

Network Standard

NETWORK

Document No : NW000-S0146
Amendment No : 2
Approved By : GM Asset Management
Approval Date : 15/01/2020

Supersedes Network Standard (NETWORK) NW000-S0146 Amendment No.1

NW000-S0146

NS179 VEGETATION MANAGEMENT



ISSUE

For issue to all Ausgrid and Accredited Service Providers' staff involved with the vegetation management and is for reference by field, technical and engineering staff.

Ausgrid maintains a copy of this and other Network Standards together with updates and amendments on www.ausgrid.com.au.

Where this Network Standard is issued as a controlled document replacing an earlier edition, remove and destroy the superseded document.

DISCLAIMER

As Ausgrid's Network Standards are subject to ongoing review, the information contained in this document may be amended by Ausgrid at any time. It is possible that conflict may exist between Standard documents. In this event, the most recent standard shall prevail.

This document has been developed using information available from field and other sources and is suitable for most situations encountered in Ausgrid. Particular conditions, projects or localities may require special or different practices. It is the responsibility of the local manager, supervisor, assured quality contractor, accredited service provider and the individuals involved to make sure that a safe system of work is employed and that statutory requirements are met.

Ausgrid disclaims any and all liability to any person or persons for anything done or not done, as a result of this Standard.

All design work, and the associated supply of materials and equipment, must be undertaken in accordance with and consideration of relevant legislative and regulatory requirements, latest revision of Ausgrid's Network Standards and specifications and Australian Standards. Designs submitted shall be declared as fit for purpose. Where the designer wishes to include a variation to a Network Standard or an alternative material or equipment to that currently approved the designer must obtain authorisation from the Network Standard owner before incorporating the variation to a Network Standard or alternative material in a design. All designers including external designers authorised as Accredited Service Providers will seek approval through the approved process as outlined in NS181 Approval of Materials and Equipment and Network Standard Variations. Seeking approval will ensure Network Standards are appropriately updated and that a consistent interpretation of the legislative framework is employed.

Notes: 1. Compliance with this Network Standard does not automatically satisfy the requirements of a Designer Safety Report. The designer must comply with the provisions of the Work Health and Safety Regulation 2017 (NSW - Part 6.2 Duties of designer of structure and person who commissions construction work) which requires the designer to provide a written safety report to the person who commissioned the design. This report must be provided to Ausgrid in all instances, including where the design was commissioned by or on behalf of a person who proposes to connect premises to Ausgrid's network, and will form part of the Designer Safety Report which must also be presented to Ausgrid. Further information is provided in Network Standard (NS) 212 Integrated Support Requirements for Ausgrid Network Assets.

2. Where the procedural requirements of this document conflict with contestable project procedures, the contestable project procedures shall take precedent for the whole project or part thereof which is classified as contestable. Any external contact with Ausgrid for contestable works projects is to be made via the Ausgrid officer responsible for facilitating the contestable project. The Contestable Ausgrid officer will liaise with Ausgrid internal departments and specialists as necessary to fulfil the requirements of this Standard. All other technical aspects of this document which are not procedural in nature shall apply to contestable works projects.

INTERPRETATION

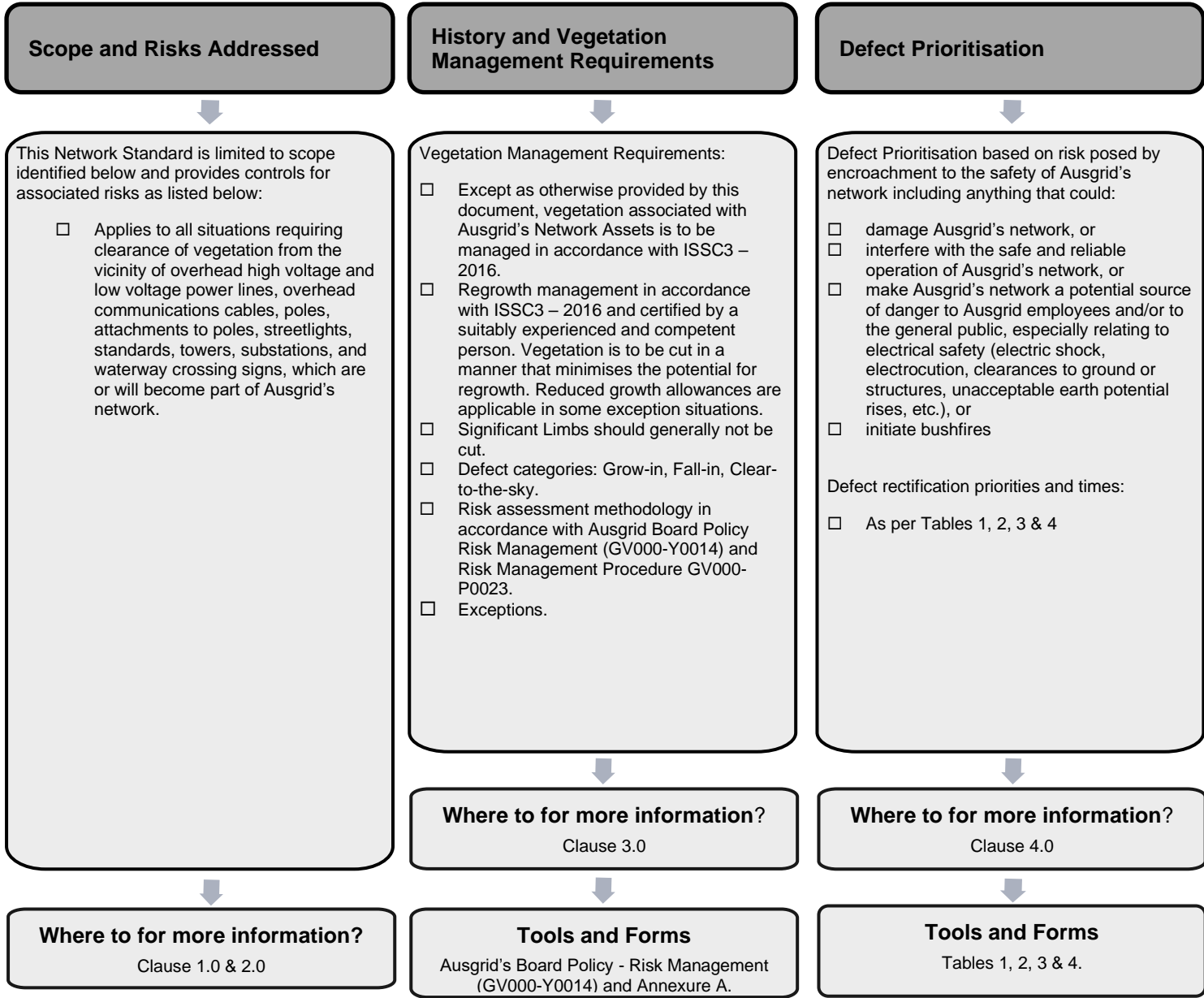
In the event that any user of this Network Standard considers that any of its provisions is uncertain, ambiguous or otherwise in need of interpretation, the user should request Ausgrid to clarify the provision. Ausgrid's interpretation shall then apply as though it was included in the Standard and is final and binding. No correspondence will be entered into with any person disputing the meaning of the provision published in the Standard or the accuracy of Ausgrid's interpretation.

