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## Macarthur wind farm

### Bushfire Mitigation Plan 2021-2022

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Macarthur DMS: ML AL FI 02 (Rev 4.2)

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## Plan Revision History

Date	Version	Author	Comment	Sections
0.1	27/11/2014	B. Ryan	Initial 2014 Draft	All
0.2	28 Dec 2016	S. Cariss	Revised for 2016 and in preparation for submission to ESV	All
1.0	1 Feb 2017	S. Cariss	Revised for 2017/18 in preparation for submission to ESV	All
1.1	10 Feb 2017	S. Cariss	Revised relating to evaluation by ESV	All
1.2	24 Feb 2017	S. Cariss	Reference to Asset Inspector qualifications and training resulting from ESV evaluation	All
2.0	01 Aug 2018	R. Widdowson	BMP Working Group Review	All
2.1	31 Aug 2018	S. Cariss	Minor changes and rebranding	All
2.2	27 June 2019	R. Widdowson	Annual review AGL / Vestas	All
3.0	09 July 2020	S. Cariss	Annual review AGL Macarthur	All
3.1	29 Aug 2020	S. Cariss	Feedback post annual review	Section 13
4.0	18 June 2021	S. Cariss	Annual AGL Macarthur review	All
4.1	29 June 2021	S. Cariss	Minor changes resulting from the annual review and following the ESV Line Clearance Plan Systems Audit.	All
4.2	20 August 2021	S. Cariss	Changes resulting from the annual ESV review and approval processes.	All

## Distribution

Copy	Position
1	AGL Macarthur Reception
2	Macarthur wind farm Reception
Electronic File	Energy Safe Victoria
Electronic File	Head of Renewables
Electronic File	Operations and Governance Manager
Electronic File	Wind and Solar Asset Manager
Electronic File	Wind and Solar Asset Leader
Electronic File	Site Supervisor – Macarthur wind farm
Electronic File	HSE Business Partner
Electronic File	AGL Web Site
Electronic File	AGL Macarthur Document Management System

# 1. Regulation Compliance Summary

Electricity Safety (Bushfire Mitigation) regulations 2013

Regulation 6: Prescribed particulars for bushfire mitigation plans – Specified Operators

Specified operator legal entity
AGL HP1 Pty Ltd (ACN 080 429 901); and AGL HP2 Pty Ltd (ACN 080 810 546); and AGL HP3 Pty Ltd (ACN 080 735 815)  Trading as <b>AGL Hydro Partnership (ABN 86 076 691 481)</b>

Reg	Requirement	Reference in this Plan
6 (1)(a)	the name, address and telephone number of the specified operator	Responsible Persons (Section 2)
6 (1)(b)	the position, address and telephone number of the person who was responsible for the preparation of the plan	Responsible Persons (Section 2)
6 (1)(c)	the position, address and telephone number of the persons who are responsible for carrying out the plan	Responsible Persons (Section 2)
6 (1)(d)	the telephone number of the specified operator's control room so that persons in the room can be contacted in an emergency that requires action by the specified operator to mitigate the danger of bushfire	Responsible Persons (Section 2)
6 (1)(e)	the bushfire mitigation policy of the specified operator to minimise the risk of fire ignition from its at-risk electric lines	Policy (Section 4)
6 (1)(f)	the objectives of the plan to achieve the mitigation of fire danger arising from the specified operator's at-risk electric lines	Objectives (Section 5)
6 (1)(g)	a description, map or plan of the land to which the bushfire mitigation plan applies, identifying the location of the specified operator's at-risk electric lines	Scope (Section 6)
6 (1)(h)	the preventative strategies and programs to be adopted by the specified operator to minimise the risk of the specified operator's at-risk electric lines starting fires	Preventative Strategies (Section 7)

Reg	Requirement	Reference in this Plan
6 (1)(i)	a plan for inspection that ensures that all of the specified operator's at-risk electric lines are inspected at regular intervals of no longer than 37 months	Inspection Programs (Section 8)
6 (1)(j)	details of the processes and procedures for ensuring that each person who is assigned to carry out the inspections referred to in paragraph (i) has satisfactorily completed a training course approved by Energy Safe Victoria and is competent to carry out such inspections	Qualifications, Training and Competency (Section 9)
6 (1)(k)	details of the processes and procedures for ensuring that persons (other than persons referred to in paragraph (j)) who carry out or will carry out functions under the plan are competent to do so	Qualifications, Training and Competency (Section 9)
6 (1)(l)(i)	the operation and maintenance plans for the specified operator's at-risk electric lines — in the event of a fire	Operations and Maintenance Plans (Section 10)
6 (1)(l)(ii)	the operation and maintenance plans for the specified operator's at-risk electric lines — during a total fire ban day	Operations and Maintenance Plans (Section 10)
6 (1)(l)(iii)	the operation and maintenance plans for the specified operator's at-risk electric lines — during a fire danger period	Operations and Maintenance Plans (Section 10)
6 (1)(m)	the investigations, analysis and methodology to be adopted by the specified operator for the mitigation of the risk of fire ignition from its at-risk electric lines	Investigations, Analysis and Methodology (Section 11)
6 (1)(n)(i)	details of the processes and procedures by which the specified operator will— monitor the implementation of the bushfire mitigation plan	Processes and Procedures (Section 12)
6 (1)(n)(ii)	details of the processes and procedures by which the specified operator will— verification the implementation of the plan	Processes and Procedures (Section 12)
6 (1)(n)(iii)	details of the processes and procedures by which the specified operator will— identify any deficiencies in the plan or the plan's implementation	Processes and Procedures (Section 12)

Reg	Requirement	Reference in this Plan
6 (1)(n)(iv)	details of the processes and procedures by which the specified operator will— change the plan and the plan's implementation to rectify any deficiencies identified under subparagraph (iii)	Processes and Procedures (Section 12)
6 (1)(n)(v)	details of the processes and procedures by which the specified operator will— monitor the effectiveness of inspections carried out under the plan	Processes and Procedures (Section 12)
6 (1)(n)(vi)	details of the processes and procedures by which the specified operator will— verification the effectiveness of inspections carried out under the plan	Processes and Procedures (Section 12)
6 (1)(o)	the policy of the specified operator in relation to the assistance to be provided to fire control authorities in the investigation of fires near the specified operator's at-risk electric lines	Assistance Provided to Fire Control Authorities (Section 13)

## 2. Responsibilities

### 2.1. Responsible Persons

Regulation	Specification – Contact Details
Name, address and telephone number of the specified operator	<p><b>Darren Martin</b>  <b>Head of Wind and Solar (Acting)</b>            AGL Energy            Torrens Island Power Station            Phone: 0417 530 455            Email: darren.martin@agl.com.au</p>
Position, address and telephone number of the person who was responsible for the preparation of the plan	<p><b>Stuart Cariss</b>  <b>Operations Governance Manager, Renewables</b>            AGL Energy            Kiewa Valley Hwy Mt Beauty 3699            Phone: (03) 5754 3225            Email: scariss@agl.com.au</p>
Position, address and telephone number of the persons who are responsible for carrying out the plan	<p><b>Hoang Nguyen</b>  <b>Asset Manager, Wind (Vic)</b>            AGL Energy            699 Bourke St Docklands 3008            Phone: 0422 432 398            Email: hnguyen@agl.com.au</p>
Telephone number of the specified operator's control room so that persons in the room can be contacted in an emergency that requires action by the specified operator to mitigate the danger of bushfire	<p><b>AGL Dispatch Centre</b>  <b>Duty Generation Dispatcher</b>            699 Bourke St Docklands 3008            Phone: (03) 5754 3142            Email: agldc@agl.com.au</p>
<p>Information, including a copy of the Plan is available to be viewed by ESV or members of the public at Macarthur wind farm located at 1850 Hawkesdale Macarthur Rd, Macarthur 3286.</p> <p>A copy of the Plan is also available on the AGL internet site at: <a href="https://www.agl.com.au/about-agl/how-we-source-energy/renewable-energy/macarthur-wind-farm">https://www.agl.com.au/about-agl/how-we-source-energy/renewable-energy/macarthur-wind-farm</a></p>	



## 2.2. Management Structure, Processes and Practices

The AGL Macarthur management structure with respect to this plan is as follows (refer to appendices):

**Head of Wind and Solar** - responsible for:

- Overall management of AGL Macarthur
- Timely completion and actioning of Bushfire Mitigation Plan strategies; and
- Ensuring the actions of AGL Macarthur meet legislative requirements.

**Operations Governance Manager** – responsible for:

- Compliance and Verification of the Bushfire Mitigation Plan
- Ensure proper liaison with other electric line and land management agencies; and
- Ensure the administration of the Bushfire Mitigation Plan meets legislative requirements

**Asset Manager, Wind (Vic)** – responsible for:

- Ensuring all outstanding work is completed in a timely manner and adequate resources are made available for the implementation of the plan
- Ensuring all outstanding compliance issues are addressed and to ensure that matters are communicated to senior management; and
- Ensuring all compliance and Verification outcomes are reported to the Operations Governance Manager in a timely manner

**Maintenance Services Agreement (MSA) Providers** — responsible for:

- Day to day operation of electric line asset maintenance in accordance with this plan
- Asset inspection, vegetation control program and liaison with other land management agencies in accordance with this plan; and
- Allocation of contracts, with the responsibility of ensuring training and competencies are maintained in accordance with this plan

**Senior Electrical Engineer** — responsible for:

- Providing technical advice as required to ensure that the assets are maintained to the required standard; and
- Assist with contractor evaluation and selection to ensure they are technically competent and can provide the required levels of service

## 3. References

- AGL Macarthur Line Clearance Plan 2021-2022
- AGL Energy Customer Complaints Policy
- Electricity Safety Act 1998
- Electricity Safety (General) Regulations 2019
- Electricity Safety (Electric Line Clearance) Regulations 2020
- Electricity Safety (Management) Regulations 2019
- Electricity Safety (Bushfire Mitigation) Regulations 2013
- Electrical Safety (Bushfire Mitigation Duties) Regulations 2017
- Australian Standard AS4373 (2007) Pruning of Amenity Trees

## 4. Policy Introduction

Reg	Requirement
6 (1)(e)	the bushfire mitigation policy of the specified operator to minimise the risk of fire ignition from its at-risk electric lines.

AGL Macarthur's management and employees are committed to avoiding fire ignition caused by electrical assets and achieving compliance with relevant legislative and regulatory requirements while encouraging innovation, system improvement and the effective use of our flexible resources. AGL Macarthur's policy is to mitigate as far as practicable the risk of fire starting from those at-risk AGL Macarthur assets.

