




ASP/3 Event

15 December 2020

Introduction

Matthew Hindson
Connections Manager

Introduction and Teams Session Protocols

- Due to the number of attendees, everyone will be **initially muted**.
- Please turn your **camera off**, only used by presenters and Ausgrid staff.
- Please use the **chat box** if you have a question **relevant to today's topics**, we will attempt to answer your questions at the end of each presenter's session. If time permits we may open up to questions via "hand up"  function at the end.
- Ausgrid staff in attendance.
- Ausgrid presenters.
- **Feedback** will be welcome via a link in the chat box towards end of Event.

Agenda

Topic	Presenter
1. Welcome	Matthew Hindson
2. Updates and Reminders	Matthew Hindson
3. ASP Reputational Survey Findings	Matthew Hindson
4. CX Lavender Report Feedback	Matthew Hindson
5. Asset Engineering and Role of Transmission Engineering	Rob Bradley/Brendon Burns
6. CRM Update	Andrew Vandenberg
7. Network Standards Update and Changes	Matthew Cupples
8. Cable Ratings	Kate Thomlinson

Updates and Reminders

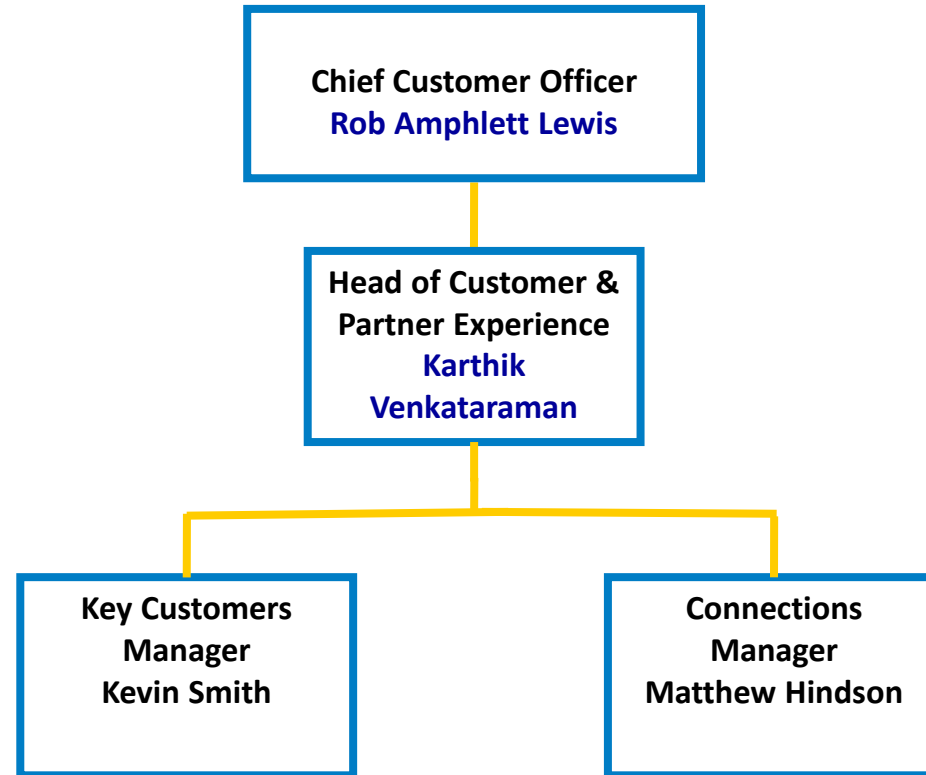


Matthew Hindson
Connections Manager

Updates and Reminders - Topics

- What is happening at Ausgrid.
- Contestable Project Statistics.
- Contestable Connections KPI's.
- Customers Detail Form.
- NS112 – Direct Distributor and Customer Substation requirements.
- Department of Planning, Industry and Environment accreditation details.
- Authorised ASP/3 designers to submit designs.
- Pole Embedment Calculator (PEC) license requests.

Connections Structure – December 2020



Contestable Project Statistics

Contestable Project Volumes

- Connection application and resulting contestable project activity are showing signs of increasing over the past year, despite COVID-19.
- Up to November 2020 there has been a 17.4% increase in requests for Contestable Connections compared to the same period in 2019.
- FY 20 - there were 4384 applications and 1234 becoming contestable projects.
- FY 21 - November YTD there were 2145 applications (17.4% increase) and 458 becoming contestable projects (10.9% decrease).

Contestable Connection KPI's

Design Information (Target < 20 Business Days (BD), 90% of the time).

- **FY20** – 12.6 BD on average, 85.7% < 20 BD.
- **FY21** – November YTD 8 BD on average, 92.5% < 20 BD.
42% improvement on FY20 November YTD at 13.8 BD.

Design Checking (Target < 10 BD, 90% of the time).

- **FY20** – 5.8 Business Days (BD) on average, 88.4% < 10 BD.
- **FY21** – November YTD 5 BD on average, 94.5% < 10 BD.
24.2 % improvement on FY20 November YTD at 6.6 BD.

Customer Details Form (CDF)

- CDF amended to reflect changes made to the Contract for Design Related Services (CDRS) in July 2020 to improve flexibility, efficiencies and provide a better customer outcome.
- CDF developed as an interim measure until Better Connected/CRM enhancements made.
- Now required earlier in the connection or relocation process.
- The customer in CRM defaults to the payee in Offers (previously was the applicant).
- Allows the customer to be billed for the design contract.
- Customer information captured after design Offer and prior to invoicing.

