft to fly at heights no less than 1,000 feet (ft) (304.8 m) above the highest obstacle within a 10 nautical mile (~18.5 km) radius.

The proposed wind farm should therefore not impact Night VFR or IFR operations which may occur within the vicinity of the proposed site, as the turbine heights²⁵ are considerably lower than the highest obstacle within 10 nm of the proposed wind farm site²⁶.

11.2.2 Aviation Operations and Activities

Aviation activities within the area have been investigated and are considered below.

Aerodromes

No Certified or Registered aerodromes are located within the vicinity (approximately 30km away) of the proposed Keyneton Wind Farm.

The nearest certified aerodromes are:

- Adelaide Parafield Aerodrome, approximately 55km south west of the area
- Adelaide International Airport, approximately 70km south west of the area

The nearest registered aerodrome is Waikerie Aerodrome, located approximately 85km north east of the site.

Royal Australian Air Force (RAAF) Edinburgh Base Aerodrome is the closest military aerodrome located approximately 53km south west of the site.

Ten unlicensed aerodromes and private airstrips (of various conditions and all likely to be used during Visual Flight Rules (VFR) operations), were identified within 30km of the proposed wind farm site, these include:

- Angaston Airstrip
- Mount Lindsay Stud Airstrip
- Sanderson Airstrip
- Sedan Airstrip
- Sedan Township Airstrip
- Rowland Flat Airstrip
- Stonefield Airfield
- Truro Flat Airpark
- Lyndoch Airport

²⁴ An aircraft not guided by instrumental navigational aids.

²⁵ Turbines do not exceed 595m ASL.

²⁶ Pewsey Vale Peak is the highest obstacle within 10nm radius of the proposed site, with an elevation of 629.4m ASL. Turbines will not exceed 595m ASL.

- Portee Station Airstrip

Nine of the unlicensed, non-instrumental runways do not have radars or navigational aids to assist aircraft and as such Visual Flight Rules apply; whereby pilots most rely on sight and air traffic control services rather than the airfield's navigational radar aids.

All these airstrips are considered too far away from the proposed wind farm site for the development to cause an adverse impact on any operations taking place within these airstrips.

No impacts to operational airspace is anticipated, as no certified or registered Aerodromes or RAAF Base stations are located within a 30km radius of the proposal.

Approach, Landing and Take-off Operations from Aerodromes

The proposed development is located well beyond 15km of a registered aerodrome and as such will not penetrate any certified or registered aerodrome's Obstacle Limitation Surfaces (OLS).

Due to the distance between the proposed wind farm and aerodromes, the wind farm will not pose a risk to approach, landing or take-off operations. Correspondence with ASA has confirmed this assessment.

Flying Schools and Clubs

The followings flying clubs and schools have been identified as potentially utilising aerodromes within 55km of the proposed wind farm site and will be notified of the proposed development prior to construction commencing:

- Adelaide University Gliding Club Incorporated
- Barossa Valley Gliding Club Incorporated
- Murray Bridge Light A/C Flying School

Emergency Services

The potential risks to low flying emergency services, including aerial fire fighting, medical and search and rescue operations, have been identified below.

- **Water Bombing for Fire Fighting Purposes** - There are currently no South Australian CFS guidelines for wind farms. It is understood these are currently being prepared with reference to the Victorian CFA guidelines²⁷ The Victorian CFA Guidelines state the following:

Fire suppression aircraft operate under "Visual Flight Rules". As such, fire suppression aircraft only operate in areas where there is no smoke and during daylight hours. The standard distance of 300 metres between wind turbines would allow aircraft to operate around a wind farm given the appropriate weather and terrain conditions.

Wind turbines, similar to high voltage transmission lines, are part of the landscape and would be considered in the incident action plan.

The minimum separation between any two turbines within the proposed Keyneton Wind Farm is 432m (from turbine centre to turbine centre), thus exceeding a 300m separation.

²⁷ CFA 2012, Emergency Management Guidelines for Wind Energy Facilities.

- **Air Ambulance and Search and Rescue Operations** - It is unlikely that the proposed development would impact on any medical or rescue operations outside the wind farm, any operations within the wind farm boundary may potentially be carried out in areas that enabled a safe high angle rescue to be performed.

11.2.3 Low Flying Operations

Potential low flying operations in the area are considered below.

Civil Low Flying Operations

The following organisations may potentially conduct low flying operations over the site and will therefore be notified of the proposed turbine heights and locations prior to construction commencing:

- SA County Fire Services
- Royal Flying Doctors Services
- Aerotech Australasia Pty Ltd
- Light Aircraft Services Pty Ltd
- Aerial Agricultural Association of Australia (AAAA)

AAAA has previously been notified of the location of the proposed development and of the existing anemometers in order for them to inform their members. Pilots have the responsibility to identify any potential hazards (such as trees and power lines) and should carry out a site reconnaissance prior to undertaking any low flying operations. Any risk from crop dusting operations would be confined to host landowners. Currently no host landowner undertakes crop dusting or aerial agricultural spraying within the proposed wind farm site.

Military Low Flying Operations

Recent consultation with DoD identified the airspace above the vicinity of the proposed site as used by military aircraft, although at the current blade tip height the proposal does not penetrate the lowest minimum safe flying altitude.

Aviation Related Consultation

Various aviation stakeholders have been notified and consulted on the proposed development and its potential impacts to operations and aircraft communications since 2009. No civil or military aviation restrictions have been raised due to the development of the wind farm.

Table 11.3 summarise their comments and advice received to date.

11.3 Obstacle Safety Lighting

Pacific Hydro engaged HART Aviation to undertake an Aviation Risk Assessment to determine whether aviation safety lighting is required at the proposed wind farm. Hart Aviation concluded that subject to the recommended mitigations including NOTAM action and identification of the wind farm on relevant aeronautical charts, all foreseeable risks will have been eliminated and consequently the aviation safety risk will be considered acceptably low.

No aviation safety lights will therefore be installed on any of the turbines at the Keyneton Wind farm.

Aviation Risk Assessment

The following points have been a factor in the decision not to light the proposed wind farm with night obstacle safety lighting:

- No aviation policy and guidelines require obstacle safety lighting.
- Advice and comments received from aviation authorities raised no concerns from the proposal.
- Experience from other wind farms with no obstacle safety lighting.
- No registered or certified aerodromes are located within the vicinity (approximately 30km away) of the proposed site.
- The closest military aerodrome (RAAF Edinburgh Base) is located approximately 53km south west of the site.
- Unlicensed airstrips within 30km of the site are at sufficient distance to avoid adverse impacts on operations.
- The wind farm is located well outside any registered aerodrome's OLS.
- The wind farm will not penetrate the Lowest Safe Flying Altitude for aircraft undertaking VFR operations and should therefore not pose a risk to such operations.
- Turbines will not penetrate the minimum safe flying height for Instrument Flight Rules (IFR) and Night VFR Operations.
- The elevation of existing topography within 10nm radius of the site.
- Mitigation measures will be implemented to reduce risks to aviation activities and operations.

Aviation Mitigation Measures

Despite the low risk to aircraft operations the following mitigation measures will be implemented to reduce risks to aviation activities and operations occurring within the vicinity of the wind farm:

- Continue to keep nearby aviation clubs and flying schools, BOM, CASA, RAAF Base Edinburgh, RAAF-AIS²⁸, DoD and ASA informed of the proposed Keyneton Wind Farm and construction timeframes.

²⁸ Responsible for maintaining a database of tall structures

- Prior to construction, Pacific Hydro will inform ASA of the turbine's locations and height details, for them to advise pilots of the presence of the wind farm by way of a Notice to Airmen (NOTAM).
- ASA and RAAF-AIS will permanent mark the wind farm's location on World Aeronautical Charts, Tall Structures Database and Military Maps.

11.4 Shadow Flicker and Blade Glint

A desktop investigation and assessment of the potential effects of shadow flicker and blade glint to nearby residents is discussed further below.

11.4.1 Shadow Flicker

Shadow flicker results from the position of the sun in relation to the blades of the wind turbines as they rotate. This occurs under certain combinations of geographical position and time of day. It is most prevalent when the sun is low in the sky and shines on a building from behind a wind turbine rotor. This can cause the shadow of the turbine's blades to be cast onto the building, which appears to flick on and off as the blades rotate. When this flicking shadow is viewed through a narrow opening, such as a window, it is known as shadow flicker. It is possible to calculate the extent of this effect using the geometry of the machine and the latitude of the potential site.

Shadow flicker effects can be predicted in advance and appropriate siting and design of a wind farm used to avoid this effect. Generally, shadow flicker is more likely to be an issue for wind turbines located to the east or west of a dwelling however shadow flicker can be avoided by maintaining an appropriate separation distance between wind turbines and dwellings.

Planning guidelines²⁹ suggest that shadow flicker effects are unlikely to be a significant issue where dwellings are located at least 500 metres from a turbine. The closest dwelling is located over 1.5km away from a turbine.