This Bushfire Mitigation Plan outlines the policies, procedures, standards, codes, and guidelines that AGL Macarthur applies to construction, operation and management of our electrical infrastructure and sub-networks. The Plan also provides an overview of AGL Macarthur's bushfire risk management strategies in relation to key stakeholders including local government, government agencies and emergency services.

AGL Macarthur wind farm is committed to maintaining fire safe assets by:

- Periodic inspection of the assets to identify the works necessary to maintain fire safety
- Operation programs to remove or manage the identified risks; and
- Monitoring and reporting regimes to measure the state of preparedness for the declared bushfire season and the effectiveness of programs

## 5. Plan Objectives

Reg	Requirement
6 (1)(f)	the objectives of the plan to achieve the mitigation of fire danger arising from the specified operator's at-risk electric lines.

The objectives of AGL Macarthur's Bushfire Mitigation Plan are as follows:

- Public safety
- Compliance by AGL Macarthur with the *Electricity Safety Act 1998* and the Electricity Safety (Bushfire Mitigation) Regulations 2013
- To maintain a program of inspection of assets on a regular basis dictated by the risks assessed at each location
- Reduce the risk of fire starting from its assets
- Vegetation management with compliance to minimum clearances and environmental practices
- Asset maintenance to a level consistent with industry standards
- Liaise with fire attack and land management agencies to formulate strategies to minimise damage to the environment in the case of bushfires
- Measurement, monitoring, reporting, and verification of program achievement and performance including the rectification of non-conformances; and
- Regular assessment of all programs in accordance with the relevant standards, regulations, and codes

## 6. Scope

### 6.1. Overview

Macarthur wind farm is operated by AGL Hydro Partnership (hereafter, AGL Macarthur), a subsidiary of AGL Energy.

AGL and its contractors are committed to avoiding fire ignition caused by electrical assets and achieving compliance with relevant legislative and regulatory requirements while encouraging innovation, system improvement and the effective use of our flexible resources.

This Bushfire Mitigation Plan outlines the policies, procedures, standards, codes, and guidelines that AGL Macarthur applies to construction, operation and management of our electrical infrastructure and sub-networks. The Plan also provides an overview of AGL Macarthur's bushfire risk management strategies in relation to key stakeholders including local government, government agencies and emergency services.

### 6.2. Maps

Reg	Requirement
6 (1)(g)	a description, map or plan of the land to which the bushfire mitigation plan applies, identifying the location of the specified operator's at-risk electric lines.

Macarthur wind farm's electric line assets are in the Moyne Shire in Victoria. Maps identifying the areas where the assets are located are provided in appendices of this plan.

### 6.3. Overhead Lines

This section provides a description of all overhead line assets within Macarthur wind farm including line pole structures and protection. It outlines operating facilities; the actions associated with the lines and provide detail of recommended maintenance practices.

Overhead line circuits within the wind farm comprise:

- 33 kV line CG1L (Collector Group 1 Line) from the transition compound at Pole 26 to the transition compound adjacent to Macarthur Substation
- 33 kV line CG6L (Collector Group 6 Line) from the transition compound at pole 19E to the transition compound adjacent to Macarthur Substation
- 132 kV line MWF1 (Macarthur wind farm 1 Line) from Macarthur Substation to Tarrone Terminal Station 132kV switchyard
- 132 kV line MWF2 (Macarthur wind farm 2 Line) from Macarthur Substation to Tarrone Terminal Station 132kV switchyard
- 132 kV line TRSL (Tarrone Substation Line) from Tarrone Terminal Station 132kV switchyard to the 500 kV/132 kV transformer bay; and
- 500 kV span at Tarrone Terminal Station between SP AusNet 500 kV gantry and AGL 500 kV/132 kV transformer bay gantry

In the sections that follow, descriptions and operating features of lines are described individually. Maintenance requirements are common for all lines and are presented in a single section.

## 6.4. 33kV Collector Group Lines

33kV overhead collector lines are run from the 33kV transition compound adjacent to Macarthur Substation to terminating transition compounds at Poles 19E and 26. Between the substation transition compound and location 19, both circuits are carried on a double circuit line approximately 4.5 km in length. From pole 19W to 26, CG6L continues a single circuit line of length 1.9 km. Both collector circuits provide connection for 35 turbines and use duplex Sulfur AAAC conductor (ie. 2 x Sulfur conductors per phase). The overall line route is shown in the appendices.

### 6.4.1. Line Pole Structures

Free standing monopoles of 25m height are used for all line structures and generally construction type is suspension with both circuits supported on a single pole. For all strain locations two monopoles are installed and are designated by the structure location and position. Each structure carries circuit nameplate and phase identification markers. Nameplates carry circuit designation CG1L or CG6L and the structure number. Where two circuits are supported by a single pole, nameplates are provided on both sides of the pole for the circuit directly above. Surge arresters are used at each line termination within the transition compound yards and mounted on structures 13E and 13W in the place of bridging insulators.

### 6.4.2. Line Protection

Collector protection is provided by Areva P141 relays (X Protection) and SEL 751 relays (Y Protection). These provide IDMT overcurrent and earth fault protection for lines as well as other wind farm protection functions (such as under and over frequency protection). The protection functions don't rely on the Optical Ground Wire (OPGW) communications path. No auto reclosing is provided collector circuits so that collector cables are not unduly stressed.

## 6.5. 132kV Lines to Tarrone Substation

The double circuit 132kV line from Macarthur Substation to Tarrone Terminal Station 132kV switchyard is 13.6 km long, with each circuit, designated MWF1 and MWF2, rated at 210 MVA.

The circuits are terminated at gantry structures at both substations and supported by steel or concrete poles at 63 locations. Steel poles are used from Macarthur substation to Pole 52, from Pole 26 to Tarrone Terminal Station and for Pole 46 on the Kangertong Rd road reserve. Concrete poles are used from Poles 27 to 45 and from 45 to 51.

Duplex Sulfur AAAC conductor is used for steel pole sections (i.e.. 2 x Sulfur conductors per phase) and simplex Sulfur AAAC conductor (1 per phase) for concrete pole sections. The overall line route is shown in the appendices.

### 6.5.1. Line Pole Structures

Free standing monopoles of 25m or 30m height are used for all line structures and generally construction type is suspension with both circuits supported on a single pole. For all steel angle and strain locations, two monopoles are installed in each location and are designated by the structure location and position. Each structure carries circuit nameplate and phase identification markers. Nameplates carry circuit designation MWF1 or MWF2 and the structure number. Where two circuits are supported by a single pole, nameplates are provided on both sides of the pole for the circuit directly above. Surge arresters with counters are used at each line termination within the substation switchyards.

## 6.5.2. Line Protection

Line protection is provided by GE L90 current differential relays (X Protection) and SEL 311L current differential relays (Y Protection). These rely on communications between the two substations, provided by the redundant OPGWs, being intact. On failure of communications, L90 relays switch to backup distance protection function at each end. Auto reclosing is provided on each line circuit and this can be enabled or disabled locally at the protection panel. All switching is 3 pole and reclosure is only for single phase faults, any three-phase fault will lockout without reclosure.

## 6.6. 132kV and 500kV Tarrone Substation Lines

A short 132kV single circuit line is run within Tarrone Terminal Station, from the 132kV switchyard to the 500kV/132kV transformer bay. It's terminated on gantries at both ends and supported between by 4 steel poles. Triplex Sulfur AAAC conductor is used (i.e. 3 x Sulfur conductors per phase) and the earth wire is Grape ACSR conductor. The 500kV overhead line consists of a single span between AusNet Services and AGL 500kV gantries and its droppers. The conductor used is quad Orange ACSR (i.e. 4 x Orange conductors per phase). The earthwire used is Grape ACSR. The overall line route is shown in the appendices.

### 6.6.1. Line Pole Structures

Free standing 25 m monopoles are used for 132kV TRSL. Single suspension poles are used at all locations. Their arrangement is as for poles used for Macarthur wind farm 132kV lines. Each structure carries circuit nameplate and phase identification markers.

### 6.6.2. Line Protection

The short 132kV line is within the transformer differential protection zone and so is protected by transformer T60 (X Protection) and SEL 357E (Y Protection). The 500kV span is within AusNet Services connection zone and so is protected by AusNet Services. Protection operations for faults in either line will result in tripping of 132 kV circuit breakers and the AusNet Services 500 kV circuit breakers.

## 7. Prevention Strategies

Reg	Requirement
6 (1)(h)	the preventative strategies and programs to be adopted by the specified operator to minimise the risk of the specified operator's at-risk electric lines starting fires.

### 7.1. Preventative Programs

The following preventative programs are adhered to, to minimise the risk of bushfire initiation AGL Macarthur Assets:

- All conductor spans in all areas will be inspected prior to the start of the fire season to identify any trees infringing the clearance space and any other obvious line defects, which may be a cause of the ignition of fire. Inspections may be carried at other times depending on location and prevailing weather conditions
- The inspection will be carried out by the method determined by the Asset Manager, Wind (Vic) as the most appropriate in the circumstances including ground patrol or line inspection; and
- The clearance space prescribed in the line clearance regulations will always be maintained clear of vegetation. In carrying out the work necessary to achieve this, the duties assigned to the responsible person in the electric line clearance plans will be observed

## 7.2. Monitoring of Asset Condition and Vegetation

The procedures employed by AGL Macarthur meet the requirements of electric line clearance regulations and include:

- Recurrent pruning and clearing will be conducted on a maximum 3-yearly cycle for hazardous fire areas, however, all reasonable efforts will be made to achieve an annual pruning and clearing cycle with the following objectives
- To maintain the clearance space during this period additional pruning and clearing will be required (regrowth space) and diseased and unstable vegetation in the area beyond this which is a hazard to the line (hazard space) must be removed or other remedial action taken
- Establishing the appropriate regrowth space will enable pruning and clearing to be limited to the 3-year cycle, but as this is dependent on climatic conditions during the cycle pre-summer, clearing may be necessary at some locations outside the normal cycle
- The pre-summer Verification program of all AGL Macarthur line assets for vegetation clearance is conducted by an independent, competent, external contractor on an annual basis. AGL Macarthur monitors this program via regular Verifications of the contractors
- The ongoing inspection program is scheduled using CMMS and undertaken by authorised competent employees and/or contractors (refer to the appendices)
- The ongoing Verification program consists of annual desktop Verifications of procedure and maintenance tasks and regular fault reporting arising out of routine line Verifications; and
- To maintain a high standard of compliance through technology and information exchange AGL Macarthur undertakes to maintain best industry practice through regular communications and liaison with distribution and transmission network companies

## 7.3. Engineered Solutions

AGL Macarthur will investigate engineering solutions prior to any clearing activities. Alternative methods shall be used where the benefits outweigh those of conventional practices.