Updates and Reminders

NS112 Design Standards for Industrial and Commercial Developments

- **Direct distributor:**

- is an exclusive supply to a customer's SB from a distribution substation remote from the customer's premises. Supply availability and the route length permitted for from an U/G direct distributor will be determined by Ausgrid.
- The maximum underground direct distributor rating is nominally 800A.
- The route length for a 600A or 800A underground direct distributor should not exceed 30 metres.

- **Customer substation:**

- Ausgrid may determine that the existing network is unable to meet the clients supply requirements. In accordance with the Service and Installation Rules of NSW, the client may be required to provide a suitable space and approved enclosure to accommodate Ausgrid transformer(s), switchgear and other associated equipment.

Where supply is taken direct from a customer substation, the customer's MSB shall, wherever practicable, be located immediately adjacent to the substation. If the customer's MSB cannot be located immediately adjacent to the substation, the proposed location must be approved by Ausgrid as early as possible in the design process.

Updates and Reminders

- Please ensure your ASP Scheme accreditation details are current with the **Department of Planning, Industry and Environment**.
- Only Ausgrid authorised ASP/3 designers are permitted to submit designs to Ausgrid for certification.
- Due to licencing agreements, only Ausgrid authorised ASP/3 designers are able to request and use a Pole Embedment Calculator (PEC) licence.

ASP Reputational Surveys

Question: How likely would you be to speak well of Ausgrid to family, friends or colleagues?

Ausgrid ASP NPS segments	May 20	August 20	Difference
Net Promoter Score – ASP/3	-48	-28	+20
Net Promoter Score -ALL ASP	-46	-37	+9

Satisfaction by area	May 20	August 20	Difference
Proactive Process Management	53%	71%	+18
Ease of finding information	65%	79%	+14
Effective Communications	53%	64%	+11
Timeliness of response	47%	79%	+32
Improving Products & Services	41%	65%	+24
Accessibility – reaching the right person	59%	64%	+5

ASP Reputational Surveys

Focus remains on improvements across service areas which are of high importance:

- Effective communications
- Timeliness of response
- Staff accessibility
- Ease of finding information

Response times in contacting Ausgrid staff and their responsiveness

Proactive communications during process changes

Better customer focus and empathy

Reaching appropriate Ausgrid staff over the phone

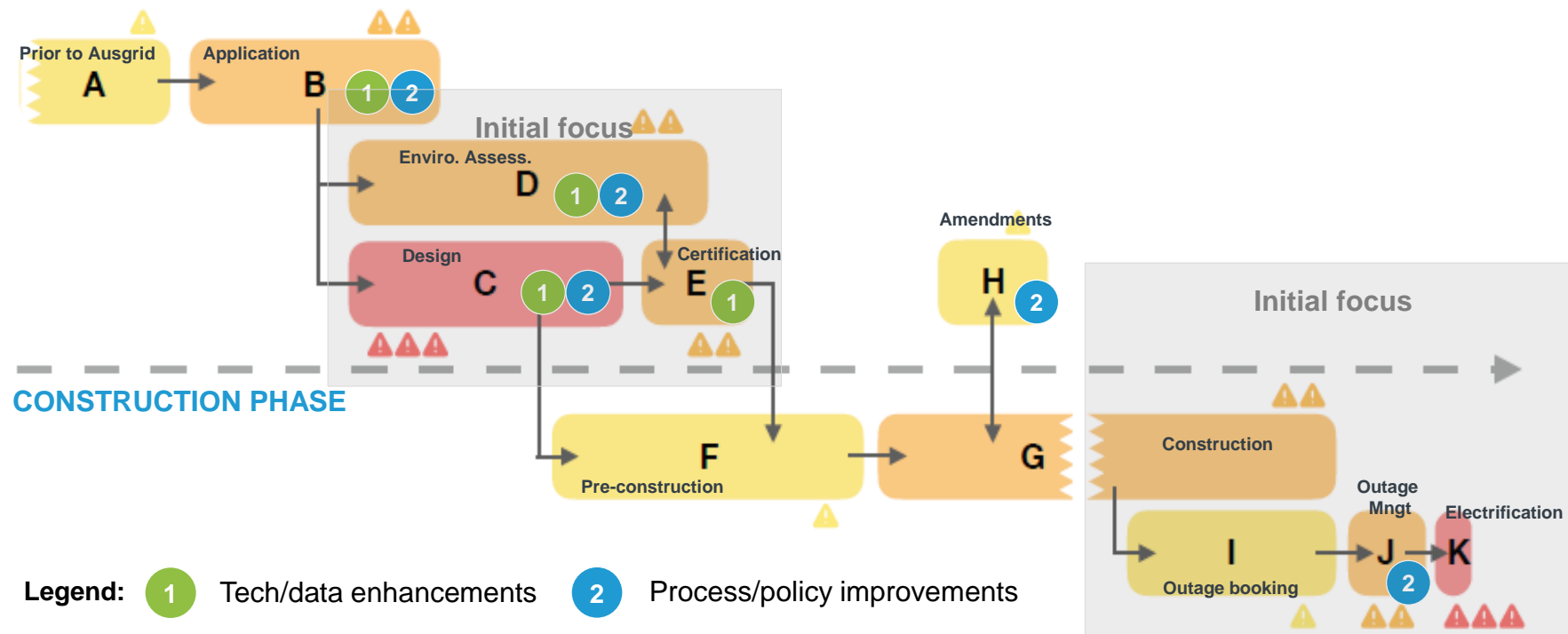
Improving products & services: Reapplication charges, portal usage