KEYPOINTS

This Network Standard has a summary of content labelled "KEYPOINTS FOR THIS STANDARD". The inclusion or omission of items in this summary does not signify any specific importance or criticality to the items described. It is meant to simply provide the reader with a quick assessment of some of the major issues addressed by the standard. To fully appreciate the content and the requirements of the standard it must be read in its entirety.

AMENDMENTS TO THIS STANDARD

Where there are changes to this standard from the previously approved version, any previous shading is removed and the newly affected paragraphs are shaded with a grey background. Where the document changes exceed 25% of the document content, any grey background in the document is to be removed and the following words should be shown below the title block on the right hand side of the page in bold and italic, for example, Supersedes – document details (for example, "Supersedes Document Type (Category) Document No. Amendment No.>").



Network Standard NS179 Vegetation Management

Contents

1.0	PURPOSE	5
2.0	SCOPE	5
3.0	VEGETATION MANAGEMENT REQUIREMENTS.....	5
3.1	General.....	5
3.2	Regrowth management.....	5
3.2.1	Regrowth – general requirements.....	5
3.2.2	Regrowth where exceptions apply	6
3.3	Significant limbs	6
3.4	Vegetation hazard categories	6
3.4.1	ISSC3 – 2016 vegetation clearances and hazards.....	6
3.4.2	Clear-to-the-sky.....	7
3.5	Risk assessment methodology	7
3.6	Exceptions.....	7
3.6.1	Exceptions – general requirements.....	7
3.6.2	Insulated Mains and communications cables exception	7
3.6.3	LV Bare or Covered exception	8
3.6.4	Significant limbs exception	8
3.7	Kiosk substations	9
3.8	Communications cables.....	9
3.8.1	Ausgrid communications cables.....	9
3.8.2	Third-party communications cables	9
3.9	Other situations	9
4.0	DEFECT PRIORITISATION	10
4.1	Maximum rectification times for vegetation defects	10
5.0	AUTHORITIES AND RESPONSIBILITIES	13
6.0	RELATED DOCUMENTS	13
6.1	General.....	13
6.2	Ausgrid documents	13
6.3	Other standards and documents.....	14
6.4	Acts and regulations.....	14
7.0	DEFINITIONS	14
8.0	RECORDKEEPING	16
9.0	DOCUMENT CONTROL.....	16
	ANNEXURE A –SAMPLE COMPLIANCE CHECKLIST	17
	ANNEXURE B – LV ABC DEFECTS.....	19
	ANNEXURE C – RISK MITIGATION MEASURES	22
	ANNEXURE D – EXAMPLE CLEARANCE DIAGRAMS.....	23

1.0 PURPOSE

To define Ausgrid's requirements regarding management of vegetation in the vicinity of Ausgrid's network assets.

Specifically, for low voltage overhead mains in non-bushfire prone areas this document contains Ausgrid's requirements for addressing vegetation management near these assets in a manner which balances network risk and community expectations with an aim to minimise vegetation cutting wherever the vegetation risk can be managed to a level that is as low as reasonably practicable.

2.0 SCOPE

This document contains the requirements regarding vegetation management associated with Ausgrid's Network Assets.

It addresses Ausgrid's particular requirements for vegetation management near low voltage overhead mains assets in non-bushfire prone areas to provide vegetation clearances other than the specific clearance requirements recommended in ISSC3 – 2016 Schedule 1, but consistent with ISSC3 – 2016 Schedule 2. Ausgrid recognises that vegetation is a community asset and aims to minimise vegetation cutting wherever the vegetation risk can be managed to a level that is as low as reasonably practicable.

It applies to all persons with responsibility for cutting vegetation from the vicinity of Ausgrid's network assets including Ausgrid employees, Contractors and Accredited Service Providers.

This Network Standard does not address safe working requirements for vegetation clearance work. Safe working requirements are addressed in legislation, Ausgrid's Electrical Safety Rules and WorkCover Guides and Codes.

3.0 VEGETATION MANAGEMENT REQUIREMENTS

3.1 General

Except as otherwise provided by this document, all vegetation associated with Ausgrid's Network Assets is to be managed in accordance with ISSC3 - 2016 Guide for the Management of Vegetation in the Vicinity of Electricity Assets.

Generally, the requirements specified in this document are supplementary to those in ISSC3 – 2016 or clarify the requirements of ISSC3 – 2016 as they specifically relate to Ausgrid. Where there is a conflict between this document and ISSC3 - 2016, this document shall take precedence.

3.2 Regrowth management

3.2.1 Regrowth – general requirements

Regrowth allowances shall be generally in accordance with the principles of ISSC3 – 2016, except for vegetation growing directly above the network (see below). Vegetation is to be cut in a manner that minimises the potential for regrowth. Branches may be cut back to a point outside of the determined Regrowth Allowance where:

- both future cutting will be reduced, the aesthetics of the vegetation will be maintained or enhanced (this is particularly important for vegetation directly under overhead mains), or
- for vegetation health and structural integrity.

The extent of Regrowth Allowances and determination of appropriate methods for achieving minimal potential for regrowth for individual vegetation species will be determined by a suitably experienced and competent person.

No allowance for regrowth is to be applied for vegetation growing directly above the network, unless the vegetation is assessed as posing a risk of growing downwards e.g. a species that has a weeping habit, a palm tree (with fronds that sag as they grow), or long overhanging branches heavy with foliage. Where vegetation located directly above the network is determined to pose a risk of breaching clearances, the Regrowth Allowance to be applied shall suit the site specific conditions with due regard for the requirements of ISSC3 – 2016, minimising the potential for regrowth, the amount of future cutting, maintaining or enhancing aesthetics, or vegetation health and structural integrity, as determined by a suitably experienced and competent person, as discussed above.

Note: Although the Minimum Vegetation Clearance is to be kept clear of all vegetation as far as reasonably practicable, only vegetation that is actually expected to grow into the Minimum Vegetation Clearance during the cutting cycle should be removed from the Regrowth Allowance.