AGL undertake to provide uniform and consistent asset management strategies for undertaking corrective (reactive) and preventive (pro-active) actions committed to avoiding fire ignition caused by electrical assets and achieving compliance with relevant legislative and regulatory requirements.

Asset management strategies comprise major capital upgrades and consideration to underground infrastructure aimed at reducing risk and ongoing O&M costs with respect to overhead lines and easements (refer to the appendices).

## 7.4. Private Overhead Electric Lines

Macarthur wind farm, as a generator of electricity, does not have Private Overhead Electric Lines (POEL's) as defined by the relevant legislation. All Macarthur wind farm line assets are either used for the internal transmission of generated electricity or the supply of electricity to assets. Macarthur wind farm does not supply customers via POEL's.

## 7.5. Key Timings

Key timings for preventative strategies are as follows:

- The Bushfire Mitigation Plan will be completed and ready for submission to Energy Safe Victoria prior to the 1 July each year
- Macarthur wind farm annual Electric Line Clearance Management Plan will be completed prior to the 31 March each year and submitted to Energy Safe Victoria upon request

- During the declared fire season, a report on fire preparedness will be tabled at the Macarthur wind farm monthly MSA meeting
- Inspection program dates are triggered by a computerised maintenance management system. Timing for rectification works is determined by the Asset Leader and the priority status of work required; and
- Desktop audit of plan and fire procedures shall occur in the first week of November each year.

## 8. Inspection Programs

Reg	Requirement
6 (1)(i)	a plan for inspection that ensures that all of the specified operator's at-risk electric lines are inspected at regular intervals of no longer than 37 months.

The purpose of the inspection programs is to assess the condition of electricity distribution assets, record test results and observations, and log results for further evaluation and action. Inspection programs have been designed for the surveillance of identified causes of fire ignition.

The following inspections are undertaken:

- All poles, cross arms, conductors, and hardware belonging to Macarthur wind farm are inspected annually prior to the fire season. The results are recorded in the Macarthur wind farm asset condition database
- A vegetation line clearance verification of all Macarthur wind farm line assets is conducted annually by an appropriately qualified contractor with results recorded in the Macarthur wind farm asset condition database; and
- All issues or actions arising from any of these inspections are reported to the Asset Leader and prioritised as below.

All issues or actions arising from any of these inspections are entered as jobs in the computerised maintenance management and prioritised below.

Inspection reports identifies the number of assets inspected, number of defect items, defect description, location and remedial actions required. These reports are reviewed as part of the annual Verification to ensure items have been completed in the required timeframe.

Priority/Code	Description
P1 (Immediate)	• Requires immediate remedial action
P2 (Break Schedule)	• Requires high priority remedial action within the current working week
P3 (Next Sched Week)	• Requires high priority remedial action within the next working week
P4 (Start 2-4 weeks)	• Requires remedial action within 2-4 weeks during fire & non fire season
P5 (Start 4+ weeks)	• Requires further assessment or remedial action within a period greater than 4 weeks in normal maintenance timeframes

### 8.1. Pole Inspections

All poles are constructed of galvanised steel or concrete and will be rectified in the advent of failed inspection.

### 8.2. High Voltage Cross Arms

All pole cross arms are constructed of galvanised steel and will be rectified in the advent of failed inspection.



### 8.3. Personnel

This section outlines the process to be employed by all personnel, including contracted staff, carrying out asset inspections and tests carried out in a responsible manner and applies to all persons associated with this management plan.

All personnel, including contracted staff, must have satisfactorily completed the required competency-based training and their performance monitored on an annual basis.

Random verifications are completed on all work conducted by contractors during the currency of each task. Any non-compliance issues are communicated to the relevant contractor or employee and corrective actions are taken immediately. These are recorded for verification purposes.

## 9. Qualifications, Training and Competency

Reg	Requirement
6 (1)(j)	details of the processes and procedures for ensuring that each person who is assigned to carry out the inspections referred to in paragraph (i) has satisfactorily completed a training course approved by Energy Safe Victoria and is competent to carry out such inspections.
6 (1)(k)	details of the processes and procedures for ensuring that persons (other than persons referred to in paragraph (j)) who carry out or will carry out functions under the plan are competent to do so.

Workers shall only undertake work for which they have been trained, assessed, and deemed competent to enable them to safely perform work and all relevant contractors must have sufficient knowledge, training, qualifications, and experience to ensure that tree activities under their control are conducted in a safe and environmentally responsible manner.

AGL Macarthur engages contractors to perform annual inspections of at-risk electric assets and all work is carried out by suitably qualified and licensed personnel having experience in the types of work to be executed and must have a minimum of Certificate II in ESI Powerline Vegetation Control, Cert III Horticulture (Arboriculture), and hold appropriate certificates for both themselves and their equipment that legally entitles them to undertake the work as laid out in the VESI framework.

AGL Macarthur contractors who are suitably qualified will be considered as an “authorised person” or under the control of an authorised person under the Victorian High Voltage Code of practise on electrical safety for the work on or near high voltage electrical apparatus.

AGL Macarthur records all contractor training and qualifications in the ‘RAPID Global’ and ‘cm3’ contractor management application systems including ensuring routine refresher training in relevant modules are current and work can be undertaken in a safe competent manner. Training records will be available prior to commencement of works or made accessible via the individuals Australian ESI Skills Passport.

AGL Macarthur will have a representative responsible for carrying out this plan on site at the commencement of the inspections/clearance to observe/conduct appropriate inductions which may include such a request for records. If any worker associated with the work tasks covered under this plan are found to be performing works without required training/qualifications/experience or outside of their capabilities or the prescribed documentation, they are supposed to be working under then work will be immediately stopped and the associated personnel removed from the site.



## 9.1. Competency and Refresher Requirements

### 9.1.1. Asset Management

The following table outlines the Units of Competency required to be undertaken for the applicable Asset Management and Inspection roles for AGL Macarthur Wind Farm. All Mandatory (M) units of competency shall be completed to undertake the role.

Qualification and Core Competency and Refresher Standard		Competency Standard Unit	Asset Inspector	Asset Inspector Trainee
<b>Qualification</b>				
Certificate II in Asset Inspection		UET20312	M	M
Apply ESI safety rules, codes of practice and procedures for work on or near electrical apparatus (Green Book / Blue book)		UETDRRF01B	M	M
Prepare to work safely in the construction industry		CPCCOHS1001A	M	M
Working safely near live electrical apparatus as a non-electrical worker		UETDREL14A	M	M
<b>Refresher Requirements</b>				
3 Yearly	Apply ESI safety rules, codes of practice and procedures for work on or near electrical apparatus (Blue book)	UETDRRF01B	M	M
3 Yearly	Apply access procedures to work on or near electrical network infrastructure (Receive Access Permit)	UETDRRF09B	M	M
3 Yearly	Control traffic with stop-slow bat	RIIWHS205D	M	M
3 Yearly	Implement traffic management plan	RIIWHS302D	M	M
3 Yearly	Manual Handling		M	M
3 Yearly	VESI Environmental Framework		M	M
3 Yearly	VESI Safety Framework		M	M
1 Year	Cardiopulmonary Resuscitation (CPR)	HLTAID001	M	M
1 Year	First Aid in an ESI environment	UETDRRF10B	M	M
<b>Other Requirements</b>				
ESI Worker Card			M	M
Network Operator Induction			M	M

M – Mandatory; A – Additional (If worker requires for the works being performed)

## 9.1.2. Vegetation Management

The following table outlines the Units of Competency required to be undertaken for the applicable Vegetation role at AGL Hydro. All Mandatory (M) units of competency shall be completed to undertake the role.

### 9.1.2.1. Qualification and Competencies

Qualification and Core Competency Standard	Competency Standard Unit	Assessor	Cutter Working from EWP	Specialist Plant Operator	Tree Climber
<b>Qualification</b>					
Certificate II in ESI - Powerline Vegetation Control	UET20312	M	M	M	M
Apply ESI safety rules, codes of practice and procedures for work on or near electrical apparatus (Green Book / Blue book)	UETTDRRF01B	M	M	M	M
<b>Elective Competency Standard Units</b>					
Use climbing techniques to cut vegetation above ground near live electrical apparatus	UETTDRVC21A				M
Assess vegetation and recommend control measures in an ESI environment	UETTDRVC24A	M			
Use elevated platform to cut vegetation above ground level near live electrical apparatus	UETTDRVC25A		M		
Operate specialist equipment at ground level near live electrical apparatus	UETTDRVC31A			A	
Use specialised plant to cut vegetation above ground level near live electrical apparatus	UETTDRVC32A			M	
Apply pruning techniques to vegetation control near live electrical apparatus	UETTDRVC33A		M	M	M
Undertake release and rescue from a tree near live electrical apparatus	UETTDRVC34A				M
Fell small trees	AHCARB202A		A	A	A
Undertake standard climbing techniques	AHCARB204A				M
Apply chemicals under supervision	AHCCHM201A		A	A	A
Operate machinery and equipment	AHCMOM304A		A	M	A
Recognise plants	AHPCPM201A	M	A	A	A
Operate a mobile chipper/mulcher	FPIHAR2206B		A	A	A
Licence to operate a boom-type elevating work platform (boom length 11 metres or more)	TLILIC2005A		M		

M – Mandatory; A – Additional (If worker requires for the works being performed)

### 9.1.3. Refresher Requirements

Frequency	Qualification and Core Competency Standard	Competency Standard Unit	Assessor	Cutter Working from EWP	Specialist Plant Operator	Tree Climber
3 Yearly	Apply ESI safety rules, codes of practice and procedures for work on or near electrical apparatus (Blue book)	UETDRRF01B	M	M	M	M
3 Yearly	Apply access procedures to work on or near electrical network infrastructure (Receive Access Permit)	UETDRRF09B	M	M	M	M
1 Year	Cardiopulmonary Resuscitation (CPR)	HLTAID001	M	M	M	M
1 Year	First Aid in an ESI environment	UETDRRF10B	M	M	M	M
1 Year	EWP Controlled Descent Escape	UETDRRF08B		M		
1 Year	EWP Rescue	UETDRRF03B		M		
1 Year	Undertake release and rescue from a tree near live electrical apparatus	UETDRVC34A				M

M – Mandatory; A – Additional (If worker requires for the works being performed)

## 10. Operations and Maintenance Plans

### 10.1. Event of a Fire

Reg	Requirement
6 (1)(I)(i)	the operation and maintenance plans for the specified operator's at-risk electric lines — in the event of a fire

In the event of fire which prevents the safe operation of the HV overhead line, the line will be deenergised to minimise further ignition sources. Where the fire is in the area but presents minimal or no risk to the safe operation of the overhead line, the overhead line will continue to operate.