Source: August 2020 survey verbatim responses

CX Lavender Report Feedback

- An end-to-end review of ASPs experience navigating the non-basic connection process from Design to Construction was conducted through multiple interviews and workshops conducted with Ausgrid and ASPs.
- This highlighted pain points and opportunities for improvements in each stage.
- Once prioritised, initiatives will commence Q1 2021 and will be communicated. A key focus is to improve internal processing and approval times (exact scope of work is still being defined).

DESIGN PHASE



Transmission Engineering

**Rob Bradley - Manager
Transmission Engineering**

**Brendon Burns - Senior
Consultant Asset Engineering**

Asset Engineering, Policy and Standards (AEPS)

Session topics:

- What does AEP&S do?
- Why adhere to standards?
- AS5577 ENSMS outlined
- Technical approvals
- Are standards perfect?
- Current problems
- How can we help you (Q&A).

Asset Engineering

What do we do?

- Standards
- Equipment specifications
- Technical approvals
- Technical documentation
- Investigations
- Technical audit
- Failures
- Innovation
- Subject Matter Expertise over asset lifecycle
- Industry representation, e.g. CIGRE/ENA
- Environmental



The Importance of Adhering to Standards and Approvals

Assets need to be managed over their lifecycle:

- Design
 - Installation
 - Operation
 - Maintenance
 - Repairs and decommissioning
- all need to be considered.

Electricity Network Safety
Management System requirements.

What can go wrong?

- Failures
- Leaks
- Reliability impact
- Safety impact
- Legal liability
- Increased maintenance
- Reduced lifetime
- Replacement costs

AS5577 Electricity Network Safety Management Systems (ENSMS)

Compliance with AS5577 is mandatory via legislation and Ausgrid's ENSMS:

- **Technical standards**
- **Industry/company codes**
- **Variations & safety**
- **IPART reporting**
- **Retrospectivity**

4.3.4.1 *Published national or international technical standards*

A Network Operator shall identify the published national or international technical standards used by it in—

- (a) the design and construction of existing network assets;
- (b) design and construction of new network assets; and
- (c) the commissioning, installation, operation, maintenance and decommissioning of network assets.

4.3.4.2 *Industry/company codes*

A Network Operator shall identify the industry or company codes used by it in—

- (a) the design and construction of existing network assets;
- (b) the design and construction of new network assets; and
- (c) the commissioning, installation, operation, maintenance and decommissioning of network assets.

If the Network Operator chooses not to comply with particular provisions of an industry or company code, the Network Operator shall document—

- (i) the reason for the non-compliance with the code; and
- (ii) the alternative provisions for the design, construction, commissioning, operating, maintenance and decommissioning of network assets that will ensure a level of safety in relation to those activities that is at least equal to or greater than the level of safety that would ensue from compliance with that code.

What is Checked for Technical Approval?

- Meets spec requirements (“company code”):
 - e.g. dimensions, weight, operability, materials, signage, ESR, MSDS, compatibility with other equipment, training, lifecycle etc.
- Meets AS/IEC/IEEE requirements (“technical standards”).
- Tested properly:
 - Type & Routine/Sample factory tests.
- Deviations/variations are properly assessed & documented:
 - NS181 Network Standard variation process
 - NS181 Approved Materials List & assessment process
 - Request via Customer representative.
- BeSafe Pro14.1F Risk assessment for Ausgrid procurement.

Are all Standards and Procurement Equipment Perfect?

- Standards are written and equipment procured at point in time for specific purpose.
- Evolve with changing world.
- Reviewed every 3 years or more frequently if needed, usually via working group.
- Prescriptive vs functional.

Feedback Welcome!

Current Problems with Contestable Transmission Projects

- Non-approved equipment:
 - Certified in design
 - Missing from design
 - Substituted after certified design.
- Inadequate QA checks / ITPs during installation.
- ASP jointing competence at 33kV.
- TSB and grout:
 - Non-approved mixes
 - No sample tests during installation
 - No review of sample test results.

CRM Portal Update

Andrew Vandenberg
Contestable Connections Team Leader

CRM Portal Reminders and Update



Navigate To ▾

⚙️ Account Settings

Sign out

Ausgrid Customer Portal

Connection Projects

Track and manage your connection applications and projects.

Enquiries

Send us your enquiry and our team will be in touch

Complaints

Help us resolve your issue and submit a complaint

Claims

Make a claim for property or other damage caused by Ausgrid

Contact Preferences

Let us know how you would like Ausgrid to contact you

CRM Portal Reminders and Update

In your project list:

- **Search function - use wildcard * and sort**
- **Closed/Warranty projects filter.**

In the Design Submission:

- **Recommend use of ZIP file for large number of attachments.**

CRM Portal Reminders and Update

ASP/3s acting as applicants/agents won't be invoiced for initial design or construction fees (even if accepting Offers on portal).

Expired Offers – can no longer be accepted.

Offers

Issued Offers

Issued Date	Expiry Date	Customer Reference	Customer	Customer Representative	Project	
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There are no records to display.