3.2.2 Regrowth where exceptions apply

Where exceptions outlined in Clause 3.6 apply (i.e. situations where clearances other than those specified by ISSC3 - 2016 are used), except for the above provision of cutting vegetation to minimise regrowth, no allowance for regrowth is to be applied for vegetation surrounding Insulated Mains (i.e. Low Voltage Aerial Bundled Cable (LV ABC) distribution mains, LV ABC (i.e. XLPE) service mains or HV ABC distribution mains). These cables are considered capable of coping with intermittent contact with vegetation provided the insulation is determined to be intact and not degraded by ultraviolet (UV) exposure (refer Annexure B for examples of LV ABC in unacceptable condition). While appropriate Minimum Vegetation Clearances are to be achieved during cutting activities, vegetation regrowth may be allowed to come into contact with the Insulated Mains between cutting cycles. Refer to Clause 3.6.2 for exception requirements

3.3 Significant limbs

It is expected that the majority of cutting activities associated with existing network assets will involve maintenance of Regrowth Allowances only, i.e. removal of new-growth vegetation or regrowth that has grown during the previous cutting cycle, rather than removal of Significant Limbs within the Regrowth Allowance. Significant Limbs can be old-growth vegetation (including tree trunks) which have been in place for numerous cutting cycles, or new-growth which can be allowed to continue to grow provided it can be managed over time in accordance with the requirements of this document without the need for future removal. This is particularly applicable in the following circumstances:

- cutting envelope to be minimised for heritage (heritage register) or significant trees;
- non-bushfire prone areas;
- Insulated Mains (lower electrical risks);
- short spans (50 metres or less) and low movement of mains under wind;
- adverse effects for the community and Ausgrid's reputation if significant limbs are removed;
- threatened species either locally or more generally;
- so that, in time, the vegetation forms a complete canopy around and above overhead mains and minimises the need for continual cutting.

Such Significant Limbs should generally not be cut provided they are healthy and attached to healthy timber. Where doubt exists, a suitably experienced and competent person should assess the health and strength of such vegetation.

Refer to Clause 3.6.4 regarding possible exceptions relating to Significant Limbs within the Minimum Vegetation Clearance.

3.4 Vegetation hazard categories

3.4.1 ISSC3 – 2016 vegetation clearances and hazards

Vegetation clearance and hazard categories to be maintained shall include the following as defined and discussed in ISSC3 - 2016:

- Grow-in vegetation hazard;
- Fall-in vegetation hazard;
- Clear-to-the-sky vegetation hazard.

3.4.2 Clear-to-the-sky

Where Clear-to-the-sky clearances have already been implemented in bushfire prone areas, these clearances shall be maintained. Clear-to-the-sky clearances at locations where Clear-to-the-sky does not presently exist shall be implemented only in high risk bushfire prone areas and when specifically identified by Ausgrid Asset Management on the basis of a bushfire risk assessment in accordance with ISSC3 – 2016 Section S1-3.7.

Where Clear-to-the-sky has previously been implemented in locations where Clear-to-the-sky is not appropriate, regrowth above the conductors shall be permitted in accordance with ISSC3 and this document.

3.5 Risk assessment methodology

Any risk assessment required to be carried out pursuant to this document shall be in accordance with Ausgrid's Risk Management Policy GV000-Y0014, Risk Management Procedure GV000-P0023 and the Risk-Ranking Matrix technique which ranks risks qualitatively by combining qualitative scales for consequence and likelihood as shown in those documents. In particular, refer to the risk matrix, and likelihood and consequence assessment tables shown in Annexure A of Board Policy - Risk Management Policy (GV000-Y0014).

3.6 Exceptions

3.6.1 Exceptions – general requirements

The following exceptions to the Minimum Vegetation Clearances for overhead line conductors defined in ISSC3 – 2016 Schedule 1 have been derived in accordance with ISSC3 – 2016 Schedule 2 and have been risk assessed to confirm that they do not establish a lesser public safety and risk outcome than that achieved by adhering to the requirements of ISSC3 – 2016 Schedule 1.

The exceptions may be implemented only when all of the following circumstances apply:

- Grow-in hazards only; and
- The following land areas only:
 - non-bushfire prone land areas or
 - buffer areas associated with Category 2 or 3 bushfire prone land, which have been risk assessed by the relevant Local Council in concert with Ausgrid as representing a “Low” risk of bushfire initiation in the event of a network fault and which have subsequently been identified and recorded in a Ausgrid Enterprise Resource Planning (ERP) system; and
- LV ABC distribution mains, LV ABC (i.e. XLPE) service mains, LV bare, LV covered, or HV ABC mains; and
- The exceptions do not apply to Fall-in or Clear-to-the-sky hazards, or in Category 1 bushfire prone areas or buffer areas associated with Category 1 bushfire prone areas.

The locations at which vegetation clearance exceptions are applied shall be documented and recorded in Ausgrid's ERP system.

3.6.2 Insulated Mains and communications cables exception

For Insulated Mains (i.e. HV ABC and LV ABC distribution mains, LV ABC (i.e. XLPE) service mains) and Ausgrid communications cables, blowout of the conductor or cable and movement of the vegetation under wind need not be taken into account and the Minimum Vegetation Clearance to vegetation may be 0.1m all around provided that all of the following apply:

- any contact between Insulated Mains and vegetation between cutting cycles is as follows: sustained (but not permanent) contact with foliage (i.e. leaves) and limbs/branches that are not

thicker than approximately 25mm diameter (i.e. “your thumb”) but only intermittent contact for branches thicker than 25mm diameter; and

- any contact between communications cables and vegetation between cutting cycles is as follows: sustained (but not permanent) contact with foliage (i.e. leaves) but only intermittent contact with limbs/branches (this will necessitate a suitable a suitable Regrowth Allowance); and
- there is low risk of the mains or cable becoming entangled and semi-permanently vertically or horizontally displaced by contact with the vegetation under wind conditions up to 500Pa / 103km/h wind pressure which equates to Category 1 cyclone conditions; and
- a visual inspection confirms that the XLPE insulation or communications cable sheath is intact and not damaged by abrasion, degraded by ultraviolet (UV) exposure (discoloured, crazed, missing), damage by wildlife (cockatoos, etc.) (refer Annexure B for examples of LV ABC in unacceptable condition); and
- where defective XLPE insulation or communications cable sheath is found the matter shall be referred to the Supervisor for the raising of a defect in SAP which is to be categorised and prioritised in accordance with NS166.

3.6.3 LV Bare or Covered exception

For LV Bare or Covered Mains, the minimum clearance to vegetation above and beneath the mains may be reduced to 0.5m and intermittent contact with foliage growing from beneath is permitted between cutting cycles provided that all of the following apply:

- any contact between LV Bare or Covered Mains and vegetation between cutting cycles is limited to intermittent contact with foliage; and
- an allowance for vegetation regrowth is to be applied; and
- span length is no greater than 50m; and
- there is low risk of conductor clashing during intermittent contact between the mains and vegetation under any likely wind pressures at maximum sag and minimum sag conditions (note: this may be achieved through the installation of LV spreaders – refer Annexure C); and
- there is low risk of conductors becoming entangled and semi-permanently vertically or horizontally displaced by contact with the vegetation under any wind conditions up to the maximum wind pressure for which the mains are designed (typically 500Pa / 103km/h which equates to Category 1 cyclone conditions) (considering movement of both mains and vegetation under wind); and
- the reduced clearance is offset by the application of appropriate risk mitigation measures as discussed in Annexure C.