Using information relating to the earth's orbit and rotation relative to the sun as well as localised information such as number of sunshine hours per day and wind direction distribution, a shadow flicker calculation model can be used to simulate the amount of shadow flicker that will be experienced over a wind farm site. A (WindPRO 2.5) model has been used to calculate the amount of shadow flicker which will be experienced at individual dwellings located within the surrounding area. The model requires turbine position, hub height and rotor diameter, position of the dwellings, geographic position of the wind farm site, time zone and daylight saving times. The shadow flicker model has therefore been run using an indicative turbine model of hub height 95m and rotor diameter of 101m. This simulation is conservative as it does not include additional localised information such as vegetation cover within the site.

Victorian planning policy³⁰ set the maximum acceptable level of shadow flicker occurring at residences at 30 hours per year. Applying this criterion, Figure 11.2 demonstrates that no dwellings will experience shadow flicker for more than 30 hours per year as a result of the proposed wind farm development.

²⁹ Planning SA 2002, Planning Bulletin for Wind Farms, draft for consultation.

³⁰ DPCD 2011, Policy and planning guidelines for development of wind energy facilities in Victoria

11.4.2 Blade Glint

The occurrence of glint off any man made or natural surface depends on a combination of circumstances arising from the orientation of the nacelle, angle of the surface, angle of the sun and the reflectivity of the given surface. In any built environment, the primary means of avoiding glint is through the use of materials that avoid reflectivity. This approach is frequently adopted in the urban environment.

Standard international practice of applying a matt non-reflective finish to the tower and blades of turbines will be used on all the turbines at the Keyneton Wind Farm, the leading edges of the blades will also have a matt PVC non-reflective coating in order to avoid the effects of blade glint. This mitigation measure has proved effective internationally and in Pacific Hydro's 10 years of operational wind farm experience.

Table 11.1: Summary of point to point / multipoint telecommunications Stakeholder Comments

No.	Stakeholder	2009 Summary Feedback	2011 Summary Feedback
1.	Bureau of Meteorology	No impacts expected to occur. Requested to be kept informed of the proposal.	No objections requested to be kept informed of the proposal
2.	South Australian Water Corporation	No reply received to date.	No reply received to date.
3.	Vodafone Network Pty Ltd	No reply received to date.	No reply received to date.
4.	Optus Mobile Pty Ltd	Project should have no impact on existing proposed infrastructure.	No reply received to date
5.	State of South Australia/ Department Of Justice	No reply received to date.	No reply received to date.
6.	Telstra Corporation Limited	Proposal will not interfere with network	Proposal will not interfere with network
7.	Genesee and Wymorning Australia Pty Ltd	No reply received to date.	No reply received to date.
8.	Spark Infrastructure SA (NO 2) Pty Limited	Confirmed that no telecommunication links pass through site.	No changes to their assets.
9.	Epic Energy South Australia Pty Ltd	No longer own the telecommunication assets that appear under in the ACMA website	N/A
10.	Vertical Telecoms SA Pty Ltd	No reply received to date.	No reply received to date.
11.	Envestra	Wind farm poses no problems to	No reply received to date.

No.	Stakeholder	2009 Summary Feedback	2011 Summary Feedback
		telecommunications	
12.	Amcom Pty Ltd	No reply received to date.	No reply received to date.
13.	Hutchison Telecommunications (Australia) Ltd	No reply received to date.	No reply received to date.
14.	Mid Murray Council	Should not impact telecommunication links from White's Hill to Blanchetown.	Not likely to impact radio links.
15.	Barossa Broadcasting Board Inc.	No reply received to date.	No reply received to date.
16.	Barossa Council	Expect Pacific Hydro to carry out a detailed assessment to highlight and avoid potential interference.	Council provided their entire broadcasting licences and tower locations.

Table 11.2: Summary of aviation radar stakeholder comments

No:	Stakeholder	2009 Stakeholder Feedback 60-57 Turbine Layout	2011-2012 Stakeholder Feedback
1.	Civil Aviation Safety Authority (CASA)	No reply received to date.	No reply received to date.
2.	Department of Defence (DoD)	Proposal is outside any areas affected by the defence regulations. Wind farm will not cause interference to defence communications.	New 42 turbine layout will not cause any interference to defence communications or radar.
3.	RAAF –Edinburgh Base	Project will not interfere with communications or radar systems. No objection.	New 42 turbine layout will not cause any interference to defence communications or radar.
4.	Airservices Australia (ASA)	No impact on communications or radar.	New 42 turbine layout will not impact on communications or radar. Requested to be kept informed of proposal.

Table 11.3: Summary of aviation stakeholder correspondence and comment

No.	Stakeholders	2009 Stakeholder Feedback	2011/ 2012 Stakeholder Feedback
1	Civil Aviation Safety Authority (CASA)	Notified of the proposal. No written comment or advice has been received to date.	Met mast location and height details were provided to CASA in April 2011.
2	AirServices Australia (ASA)	Wind farm will not affect any approach or departure from Adelaide, Edinburgh, or Parafield. It will also have no effect on any route or grid Lower Safe Altitude (LSALT).	Wind farm will not affect any approach or departure procedures at Adelaide, Parafield or Edinburgh aerodromes.
3	RAAF Edinburgh Base	DoD replied on their behalf (see below).	DoD replied on their behalf (see below).
4	RAAF-AIS (Melbourne)	Notified of met masts location and height details in 2007.	Pacific Hydro notified of the two existing 50m met masts in 2011.
5	Department of Defence (DoD)	The proposed site falls outside areas regulated by the Defence Regulations, where low flying military operation are likely to occur. No objections.	Requested that RAAF Base Edinburgh, RAAF-AIS and ASA be kept informed of the construction timeframes and that prior to construction they are provided with accurate position height data.
6	AAAA – Aerial Agricultural Association of Australia	Provided Pacific Hydro with AAAA'S policy guidelines on wind farms (dated Dec 2009)	Provided Pacific Hydro with AAAA's policy guidelines on wind farms (dated March 2011).