### 10.2. Days of Total Fire Ban and Fire Emergencies

Reg	Requirement
6 (1)(I)(ii)	the operation and maintenance plans for the specified operator's at-risk electric lines — during a total fire ban day

On days of Total Fire Ban and emergencies, the AGL Dispatch Centre Generation Dispatcher will inform team leaders of the declaration days of total fire ban, verbally and in writing before 7:30 am. Team leaders will organise to reschedule any planned works that may be considered by government fire service agencies, or under codes of practice, regulations, or statutory requirements, to pose a risk of fire ignition.

Where such tasks need to be performed to ensure the security and safety of the network all permits required by the government fire service agencies, or under codes of practice, regulations, or statutory requirements, will be obtained.

Subject to safe access, AGL Macarthur high voltage pole assets will be visually inspected, prior to 9:00am on Total Fire Ban days. Any potential hazards will be reported to the Asset Manager, Wind (Vic) and a decision made to remove the hazard or isolate the affected asset.

Records of events and instructions for days of Total Fire ban will be kept by AGL Macarthur for inspection by regulatory and government fire service agencies if required. The Macarthur Asset Manager, Wind (Vic) will remain in close liaison with government fire service in the approach to the fire season to confirm season start date.

### 10.3. During the Fire Danger Period

Reg	Requirement
6 (1)(l)(iii)	the operation and maintenance plans for the specified operator's at-risk electric lines — during a fire danger period

AGL Macarthur assets will be operated in accordance with normal operating practices during the declared fire danger periods.

## 11. Investigations, Analysis and Methodology

Reg	Requirement
6 (1)(m)	the investigations, analysis, and methodology to be adopted by the specified operator for the mitigation of the risk of fire ignition from its at-risk electric lines.

Electrical events/faults, if they influence risk of fire ignition from the sites at-risk electric lines or not, are recorded and reported using AGL Macarthur's "myHSE Event Report" which if considered to be a 'Serious Electrical Event', are reported separately to ESV and/or WorkSafe Victoria. For faults/incidents/defects requiring further internal investigation the 'Incident Reporting and Investigation Procedure' is followed.

### 11.1. Fire Reporting and Investigations

In the event of any fire involving Macarthur wind farm assets; the Wind and Solar Manager with the assistance of the Operations Manager is to initiate an investigation into the cause and effects of the fire and produce, if necessary, a plan for minimising the likelihood of a further similar occurrence.

AGL Investigation Procedure (AGL-HSE-PRO-12.2) outlines the control objectives and minimum controls that provide a consistent and systematic approach to the investigation of hazards, near misses and incidents at AGL.

The two investigation methodologies most commonly used at AGL are:

- The 5 Whys Analysis; and
- ICAM (Incident Cause Analysis Method).

Other investigation methodologies may be used if the AGL Wind and Solar Manager or Head of Wind and Solar determine that the Five Whys or ICAM methods are not suitable.

Every effort is to be made to commence the investigation within two calendar weeks of the incident and have the investigation completed and the recommendations and action plan produced within six calendar

weeks of the incident. Investigation findings, recommendations and action plans are then to be forwarded to Energy Safe Victoria for all notifiable incidents.

### 11.1.1. Definitions

Fires are categorised under two definitions as follows:

- Fire: the ignition of combustible materials on the ground including trees and other vegetation possibly caused by AGL Macarthur's assets; and
- Significant Fire: a fire which causes injury or death, or significant damage to stock or property which includes trees, pasture and fencing possibly caused by AGL Macarthur's assets.

### 11.1.2. Fire Reporting Procedures

Should a fire occur, which may have been caused by AGL Macarthur assets it is to be reported by:

- A telephone report to the AGL Dispatch Center and Head of Wind and Solar
- An HSE incident raised in the AGL Macarthur HSE Management System (myHSE)

When reporting fires causing minimal damage, and where it is unlikely that there will be any media involvement, the Head of Wind and Solar, Operations Manager and Asset Manager, Wind (Vic) must be provided with at least the following information:

1. Current status of the fire (ie. out, under control etc.)
2. Attendance of any other authority (Police, CFA)
3. Date and time of discovery
4. Pole number
5. Locality or line/spur name
6. Injured personnel
7. Material damage
8. Line voltage
9. Possible cause; and
10. Details of preliminary information from the initial site inspection.

In the event of a significant fire, or if media involvement is likely, the Asset Manager, Wind (Vic), Operations Governance Manager and Head of Wind and Solar are to be provided with the following information, in addition to that above, as soon as possible:

1. Name of the person reporting the fire
2. Whether AGL Macarthur Employees are still on site; and
3. If the police attended the incident.

Fire Report information must be submitted within 48 hours of first notification of the incident. Sufficient detail is to be included to allow a full understanding of the incident (including weather, pole/cross arm materials, conductor materials, etc.).

### 11.1.3. Report to Energy Safe Victoria

If as the result of an incident, serious property damage, or a serious reduction in the level of public safety, has occurred or is likely to occur in Victoria, then all details of the incident must be reported to Energy Safe Victoria in accordance with Regulation 401 of the Electrical Safety (General) Regulations 2019.

## 11.2. Response Review and Reporting

- Macarthur wind farm undertakes to respond as soon as practicable to all fires arising from their actions or asset. In the case of potential ignition sources from asset operations on days of total fire ban, Macarthur wind farm may open-off HV lines running through high-risk areas, dependent on

weather conditions where a risk of ignition is identified such as unstable trees encroaching the power line. All employees and contractors employed by Macarthur wind farm are instructed to report all fires immediately.

- The Bushfire Mitigation Plan, Electric Line Clearance Management Plan, Bushfire Mitigation Manual, 500kV, 132 kV AND 33 kV Overhead Line Overhead and Maintenance Manual, Line Inspection Manual, and all subordinate documents will be reviewed on an annual basis or more frequently if required.
- All Macarthur wind farm procedures, documentation and asset readiness relating to bushfire mitigation, shall be reviewed each year in November prior to declaration of the fire season. All corrective actions identified shall be identified prior to the declaration of the fire danger period. A verification report and progress on corrective actions shall be forwarded to the Wind and Solar Manager prior to the declaration of the fire season.

### 11.3. Assistance from Fire Agencies for Fires near Electrical Assets

The following procedures apply when assistance is required from fire agencies for fires near electrical assets:

- Access to assets - for personal safety reasons no access to any high voltage source (e.g. switchyards, HV Lines, poles) by any fire authority or personnel is permitted without prior approval from the Site Supervisor of Macarthur wind farm
- Co-ordination of resources - each year Macarthur wind farm shall circulate the Macarthur wind farm preparedness and capability statement with local fire agencies that includes the role of each agency in the event of a fire endangering or affecting any HV assets
- Appointed contact persons — in the event of an incident affecting any Macarthur wind farm asset, the Site Supervisor shall notify the Asset Leader or their delegate for allocation of resources; and
- Information exchange - Macarthur wind farm shall maintain a free exchange of information to all fire control agencies to enable a rapid, appropriate response to all incidents. The Wind and Solar Manager will use this information exchange to best advantage to identify risks to and from Macarthur wind farm Assets and effectively apply lessons learnt from past events to manage future fire risk

## 12. Processes and Procedures

### 12.1. Implementation Monitoring

Reg	Requirement
6 (1)(n)(i)	details of the processes and procedures by which the specified operator will— monitor the implementation of the bushfire mitigation plan

#### 12.1.1. General

Monitoring the implementation of the plan is performed predominantly through the use and management of the AGL computerised maintenance management system (CMMS) which records any required scheduled or unscheduled works including, but not limited to, the preventative works listed in this plan.

The specific measure is the closure of maintenance work orders related to bushfire mitigation and line vegetation works which have a due date, or are required to be done, prior to the 1st of December or before the declared fire danger period each year, whichever is earlier.

This measure is referred to as the Bushfire Index and is calculated as follows:

$$\text{Index Bushfire} = \frac{\text{Number of outstanding works}}{\text{Total works required}}$$

### 12.1.2. Preparedness Reviews

AGL Macarthur will undertake annual reviews of its bushfire preparedness in relation to overhead line assets and generation structures. Plan reviews by Senior Leaders, and other nominated staff, will be held annually to validate; the plan; the efficiency of maintenance programs, program compliance, and program relevance.

Random checks will be undertaken during October/November of each year into all facets of the implementation of the bushfire mitigation plan.

Plan reviews by Senior Leaders, include:

- The Operations Governance Manager
- The Asset Manager, Wind (Vic)
- The Senior Electrical Engineer; and
- Other nominated personnel as deemed necessary

Note: A delegate may be nominated in the absence of one of the above Leader.

Plan reviews will include checks and assessments of the following:

- Planning
- Monitoring inspections carried out
- Line maintenance database & SAP
- Urgent work
- Poles and Line hardware
- Trees/vegetation
- Communication effectiveness with the fire service agencies
- Response to days of Total Fire Ban and high fire danger; and
- HV switching procedures

All issues or actions arising from any of these reviews are entered as jobs in the computerised maintenance management system (refer to the appendices) and prioritised as follows:

- The Asset Manager, Wind (Vic) oversees each plan review and coordinates follow-up action to verify the implementation of the corrective action and that a works management work order is raised and tracked.
- Records supporting the plan reviews will be made available to Energy Safe Victoria for review upon request Verification and will be independently verified every five years by external consultants.
- The Asset Manager, Wind (Vic) shall ensure that bushfire mitigation index status reports are forwarded to the Operations Governance Manager and to Energy Safe Victoria during the currency of the declared fire season.

### 12.1.3. Plan Effectiveness and Monitoring

The results of plan reviews that identify deficiencies in the procedures or the plan implementation associated with the management of bushfire mitigation are added to the HSE management system and action register for further action and tracking. This register tracks the issue, responsible person, and progress status. The results of each plan review including the documented actions are advised to the Macarthur Leadership Team.

The change to a procedure or this plan will be implemented in a timely manner depending on the significance of the issue identified. All items identified will be incorporated into the next annual revision of the manual.