Minimum Vegetation Clearance and an allowance for vegetation regrowth in accordance with ISSC3 – 2016 is to be applied beside and above the mains, subject to the presence of any Significant Limbs as discussed in Clause 3.6.4.

3.6.4 Significant limbs exception

Significant Limbs may be within the Minimum Vegetation Clearance in the following situations:

- for Insulated Mains the criteria for a vegetation clearance exception as discussed in Clause 3.6.2 must apply;
- for LV Bare or Covered Mains, the following criteria must apply:
 - minimum clearance between Bare or Covered LV conductors and Significant Limbs is no less than 0.1m under no wind, and all conductor temperature (i.e. sag) conditions;
 - any contact between LV Bare or Covered Mains and Significant Limbs is limited to intermittent contact; and
 - span length is no greater than 50m; and
 - there is low risk of conductor clashing during intermittent contact between the mains and Significant Limbs under any likely wind pressures at maximum sag and minimum sag conditions (note: this may be achieved through the installation of LV spreaders – refer Annexure C); and

- there is low risk of conductors becoming entangled and semi-permanently vertically or horizontally displaced by contact with the Significant Limbs under any wind conditions up to the maximum wind pressure for which the mains are designed (typically 500Pa / 103km/h which equates to Category 1 cyclone conditions) (considering movement of both mains and vegetation under wind); and
- intermittent contact between conductors and Significant Limbs at wind pressures for which the mains are designed (typically 500Pa / 103km/h which equates to Category 1 cyclone conditions) is not causing damage to the conductors e.g. conductor discolouration, frayed conductors, damaged conductor covering, repairs to conductors; and
- intermittent contact between conductors and Significant Limbs is not causing a reduction in the strength of the limbs through scarring, etc.

Where Significant Limbs are within the Minimum Vegetation Clearance but do not comply with the criteria discussed above an investigation should be undertaken to determine the appropriate risk mitigation strategy such as a network augmentation solution (including installation of LV spreaders) or negotiated tree replacement.

3.7 Kiosk substations

Vegetation associated with kiosk substations shall be managed in accordance with NS141.

3.8 Communications cables

3.8.1 Ausgrid communications cables

Vegetation associated with Ausgrid communications cables shall be managed in accordance with ISSC3 - 2016 except where exceptions apply as discussed in Clause 3.6.2.

3.8.2 Third-party communications cables

Vegetation associated with communications cables owned by third parties shall not be included in any Ausgrid vegetation management programs except in specific situations where the interaction between the third- party communications cables and vegetation represents a risk to the safety of Ausgrid's assets (for example: a tree limb leaning on a third- a party cable which is threatening to overload an Ausgrid pole). In these situations, the vegetation may be cut to remove the risk to the Ausgrid asset, provided that:

- Only the minimum amount of vegetation necessary to remove the risk to Ausgrid's assets is to be cut. The amount of cutting shall not extend to removing any adverse effects on the third-party's cable or associated assets.
- The vegetation cutting must not adversely impact community expectations or the objective of implementing any exceptions discussed in Clause 3.6. If any necessary vegetation cutting is likely to adversely impact community expectations or the objective of implementing any exceptions discussed in Clause 3.6, the matter is to be referred to the owner of the third- party cables for their urgent attention and remedial action.

This does not preclude Ausgrid entering into commercial agreements with third- party communications cable owners to manage vegetation associated with their assets on their behalf.

3.9 Other situations

A request may be made to consider appropriate vegetation clearances in situations including but not limited to where:

- this document does not provide guidance in relation to allowing a reduction in clearance; or
- ISSC3 – 2016 does not provide guidance in relation to the voltage, construction or span length for a given span within the network.

Such requests should be made in accordance with the requirements of NS181 regarding approval of Network Standard variations, and will be assessed on a risk based, case by case basis.

Requests for approval for reduction in vegetation clearances for any HV Bare Mains, HV CCT, LV Bare Mains or LV Covered Mains (i.e. anything other than LV ABC distribution, LV ABC (i.e. XLPE) service mains or HV ABC mains) in bushfire prone areas or buffer areas associated with Category 1 bushfire prone areas will not be considered.

Each specific request for the approval of an exception will require for each span the provision of vegetation related information required to make the assessment (specific location details, tree type, tree significance, photographs, etc.). All requests for exceptions in bushfire prone areas, which if approved will be in place over the bushfire risk period, must be submitted with adequate time for assessment and response prior to the deemed bushfire period commencement date, and must take into account the volume and complexity of exception requests anticipated. Data regarding voltage, conductor type and basic conductor profile information may also be required and is to be provided with the request submission. Any decision will consider the potential risk posed by the exception and may stipulate a higher frequency cutting cycle or other risk mitigation measures.

4.0 DEFECT PRIORITISATION

The defect prioritisation Tables 1, 2, 3 & 4 below apply to vegetation hazard defects which are identified between routine cutting cycles. They are not intended to apply to defects identified immediately after cutting, which are to be considered and addressed under the contractual performance framework in the first instance.

The prioritisations are intended for Grow-in defects found by both LiDAR and traditional inspection methods (ground and aerial patrol).

When Grow-in defects occur the encroachments on the Minimum Vegetation Clearances need to be addressed based on the risk posed by the encroachment to the safety of Ausgrid's network including but not limited to anything that could:

- damage Ausgrid's network; or
- interfere with the safe and reliable operation of Ausgrid's network; or
- make Ausgrid's network a potential source of danger to Ausgrid employees and/or to the general public, especially relating to electrical safety (electric shock, electrocution, clearances to ground or structures, unacceptable earth potential rises, etc.); or
- initiate bushfires.

This must be done in a way that allows time to plan and carry out the work safely and giving consideration to achieving maximum effectiveness in addressing the pool of defects requiring attention.

4.1 Maximum rectification times for vegetation defects

Identified vegetation defects are to be rectified in accordance with Tables 1, 2, 3 and 4 below which nominate the maximum defect rectification times for Network Assets. Within each of the maximum rectification periods it is expected that defects will be further prioritised as deemed appropriate based on other risk factors such as voltage level, position of encroachment (above, beside or below the power lines), strength of vegetation (i.e. and cause conductors to clash), growth rate, time of year found (bushfire period or not), etc. Each of these variables will influence the risk posed by the vegetation encroachment.