Chapter 11 Figures

Figures 11.1: Adelaide TV 1 Licence Area Plan

Figures 11.2: Shadow Flicker Assessment

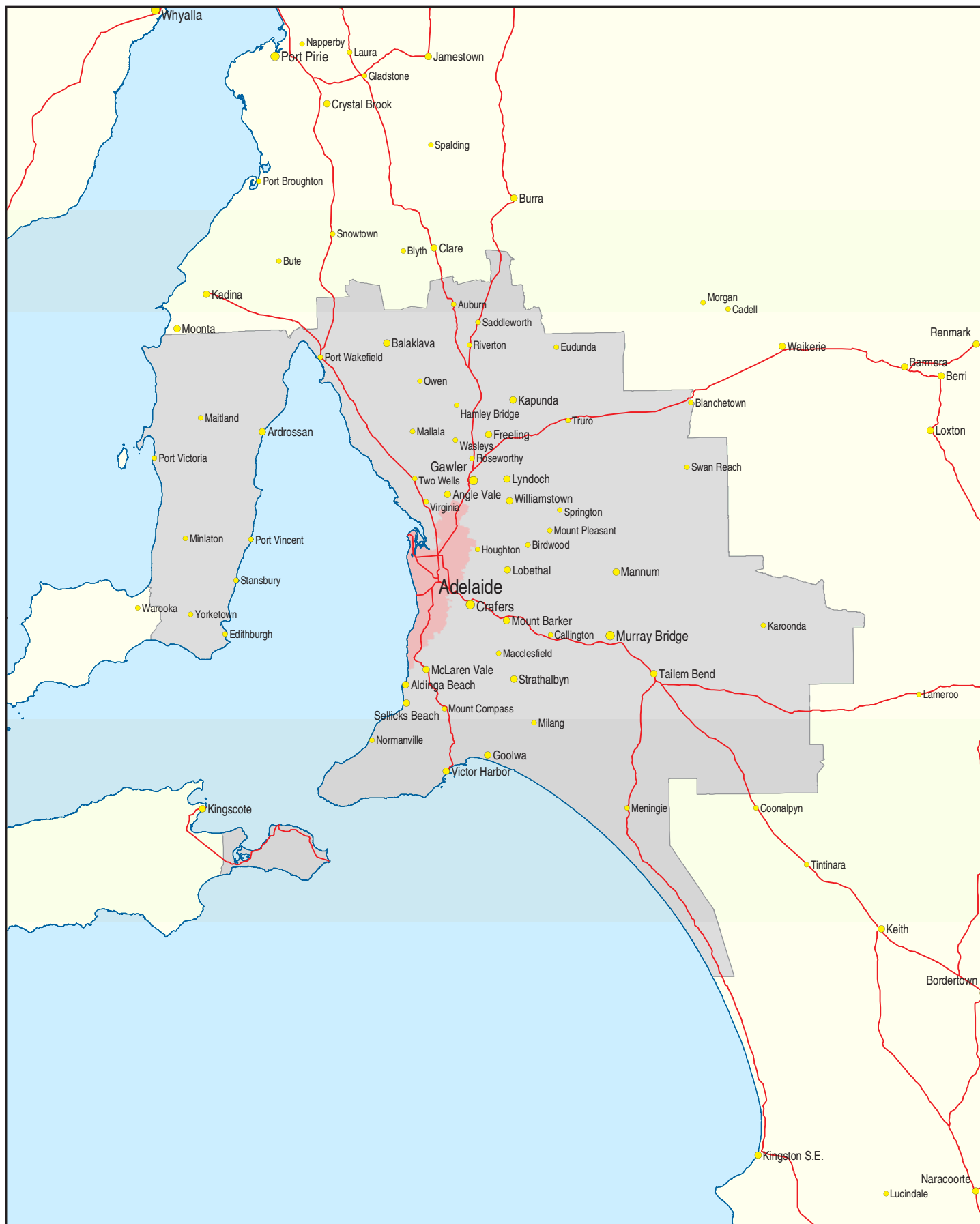


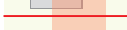




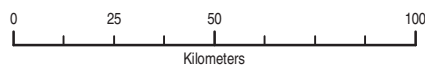
Figure 11.1 Adelaide TV1 Licence Area Plan

ADELAIDE TV1

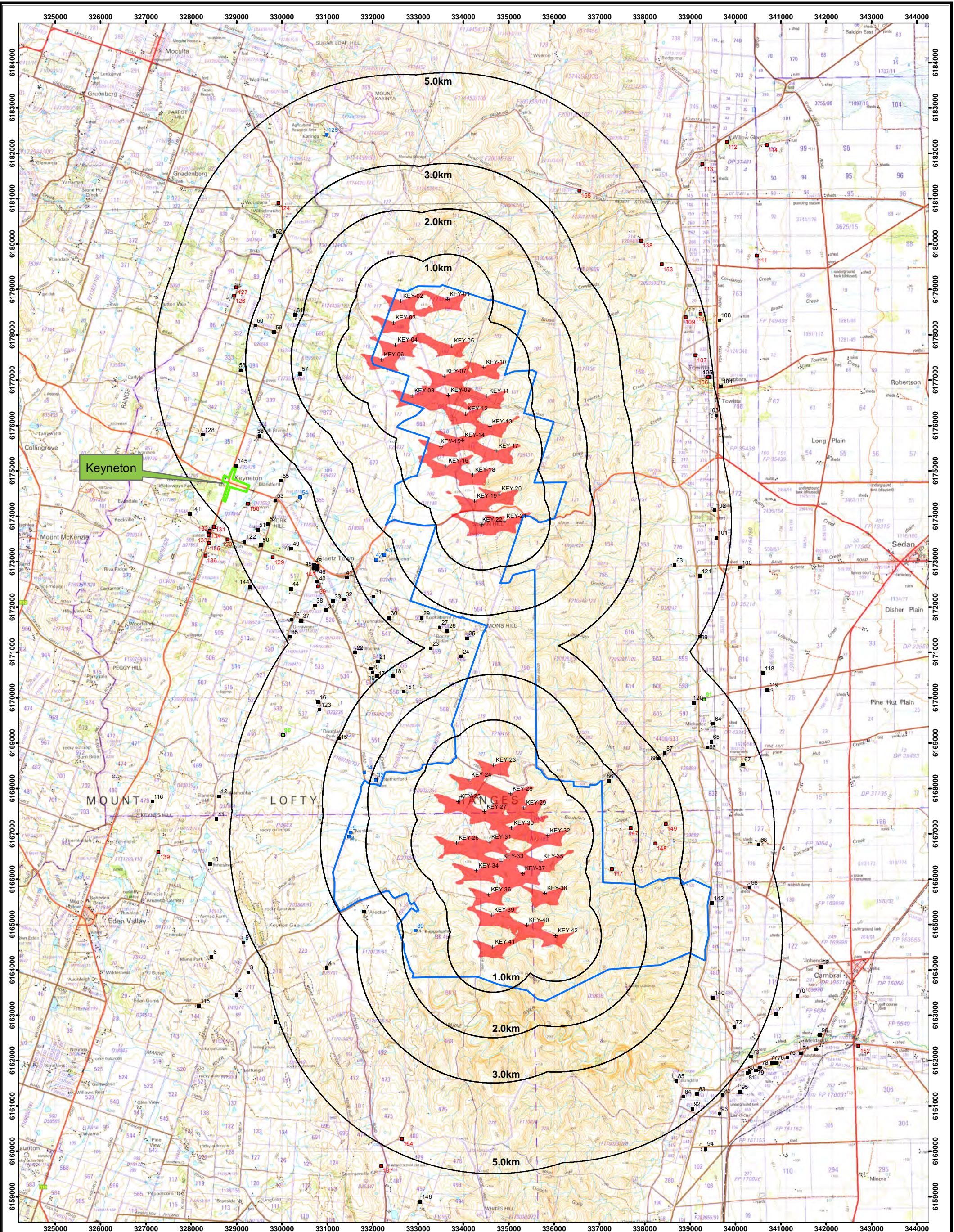
Area ID: 162

Legend

-  Coastline; State Borders
-  Licence Area
-  Principal roads; Cities (Medium & Large)
-  Secondary roads; Towns, Cities (Small)
-  Minor roads; Localities



Australian Government
Australian Communications
and Media Authority



Proposed Turbine Layout*

Site Boundary

Shadow Flicker (30+ hours per year)

Dwellings**

Confirmed

Unconfirmed

Planning Approved

Project Stakeholder

Note:

*Turbines are to scale and rotor swept area is displayed by symbol

**Dwellings indicated are identified through a combination of site visits, aerial photography, Council(s) records with respect to approved dwellings and through community consultation. The focus is upon identifying all houses within 5km and Pacific Hydro makes every effort to identify each dwelling within this radius, except dwellings within the Keyneton township which have not been identified individually on this figure. The Keyneton township as a whole is identified. Additional houses outside the 5km radius are indicated where they have been identified during the course of community consultation and to indicate known clusters of dwellings immediately outside the 5km radius.

PROJECT		Keyneton, South Australia		DATUM	
TITLE		Figure 11.2 Shadow Flicker		MGA94 (z54)	
FOR EXTERNAL DISTRIBUTION		DATE		SCALE	
				1:75,000 A3	
Maps marked "For External Distribution" have been checked and approved for release for information purposes as at the date shown on the map. A Responsible Manager must approve release of these maps on any other date.		05/06/12		DRAWING NO	
		PH-0883		REV	
		A		Pacifi Hydro	
CREATED		A.Liu		CLEARED	
V.Vandale		APPROVED			
M.Barnett					

Attachment 11.1

Registered Radio / Telecommunications Systems

Attachment 11.1: Registered radio/ telecommunication systems

Table 11 A. identifies all points to point / point to multipoint licensees within 15 km of the site.

Telecommunication tower location	Km away	Frequency	Emission Designator	Mode	Licensee	License type	Antenna height / azimuth	Lat /long AGD 66	Lat/ long GDA 94
Flood Alert Site 5.6 km ENE of Keyneton Sedan Hill	3.4 kms W	151.500000 0 MHz	7K50F2D	Transmit / Receive	Bureau of Meteorology	point to multipoint	2.5/ ND	-34 32 45 139 11 29	-34 32 39.735 139 11 33.826
Pumping Stn No 3 Swan Reach Stockwell Pipeline Mt Karinya Rd Karinya	4.6 kms N	460.775000 0 MHz	10K1F2D	receive	South Australian Water Corporation	Point to point	9/284	-34 29 58 139 13 06	-34 29 52.733 139 13 10.822
Summit Storage Swan Reach Stockwell Pipeline Mt Karinya Road Karinya	7.0 kms NW	460.775000 0 MHz	10K1F2D	Transmit	South Australian Water Corporation	Point to point	6/104	-34 29 28 139 10 58	-34 29 22.734 139 11 2.823
Summit Storage Swan Reach Stockwell Pipeline Mt Karinya Road Karinya	7.0 kms NW	451.275000 0 MHz	10K1F2D	Receive	South Australian Water Corporation	Point to point	6/104	-34 29 28 139 10 58	-34 29 22.734 139 11 2.823
Pumping Stn No 3 Swan Reach Stockwell Pipeline Mt Karinya Rd Karinya	4.6 kms N	451.275000 0 MHz	10K1F2D	Transmit	South Australian Water Corporation	Point to point	9/284	-34 29 58 139 13 06	-34 29 52.733 139 13 10.822
SA Water Radio Tower Moculta Tanks, Pipeline Road, 6.5 km ESE of Moculta	7.1 kms NW	463.600000 0 MHz	16K0F1D	Transmit	South Australian Water Corporation	Point to Multipoint - Land Mobile Spec	40/ND	-34 29 26 139 10 57	-34 29 20.734 139 11 1.823
SA Water Radio Tower Moculta Tanks, Pipeline Road, 6.5 km ESE of Moculta	7.1 kms NW	454.100000 0 MHz	16K0F1D	receive	South Australian Water Corporation	Point to Multipoint - Land Mobile Spec	40/ND	-34 29 26 139 10 57	34 29 20.734 139 11 1.823
SA Water Radio Tower Moculta Tanks, Pipeline Road, 6.5 km ESE of	7.1 kms NW	404.525000 0 MHz	16K0F1D	receive	South Australian Water Corporation	Point to point	40/241	-34 29 26 139 10 57	34 29 20.734 139 11 1.823