Accepted Offers

Issued Date	Customer Reference	Customer	Customer Representative	Project	Offer Type	Offer Status	
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There are no records to display.

Declined Offers

Issued Date	Customer Reference	Customer	Customer Representative	Project	Offer Type	Offer Status	
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There are no records to display.

Expired Offers

Issued Date	Expiry Date	Customer Reference	Customer	Customer Representative	Project	Offer Type	
17/04/2020	22/06/2020				AN-20523 SYDNEY	Connection - Standard ASP1 offer	▼

CRM Portal Reminders and Update

Roadmap Highlights:

- **PDS submission upload via portal**
- **Ability for ASP/3 to open portal submission record for design amendment upload**
- **Customer data structure enhancement to allow more efficient and flexible portal access (e.g. users with multiple companies).**

ASP/3s are one of our key user groups – please keep sending suggestions to contestability@ausgrid.com.au

Network Standards Update and Changes

**Matthew Cupples - Manager
Distribution Engineering**



Network Standard Updates

- Process.
- Types of changes.
- Work over the last year.
- Focus on NS220 – Overhead line design.

Review Process

- Review in accordance with a schedule, or where a specific need is identified.
- Lead by the Standards team, in consultation with stakeholders.
- Contact via Contestable Project Coordinator.

Major and Minor Changes

- Minor changes are shown highlighted in grey.
- Full rewrites do not contain grey shading.

NS130 Laying Underground Cables up to and including 110kV
Amendment No 4

10.17 Procedure for dry bedded banks of conduits

The bedding compaction ratio shall be minimum 3:2.
Dry bedded banks of conduits shall be constructed using the following procedure:

For 125mm conduits:

1. Place a 75mm deep layer of approved bedding material at the bottom of the trench and compact the bedding down to 50mm.
2. Lay the first row of conduits. Maintain a minimum separation of 50mm between conduits, and 50mm between the outer conduits and the sides of the trench.
3. Place bedding material over the first row of conduits to a depth of 285mm and compact the bedding material down to 190mm.
4. Lay any additional rows, then place more bedding material and compact between the rows in the same manner.
5. Place a 150mm layer of bedding material over the top layer of conduits and compact down to 100mm.

For 150mm conduits:

1. Place a 105mm deep layer of bedding material at the bottom of the trench and compact the bedding down to 70mm.
2. Lay the first row of conduits. Maintain a minimum separation of 70mm between conduits, and 70mm between the outer conduits and the sides of the trench.
3. Place bedding material over the first row of conduits to a depth of 345mm and compact the bedding material down to 230mm.
4. Lay any additional rows, then place more bedding material and compact between the rows in the same manner.
5. Place a 150mm layer of bedding material over the top layer of conduits and compact down to 100mm.

Notes: When adding and compacting the bedding material, care shall be taken to avoid dislodging the laid conduits from their required position. Conduit spacers should be used to progressively construct the conduit bank.
The layer of bedding material over the conduits shall be carefully consolidated using hand rammers only. Under no circumstances shall mechanical rammers be used to consolidate the bedding material.
On steep inclines and other locations where scouring of the bedding material is likely to occur, bulkheads consisting of bags packed with 20:1 sand/cement mix must be installed at regular intervals.

10.18 Protection of conduits

Conduits are considered to be inherently protected from mechanical damage, provided they are installed with a standard depth of cover (refer to Clause 10.11) and are either:

- concrete encased, or
- TSB encased, or
- installed using Trenchless Technology.

These installations do not require cable protection covers unless specifically requested in writing by Ausgrid. Critical or high-risk Sydney CBD installations are possible locations where additional cable protection covers may be required. Warning tapes shall be provided in accordance with Clause 10.19.

NS130 Laying Underground Cables up to and including 110kV
Amendment No 4

10.19 Use of warning tape

Warning tape, as listed in Annexure G, shall be used in the following circumstances:

- over concrete encased conduits
- over TSB encased conduits
- where specifically required by Ausgrid.

Where used, the tape shall cover the full width of the trench, or portion thereof containing the conduits. Where two or more strips of warning tape are laid side-by-side, they shall overlap by 20mm. Warning strips shall be immediately secured in place by a 150mm minimum covering of backfill material.

10.20 Inspections by Ausgrid

Ausgrid has the right to inspect all works regarding the installation of its assets. If access to our assets is unavailable, then the constructor must provide Ausgrid access at the constructor's expense.

10.21 Kerb marking

Permanent kerb marking must be provided (except where there is no kerb or gutter) at all roadway conduit crossings and under road borings, using the letter E (for Electricity). The markings shall be done by engraving or other approved means, and shall be positioned on the face of the kerb directly above the installed conduits at both sides of the roadway crossing.

Note: Permanent markings shall not be installed in heritage situations unless approved.
For example, permanent kerb marking may consist of an approved stainless steel 'E' plate anchored onto the kerb as shown in Figure 13. The supplier is Hi-Tech Horizontal Drilling.
<http://www.kerbmarking.com.au>

NS130 Laying Underground Cables up to and including 110kV
Amendment No 4

10.22 Bridge crossings

Where bridge crossings are required, specific structural designs must be provided. Before any work occurs, the design must be certified, and authorisation must be obtained from the relevant bridge Authority/Owner and from Ausgrid.
The cable and cable/conduit support design shall allow for the expected bridge movements (vertical and longitudinal).
Cable design shall meet the distribution network rating requirements.
For exposed HV and LV cables and conduits, suitable measures shall be used to provide adequate mechanical protection and to restrict public access. These measures shall be subject to review and approval by Ausgrid.
For all bridge crossings, clearly visible permanent surface marking at 5m intervals along the cable route shall be provided in accordance with Clause 10.12.