Table 1 is to be read in conjunction with Tables 2, 3 and 4 below and shows vegetation defect rectification times and how these relate to the Defect Categories specified in Maintenance & Replacement Planning Advice MRPA 101/15.

Table 1 – Defect Rectification Times and MRP 101/15 Defect Categories

Vegetation Defect Maximum Rectification Times	MRPA 101/15 Rectification Priority
Emergency	CAT 1
1 month	CAT 2 (change end date)
3 months	CAT 2
6 months	CAT 3 (change end date)
Reinspect (reinspect prior to next planned maintenance – nominally 18 months)	CAT 4
Unrestricted (may include next maintenance)	Unrestricted
No Defect	No Report

Table 2 – Defects found during Pole and Line Inspection

Voltage and installation type	Emergency criteria (CAT 1)	Reportable criteria (CAT 2)
HV and LV Insulated Mains	Visible signs of insulation damage or degradation	Deflecting mains
Bare or Covered LV service mains or LV distribution mains in non-bushfire prone areas	Visible signs of burning / charring	Deflecting mains
Bare or Covered LV service mains or LV distribution mains in bushfire prone areas	Visible signs of burning / charring	< 0.5m
11-22kV Bare or Covered	Touching or visible signs of burning/charring	< 0.7m
33-66kV	Touching or visible signs of burning/charring	< 1.0m
132kV	Touching or visible signs of burning/charring	< 1.5m

Table 3 – Defect Rectification Times

Asset Type	Vegetation Defect	Rectification Time
Overhead Power Lines	Grow-in vegetation	Refer to Table 4
	Clear-to-the-Sky vegetation	Subject to risk assessment up to a maximum of 6 months.
	Fall-in vegetation	1 month unless subject to risk assessment up to a maximum of 6 months (see Note 1) below).
Poles	All Vegetation Defects	Subject to risk assessment up to a maximum of next maintenance.
Towers		
Kiosk Substation/switching station		
Zone/Transmission Substation		
Street Lighting Lantern		

Waterway Crossing Sign (visibility of face of sign)		1 month
Notes to Table 3:		
1) Any Fall-in vegetation defects in bushfire prone areas identified during the bushfire season are to be rectified as soon as reasonably practicable unless a risk assessment by a suitably experienced and competent person determines otherwise. The risk assessment is to nominate the rectification time, up to a maximum of six months.		

Table 4 – Overhead Power Lines Maximum Grow-in Defect Rectification Times

Conductor Type	Voltage Level	Grow-in Defects ISSC3 - 2016 Tables 1 & 3		Maximum Defect Rectification Times	
		Encroachment into Minimum Vegetation Clearance (%)	Class (see Note 3)	Bushfire Prone Area	Non-Bushfire Prone Area
Insulated	LV ABC / HV ABC / Comms	<25%	A4	Unrestricted	No defect.
		≥25% and <50%	A3		
		≥50% and <75%	A2	3 months	
		≥75% but not touching	A1	3 months	Exceptions apply as per Clause 3.6. 3 months where exception criteria are not met and clearance <0.1m.
		Touching	A1	3 months	
Bare / Covered	LV	<25%	A4	Reinspect (see Note 4)	No defect.
		≥25% and <50%	A3		
		≥50% and <75%	A2	3 months	Unrestricted
		≥75% but not touching	A1	1 month	Exceptions apply as per Clause 3.6. 3 months where exception criteria are not met and clearance <0.5m.
		Touching	A1	1 month	
	HV	<25%	A4	Reinspect (see Note 4)	No Defect
		≥25% and <50%	A3		
		≥50% and <75%	A2	1 months	No exceptions apply.
		≥75% but not touching	A1	Emergency or 1 month (see Note 2)	
		Touching	A1	Emergency	

Notes to Table 4:

- 1) In bushfire prone areas all A1 and A2 Class Grow-in defects are to be prioritised and rectified within the maximum periods shown or before the start of the bushfire season, whichever comes first.
- 2) Bare HV A1 (not touching) Class defects are considered emergency work if identified in a bushfire prone area during the declared bushfire season.

- 3) Defect Classes (A1, A2, A3 or A4) are to be used to categorise the degree of encroachment when entering the defect into SAP in the notification description or long text fields.
- 4) One-off follow-up reinspection within 3 months of the start of bushfire season to check growth and health of vegetation. If these defects have become or are likely to become A1 or A2 during the bushfire danger period, the defects shall be rectified in accordance with the revised defect Class.

5.0 AUTHORITIES AND RESPONSIBILITIES

For this Network Standard the authorities and responsibilities of Ausgrid employees and managers in relation to content, management and document control of this Network Standard can be obtained from the Company Procedure (Network) – Production / Review of Engineering Technical Documents within BMS. The responsibilities of persons for the design or construction work detailed in this Network Standard are identified throughout this Network Standard in the context of the requirements to which they apply.

6.0 RELATED DOCUMENTS

6.1 General

All work covered in this document shall conform to all relevant Legislation, Standards, Codes of Practice and Network Standards. Current Network Standards are available on Ausgrid's Internet site at www.ausgrid.com.au.

6.2 Ausgrid documents

- Bushfire Risk Management Plan
- Company Form (Governance) - Network Technical Document Endorsement and Approval
- Company Procedure (Governance) - Network Technical Document Endorsement and Approval
- Company Procedure (Network) – Network Standards Compliance
- Company Procedure (Network) - Production / Review of Engineering Technical Documents within BMS
- Customer Installation Safety Plan
- Electrical Safety Rules
- Electricity Network Safety Management System Manual
- Formal Safety Assessment, Critical Risk: Bushfire
- Maintenance and Replacement Planning Advise (MRPA) 101/15 Network Defect Prioritisation Matrix July 2017
- Public Electrical Safety Awareness Plan
- Public Lighting Management Plan
- Tree Safety Management Plan
- NS102 Working on Poles with Mobile Phone Transmitter Installations
- NS119 Street Lighting Design and Construction
- NS125 Construction of Low Voltage Overhead Mains
- NS126 Construction of High Voltage Overhead Mains
- NS135 Specification for the Construction of Overhead Sub-transmission Lines
- NS141 Site Selection and Site Preparation Standards for Kiosk Type Substations
- NS146 Inspection Procedure for Working on Poles
- NS156 Working Near or Around Underground Cables
- NS166 Routine Overhead Line Inspection
- NS181 Approval of Materials & Equipment and Network Standard Variations
- NS201 All Dielectric Self-Supporting Fibre Optic Cabling for Installation on Distribution Assets
- NS209 Operating Cranes & Plant in Proximity to Overhead Power Lines
- NS212 Integrated Support Requirements for Ausgrid Network Assets