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Moculta									
Major Radio Site Rifle Range Road 7km SE of Tanunda Mt Kitchener		404.525000 0 MHz	16K0F1D	Transmit	South Australian Water Corporation	Point to point	20/61	-34 34 23 139 00 16	-34 34 17.743 139 0 20.836
SA Water Radio Tower Moculta Tanks, Pipeline Road, 6.5 km ESE of Moculta	7.1 kms NW	413.975000 0 MHz	16K0F1D	Transmit	South Australian Water Corporation	Point to point	40/21	-34 29 26 139 10 57	34 29 20.734 139 11 1.823
Major Radio Site Rifle Range Road 7km SE of Tanunda Mt Kitchener		413.975000 0 MHz	16K0F1D	Receive	South Australian Water Corporation	Point to point	20/61	-34 34 23 139 00 16	-34 34 17.743 139 0 20.836
Pumping Station Swan Reach Stockwell Pipeline 23 km SE of Truro	7.2 kms NE	460.900000 0 MHz	10K1F2D	Receive	South Australian Water Corporation	Point to point	9/92	-34 30 09 139 16 29	-34 30 3.731 139 16 33.82
Pumping Station Swan Reach Stockwell Pipeline Black And White Hill	12.4 kms E	460.900000 0 MHz	10K1F2D	Transmit	South Australian Water Corporation	Point to point	6/272	-34 30 18 139 19 40	-34 30 12.729 139 19 44.818
Pumping Station Swan Reach Stockwell Pipeline Black And White Hill	12.4 kms E	451.400000 0 MHz	10K1F2D	Receive	South Australian Water Corporation	Point to point	6/272	-34 30 18 139 19 40	34 30 12.729 139 19 44.818
Pumping Station Swan Reach Stockwell Pipeline 23 km SE of Truro	7.2 kms NE	451.400000 0 MHz	10K1F2D	Transmit	South Australian Water Corporation	Point to point	9/92	-34 30 09 139 16 29	-34 30 3.731 139 16 33.82
Tank Keyneton Road 4km NNE Of Eden Valley Keynes Hill	14.5 kms SW	460.850000 0 MHz	16K0F2D	Transmit	South Australian Water Corporation	Point to point	3.5/188	-34 36 35 139 06 41	-34 36 29.739 139 6 45.833
Pump Cnr Mt Pleasant Keyneton & Basil Roeslers Roads Eden Valley	18.8 kms SW	460.850000 0 MHz	16K0F2D	Receive	South Australian Water Corporation	Point to point	3.5/8	-34 39 33 139 06 06	-34 39 27.741 139 6 10.836
Tank Keyneton Road	14.5	451.350000	16K0F2D	Receive	South Australian Water	Point to point	3.5/188	-34 36 35	-34 36

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4km NNE Of Eden Valley Keynes Hill	kms SW	0 MHz			Corporation			139 06 41	29.739 139 6 45.833
Pump Cnr Mt Pleasant Keyneton & Basil Roeslers Roads Eden Valley	18.8 kms SW	451.350000 0 MHz	16K0F2D	Transmit	South Australian Water Corporation	Point to point	3.5/8	-34 39 33 139 06 06	-34 39 27.741 139 6 10.836
Part Hundred of Jellico Truro		15.3270000 GHz	28M0G7W	Receive	Optus Mobile Pty Limited	Point to point	10/82	-34 24 21 139 11 38	-34 24 15.732 139 11 42.818
Vodafone Site Lot 8 Park Road Blanchetown		15.3270000 GHz	28M0G7W	Transmit	Optus Mobile Pty Limited	Point to point	30/262	-34 21 52 139 32 27	-34 21 46.718 139 32 31.8
Part Hundred of Jellico Truro		14.6830000 GHz	28M0G7W	Transmit	Optus Mobile Pty Limited	Point to point	10/82	-34 24 21 139 11 38	-34 24 15.732 139 11 42.818
Vodafone Site Lot 8 Park Road Blanchetown		14.6830000 GHz	28M0G7W	Receive	Optus Mobile Pty Limited	Point to point	30/262	-34 21 52 139 32 27	-34 21 46.718 139 32 31.8
Vodafone Site Sturt Hwy 6 Km E Of Truro Laroona	15.4 kms N	7.4280000 GHz	7M00G7W	Receive	Vodafone Network Pty Ltd	Point to point	10/81	-34 24 16 139 11 41	-34 24 10.732 139 11 45.818
Vodafone Site Lot 8 Park Road Blanchetown		7.4280000 GHz	7M00G7W	Transmit	Vodafone Network Pty Ltd	Point to point	10/261	-34 21 52 139 32 27	-34 21 46.718 139 32 31.8
Vodafone Site Sturt Hwy 6 Km E Of Truro Laroona	15.4 kms N	7.5890000 GHz	7M00G7W	Transmit	Vodafone Network Pty Ltd	Point to point	10/81	-34 24 16 139 11 41	-34 24 10.732 139 11 45.818
Vodafone Site Lot 8 Park		7.5890000	7M00G7W	Receive	Vodafone Network Pty Ltd	Point to point	10/261	-34 21 52	-34 21

Road Blanchetown		GHz						139 32 27	46.718 139 32 31.8
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Table 11.B: Identifies all other point to point and point to multipoint licensees within 25km of the proposed site.

Telecommunication tower location	Km away	Frequency	Emission Designator	Mode	Licensee	License type	Antenna height / azimuth	Lat /long AGD 66	Lat/ long GDA 94
Optus Site Birdwood Mc Vitties Hill	16.8km SWS	10.7350000 GHz	40M0D7W	Transmit	Optus mobile Pty Ltd	Point to point	30/202	-34 49 38 138 59 58	-34 49 32.748 139 0 2.85
Optus Eden Valley Keynes Hill		10.7350000 GHz	40M0D7W	Receive	Optus mobile Pty Ltd	Point to point	30/22	-34 37 29 139 05 50	-34 37 23.74 139 5 54.835
Optus Site Birdwood Mc Vitties Hill		11.2250000 GHz	40M0D7W	Transmit	Optus mobile Pty Ltd	Point to point	30/22	-34 49 38 138 59 58	-34 49 32.748 139 0 2.85
Optus Eden Valley Keynes Hill		11.2250000 GHz	40M0D7W	Receive	Optus mobile Pty Ltd	Point to point	30/202	-34 37 29 139 05 50	-34 37 23.74 139 5 54.835
CMTS Warburton Road Tappa Pass		22.0990000 GHz	40M0D7W	Transmit	Vodafone Network Pty Ltd	Point to point	25/280	-34 29 47 139 03 41	-34 29 41.739 139 3 45.829
Vodafone Site Keller Road Off Stonewell Road Nuriootpa		22.0990000 GHz	40M0D7W	Receive	Vodafone Network Pty Ltd	Point to point	25/100	-34 28 52 138 57 29	-34 28 46.743 138 57 33.833
CMTS Warburton Road Tappa Pass		23.3310000 GHz	40M0D7W	Receive	Vodafone Network Pty Ltd	Point to point	25/280	-34 29 47 139 03 41	-34 29 41.739 139 3 45.829
Vodafone Site Keller Road Off Stonewell Road Nuriootpa		23.3310000 GHz	40M0D7W	Transmit	Vodafone Network Pty Ltd	Point to point	25/100	-34 28 52 138 57 29	-34 28 46.743 138 57 33.833
Optus Monopole off L. Staricks Road Springton		14.6830000 GHz	28M0D7W	Transmit	Optus mobile Pty Ltd	Point to point	25/12	-34 42 15 139 4 36	-34 42 9.742 139 4 40.84
Optus Eden Valley Keynes Hill		14.6830000 GHz	28M0D7W	Receive	Optus mobile Pty Ltd	Point to point	21/192	-34 37 29 139 05 50	-34 37 23.74 139 5 54.835