All bridge crossings shall have a rating assessment completed by the Designer as per NS272, and the rating assessment shall be submitted to Ausgrid for review and written approval.

11. THERMALLY STABLE BEDDING MATERIAL

11.1 General

Ausgrid uses the generic term Thermally Stable Bedding (TSB) in referring to any thermally stable bedding or backfill material which has been designed to achieve specific thermal characteristics.
Where Ausgrid specifies the use of TSB material, the installation shall meet the following requirements, unless specifically approved otherwise by Ausgrid.
Generally, cable design should not require the use of thermal backfill above the cable warning tapes on distribution projects as use of TSB could create an obstruction to other utility services in footpath or road crossing locations.
TSB must be used in accordance with any relevant resource recovery orders and exemptions issued by the NSW Environment Protection Authority (EPA). The coal ash order and exemption 2014 apply to products that contain fly ash.

Approved materials and mix design
TSB is available in the form of Slurry or Dry mix.
The slurry mix is the default mix. Dry mix shall only be used with the approval of the Ausgrid representative.
The following table outlines the required performance characteristics of the TSB:

Table 6: Performance characteristics of TSB mixes

Site Location	Thermal resistivity (TR) kJ/mW (dry dry)	Compressive strength (MPa) at 28 days	Compressive strength (MPa) at 120 days
Footways, Unclassified roads & Classified Regional roads	0.9 or less	1 to 2	Less than 3
Classified State roads	0.9 or less	3 to 5	Less than 7

Any design requiring the use of TSB shall comply with the performance requirements of the above table. The Designer shall clearly specify the site location of the TSB mix in the design in the following way:

- TSB - Footways, Unclassified roads & Classified Regional roads, or
- TSB - Classified State roads.

NS130 Laying Underground Cables up to and including 110kV
Amendment No 4

For the Schedule of Unclassified Roads, Classified Regional Roads and Classified State Roads, refer to the following RMS website link:
<https://www.rms.nsw.gov.au/business-industry-partners-suppliers/gr-documents/classified-roads-schedule.pdf>

The Constructor shall ensure that the selected TSB mix complies with the design.

Key parameters of TSB – unless otherwise approved by Ausgrid are:

- **Clump Content** - 5% max (by weight) unless approved by Ausgrid
- **Course Aggregate** - 10mm max size crushed gravel.
- Additives for Pumping etc - subject to Ausgrid approval (product specific data sheet required).
- Lightweight Aggregate - not allowed
- Air Entrainment - not allowed
- Early Strength Accelerators - not allowed.

Key components of TSB are:

- Cement
- Clump
- Crushed gravel
- Coarse sand
- Water.

Ausgrid's Approved Material List (AML) provides a list of suppliers of TSB mixes and their product codes.

TSB mixes from other suppliers not listed in the AML can also be submitted to the Ausgrid Representative for consideration using the NS181 approval process. In this case, the Constructor shall provide the Ausgrid Representative a TR test report, Compressive Strength test report and mix design / recipe for review.


The Constructor shall provide a copy of the TSB delivery docket to the Ausgrid Representative for every batch of TSB mix supplied and shall demonstrate compliance with the AML for the approved TSB mix and site location specified in the design. If the TSB mix is not listed on the AML, the Constructor shall demonstrate compliance of this TSB mix to a design approved by Ausgrid for the site location.

Once approved, the TSB mix design shall not be modified without the further approval of Ausgrid. All materials used in the approved mix design shall continue to be sourced from the original locations to ensure consistent strength and TR values. Any change to the source of material supply will require a revised mix design, re-testing of strength and TR values, and the subsequent approval of Ausgrid.

11.2 Default slurry mix

11.2.1 General

Application: All trenches and banks of conduits requiring TSB unless otherwise authorised.
A slump of 110mm average (range 90mm to 130mm) shall be adopted as the standard for most projects. Water may only be added on site to restore the correct slump – never to speed installation.
Where vibration is required, it shall be strictly controlled in accordance with Clause 11.3.2.5 due to the risk of aggregates segregating and reducing thermal performance.

 **Ausgrid**
Connecting communities, empowering lives

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Major and Minor Changes



Network Standard
Advice No. 2012 - 06/08/2020
Doc. Ref. Network Standard NS129 – Amdt 4

TO: Customers, Accredited Service Providers and Ausgrid Staff.

Amending Network Standard NS129, 11kV Joints and Terminations - Paper Insulated Lead Covered Cables

Summary:

This Network Standard specifies Ausgrid's construction requirements for high voltage (11,000 volts) paper insulated lead covered (PILC) cable joints, Underground to Overhead (UGOH) connections, terminations for distribution transformers, indoor and outdoor terminations, and taped terminations in compound-filled end boxes.

This document also specifies the construction requirements and joint kit details for the following 11kV joints on paper insulated lead covered (PILC) cables:-

- straight through joints for single core and multicore
- three-to-one joints
- tee joints
- stub tee joints
- pot ends for single core and multicore.