### 12.1.4. Performance Indicators

Other performance measures which will be collated and reviewed annually prior to the resubmission of this plan to ESV include:

- Number of electrical events/faults that have occurred on the relevant Electric Lines with the cause identified to be directly related to their condition and/or compliance with the Regulations
- Annual Number of Fire Starts
- Number of Stakeholder complaints/correspondence received in relation to the relevant Electric Lines as measured through AGL Macarthur's community and communications department
- Lost Time Injuries (LTI's) or Medical Treatment Injuries (MTI's) with the cause identified to be directly related to the Electric Lines
- Future Electric Line Clearance Plan submitted by 30th June each year
- Financial Penalties (Penalty Units) received

### 12.2. Implementation Verification

Reg	Requirement
6 (1)(n)(ii)	details of the processes and procedures by which the specified operator will— Verification the implementation of the plan

Verification the implementation of the plan is largely done as part of the annual review process prior to resubmission of this plan to ESV and a review prior to the declared fire danger period which will be undertaken by a representative responsible for carrying out this plan which includes:

- that the qualifications and experience of personnel performing any scheduled inspection and/or clearance works adheres to both ESV's and this plans requirements
- associated report/s have been submitted to the persons responsible for carrying out this plan
- all inspections, reports, and subsequent recommendations from have been conducted in line with the scope/timing of recommendations and to the quality of this plan and the applicable Acts, Regulations, Codes and Standards; and
- the inspections and recommendations from the report, if any, have an appropriate task/s entered into the AGL Macarthur works management systems and those task/s have been closed out following completion or the works.

### 12.3. Implementation Deficiencies

Reg	Requirement
6 (1)(n)(iii)	details of the processes and procedures by which the specified operator will— identify any deficiencies in the plan or the plan's implementation

Identification of any deficiencies in the plan or the plan's implementation is achieved through:

- the annual review process of this plan prior to resubmission to ESV
- Persons carrying out this plan to provide feedback to their Leader and/or the person/s responsible for the preparation of this plan when a deficiency is found
- AGL Macarthur's critical control checks and workplace safety and environment observation/conversation program which requires employees and leaders to have routine observation/conversation which are entered into the AGL Macarthur myHSE systems; and/or
- Review of site/asset risk registers.



## 12.4. Changes to the Plan's Implementation

Reg	Requirement
6 (1)(n)(iv)	details of the processes and procedures by which the specified operator will— change the plan and the plan's implementation to rectify any deficiencies identified under subparagraph (iii)

Changes to the plan and the plan's implementation if any deficiencies are identified are performed during the annual review of this plan prior to resubmission to ESV.

If there are more critical changes required to important information, including but not limited to, contact details or applicable procedures/policies these will be performed as soon as possible and resubmitted to ESV. The updated plans will then be reloaded into AGL Macarthur's enterprise library and on the AGL Macarthur webpage listed in the plan.

The annual review of this plan is performed by the persons responsible for preparing the plan in conjunction with the other stakeholders and responsible persons listed in this plan. These include, but is not limited to, updating the plan for any new or revised Legislation, Regulations or Codes, industry practices and Electric Line configurations and/or locations.

## 12.5. Monitor Effectiveness of Inspections

Reg	Requirement
6 (1)(n)(v)	details of the processes and procedures by which the specified operator will— monitor the effectiveness of inspections carried out under the plan

Monitor the effectiveness of inspections under the plan will be performed through the annual review of the performance measures listed above by the persons responsible for preparing the plan.

## 12.6. Verification of the Effectiveness of Inspections

Reg	Requirement
6 (1)(n)(vi)	details of the processes and procedures by which the specified operator will— Verification the effectiveness of inspections carried out under the plan

Verification of the effectiveness of any inspections carried out under the plan is performed through conducting a ground based visual assessment following the completion of the 36-month Electric Line Inspection works. This will be performed by personnel who have:

- Knowledge of applicable Acts, Regulations and Codes associated with this plan
- Knowledge of this plan and its review and verification obligations
- Knowledge and are familiar with, the Electric Lines subject to the review and verification; and
- A minimum of 3 years Electric Line management experience; or
- An independent 3<sup>rd</sup> Party.

# 13. Assistance Provided to Fire Control Authorities

Reg	Requirement
6 (1)(o)	the policy of the specified operator in relation to the assistance to be provided to fire control authorities in the investigation of fires near the specified operator's at-risk electric lines.

### 13.1. Investigations of fires

AGL Macarthur will allow access to and assist fire control authorities in the investigation of fires at or near the relevant Electric Lines.

### 13.2. Liaison with Management Agencies

Macarthur wind farm will liaise with Moyne Shire to ensure that fire mitigation strategies are in place prior to the declaration of fire season.

Macarthur wind farm shall maintain links with the CFA to ensure swift and effective, response to fire ignition within its area of responsibility. A fire response plan shall be circulated to the CFA prior to the fire season each year detailing what resources are available to fire attack agencies.

### 13.3. Fire Reporting and Investigations

Macarthur wind farm will undertake an investigation and analysis of all fire ignitions originating from its electric line assets.

#### 13.3.1. Report to Energy Safe Victoria

If as the result of an incident, serious property damage, or a serious reduction in the level of public safety, has occurred or is likely to occur, then all details of the incident must be reported to Energy Safe Victoria in accordance with Regulation 401 of the Electrical Safety (General) Regulations 2019.

## 14. Public Awareness Program

Macarthur wind farm has no private electric supply lines connected to any of its overhead assets. Where Macarthur wind farm has overhead lines passing over private or public land it shall inform, and make aware, the land holders of their obligations regarding; ensuring limits of approach and clearance distances are maintained, allowing access for periodic inspections, and what actions will need to be undertaken if there is a non-compliance.

The following communications will achieve this:

- Macarthur wind farm shall inform land holders of inspection times, their rights, and the procedure for settlement of any grievances arising; and
- Macarthur wind farm shall circulate a form on an annual basis detailing the needs of Macarthur wind farm for asset access and the land holder's responsibilities for not encroaching on limits of approach to high voltage line assets.
- Plan available for inspection

As per Section 83BA (3) (a) of the Act, the latest ESV approved Bushfire Mitigation Plan is available on the AGL internet site at:

<https://www.agl.com.au/-/media/aglmedia/documents/about-agl/how-we-source-energy/macarthur/ml-al-fi-02---agl-macarthur-wind-farm---bush-fire-mitigation-plan-2020-2021.pdf?la=en&hash=2E54D3CD3353D5E73AA2EF2DD3E846D3>

A hardcopy of the ESV approved/accepted Bushfire Mitigation Plan mentioned above is available for inspection at AGL Macarthur's Site Administration office, during normal business hours. Any hardcopy superseded versions of the plan will be destroyed by the person responsible for preparing the plan.

## 15. Macarthur Assets

### 15.1. Macarthur Wind Farm Substation



### 15.2. Tarrone Substation





### 15.3. Tarrone Terminal Station





# 16. Appendices

## 16.1. Location Map – At-risk Electric Line Assets in Hazardous Bushfire Risk Area

# MACARTHUR WIND FARM

## CIVIL AND STRUCTURAL SITE LAYOUT DRAWINGS

**LOCALITY PLAN**  
NOT TO SCALE

NUMBER SETS	DRAWINGS
0000	CIVIL & STRUCTURAL DRAWINGS COVER SHEET
0001-0999	CIVIL SITE LAYOUT DRAWINGS REFER DRAWING 0000 FOR DRAWING LIST
1000-1000	WTG HANDSTANDS DRAWINGS REFER DRAWING 1000 FOR DRAWING LIST
2000-4999	INTERNAL ROADS DRAWINGS REFER DRAWINGS 2000 FOR DRAWING LIST
5000-5999	PUBLIC ROAD INTERSECTIONS REFER DRAWING 5000 FOR DRAWING LIST
6000-6999	CATCHMENT PLAN DRAWINGS REFER DRAWING 6000 FOR DRAWING LIST
8000-8999	GENERAL SITE LAYOUT DRAWINGS REFER DRAWING 8000 FOR DRAWING LIST
9000-9999	STRUCTURAL DRAWINGS REFER DRAWING 9000 FOR DRAWING LIST

**GENERAL CONSTRUCTION NOTES:**

- DO NOT SCALE FROM DRAWINGS.
- ALL WORKS TO BE IN ACCORDANCE WITH CURRENT LOCAL AUTHORITY STANDARDS UNLESS OTHERWISE DIRECTED.
- EXISTING SERVICES SHOWN ARE INDICATIVE ONLY. THE CONTRACTOR SHALL VERIFY THE LEVEL AND POSITION OF ALL EXISTING SERVICES WITH RELEVANT AUTHORITIES PRIOR TO COMMENCING CONSTRUCTION.
- FEATURE SURVEY INFORMATION HAS BEEN COMPILED BY OTHERS, WHERE PROPOSED WORKS TIE INTO EXISTING WORKS THE CONTRACTOR SHALL VERIFY THE FEATURE SURVEY INFORMATION PRIOR TO CONSTRUCTION.
- WHERE WORKS CARRIED OUT BY OTHERS AFFECT CONSTRUCTION OF THE PROPOSED WORKS, THE COMPATIBILITY WITH THE PROPOSED WORKS IS TO BE VERIFIED BY THE CONTRACTOR.
- THE CONTRACTOR SHALL VERIFY SETOUT PEGS AND BENCH MARK LEVELS AND ADVISE THE SUPERINTENDENT OF ANY DISCREPANCY PRIOR TO COMMENCING CONSTRUCTION AND WHEN USED FOR SETOUT OR AUDITING.
- THESE PLANS ARE TO BE READ IN CONJUNCTION WITH OTHER CONSULTANTS DRAWINGS.
- VIC ROADS ROADWORK SIGNING CODE OF PRACTICE WHICH COMPLIES WITH AUSTRALIAN STANDARD 1742.3 2002 IS TO BE ADHERED TO DURING CONSTRUCTION WORKS.
- SIGNAGE AND LINE MARKING TO BE AS PER CURRENT AS1742.1 AND AS1742.2 AND VIC ROADS TRAFFIC ENGINEERING MANUAL VOLUME 2 – SIGNS AND MARKINGS
- THESE PLANS ARE TO BE READ IN CONJUNCTION WITH THE SPECIFICATIONS

DRAWING SETS – CIVIL SITE LAYOUT		
NUMBER SETS	DRAWINGS	AS BUILT PLANS
0000	CIVIL AND STRUCTURAL DRAWINGS COVER SHEET	AS BUILT
0001	GENERAL LAYOUT – SHEET 1 OF 2	AS BUILT
0002	GENERAL LAYOUT – SHEET 2 OF 2	AS BUILT
0003	GENERAL LAYOUT – SOUTHERN SECTION	AS BUILT
0004	GENERAL LAYOUT – WESTERN SECTION	AS BUILT
0005	GENERAL LAYOUT – EASTERN SECTION	AS BUILT
0006	GENERAL LAYOUT – NORTHERN SECTION	AS BUILT
0007	WIND TURBINE GENERATOR SUMMARY SHEET 1 OF 3	
0008	WIND TURBINE GENERATOR SUMMARY SHEET 2 OF 3	
0009	WIND TURBINE GENERATOR SUMMARY SHEET 3 OF 3	
0010	ELECTRICAL LAYOUT – SHEET 1 OF 2	AS BUILT
0011	ELECTRICAL LAYOUT – SHEET 2 OF 2	AS BUILT
0012	WTG FOOTING RISK SUMMARY SHEET 1 OF 3	
0013	WTG FOOTING RISK SUMMARY SHEET 2 OF 3	
0014	WTG FOOTING RISK SUMMARY SHEET 3 OF 3	