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Optus Eden Valley Keynes Hill		15.3270000 GHz	28M0D7W	Transmit	Optus mobile Pty Ltd	Point to point	21/192	-34 37 29 139 05 50	-34 37 23.74 139 5 54.835
Optus Monopole off L. Staricks Road Springton		15.3270000 GHz	28M0D7W	Receive	Optus mobile Pty Ltd	Point to point	25/12	-34 42 15 139 4 36	-34 42 9.742 139 4 40.84
Council Site 10km E Of Springton Whites Hill	18.1 kms S	10.6265000 GHz	14M0F1DDT	Receive	Mid Murray Council	Point to point	0/157	-34 42 04 139 11 43	-34 41 58.738 139 11 47.834
Council Office Walker Avenue Mannum		10.6265000 GHz	14M0F1DDT	transmit	Mid Murray Council	Point to point	0/337	-34 54 55 139 18 07	-34 54 49.738 139 18 11.842
Council Site 10km E Of Springton Whites Hill	18.1 kms S	10.5615000 GHz	14M0F1DDT	transmit	Mid Murray Council	Point to point	0/157	-34 42 04 139 11 43	-34 41 58.738 139 11 47.834
Council Office Walker Avenue Mannum		10.5615000 GHz	14M0F1DDT	Receive	Mid Murray Council	Point to point	0/337	-34 54 55 139 18 07	-34 54 49.738 139 18 11.842
Council Site 10km E Of Springton Whites Hill		7.7185000 GHz	14M0F1DDT	transmit	Mid Murray Council	Point to point	0/043	-34 42 04 139 11 43	-34 41 58.738 139 11 47.834
CFS Site cnr Sturt Highway and Blanchetown Road Blanchetown		7.7185000 GHz	14M0F1DDT	receive	Mid Murray Council	Point to point	0/223	-34 21 09 139 36 15	-34 21 3.716 139 36 19.797
Council Site 10km E Of Springton Whites Hill		7.5575000 GHz	14M0F1DDT	Receive	Mid Murray Council	Point to point	0/043	-34 42 04 139 11 43	-34 41 58.738 139 11 47.834
CFS Site cnr Sturt Highway and		7.5575000 GHz	14M0F1DDT	transmit	Mid Murray Council	Point to point	0/223	-34 21 09 139 36 15	-34 21 3.716 139 36

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Blanchetown Road Blanchetown									19.797
Cmts Warburton Road Tappa Pass	18.6 kms W	22.1305000 GHz	6M00F7W	Transmit	Vodafone Network Pty Ltd	Point to point	0/279	-34 29 47 139 03 41	-34 29 41.739 139 3 45.829
Vodafone Site Keller Road Off Stonewell Road Nuriootpa		22.1305000 GHz	6M00F7W	Receive	Vodafone Network Pty Ltd	Point to point	0/99	-34 28 52 138 57 29	-34 28 46.743 138 57 33.833
Cmts Warburton Road Tappa Pass		23.3625000 GHz	6M00F7W	Receive	Vodafone Network Pty Ltd	Point to point	0/279	-34 29 47 139 03 41	-34 29 41.739 139 3 45.829
Vodafone Site Keller Road Off Stonewell Road Nuriootpa		23.3625000 GHz	6M00F7W	Transmit	Vodafone Network Pty Ltd	Point to point	0/99	-34 28 52 138 57 29	-34 28 46.743 138 57 33.833
Bureau of Meteorology Repeater Station Duck Ponds Creek Stockwell	20.6 kms NW	151.500000 0 MHz	7K50F2D	Receive	Bureau of Meteorology	Point to point	0/ND	-34 27 01 139 03 37	-34 26 55.738 139 3 41.826
Bureau of Meteorology Field Station Duck Ponds Creek Stockwell		151.500000 0 MHz	7K50F2D	transmit	Bureau of Meteorology	Point to point	0/ND	-34 27 02 138 48 41	-34 26 56.748 138 48 45.837
Optus Pole 165-173 Craker St Nuriootpa		14.6550000 GHz	28M0D7W	Receive	Optus Mobile Pty Limited	Point to point	36/148	-34 27 37 138 59 58	-34 27 31.741 139 0 2.83
Optus Site Crennis Mines Road Angaston		14.6550000 GHz	28M0D7W	transmit	Optus Mobile Pty Limited	Point to point	19/328	-34 30 41 139 02 18	-34 30 35.74 139 59 13.836
Optus Pole 165-173 Craker St Nuriootpa		15.2990000 GHz	28M0D7W	Transmit	Optus Mobile Pty Limited	Point to point	36/148	-34 27 37 138 59 58	-34 27 31.741 139 0 2.83
Optus Site Crennis		15.2990000	28M0D7W	Receive	Optus Mobile Pty Limited	Point to point	19/328	-34 30 41	-34 30 35.74

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Mines Road Angaston		GHz						139 02 18	139 59 13.836
Optus Site Crennis Mines Road Angaston		14.6830000 GHz	28M0D7W	Transmit	Optus Mobile Pty Limited	Point to point	15/296	-34 30 41 139 02 18	-34 30 35.74 139 59 13.836
Optus Site Lot 11 Keller Rd Nuriootpa		14.6830000 GHz	28M0D7W	Receive	Optus Mobile Pty Limited	Point to point	28/116	-34 28 46 138 57 33	-34 28 40.743 138 57 37.832
SA Water Tanks Crennis Mines Road Angaston	20.7 kms W	460.125000 0 MHz	16K0F1D	Transmit	South Australian Water Corporation	Point to point	3/313	-34 30 41 139 02 17	-34 30 35.74 139 2 21.831
Angaston Pumping Station Angaston Road Angaston		460.125000 0 MHz	16K0F1D	Receive	South Australian Water Corporation	Point to point	3/133	-34 29 31 139 0 51	-34 29 25.741 139 0 55.831
SA Water Tanks Crennis Mines Road Angaston		450.625000 0 MHz	16K0F1D	Receive	South Australian Water Corporation	Point to point	3/313	-34 30 41 139 02 17	-34 30 35.74 139 2 21.831
Angaston Pumping Station Angaston Road Angaston		450.625000 0 MHz	16K0F1D	Transmit	South Australian Water Corporation	Point to point	3/133	-34 29 31 139 0 51	-34 29 25.741 139 0 55.831
Telstra Site 3 Km Southwest Angaston Barossa Range	20.9 kms W	23.3100000 GHz	28M0G7W	Transmit	Department of Justice	Point to point	35/ 228	-34 31 42 139 02 04	-34 31 36.741 139 2 8.832
Lot 2 Rifle Range Road Tanunda		23.3100000 GHz	28M0G7W	Receive	Department of Justice	Point to point	25/ 48	-34 33 45 138 59 09	-34 33 39.743 138 59 13.836
Telstra Site 3 Km Southwest Angaston Barossa Range	20.9 kms W	22.0780000 GHz	28M0G7W	Receive	Department of Justice	Point to point	35/ 228	-34 31 42 139 02 04	-34 31 36.741 139 2 8.832
Lot 2 Rifle Range Road Tanunda		22.0780000 GHz	28M0G7W	Transmit	Department of Justice	Point to point	25/ 48	-34 33 45 138 59 09	-34 33 39.743

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									138 59 13.836
Telstra/SAPD site 6 km NNW of Dutton Mt Rufus		15.3270000 GHz	28M0G7W	Transmit	Department of Justice	Point to point	40/99	-34 19 02 139 07 32	-34 18 56.733 139 7 36.816
Telstra Site 3 Km Southwest Angaston Barossa Range		15.3270000 GHz	28M0G7W	Receive	Department of Justice	Point to point	20/19	-34 31 42 139 02 04	-34 31 36.741 139 2 8.832
Telstra/SAPD site 6 km NNW of Dutton Mt Rufus		14.6830000 GHz	28M0G7W	Receive	Department of Justice	Point to point	40/99	-34 19 02 139 07 32	-34 18 56.733 139 7 36.816
Telstra Site 3 Km Southwest Angaston Barossa Range		14.6830000 GHz	28M0G7W	Transmit	Department of Justice	Point to point	20/19	-34 31 42 139 02 04	-34 31 36.741 139 2 8.832
Telstra Exchange Murray Street Nuriootpa		18.4150000 GHz	13M6D7W	Transmit	Telstra Corporation Limited	Point to point	28/148	-34 28 30 138 59 41	-34 28 24.741 138 59 45.831
Telstra Site 3 Km Southwest Angaston Barossa Range		18.4150000 GHz	13M6D7W	Receive	Telstra Corporation Limited	Point to point	31/328	-34 31 42 139 02 04	-34 31 36.741 139 2 8.832
Telstra Exchange Murray Street Nuriootpa		19.4250000 GHz	13M6D7W	Receive	Telstra Corporation Limited	Point to point	28/148	-34 28 30 138 59 41	-34 28 24.741 138 59 45.831
Telstra Site 3 Km Southwest Angaston Barossa Range		19.4250000 GHz	13M6D7W	Transmit	Telstra Corporation Limited	Point to point	31/328	-34 31 42 139 02 04	-34 31 36.741 139 2 8.832
Penrice Soda Products Pty Ltd Quarry Penrice Road Angaston	21.0 kms W	404.775000 0 MHz	16K0F3E	transmit	Genesee & Wyoming Australia Pty Ltd	Point to point	0/274	-34 28 51 139 02 35	-34 28 45.739 139 2 39.829
ARTC & ASR Railway Station Mallala		404.775000 0 MHz	16K0F3E	Receive	Genesee & Wyoming Australia Pty Ltd Point to	Point to point	0/094	-34 26 30 138 30 23	-34 26 24.759