6.3 Other standards and documents

- AS 5577-2013 Electricity Network Safety Management Systems
- AS4673-2007 Pruning of Amenity Trees
- AS/NZS 7000-2016 Overhead Line Design
- ENA Doc 001-2008 National Electricity Network Safety Code
- ISSC3 - 2005 Guideline for Managing Vegetation near Power Lines
- ISSC3 - 2016 Guide for the Management of Vegetation in the Vicinity of Electricity Assets
- NSW Rural Fire Service Guide for Bushfire Prone Land Mapping (Version 5b, November 2015)
- Vegetation Management Common Requirement Ausgrid/Endeavour Energy/Essential Energy October 2014 (VMCR)

6.4 Acts and regulations

- Electricity Supply Act 1995 (NSW)
- Electricity Supply (General) Regulation 2014 (NSW)
- Electricity Supply (Safety and Network Management) Regulation 2014 (NSW)
- Work Health and Safety Act 2011 (NSW)
- Work Health and Safety Regulation 2017 (NSW)

7.0 DEFINITIONS

Accredited Service Provider (ASP)	An individual or entity accredited by the NSW Department of Industry, Division or Resources and Energy in accordance with the Electricity Supply (Safety and Network Management) Regulation 2014 (NSW).
Bare Mains	In this Standard Bare Mains refers to mains consisting of conductors (manufactured to AS1222, AS3607, AS1531 or AS1746) which are not covered or insulated
Bushfire prone areas	<p>Areas identified by councils, certified by the New South Wales Rural Fire Service (NSW RFS) and then published by the NSW RFS. The data is released on an annual basis in the form of bushfire prone land maps identifying vegetation within council areas that have the potential to support a bushfire. The bushfire prone land consists of four categories:</p> <ul style="list-style-type: none"> • Vegetation Category 1 – highest risk for bushfire consisting of highest combustibility. • Vegetation Category 2 – lower risk than Category 1 and Category 3 and has lower combustibility. • Vegetation Category 3 – medium risk bush fire risk vegetation. • Buffer – predetermined buffer applied to Vegetation Categories based on risk.
Clear to the Sky	The practice of removing all vegetation above the electricity assets to the width of the Minimum Vegetation Clearance plus the Regrowth Allowance.
Cutting Cycle	The time required, after consideration of the Regrowth Allowance, between return visits to areas to cut vegetation that enables maintenance of the Minimum Vegetation Clearance without cutting vegetation beyond acceptable community standards. The objective of the cutting cycle is to avoid any encroachment into the Minimum Vegetation Clearance between cutting cycles as far as is reasonably practicable.
Designer	An Ausgrid employee, contractor or Ausgrid ASP/3 who is duly qualified to produce design plans.
Document control	Ausgrid employees who work with printed copies of document must check the document repository regularly to monitor version control. Documents

are considered “UNCONTROLLED IF PRINTED”, as indicated in the footer.

Enterprise Resource Planning (ERP)	The main software package used by Ausgrid to capture and record data, including financial data
Fall-in Vegetation Hazard	As defined in ISSC3 – 2016.
Grow-in Vegetation Hazard	As defined in ISSC3 - 2016.
Insulated Mains	Mains consisting of conductors which are individually surrounded by a layer of insulation which provides resistance to the passage of current, or to disruptive discharges through or over the surface of the substance at the operating voltage, or injurious leakage current i.e. Low Voltage Aerial Bundled Cable (LV ABC) distribution mains, LV ABC (i.e. XLPE) service mains and HV ABC distribution mains.
LV Aerial Bundled Cable (ABC)	A cable system used by Ausgrid for the low voltage overhead distribution system. The low voltage cable system consists of four compacted stranded hard-drawn aluminium conductors individually insulated with black cross-linked polyethylene (XLPE) complying with Ausgrid’s specification.
LV Covered Conductor	A low voltage conductor around which a covering material is applied but which may not be of a grade considered to be insulation.
Minimum Vegetation Clearance	As defined in ISSC3 - 2016.
Network Assets	All components of Ausgrid’s network, such as substations, poles, conductors, communications cables and associated equipment, structures, lattice steel towers, waterway crossing signs, support structures in switch yards, switchyard fencing, transformers and associated switchgear, insulators and cross arms, brackets and associated mounting hardware, street light lanterns, access tracks and the like. Buildings that form part of switchyards and covering structures such as kiosk housings and switchgear cubicles are also Network Assets.
Network Standard	A document, including Network Planning Standards, that describes the Company’s minimum requirements for planning, design, construction, maintenance, technical specification, environmental, property and metering activities on the distribution and transmission network. These documents are stored in the Network Category of the document repository.
Regrowth Allowance	As defined in ISSC3. The Regrowth Allowance will be dependent on factors including but not limited to environmental considerations, species type, and cutting cycle.
Review date	The review date displayed in the header of the document is the future date for review of a document. The default period is three years from the date of approval however a review may be mandated at any time where a need is identified. Potential needs for a review include changes in legislation, organisational changes, restructures, occurrence of an incident or changes in technology or work practice and/or identification of efficiency improvements.
Significant Limbs	Old-growth vegetation (including tree trunks) which have been in place for numerous cutting cycles, or new-growth which can be allowed to continue

to grow provided it can be managed over time in accordance with the requirements of this document without the need for future removal.

Vegetation All plant life including, but not limited to, trees, palms, vines, shrubs and grasses such as bamboo but excluding lawns

8.0 RECORDKEEPING

The table below identifies the types of records relating to the process, their storage location and retention period.

Table 5 Recordkeeping

Type of Record	Storage Location	Retention Period*
Approved copy of the Network Standard	Document Repository Network sub process Standard – Company	Unlimited
Draft Copies of the Network Standard during amendment/creation	Records management system Work Folder for Network Standards (HPRM ref. 2014/21250/304)	Unlimited
Working documents (emails, memos, impact assessment reports, etc.)	Records management system Work Folder for Network Standards (HPRM ref. 2014/21250/304)	Unlimited

* The following retention periods are subject to change eg if the records are required for legal matters or legislative changes. Before disposal, retention periods should be checked and authorised by the Records Manager.

9.0 DOCUMENT CONTROL

Content Coordinator : Head of Asset Engineering Policy & Standards

Distribution Coordinator : Manager Asset Engineering Standards



Annexure A –Sample Compliance Checklist

Network Standard Checklist Form

NS179 Vegetation management

Project Identification:	
Prepared by: <Name & Position Title>	Date:

This checklist is for internal Ausgrid use only and does not apply to ASPs or contractors who have specific compliance requirements in relation to Contestable project works. The checklist is unique for each network standard and is available within BALIN and the BMS as a separate form that can be amended as required, completed and saved in HPRM with the other project documentation.

This section is used to identify compliance checks that when applied to the work associated with this Network Standard will satisfy an audit process to establish that the requirements of the standard have been followed. It is expected that applicable items would normally be checked as Comply (Yes) as non-compliance is generally not tolerated.