The document has undergone minor amendments of its content and contains the following amendments:

- Section 18.2 – Approved joint kits – Table 13
- Section 20.2 – Approved joint kits – Note 3

Refer to grey shading in the document for details of modifications.

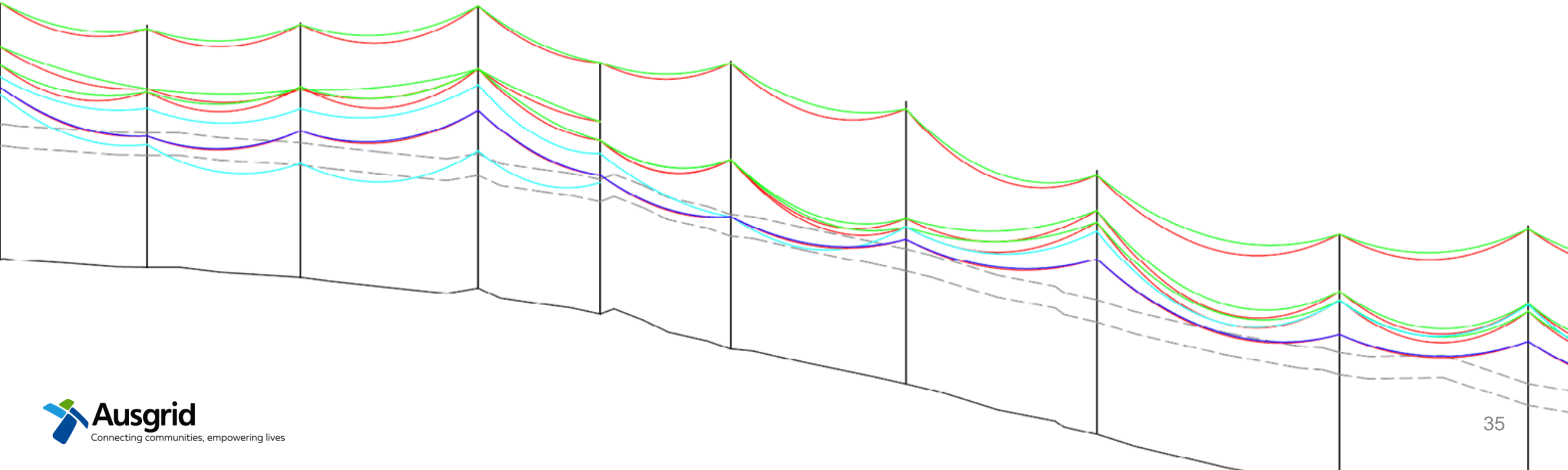
Network Standards

- Major push to review technical documents over the last year.
- Includes new versions of around 30 network standards.



NS220 – Overhead Line Design

- The main design standard for overhead lines.
- Applies to LV and HV distribution, and subtransmission networks.
- Interprets AS/NZS 7000 for use in Ausgrid's area.



NS220 – Summary

- 98 pages, down from 268.
- Entire chapters rewritten.
- Changes to values.
- Improved readability and layout.

NS220 – Key Changes

- Load cases.
- Security levels.
- Component strength reduction factors.
- Foundations.
- Clearances.
- Software.

NS220 3.3 – Limit State

- Ultimate strength – maximum wind.
- Serviceability limit – sustained load.
- Failure containment.
- Maintenance and construction loading.

NS220 Table 2 – Load Cases

Load Case	Conditions		Load Factors				
	Design Wind Pressure	Temp.	Non-Conductor Dead Load (Gs)	Conductor Dead Load (G _c)	Conductor Tension (F _t)	Live Load (Q) (see note 4)	Broken Conductor Out of Balance Load (F _b)
Maximum Wind (Ultimate Strength)	Refer Note 1 in NS220	15°C	1.1	1.25	1.25	-	-
Serviceability (Sustained) Loads	144 Pa	5°C	1.1	1.1	1.0	-	-
Maintenance/Construction	100 Pa	15°C	1.1	1.5	1.5	2.0	-
Failure Containment	0.25 Max Wind	15°C	1.1	1.25	1.25	-	1.25

NS220 3.4 – Security Levels

- Security levels have been introduced.
- More important lines require a higher security level.
- Simple method.

AS/NZS 7000 Security Level	Line / load type	Design working life	Maximum design wind return period
I	<ul style="list-style-type: none">• LV pole lines• HV pole lines	50 years	50 years
II	<ul style="list-style-type: none">• 33kV pole lines• 66kV pole lines	50 years	100 years
III	<ul style="list-style-type: none">• 132kV pole lines	50 years	200 years
	<ul style="list-style-type: none">• Steel tower transmission and sub-transmission lines	100 years	400 years

NS220 3.7 – Strength Reduction Factors

- New values for timber crossarms and fibreglass crossarms.
- New entries for fibre-cement poles and for concrete pole serviceability state.
- New value for composite insulators, and new serviceability states.
- Changes to foundations.

NS220 7.5 – Foundations

- Pole Embedment Calculator has been redeveloped.
- More accurate, less onerous in many situations.
- Consistent method and format for designers and certifiers.
- PEC user manual is also available on Ausgrid's website.