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					point				138 30 27.85
Penrice Soda Products Pty Ltd Quarry Penrice Road Angaston		414.225000 0 MHz	16K0F3E	Receive	Genesee & Wyoming Australia Pty Ltd	Point to point	0/274	-34 28 51 139 02 35	-34 28 45.739 139 2 39.829
ARTC & ASR Railway Station Mallala		414.225000 0 MHz	16K0F3E	Transmit	Genesee & Wyoming Australia Pty Ltd	Point to point	0/094	-34 26 30 138 30 23	-34 26 24.759 138 30 27.85
ETSA Utilities 3km WNW of Truro Hawker Hill	21.1 kms NW	460.225000 0 MHz	16K0F3E	Receive	Spark Infrastructure SA (No2) Pty Limited	Point to point	0/223	-34 23 39 139 05 51	-34 23 33.736 139 5 55.822
ETSA Site - Medlow Road Uleybury		460.225000 0 MHz	16K0F3E	Transmit	Spark Infrastructure SA (No2) Pty Limited	Point to point	0/43	-34 41 00 138 45 25	-34 40 54.754 138 45 29.853
ETSA Utilities 3km WNW of Truro Hawker Hill	21.1 kms NW	450.725000 0 MHz	16K0F3E	Transmit	Spark Infrastructure SA (No2) Pty Limited	Point to point	0/223	-34 23 39 139 05 51	-34 23 33.736 139 5 55.822
ETSA Site - Medlow Road Uleybury		450.725000 0 MHz	16K0F3E	Receive	Spark Infrastructure SA (No2) Pty Limited	Point to point	0/43	-34 41 00 138 45 25	-34 40 54.754 138 45 29.853
ETSA Substation Angaston	22.3 kms W	460.425000 0 MHz	16K0F2D	Receive	Spark Infrastructure SA (No2) Pty Limited	Point to point	0/280	-34 30 13 139 01 30	-34 30 7.741 139 1 34.831
ETSA Substation Dorrien		460.425000 0 MHz	16K0F2D	Transmit	Spark Infrastructure SA (No2) Pty Limited	Point to point	0/100	-34 29 37 138 57 55	-34 29 31.743 138 57 59.833
ETSA Substation Angaston	22.3 kms W	450.925000 0 MHz	16K0F2D	Transmit	Spark Infrastructure SA (No2) Pty Limited	Point to point	0/280	-34 30 13 139 01 30	-34 30 7.741 139 1 34.831
ETSA Substation Dorrien		450.925000 0 MHz	16K0F2D	Receive	Spark Infrastructure SA (No2) Pty Limited	Point to point	0/100	-34 29 37 138 57 55	-34 29 31.743

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									138 57 59.833
Nuriootpa Sales Tap Barossa Valley Highway Nuriootpa		460.450000 0 MHz	16K0F2D	Transmit	Epic Energy South Australia Pty Ltd	Point to point	5/68	-34 29 42 138 59 10	-34 29 36.742 138 59 14.832
Angaston Meter Station Stockwell Road Angaston	23.0 kms W	460.450000 0 MHz	16K0F2D	Receive	Epic Energy South Australia Pty Ltd	Point to point	5/248	-34 28 58 139 01 24	-34 28 52.74 139 1 28.83
Nuriootpa Sales Tap Barossa Valley Highway Nuriootpa		450.950000 0 MHz	16K0F2D	Receive	Epic Energy South Australia Pty Ltd	Point to point	5/68	-34 29 42 138 59 10	-34 29 36.742 138 59 14.832
Angaston Meter Station Stockwell Road Angaston	23.0 kms W	450.950000 0 MHz	16K0F2D	Transmit	Epic Energy South Australia Pty Ltd	Point to point	5/248	-34 28 58 139 01 24	-34 28 52.74 139 1 28.83
Major Radio Site Rifle Range Road 7km SE Of Tanunda MT Kitchener	24.5 kms W	404.050000 0 MHz	16K0F3E	Transmit	South Australian Water Corporation	Point to point	0/211	-34 34 23 139 00 16	-34 34 17.743 139 0 20.836
SA Water Corporation Coach Road Greenhill		404.050000 0 MHz	16K0F3E	Receive	South Australian Water Corporation	Point to point	0/31	-34 56 54 138 42 46	-34 56 48.761 138 42 50.87
Major Radio Site Rifle Range Road 7km SE Of Tanunda MT Kitchener		413.500000 0 MHz	16K0F3E	Receive	South Australian Water Corporation	Point to point	0/211	-34 34 23 139 00 16	-34 34 17.743 139 0 20.836
SA Water Corporation Coach Road Greenhill		413.500000 0 MHz	16K0F3E	Transmit	South Australian Water Corporation	Point to point	0/31	-34 56 54 138 42 46	-34 56 48.761 138 42 50.87
CFS/RAA Site Range Road North Banksia Park		855.900000 0 MHz	200KF7W	Transmit	Vertical Telecoms SA Pty Ltd	Point to point	0/040	-34 48 56 138 44 51	-34 48 50.757 138 44 55.861
Major Radio Site Rifle		855.900000	200KF7W	Receive	Vertical Telecoms SA Pty	Point to point	0/220	-34 34 23	-34 34

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Range Road 7km SE Of Tanunda MT Kitchener		0 MHz			Ltd			139 00 16	17.743 139 0 20.836
CFS/RAA Site Range Road North Banksia Park		931.900000 0 MHz	200KF7W	Receive	Vertical Telecoms SA Pty Ltd	Point to point	0/040	-34 48 56 138 44 51	-34 48 50.757 138 44 55.861
Major Radio Site Rifle Range Road 7km SE Of Tanunda MT Kitchener		931.900000 0 MHz	200KF7W	Transmit	Vertical Telecoms SA Pty Ltd	Point to point	0/220	-34 34 23 139 00 16	-34 34 17.743 139 0 20.836
Old Railway Station Bushman Street Tanunda		847.000000 0 MHz	200KF8EH	Transmit	Barossa Broadcasting Board Inc.	Point to point	10/141	-34 31 40 138 57 39	-34 31 34.743 138 57 43.835
Major Radio Site Rifle Range Road 7km SE Of Tanunda MT Kitchener		847.000000 0 MHz	200KF8EH	Receive	Barossa Broadcasting Board Inc.	Point to point	25/321	-34 34 23 139 00 16	-34 34 17.743 139 0 20.836
Fire Spotting Tower 7 km SE of Williamstown		414.100000 0 MHz	16K0F1D	Transmit	South Australian Water Corporation	Point to point	20/23	-34 43 39 138 55 33	-34 43 33.749 138 55 37.848
Major Radio Site Rifle Range Road 7km SE Of Tanunda MT Kitchener		414.100000 0 MHz	16K0F1D	Receive	South Australian Water Corporation	Point to point	20/203	-34 34 23 139 00 16	-34 34 17.743 139 0 20.836
Fire Spotting Tower 7 km SE of Williamstown		404.650000 0 MHz	16K0F1D	Receive	South Australian Water Corporation	Point to point	20/23	-34 43 39 138 55 33	-34 43 33.749 138 55 37.848
Major Radio Site Rifle Range Road 7km SE Of Tanunda MT Kitchener		404.650000 0 MHz	16K0F1D	Transmit	South Australian Water Corporation	Point to point	20/203	-34 34 23 139 00 16	-34 34 17.743 139 0 20.836
Major Radio Site Rifle Range Road 7km SE Of Tanunda MT Kitchener		404.700000 0 MHz	16K0F1D	Transmit	South Australian Water Corporation	Point to point	20/8	-34 34 23 139 00 16	-34 34 17.743 139 0 20.836