DRAWING SETS – CIVIL SITE LAYOUT		
NUMBER SETS	DRAWINGS	AS BUILT PLANS
6001	MAJOR CATCHMENT PLAN – Q100 EXTENT	
6002	MAJOR CATCHMENT PLAN – Q20 EXTENT	
6003	FULL CATCHMENT AREA FOR MOORE AND SHAW RIVER	
6004	WTG'S AT RISK OF INUNDATION OR BUDVANCY ISSUES	
6005	LOCALISED INTERNAL CATCHMENT PLAN – SHEET 1 OF 2	
6006	LOCALISED INTERNAL CATCHMENT PLAN – SHEET 2 OF 2	

DRAWING SETS – GENERAL SITE LAYOUT		
NUMBER SETS	DRAWINGS	AS BUILT PLANS
8001	DRAWER AGREED VEHICLE VESTAS VEHICLE MICROPIED COORDINATES	
8002	OIL ROUTE OPTIONS & WTG (VIGOR vs V1000) WITH ROAD LAYOUT	
8003	OIL ROUTE OPTIONS & WTG (VIGOR vs V1000) WITH AERIAL PHOTO	
8004	OIL ROUTE COMPARISON WITH ROAD LAYOUT	
8005	OIL ROUTE COMPARISON WITH AERIAL PHOTO	
8006	SITE LAYOUT – SOUTHERN AREA	AS BUILT
8007	SITE LAYOUT – EASTERN AREA	AS BUILT
8008	SITE LAYOUT – WESTERN AREA	AS BUILT
8009	SITE LAYOUT – NORTHERN AREA	AS BUILT
8010	OIL ROUTE WITH AERIAL PHOTO – SHEET 1 OF 2	
8011	OIL ROUTE WITH AERIAL PHOTO – SHEET 2 OF 2	
8012	RESIDENTIAL LOCATIONS WITHIN A 2km RADIUS OF SITE BOUNDARY	
8013	OVERALL SITE PLAN	
8014	WTG CLEARANCE FROM TITLES & FENCELINES	

Rev	Amendments	By	Appr	Date
1	ISSUED FOR AS-BUILT READY	EDW	LD	23/10/12

EXALLOS DIVISION  
SPECIALIST ENGINEERING SERVICES  
CONSTRUCTION  
PROPERTY  
EQUIPMENT  
INFRASTRUCTURE  
MINING AND RESOURCES

North  
AND ZONE 54

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MACARTHUR WIND FARM

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Team Leader: UNH  
Project Engineer: -  
LCPL Des Manager: -

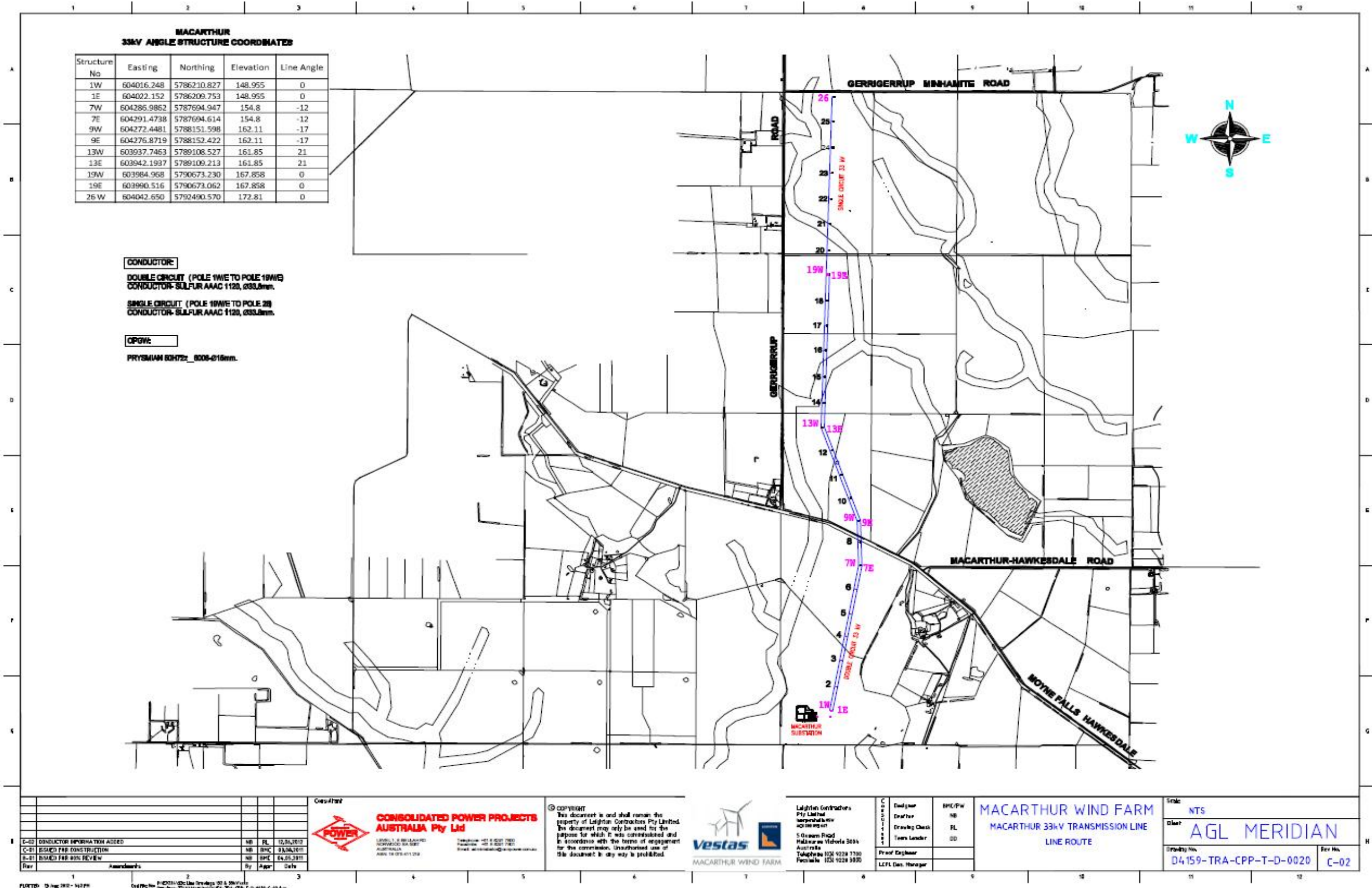
**MACARTHUR WIND FARM**  
CIVIL SITE LAYOUT  
CIVIL & STRUCTURAL DRAWINGS  
COVER SHEET

Scale: **AS SHOWN**  
Client: **AGL MERIDIAN**  
Drawing No: **D4159/MWF/RBG/C/D/0000/D**  
Rev No: **1**





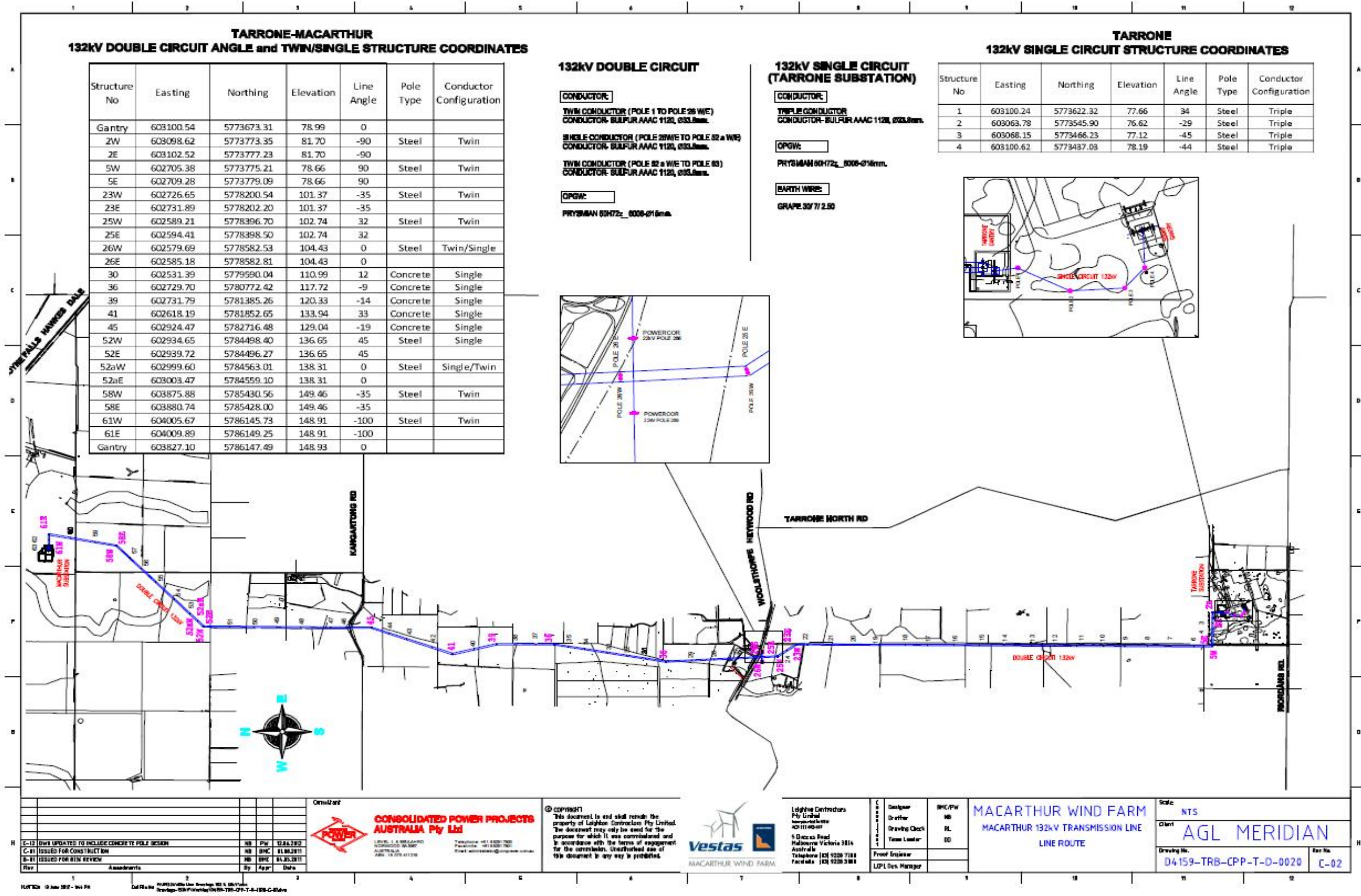
16.2. Location Map – 33 kV Transmission Line – Line route