The screenshot shows the Pole Embedment Calculator (PEC) software interface. The window has a title bar with 'PEC' and standard window controls. Below the title bar is a menu bar with 'File', 'Tools', and 'Help'. On the left is a 'Projects' panel with a tree view showing 'Default' and 'Not Specified'. The main area is divided into sections: 'Currently Displaying ...' with 'Project' set to 'Default' and 'Pole Name' set to 'Not Specified'; an 'Inputs' section with various fields including 'Pole Type', 'Min Pole Size', 'Pole Name', 'Min GL To Top' (0.0 metres), 'Water Table Depth' (checkbox), 'Ground Slopes' (0 degrees), 'Foundation Class', 'Backfill Type', 'Soil Code', 'Soil Occurrence', 'Easting', and 'Northing'; and a 'Control Panel' on the right with a 'Clear Fields' button. The 'Soil Code' and 'Soil Occurrence' fields are highlighted in yellow.

NS220 10.0 – Clearances

- Clearance to ground is higher than in AS/NZS 7000.
- LVABC to structures.
- Interspan poles.
- Attached and unattached crossings.
- Midspan separation.
- Telecommunications reference to NS232.
- Streetlights on same or different poles.

NS220 11.0 – Software

- Designs must be prepared in a specialised line design software package, approved by Ausgrid.
- Divided into two categories:
 - Distribution designs with spans up to 250m
 - All subtransmission designs, and any distribution designs with spans over 250m.

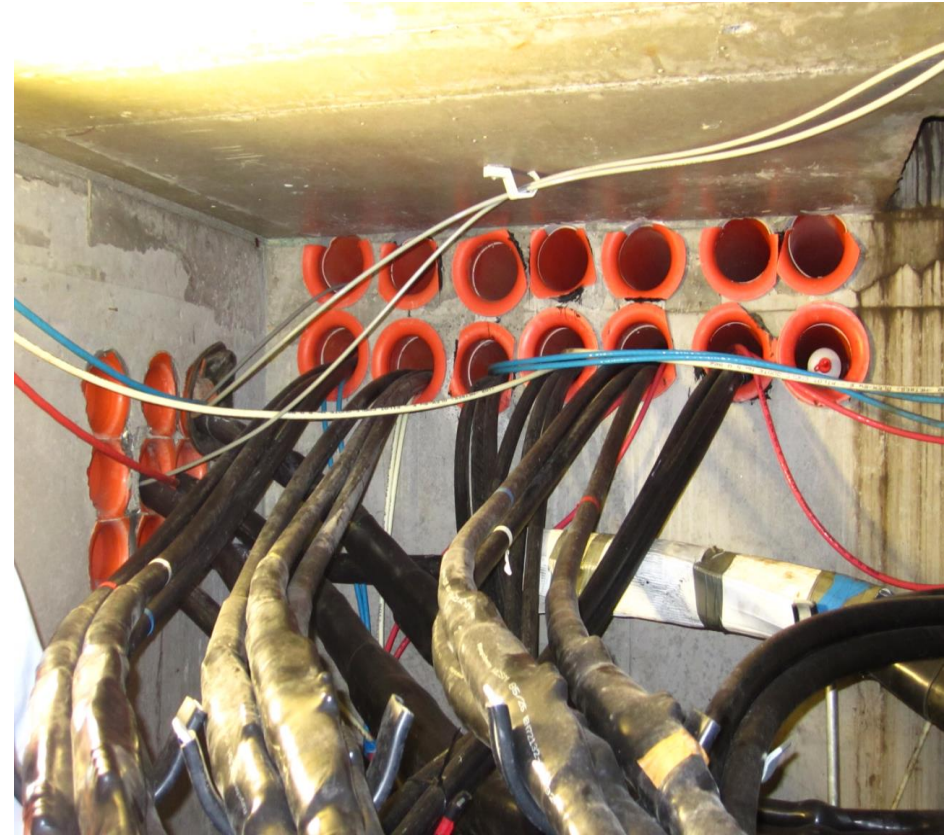
NS220 – Other Topics

- Conductors.
- Ratings.
- Pole positioning.
- Pole deflection.
- Stays.
- Aerial warning markers.

Underground Cable Rating

Kate Thomlinson Engineer - Ratings

A thermal rating can be defined as the maximum current carrying capacity of electrical equipment, without exceeding its permissible maximum operating temperature.



Underground Cable Rating

Overview of areas which will be covered:

- Ausgrid's approach to cable rating
- Overview of Ausgrid Standard NS272
- Standard report structure for submission
- Questions.



Ausgrid's Approach to UG Cable Rating



Two standards which influence Ausgrid's approach to UG cable rating are as follows:

- **IEC60287:** Electric cables - calculation of the current rating.
- **Ausgrid Network Standard NS272:** Underground cable rating.



NS272 defines where Ausgrid aligns and deviates from IEC60287. Primary differences are as follows:

- Heat sources more than 4m away are considered not material; and
- Cables crossing between 45° and 90° are treated as being a 90° crossing and will not require mutual heating calculation.

NS272 – Underground Cable Rating



- NS272 applies to:
 - 132kV, 66kV and 33kV cables
 - 11kV and LV cables that come within 4m of above
 - 11kV and LV cables that are not installed in accordance with NS130.
- Contents of NS272 include the following:
 - Approach
 - Considerations
 - Maintaining Asset Ratings
 - Software
 - Checklist.