Where non-compliance is the result of specific site conditions or design decisions this needs to be identified in the notes section of the form for each non-compliance and approval sought from an appropriately authorised Ausgrid manager responsible for design approval.

Should additional information be available to document non-compliance decisions, these can be attached to the checklist form. The checklist and any attached explanatory notes should be saved in the project document repository.

Item	Description	Refer clause	Completed/ Actioned
Scope			
	Applies to all persons with responsibility for cutting vegetation from the vicinity of Ausgrid's poles and associated attachments, overhead power lines, overhead communications cables, street lights, standards, towers, substations and waterway crossing signs including Ausgrid staff, Contractors and Accredited Service Providers	2.0	
Vegetation Management Requirements			
1	Except as otherwise provided all vegetation to be managed in accordance with ISSC3 - 2016	3.1	Yes/No/NA
2	Vegetation is to be cut in a manner that minimises the potential for regrowth	3.2.1	Yes/No/NA
3	A suitably experienced and competent person to determine the extent of regrowth allowance and methods for achieving minimal potential for regrowth	3.2.1	Yes/No/NA
4	No allowance for regrowth is required above the network unless vegetation assessed as posing risk of growing downwards	3.2.1	Yes/No/NA
5	Only vegetation that is actually expected to grow into the Minimum Vegetation Clearance during the cutting cycle should be removed from the Regrowth Allowance	3.2.1	Yes/No/NA
6	No regrowth allowance required for Insulated Mains	3.2.2	Yes/No/NA

7	Significant Limbs should generally not be cut	3.3	Yes/No/NA
8	Vegetation hazard categories: Grow-in, Fall-in, Clear-to-the-sky	3.4.1	Yes/No/NA
9	Where Clear-to-the-sky clearances have already been implemented in bushfire prone areas, these clearances shall be maintained. Clear-to-the-sky clearances at locations where Clear-to-the-sky does not presently exist shall be implemented only in high risk bushfire prone areas and when specifically identified by Ausgrid .	3.4.2	Yes/No/NA
10	Risk assessment methodology to be in accordance with Ausgrid Board Policy: Risk Management GV000-Y0014 and Risk Management Procedure GV000-P0023	3.5	Yes/No/NA
11	Exceptions: Insulated Mains, communications cables, LV Bare or Covered, Significant Limbs.	3.6	Yes/No/NA
12	Vegetation associated with kiosk substations to be managed in accordance with requirements of NS141	3.7	Yes/No/NA
13	Ausgrid communication cables managed in accordance with ISSC3 – 2016 except where exceptions apply	3.8.1	Yes/No/NA
14	Vegetation associated with 3rd party communications cable to be cut only to remove risk to Ausgrid assets	3.8.2	Yes/No/NA
15	Requests to consider clearances in situations where NS179, or ISSC3 – 2016 does not provide guidance may be made in accordance with NS181 in the form of a Network Standard Variation	3.9	Yes/No/NA
16	The defect prioritisation in accordance with Tables 1, 2 3 & 4	4.0	Yes/No/NA

Notes:

.....

.....

.....

.....

.....

The signatures panel of this document has been removed for privacy considerations. The remainder of the document is unchanged.

Annexure B – LV ABC Defects

The following Figures show various defects affecting LV ABC cable.

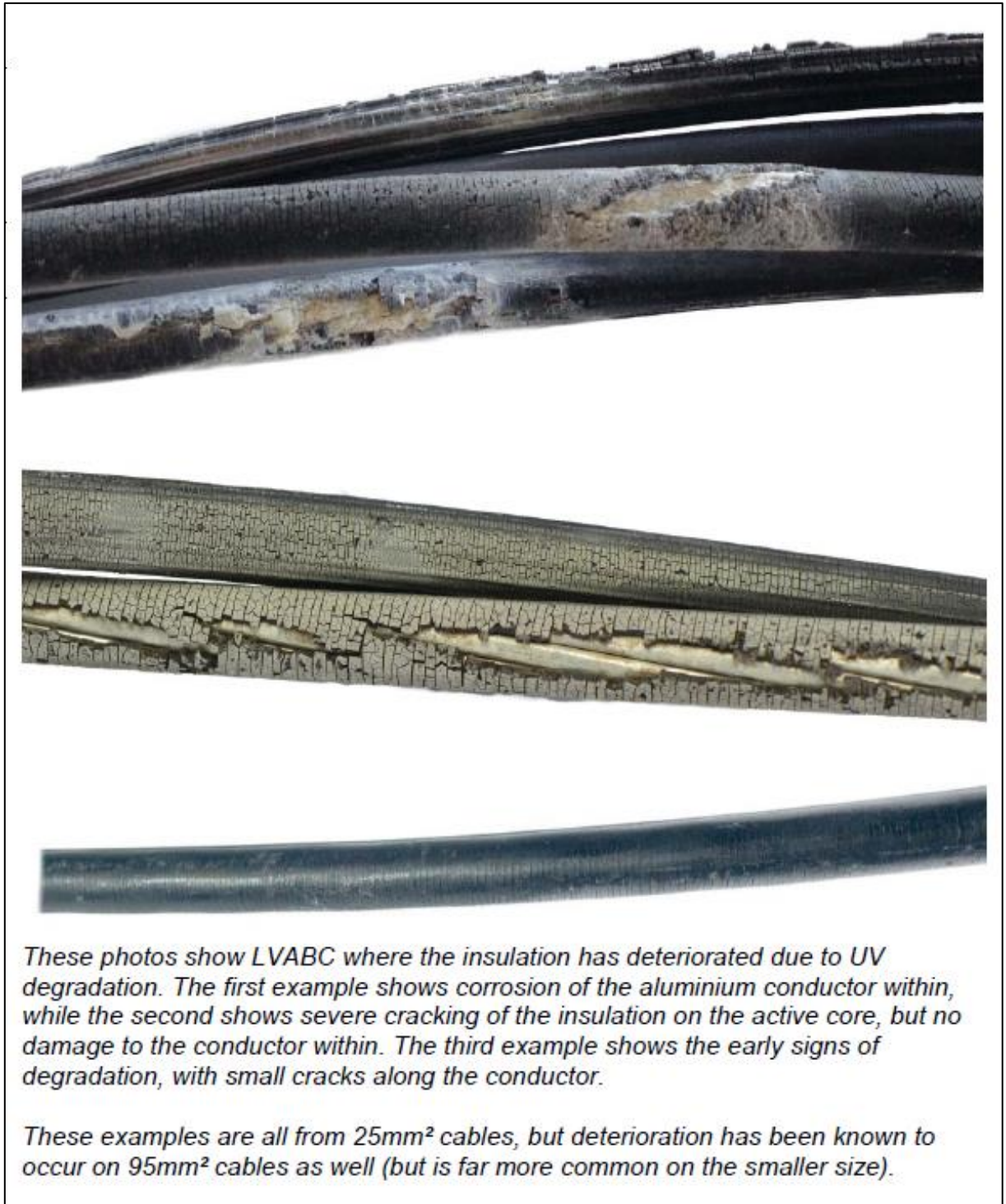


Figure B1



This photo shows damage to a tree branch and the repairs made to an LVABC cable following abrasion (a new piece of cable has been spliced in for the phase that was damaged). The insulation on LVABC is very tough, but can eventually wear through, damaging the cable, the tree, and having potential impacts on safety and reliability.