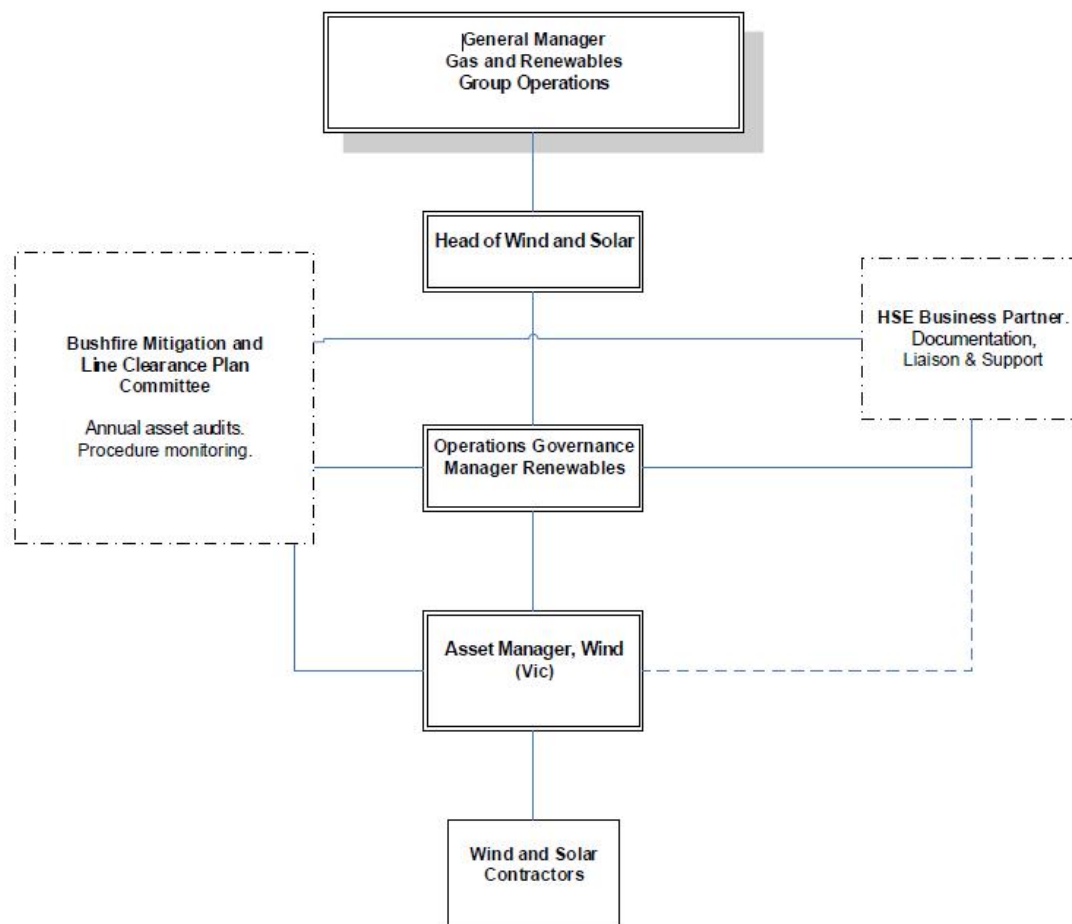


16.3. Location Map – 132 kV Transmission Line – Line route




## 16.4. Reporting Organisational Structure

AGL Macarthur Wind Farm		
Organisational Structure	30/6/2021	Bushfire Mitigation





## 16.5. Fire Report Form



### FIRE REPORT FORM

<b>Date:</b>	<b>Time:</b>	<b>Reporting Officer:</b>

Significant fire, i.e. injury or death or damage to stock or property which includes tress, pasture and fencing, details should be immediately phoned to the Manager of Renewables, Hydro Manager and Renewable Operations Manager.

**Incident Details:**

<b>Date and Time of Fire:</b>	
<b>Fire Source and Locality:</b>	
<b>Pole Number:</b>	
<b>Asset Number:</b>	
<b>Map Reference:</b>	

**Environmental Details:**

<b>Weather at time of Fire:</b>	
<b>Consequences of Fire: (list damage)</b>	
<b>Injury or Death:</b>	
<b>Area of Fire:</b>	
<b>Day of Total Fire Ban:</b>	
<b>Temperature:</b>	
<b>Wind Direction:</b>	
<b>Wind Speed (Kph):</b>	
<b>Humidity (%):</b>	

**Pole Information:**

<b>Pole Number:</b>		<b>Pole Location:</b>	
<b>Nearest Asset:</b>		<b>Line Number:</b>	
<b>Last Inspection Date:</b>			
<b>Pole Material:</b>	<b>Wood: Yes / No</b>	<b>Steel: Yes / No</b>	<b>Concrete: Yes / No</b>
<b>Cross-arm Material:</b>	<b>Wood: Yes / No</b>	<b>Steel: Yes / No</b>	<b>Concrete: Yes / No</b>
<b>Conductor Material:</b>	<b>SC: Yes / No</b>	<b>AAC: Yes / No</b>	<b>ACSR: Yes / No</b>
	<b>CU: Yes / No</b>		



## FIRE REPORT FORM

Voltage and Current Information:		
Fault Type:	Three Phase: Yes / No	Phase to Ground: Yes / No
Voltage (KV):		
Fault Current (A):		

Contributing Factors:					
Assets	Tick	Assets	Tick	Assets	Tick
Conductor		Joint Failure		"D" burn Through	
Clashing		Conductor Failure		Fuse	
Tie Failure		Bridging		EDO operation	
EDO Hang up		BA Failure		Low Voltage	
PFF failure		Transform Failure		Switch Failure	
Insulator	Tick	Surge Diverter	Tick	Cross-Arm	Tick
Mechanical Failure		Earth Leads		Fire	
Electrical Failure		End Cap		Broken Cross-arm	
Pollution		Surge Diverter failure		Termites	
Salt				Age rot	
Other				Other	
Fauna	Tick	Lightning	Tick	Miscellaneous	Tick
Intermediate		Fuse Separation		Service Failure	
Structure		Transformer Fail		U/G Asset Failure	
Complex Structure		Pole Failure		Overload	
Substation Pole		Miscellaneous		Earthing Failure	
Mid Span/Bird/Animal		Vehicle		PEL Failure	
Zone Sub Feeder	Tick	ACR's	Tick	Fuses	Tick
Feeder CB tripped		ACR Tripped		Fuses Operated	
CB Tripped to lockout		ARC Tripped lockout		No of Fuses Operated.	
Auto Reclose Suppressed		Auto Reclose Suppressed		Fuse Type PFF	
No of trips		Miscellaneous		Fuse Type EDO	
Mid Span/Bird/Animal		Vehicle		Fuse Type Acid Boric	
Protection Operation		Protection Operation		Protection Operation	
Other:		Other:		Other:	
Other:		Other:		Other:	



# FIRE REPORT FORM

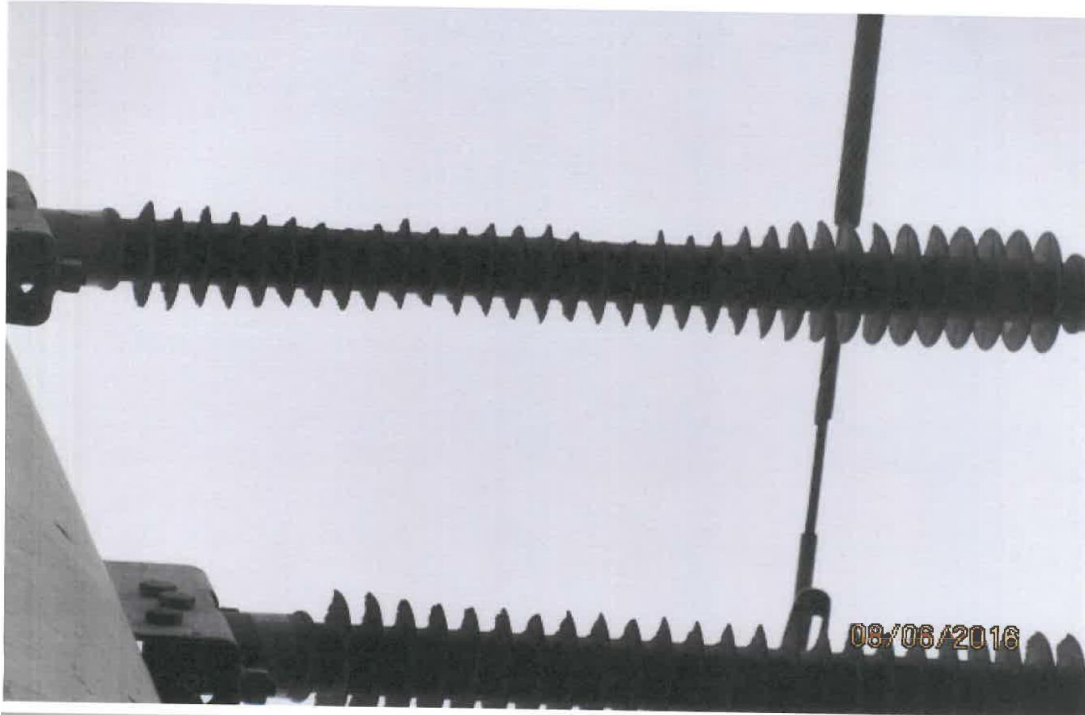
Additional Information	
Comments	Property Owners

Signed: ..... Date: .....  
( AGL Responsible Officer)

Signed: ..... Date: .....  
( Operations Manager)

## 16.6. Engineered Solutions

Since the initial construction of Macarthur wind farm in 2013, the only engineered solution relating to bushfire mitigation and overhead lines and easements has been the replacement of 132kV polymer line insulators damaged by fauna. An engineering design was completed on all 140 line insulators resulting in insulators being replaced with ceramic insulators in 2016 (18of) and 2019 (16of). Inspections have identified and captured a further 9of priority polymer insulators in the replacement program (2020).



Damaged insulators (major) replaced in 2016



Damaged insulators (minor) picked up through inspections identified and captured in the replacement program (2020).