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SA Water Tank on Hill Kapunda Road Eudunda		404.700000 0 MHz	16K0F1D	Receive	South Australian Water Corporation	Point to point	30/188	-34 11 10 139 04 14	-34 11 4.733 139 4 18.811
Major Radio Site Rifle Range Road 7km SE Of Tanunda MT Kitchener		414.150000 0 MHz	16K0F1D	Receive	South Australian Water Corporation	Point to point	20/8	-34 34 23 139 00 16	-34 34 17.743 139 0 20.836
SA Water Tank on Hill Kapunda Road Eudunda		414.150000 0 MHz	16K0F1D	Transmit	South Australian Water Corporation	Point to point	30/188	-34 11 10 139 04 14	-34 11 4.733 139 4 18.811
Major Radio Site Rifle Range Road 7km SE Of Tanunda MT Kitchener		461.700000 0 MHz	16K0F1D	Transmit	South Australian Water Corporation	Point to multipoint	20/ND	-34 34 23 139 00 16	-34 34 17.743 139 0 20.836
Major Radio Site Rifle Range Road 7km SE Of Tanunda MT Kitchener		452.200000 0 MHz	16K0F1D	Receive	South Australian Water Corporation	Point to multipoint	20/ND	-34 34 23 139 00 16	-34 34 17.743 139 0 20.836
Major Radio Site Rifle Range Road 7km SE Of Tanunda MT Kitchener		15.2990000 GHz	28M0G7W	Receive	Amcom Pty Ltd	Point to point	20/208	-34 34 23 139 00 16	-34 34 17.743 139 0 20.836
Telstra site 6 km NE of Williamstown Trial Hill		15.2990000 GHz	28M0G7W	Transmit	Amcom Pty Ltd	Point to point	26/28	-34 39 22 138 57 07	-34 39 16.746 138 57 11.843
Major Radio Site Rifle Range Road 7km SE Of Tanunda MT Kitchener		14.6550000 GHz	28M0G7W	Transmit	Amcom Pty Ltd	Point to point	20/208	-34 34 23 139 00 16	-34 34 17.743 139 0 20.836
Telstra site 6 km NE of Williamstown Trial Hill		14.6550000 GHz	28M0G7W	Receive	Amcom Pty Ltd	Point to point	26/28	-34 39 22 138 57 07	-34 39 16.746 138 57 11.843
Telstra Exchange Tanunda 3 Sobels Street Tanunda		14.6830000 GHz	28M0G7W	Receive	Amcom Pty Ltd	Point to point	4/143	-34 31 25 138 57 35	-34 31 19.743 138 57 39.835

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Major Radio Site Rifle Range Road 7km SE Of Tanunda MT Kitchener		14.6830000 GHz	28M0G7W	Transmit	Amcom Pty Ltd	Point to point	20/323	-34 34 23 139 00 16	-34 34 17.743 139 0 20.836
Telstra Exchange Tanunda 3 Sobels Street Tanunda		15.3270000 GHz	28M0G7W	Transmit	Amcom Pty Ltd	Point to point	4/143	-34 31 25 138 57 35	-34 31 19.743 138 57 39.835
Major Radio Site Rifle Range Road 7km SE Of Tanunda MT Kitchener		15.3270000 GHz	28M0G7W	Receive	Amcom Pty Ltd	Point to point	20/323	-34 34 23 139 00 16	-34 34 17.743 139 0 20.836
Major Radio Site Rifle Range Road 7km SE Of Tanunda MT Kitchener		413.600000 0 MHz	16K0F3E	Receive	South Australian Water Corporation	Point to point	0/211	-34 34 23 139 00 16	-34 34 17.743 139 0 20.836
SA Water Corporation Coach Road Greenhill		413.600000 0 MHz	16K0F3E	Transmit	South Australian Water Corporation	Point to point	0/31	-34 56 54 138 42 46	-34 56 48.761 138 42 50.87
Major Radio Site Rifle Range Road 7km SE Of Tanunda MT Kitchener		404.150000 0 MHz	16K0F3E	Transmit	South Australian Water Corporation	Point to point	0/211	-34 34 23 139 00 16	-34 34 17.743 139 0 20.836
SA Water Corporation Coach Road Greenhill		404.150000 0 MHz	16K0F3E	Receive	South Australian Water Corporation	Point to point	0/31	-34 56 54 138 42 46	-34 56 48.761 138 42 50.87
Major Radio Site Rifle Range Road 7km SE Of Tanunda MT Kitchener		410.550000 0 MHz	16K0F3E	Receive	Hutchison Telecommunications (Australia) Ltd	Point to point	0/209	-34 34 23 139 00 16	-34 34 17.743 139 0 20.836
NWS 9 site 109 Summit Road Crafers		410.550000 0 MHz	16K0F3E	Transmit	Hutchison Telecommunications (Australia) Ltd	Point to point	0/29	-34 59 02 138 42 25	-34 58 56.762 138 42 29.872
Optus Site Lot 11 Keller Rd Nuriootpa		18.3600000 GHz	27M5D7W	Transmit	Optus Mobile Pty Limited	Point to point	30/60	-34 28 46 138 57 33	-34 28 40.743 138 57 37.832
Optus Pole 165-173 Craker St Nuriootpa		18.3600000 GHz	27M5D7W	Receive	Optus Mobile Pty Limited	Point to point	24/240	-34 27 37 138 59 58	-34 27 31.741 139 0

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									2.83
Optus Site Lot 11 Keller Rd Nuriootpa		19.3700000 GHz	27M5D7W	Receive	Optus Mobile Pty Limited	Point to point	38/60	-34 28 46 138 57 33	-34 28 40.743 138 57 37.832
Optus Pole 165-173 Craker St Nuriootpa	26.3 kms W	19.3700000 GHz	27M5D7W	Transmit	Optus Mobile Pty Limited	Point to point	24/240	-34 27 37 138 59 58	-34 27 31.741 139 0 2.83
Optus Pole 165-173 Craker St Nuriootpa	26.3 kms W	15.2990000 GHZ	28M0D7W	Transmit	Optus Mobile Pty Limited	Point to point	30/186	-34 27 37 138 59 58	-34 27 31.741 139 0 2.83
Lot 2 Rifle Range Road Tanunda		15.2990000 GHZ	28M0D7W	Receive	Optus Mobile Pty Limited	Point to point	36/6	-34 33 45 138 59 09	-34 33 39.743 138 59 13.836
Lot 2 Rifle Range Road Tanunda		14.6550000 GHz	28M0D7W	Transmit	Optus Mobile Pty Limited	Point to point	36/6	-34 33 45 138 59 09	-34 33 39.743 138 59 13.836
Optus Pole 165-173 Craker St Nuriootpa		14.6550000 GHz	28M0D7W	Receive	Optus Mobile Pty Limited	Point to point	30/186	-34 27 37 138 59 58	-34 27 31.741 139 0 2.83
Telstra site 6 km NE of Williamstown Trial Hill		15.2990000 GHZ	28M0D7W	Transmit	Amcom Pty Ltd	Point to point	26/28	34 39 22 +138 57 07	-34 49 16.749 138 57 11.852
Major Radio Site Rifle Range Road 7km SE of Tanunda MT Kitchener		15.2990000 GHZ	28M0D7W	Receive	Amcom Pty Ltd	Point to point	20/208	-34 34 23 139 00 16	-34 34 17.743 139 0 20.836
Telstra site 6 km NE of Williamstown Trial Hill		14.6550000 GHz	28M0D7W	Receive	Amcom Pty Ltd	Point to point	20/208	34 39 22 +138 57 07	-34 49 16.749 138 57 11.852
Major Radio Site Rifle		14.6550000	28M0D7W	Transmit	Amcom Pty Ltd	Point to point	20/208	-34 34 23	-34 34

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Range Road 7km SE of Tanunda MT Kitchener		GHz						139 00 16	17.743 139 0 20.836
Pump Station Corner Main and Tunkillo Roads Mount Pleasant		518.275000 0 MHz	16K0F3E	Receive	South Australian Water Corporation	Point to point	0/35	-34 46 42 139 02 31	-34 46 36.745 139 2 35.846
South Australian Water Corporation Tank Keyneton Road 2.75 Km South of Springton	26.8 kms SW	518.275000 0 MHz	16K0F3E	Transmit	South Australian Water Corporation	Point to point	0/ND	-34 43 59 139 04 57	-34 43 53.743 139 5 1.841
Telstra/SAPD site 6 km NNW of Dutton Mt Rufus		7.6030000 GHz	7M00D7W	Transmit	Vodafone Network Pty Ltd	Point to point	10/98	-34 19 02 139 07 32	-34 18 56.733 139 7 36.816
Vodafone Site Lot 8 Park Road Blanchetown		7.6030000 GHz	7M00D7W	Receive	Vodafone Network Pty Ltd	Point to point	36/278	-34 21 52 139 32 27	-34 21 46.718 139 32 31.8
Telstra/SAPD site 6 km NNW of Dutton Mt Rufus		7.4420000 GHz	7M00D7W	Receive	Vodafone Network Pty Ltd	Point to point	10/98	-34 19 02 139 07 32	-34 18 56.733 139 7 36.816
Vodafone Site Lot 8 Park Road Blanchetown		7.4420000 GHz	7M00D7W	Transmit	Vodafone Network Pty Ltd	Point to point	36/278	-34 21 52 139 32 27	-34 21 46.718 139 32 31.8

Table 11.C: Identifies all broadcasting licensee within 25km of the proposed site