Network Standard

NETWORK	Document No	: NW000-S0148
	Amendment No	: 0
	Approved By	: Head of Asset Investment
	Approval Date	: 04/03/2020
	Review Date	: 04/03/2023

NW000-S0148

NS272 UNDERGROUND CABLE RATING



Considerations for UG Cable Rating

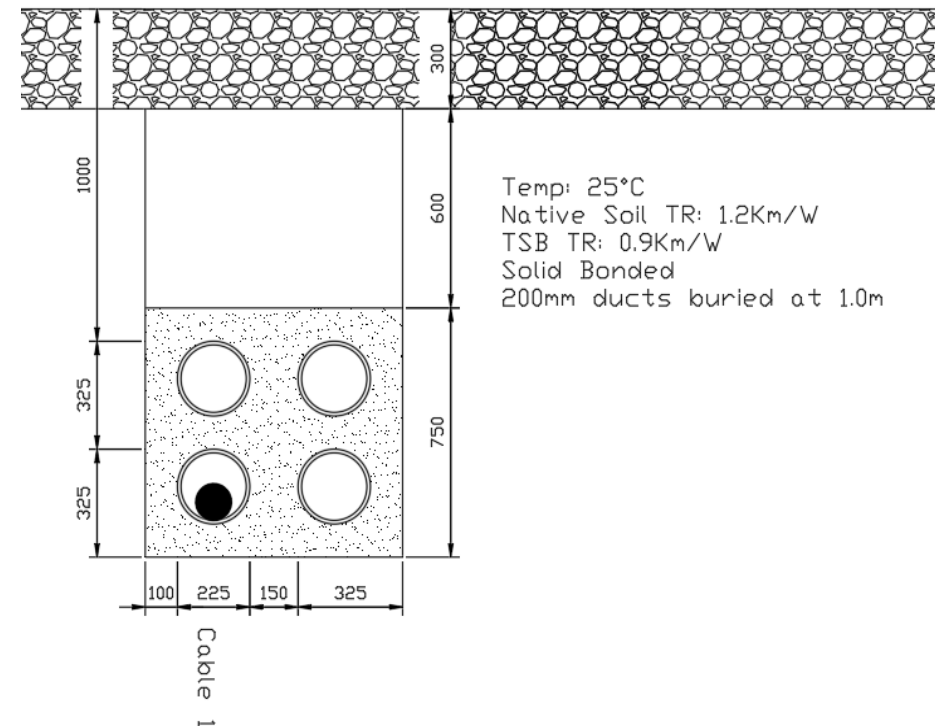
Ausgrid's
approach to
cable rating

Overview of
NS272

Standard report
structure for
submission

Questions

- Considerations for cable ratings include the following:
 - Conductor properties
 - Environmental conditions
 - Installation conditions
 - Proximity to neighbouring cables
 - Operational conditions.



Rating to be Maintained (RTBM)



Required when an existing or proposed cable or duct comes within 4m of the cable being assessed.



Contact Ausgrid for the 'Rating to be Maintained' (RTBM) relating to the existing or proposed cable or duct.

Ratings Assessment Submission Template

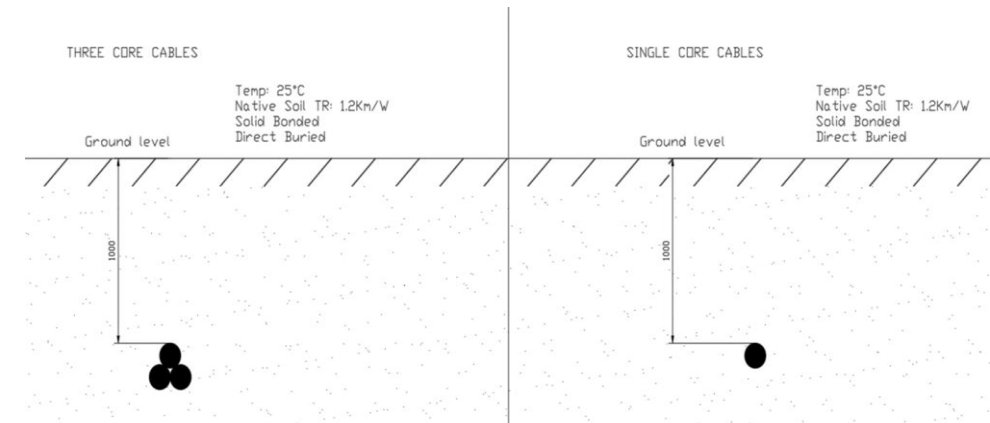
Ausgrid's
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- Content Structure for submissions is as follows:
 1. Cable verification (NS272 s8.0)
 2. Standard cross section validation
 3. Ratings calculation review (NS272 s9.0)
 4. Conclusion.
- Submissions with Cymcap studies attached are preferable (e.g. .mdb files).



Contact your Ausgrid CPC

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Whenever your design changes, for any reason (Changes to route, cross section, spacing, depth, conductor etc.), the rating needs to be reassessed and submitted to Ausgrid for approval.

Relevant References

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- **IEC60287:** Electric cables - Calculation of the current rating.
- **Ausgrid Network Standard NS130:** Specification for Laying Underground Cables up to and including 11KV.
- **Ausgrid Network Standard NS168:** Specification for the Design and Construction of 33KV, 66KV and 132KV Underground Cables.



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Thank You