## 16.7. Emergency Response Plan

The 'Emergency Response Plan' (ERP) is designed to provide guidance on how to manage the occurrence of specific emergencies that may occur including Bushfire, and is supported through training and undertaking of drills and exercises with local Emergency Services to ensure all parties are suitably skilled and ensure the ongoing review and improvement of the plans content.



ASP-PACIFIC-HB-0141  
- Emergency Respons

## 16.8. Macarthur at-risk electric line register

The following images is an extract from the Macarthur at-risk overhead line condition register.

		<b>Macarthur 132kV overhead line condition register</b>				
Pole No.	Pole type	Phase Insulator		Bridging post insulator		Comments
		Line 1	Line 2			
None	175					
Minor	46					
Moderate	8					
Severe	1					
		Porcelain	Porcelain	-	-	
		Porcelain	Porcelain	-	-	
50	Concrete	Polymer	Polymer	-	-	Standoff type insulator, top two replaced with porcelain
		Polymer	Polymer	-	-	
		Porcelain	Porcelain	-	-	
49	Concrete	Polymer	Polymer	-	-	Standoff type insulator, top two replaced with porcelain
		Polymer	Polymer	-	-	
		Porcelain	Porcelain	-	-	
48	Concrete	Porcelain	Porcelain	-	-	Standoff type insulator, top four replaced with porcelain
		Porcelain	Porcelain	-	-	
		Polymer	Polymer	-	-	
47	Concrete	Porcelain	Porcelain	-	-	Standoff type insulator, top two replaced with porcelain
		Polymer	Polymer	-	-	
		Polymer	Polymer	-	-	
46	Steel	Porcelain	Porcelain	-	-	Strain type insulator
		Porcelain	Porcelain	-	-	
		Porcelain	Porcelain	-	-	
45	Concrete	Porcelain	Porcelain	-	Polymer	Strain type insulator with bridging post insulators, one side only
		Porcelain	Porcelain	-	Polymer	
		Porcelain	Porcelain	-	Polymer	
		Polymer	Polymer	-	-	
44	Concrete	Polymer	Polymer	-	-	Standoff type insulator
		Polymer	Polymer	-	-	
		Polymer	Polymer	-	-	
43	Concrete	Polymer	Polymer	-	-	Standoff type insulator
		Polymer	Polymer	-	-	
		Porcelain	Porcelain	Polymer	Polymer	
42	Concrete	Porcelain	Porcelain	Polymer	Polymer	Strain type insulator with bridging post insulators
		Porcelain	Porcelain	Polymer	Polymer	
		Porcelain	Porcelain	Polymer	Polymer	
41	Concrete	Porcelain	Porcelain	-	Polymer	Strain type insulator with bridging post insulators, one side only
		Porcelain	Porcelain	-	Polymer	
		Porcelain	Porcelain	-	Polymer	
40	Concrete	Porcelain	Porcelain	Polymer	Polymer	Strain type insulator with bridging post insulators
		Porcelain	Porcelain	Polymer	Polymer	
		Porcelain	Porcelain	Polymer	Polymer	
39	Concrete	Porcelain	Porcelain	-	-	Strain type insulator
		Porcelain	Porcelain	-	-	
		Porcelain	Porcelain	-	-	
38	Concrete	Polymer	Polymer	-	-	Standoff type insulator
		Polymer	Polymer	-	-	
		Polymer	Polymer	-	-	
37	Concrete	Polymer	Polymer	-	-	Standoff type insulator
		Polymer	Polymer	-	-	
		Porcelain	Porcelain	-	-	
36	Concrete	Porcelain	Porcelain	-	-	Strain type insulator

## 16.9. Works and Verification Schedule

The following images are extracts from the Macarthur overhead line routine works and verification inspection schedule.

Item Prompt	Item Result	Completed By	Completed On
Check TRSL 1 Tower structure	10 of 10	Hemi Prasad	1/12/20, 10:20 PM
Check TRSL 1 Jumper Connectors	10 of 10	Hemi Prasad	1/12/20, 10:20 PM
Small amount of wear on Jumper conductor <i>Prasad, Hemi (Jan 12, 2020, 10:20 PM)</i>			
Check TRSL 1 Conductor	10 of 10	Hemi Prasad	1/12/20, 10:20 PM
Check TRSL 1 Foundation	10 of 10	Hemi Prasad	1/12/20, 10:20 PM
Check TRSL 1 Vibration Dampers	10 of 10	Hemi Prasad	1/12/20, 10:20 PM
Check TRSL 1 Hardware	10 of 10	Hemi Prasad	1/12/20, 10:20 PM
Wear on Jumper flag and dead end flag, rubbing <i>Prasad, Hemi (Jan 12, 2020, 10:21 PM)</i>			
Check TRSL 1 Post Insulator	10 of 10	Hemi Prasad	1/12/20, 10:20 PM
Check TRSL 1 Insulator	10 of 10	Hemi Prasad	1/12/20, 10:20 PM
Check TRSL 1 Earth Bond Pole top	10 of 10	Hemi Prasad	1/12/20, 10:19 PM
Earth bond replacement required <i>Prasad, Hemi (Jan 12, 2020, 10:20 PM)</i>			
Check TRSL 1 Earth Bond Pole Bottom	10 of 10	Hemi Prasad	1/12/20, 10:19 PM
Check TRSL 1 Duplex conductor spacer	10 of 10	Hemi Prasad	1/12/20, 10:22 PM
Triplex spacer <i>Prasad, Hemi (Jan 12, 2020, 10:19 PM)</i>			



Check TRSL 1 Earth Wire Conductor	10 of 10	Hemi Prasad	1/12/20, 10:19 PM
Check TRSL 1 Line Sag	10 of 10	Hemi Prasad	1/12/20, 10:19 PM
Check TRSL 1 Trees	N/A	Hemi Prasad	1/12/20, 10:19 PM
Check TRSL 1 Road Crossing	10 of 10	Hemi Prasad	1/12/20, 10:19 PM
Check TRSL 1 I D Tag	10 of 10	Hemi Prasad	1/12/20, 10:19 PM
Check TRSL 1 Danger Tag	10 of 10	Hemi Prasad	1/12/20, 10:22 PM
Check TRSL 1 Fenced	N/A	Hemi Prasad	1/12/20, 10:19 PM
Check TRSL 2 Tower structure	10 of 10	Hemi Prasad	1/12/20, 10:19 PM
Check TRSL 2 Jumper Connectors	10 of 10	Hemi Prasad	1/12/20, 10:19 PM
Check TRSL 2 Conductor	10 of 10	Hemi Prasad	1/12/20, 10:19 PM
Check TRSL 2 Foundation	10 of 10	Hemi Prasad	1/12/20, 10:19 PM
Check TRSL 2 Vibration Dampers	10 of 10	Hemi Prasad	1/12/20, 10:19 PM
Check TRSL 2 Hardware	10 of 10	Hemi Prasad	1/12/20, 10:19 PM
Check TRSL 2 Post Insulator	10 of 10	Hemi Prasad	1/12/20, 10:19 PM
Check TRSL 2 Insulator	10 of 10	Hemi Prasad	1/12/20, 10:19 PM
Check TRSL 2 Earth Bond Pole top	10 of 10	Hemi Prasad	1/12/20, 10:19 PM
Check TRSL 2 Earth Bond Pole Bottom	10 of 10	Hemi Prasad	1/12/20, 10:19 PM
Check TRSL 2 Duplex conductor spacer	10 of 10	Hemi Prasad	1/12/20, 10:19 PM
Check TRSL 2 Earth Wire Conductor	10 of 10	Hemi Prasad	1/12/20, 10:19 PM



Check TRSL 2 Line Sag	10 of 10	Hemi Prasad	1/12/20, 10:19 PM
Check TRSL 2 Trees	N/A	Hemi Prasad	1/12/20, 10:19 PM
Check TRSL 2 Road Crossing	N/A	Hemi Prasad	1/12/20, 10:19 PM
Check TRSL 2 I D Tag	10 of 10	Hemi Prasad	1/12/20, 10:19 PM
Check TRSL 2 Danger Tag	10 of 10	Hemi Prasad	1/12/20, 10:19 PM
Check TRSL 2 Fenced	N/A	Hemi Prasad	1/12/20, 10:19 PM
Check TRSL 3 Tower structure	10 of 10	Hemi Prasad	1/12/20, 10:19 PM
Check TRSL 3 Jumper Connectors	10 of 10	Hemi Prasad	1/12/20, 10:19 PM
Check TRSL 3 Conductor	10 of 10	Hemi Prasad	1/12/20, 10:19 PM
Check TRSL 3 Foundation	10 of 10	Hemi Prasad	1/12/20, 10:18 PM
Check TRSL 3 Vibration Dampers	10 of 10	Hemi Prasad	1/12/20, 10:18 PM
Check TRSL 3 Hardware	9 of 10	Hemi Prasad	1/12/20, 10:18 PM
Small amount of Wear on Jumper conductor			
<i>Prasad, Hemi (Jan 12, 2020, 10:18 PM)</i>			
Check TRSL 3 Post Insulator	10 of 10	Hemi Prasad	1/12/20, 10:17 PM
Check TRSL 3 Insulator	10 of 10	Hemi Prasad	1/12/20, 10:17 PM
Check TRSL 3 Earth Bond Pole top	10 of 10	Hemi Prasad	1/12/20, 10:17 PM
Check TRSL 3 Earth Bond Pole Bottom	10 of 10	Hemi Prasad	1/12/20, 10:17 PM
Check TRSL 3 Duplex conductor spacer	10 of 10	Hemi Prasad	1/12/20, 10:22 PM

## 17. Referenced Documents / Procedures

Document Number	Document Title
AP MO AD 032	AGL Controlled Document Update Procedure
HI AL SF 02	AGL Emergency Management Plan
ML AL FI 02	AGL Macarthur Bushfire Mitigation Plan
AGL-HSE-STD-004.1	AGL HSE Risk Management Standard
AGL-HSE-SDM-004.1	AGL HSE Risk Management Standard Methodologies
AGL-HSE-TMP-004.1	AGL HSE Risk Management Standard Procedure Template
AGL-HSE-GUI-012.1	AGL Obligations to Notify Regulatory Authorities - Guideline
AGL-HSE-PRO-012.1	AGL HSE Incident, Near Miss and Hazard Management Procedure
AGL-HSE-PRO-012.3	AGL HSE Corporate Reporting Procedure
AGL-HSE-STD-012	AGL HSE Incident, Near Miss and Hazard Management Standard
	Vestas High Voltage Electricity Safety Procedures
	Vestas Lockout Tagout and Permit to Work Procedures
	Vestas Electricity Safety Management Scheme
	Vestas HSE Induction and Authorisation Procedures