Figure B2

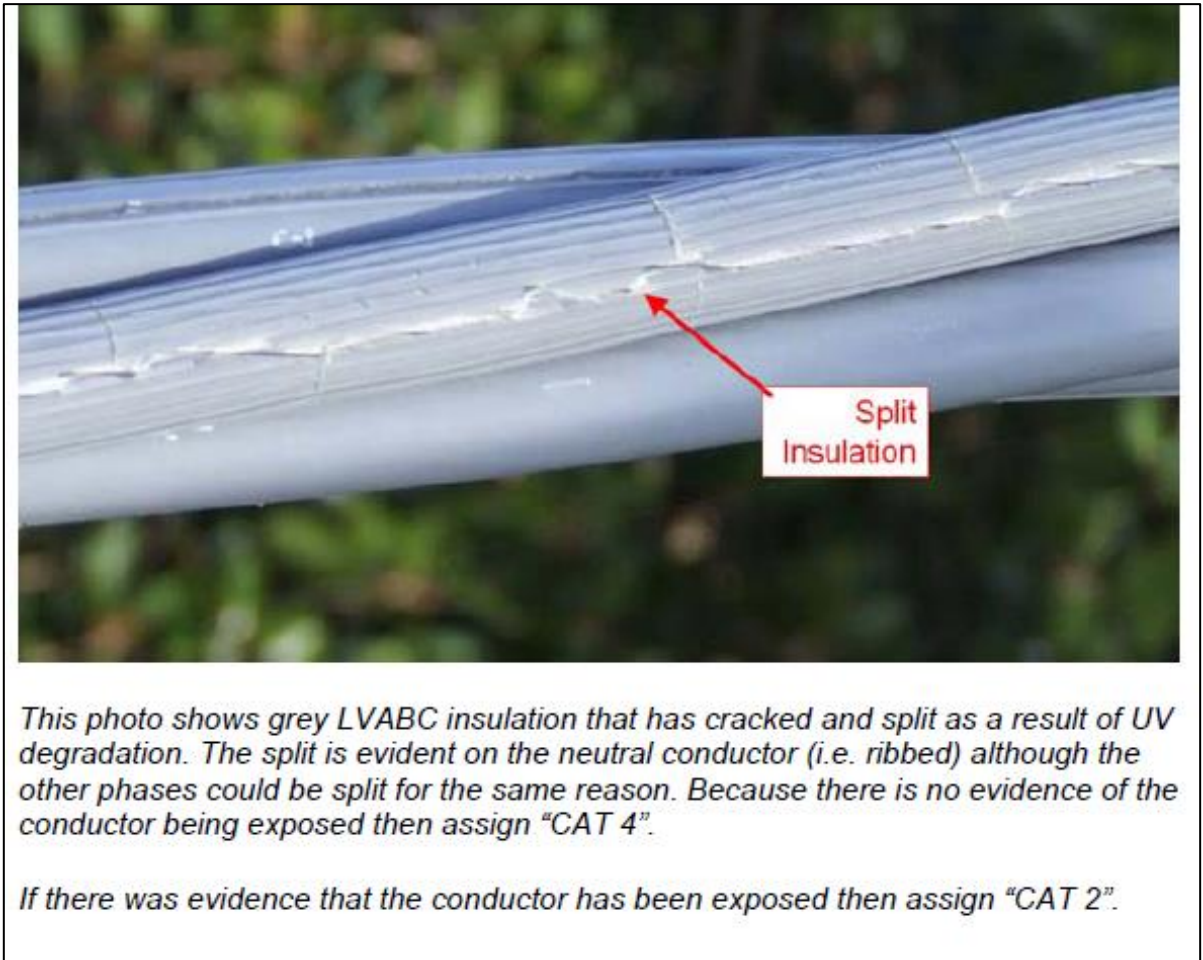


Figure B3

Annexure C – Risk Mitigation Measures

In general, any reduction in clearance from those stated in ISSC3 -2016 must be offset by the application of appropriate risk mitigation measures. Vegetation clearances and the amount of vegetation cutting generally may be influenced by mitigating risks through factors including but not limited to:

- Use of Insulated Mains (i.e. LV ABC distribution mains, LV ABC (i.e. XLPE) service mains or existing HV ABC distribution mains). In non-bushfire areas, the exception as discussed in Clause 3.6.2 may be applied. In other areas the Minimum Vegetation Clearances specified in ISSC3 – 2016 Table 1 are to be achieved including Regrowth Allowance.
- Use of spreaders to offset risk of LV conductor clashing. This may allow LV Bare or Covered exception to be applied as discussed in Clause 3.6.3.

Other risk control measures that may be used to reduce the amount of vegetation cutting include:

- removal of trees and replanting with more suitable species;
- relocation of overhead distribution mains away from vegetation;
- undergrounding of overhead mains;
- relocating the path of service mains away from vegetation by utilising suspended or in-span service take-offs. Refer to the drawings in Table C1 for options.

Note: the risk control measure(s) ultimately implemented is to achieve an overall least cost solution and will depend on the outcome of consultation with all stakeholders, taking into account implementation and future costs to Ausgrid, the impact on customers and the wider community affected by the change, and any costs to the local Municipal Council.

Table C1 - Suspended Service Take-off Drawings

Drawing Number	Drawing Title
152487*	Standard Construction 100Amp Open Wire Mains Suspended Service – In Span Pole End Termination
167461*	Standard Construction 100Amp Open Wire Mains Suspended Service – In Span.
192104*	Standard Construction 100Amp Open Wire Mains Suspended In Span Service 1Phase/2Phase/3Phase
212984	Standard Construction 100Amp Open Wire Mains Suspended Service 1Phase/2Phase/3Phase
152476	Standard Construction 100amp ABC Mains Support from ABC – 1 Phase
167458	Standard Construction 100amp ABC Mains Support from ABC – 2 Phase
152477	Standard Construction 100amp ABC Mains Support from ABC – 3 Phase
*to be used together	

Annexure D – Example Clearance Diagrams

Note: The diagrams and the clearances depicted in Table D1 are provided for information only and do not form part of the technical requirements of this Standard.

Table D1 – Example Vegetation Clearances

Situation	Non-Exception	Exception
LV ABC, all span lengths.		
Bare LV, spans < 50m		