Telecommunication tower location	Km Away	Frequency	Emission Designator	Mode	Licensee	License type	Antenna height / azimuth	Lat /long AGD 66	Lat/ long GDA 94
Tappa Pass 1.5 Km Ne Of Angaston		90.7000000 MHz	200KF8EHF	Transmit	The Barossa council	Broadcasting 5ABCFM	15/	-34 29 40 139 03 39	-34 29 34.739 139 3 43.829
Tappa Pass 1.5 Km Ne Of Angaston	18.6 kms W	94.7000000 MHz	200KF8EHF	Transmit	The Barossa council	Broadcasting 5DN FM	15/	-34 29 40 139 03 39	-34 29 34.739 139 3 43.829
Broadcast Site Country Fire Services Tower Truro		772.2500000 MHz	6M25C3F	Transmit	Mid Murray Council	Broadcasting ADS63	30/	-34 24 20 139 07 21	-34 24 14.735 139 7 25.821
Broadcast Site Country Fire Services Tower Truro		777.7500000 MHz	130KF3EG	Transmit	Mid Murray Council	Broadcasting ADS63	0/	-34 24 20 139 07 21	-34 24 14.735 139 7 25.821
Broadcast Site Country Fire Services Tower Truro		777.9921880 MHz	130KF3EG	Transmit	Mid Murray Council	Broadcasting ADS63	0/	-34 24 20 139 07 21	-34 24 14.735 139 7 25.821
Broadcast Site Country Fire Services Tower Truro		793.2500000 MHz	6M25C3F	Transmit	Mid Murray Council	Broadcasting ABS66	30/	-34 24 20 139 07 21	-34 24 14.735 139 7 25.821
Broadcast Site Country Fire Services Tower Truro		798.7500000 MHz	130KF3EG	Transmit	Mid Murray Council	Broadcasting ABS66	0/	-34 24 20 139 07 21	-34 24 14.735 139 7 25.821
Broadcast Site Country Fire Services Tower Truro		798.9921880 MHz	130KF3EG	Transmit	Mid Murray Council	Broadcasting ABS66	0/	-34 24 20 139 07 21	-34 24 14.735 139 7 25.821
Broadcast Site Country Fire Services Tower Truro	18.6 kms NW	814.2500000 MHz	6M25C3F	Transmit	Mid Murray Council	Broadcasting SBS69	30/	-34 24 20 139 07 21	-34 24 14.735 139 7 25.821
Broadcast Site Country Fire Services Tower		730.2500000 MHz	6M25C3F	transmit	Mid Murray Council	Broadcasting SAS57	30/	-34 24 20 139 07 21	-34 24 14.735

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Truro									139 7 25.821
Broadcast Site Country Fire Services Tower Truro		735.7500000 MHz	130KF3EG	transmit	Mid Murray Council	Broadcasting SAS57	0/	-34 24 20 139 07 21	-34 24 14.735 139 7 25.821
Broadcast Site Country Fire Services Tower Truro		735.9921880 MHz	130KF3EG	transmit	Mid Murray Council	Broadcasting SAS57	0/	-34 24 20 139 07 21	-34 24 14.735 139 7 25.821
Broadcast Site Country Fire Services Tower Truro		751.2500000 MHz	6M25C3F	transmit	Mid Murray Council	Broadcasting NWS60	0/	-34 24 20 139 07 21	-34 24 14.735 139 7 25.821
Broadcast Site Country Fire Services Tower Truro		756.7500000 MHz	130KF3EG	transmit	Mid Murray Council	Broadcasting NWS60	0/	-34 24 20 139 07 21	-34 24 14.735 139 7 25.821
Broadcast Site Country Fire Services Tower Truro		756.9921880 MHz	130KF3EG	transmit	Mid Murray Council	Broadcasting NWS60	0/	-34 24 20 139 07 21	-34 24 14.735 139 7 25.821
Broadcast Site Country Fire Services Tower Truro	18.6 kms NW	819.7500000 MHz	130KF3EG	Transmit	Mid Murray Council	Broadcasting SBS69	0/	-34 24 20 139 07 21	-34 24 14.735 139 7 25.821
Broadcast Site Country Fire Services Tower Truro	18.6 kms NW	819.9921880 MHz	130KF3EG	Transmit	Mid Murray Council	Broadcasting SBS69	0/	-34 24 20 139 07 21	-34 24 14.735 139 7 25.821
Television Broadcast Site 0.8km East Angaston	18.7 kms W	779.2500000 MHz	6M25C3F	Transmit	The Barossa Council	Broadcasting NWS64	25/	-34 30 18 139 03 29	-34 30 12.739 139 3 33.83
Television Broadcast Site 0.8km East Angaston	18.7 kms W	784.7500000 MHz	130KF3EG	Transmit	The Barossa Council	Broadcasting NWS64	25/	-34 30 18 139 03 29	-34 30 12.739 139 3 33.83
Television Broadcast Site 0.8km East Angaston		784.9921880 MHz	130KF3EG	Transmit	The Barossa Council	Broadcasting NWS64	25/	-34 30 18 139 03 29	-34 30 12.739 139 3 33.83
Television Broadcast Site 0.8km East		716.2500000 MHz	6M25C3F	Transmit	The Barossa Council	Broadcasting SBS55	25/	-34 30 18 139 03 29	-34 30 12.739

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Angaston									139 3 33.83
Television Broadcast Site 0.8km East Angaston		721.7500000 MHz	130KF3EG	Transmit	The Barossa Council	Broadcasting SBS55	0/	-34 30 18 139 03 29	-34 30 12.739 139 3 33.83
Television Broadcast Site 0.8km East Angaston		721.9921880 MHz	130KF3EG	Transmit	The Barossa Council	Broadcasting SBS55	0/	-34 30 18 139 03 29	-34 30 12.739 139 3 33.83
Television Broadcast Site 0.8km East Angaston		800.2500000 MHz	6M25C3F	Transmit	The Barossa Council	Broadcasting ADS67	25/	-34 30 18 139 03 29	-34 30 12.739 139 3 33.83
Television Broadcast Site 0.8km East Angaston		721.7500000 MHz	130KF3EG	Transmit	The Barossa Council	Broadcasting ADS67	0/	-34 30 18 139 03 29	-34 30 12.739 139 3 33.83
Television Broadcast Site 0.8km East Angaston		721.9921880 MHz	130KF3EG	Transmit	The Barossa Council	Broadcasting ADS67	0/	-34 30 18 139 03 29	-34 30 12.739 139 3 33.83
Television Broadcast Site 0.8km East Angaston		737.2500000 MHz	6M25C3F	Transmit	The Barossa Council	Broadcasting ABS58	25/	-34 30 18 139 03 29	-34 30 12.739 139 3 33.83
Television Broadcast Site 0.8km East Angaston		758.2500000 MHz	6M25C3F	Transmit	The Barossa Council	Broadcasting SAS61	25/	-34 30 18 139 03 29	-34 30 12.739 139 3 33.83
Television Broadcast Site 0.8km East Angaston		763.7500000 MHz	130KF3EG	Transmit	The Barossa Council	Broadcasting SAS61	25/	-34 30 18 139 03 29	-34 30 12.739 139 3 33.83
Television Broadcast Site 0.8km East Angaston		763.9921880 MHz	130KF3EG	Transmit	The Barossa Council	Broadcasting SAS61	25/	-34 30 18 139 03 29	-34 30 12.739 139 3 33.83
Broadcast Site STEDS Lagoons Barossa Valley Way Lyndoch		702.2500000 MHz	6M25C3F	Transmit	The Barossa Council	Broadcasting SBS53	32/	-34 36 09 138 53 45	-34 36 3.747 138 53 49.842
Barossa Amateur Radio Site Rifle Range Road	24.5 kms W	89.1000000 MHz	200KF8EHF	Transmit	Barossa Broadcasting Board Inc.	Broadcasting 5BBB FM	30/	-34 34 24 139 00 16	-34 34 18.743

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MT Kitchener									139 0 20.836
The Barossa Valley Tourist Park Penrice Rd CNR Driveway to Tourist Park Nuriootpa		97.9000000 MHz	200KF8EHF	Transmit	Uniting Church in Australia	Broadcasting service	8/	-34 28 17 139 00 14	-34 28 11.741 139 0 18.83
Broadcast Site STEDS Lagoons Barossa Valley Way Lyndoch		723.25 MHz	6M25C3F	Transmit	The Barossa Council	Broadcasting ABC 56	32/	-34 36 09 138 53 45	-34 36 3.747 138 53 49.842
Broadcast Site STEDS Lagoons Barossa Valley Way Lyndoch		744.25 MHz	6M25C3F	Transmit	The Barossa Council	Broadcasting SAS 59	32/	-34 36 09 138 53 45	-34 36 3.747 138 53 49.842
Broadcast Site STEDS Lagoons Barossa Valley Way Lyndoch		786.25MHz	6M25C3F	Transmit	The Barossa Council	Broadcasting ADS 65	32/	-34 36 09 138 53 45	-34 36 3.747 138 53 49.842