Network Standard

Document No.
NS119

Title:
Public Lighting Design and Construction

Approved Date	1/07/2022	Revision		5	
Lifecycle Stage	Plan; Design; Construct	Internal Use	☒	External Use	☒
Technical Approver		Authorised By			
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Designation	Engineer Street Lighting	Designation		Manager Asset Standards	

Revision

No	Date	Description	Technical Approver	Authorised By
0	1/04/2015	BMS Conversion	Phil McKee	Chief Engineer
1	10/12/2015	Change definition of Accredited Service Provider (ASP). Updated Clause 13.1 with new Clause references to ESR on “screens & temporary insulation” and “earth situations”.	Phil McKee	Chief Engineer
2	6/02/2017	Changes to Clause 11.1 on commissioning checks/tests and an update to the Category P road lighting luminaires in F.11.2.	Phil McKee	Manager Network Risk and Planning
3	30/08/2018	Changes to Section 3 and 4 References and Definitions; Section 5 Design; Section 6 Equipment and Purchasing; Section 8 Install; Section 10 Maintain; Section 11 Refurbish; Annexure A, C, D, E and F.	Cori Wilson	Head of Asset Engineering Policy and Standards
4	30/09/2021	New NS template. Minor amendments to construction requirements. All HID Luminaires listed as standard equipment in the previous version of the Network Standard has been replaced with LED equivalents. Equipment lists removed from the Standard and supplied separately as Annexures.	Troy Tracey	Head of Asset Risk and Performance
5	1/07/2022	Replaced DBYD with reference to function, following organisation name change	Troy Tracey	Manager Asset Standards

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Scope

This Network Standard specifies Ausgrid's requirements for the design and construction of all public lighting assets and shall apply to all such installations that are to be owned and operated by Ausgrid on behalf of Ausgrid's Public Lighting Customers. The requirements of this standard shall apply throughout Ausgrid's supply area for contestable and non-contestable projects.

Where a public lighting project is deemed contestable, the Customer shall use an Accredited Service Provider to complete the electrical design, illumination design and construction work. Refer to Ausgrid's Electricity Supply document ES4 Accredited Service Provider Authorisation.

For information on privately owned public lighting installations, i.e. installations which are not owned and operated by Ausgrid, refer to Section 8.

Reference Documents

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.

ASPs and other persons external to Ausgrid are responsible for sourcing the manufacturer's instructions and manuals.

Ausgrid Documents

Customer Installation Safety Plan

Electrical Safety Rules

ES 4 Accredited Service Provider Authorisation

NS001 Glossary of Terms

NS100 Field Recording of Network Assets

NS104 Specification for Electrical Network Project Design Plans

NS110 Design and Construction Standard for URDs

NS122 Pole Mounted Substation Site Selection and Construction

NS124 Specification for Overhead Service Connections up to 400 Amps

NS127 Low Voltage Cable Joints and Terminations

NS128 Pole Installation and Removal

NS130 Laying Underground Cables up to and including 11kV

NS148 Overhead Line Support, Street Light Column, Pit and Pillar Labelling

NS158 Labelling of Mains and Apparatus

NS161 Specification for Testing of Underground Cables

NS167 Positioning of Poles and Lighting Columns

NS181 Approval of Materials and Equipment and Network Standard Variations

NS238 Supply Quality

Public Electrical Safety Awareness Plan

Public Lighting Management Plan

Other Standards and Documents

AS/NZS 1158 series - Lighting for roads and public spaces

AS/NZS 1798 Lighting poles and bracket arms – Recommended dimensions

AS/NZS 4677 Steel utility service poles

AS 2700 Colour standards for general purposes

AS 4282 Control of the obtrusive effects of outdoor lighting

WorkCover Code of Practice, Work Near Overhead Power Lines, 2006

Acts and Regulations

Electricity Supply (General) Regulation 2014 (NSW)

Electricity Supply (Safety and Network Management) Regulation 2014 (NSW)

Electricity Supply Act 1995 (NSW)

Work Health and Safety Act 2011 (NSW)

Work Health and Safety Regulation 2017 (NSW)

NSW Public Lighting Code 2021

Clause	Standard Requirements

1 Electrical Design

1.1 Design Information

For contestable works, Ausgrid will provide design information sufficient to enable design and construction drawings to be completed based on this information. Detailed design of street lighting requirements must use the types of cables, pillars and other electrical equipment specified in this and other referenced Standards.

1.2 Clearances between Installed Street Lighting Equipment and Exposed Conductors

1.2.1 The clearances detailed in NS220 between installed public lighting components and exposed conductors must be adhered to.

1.2.2 Where erected on a timber pole using LV ABC, the streetlight shall be erected so that no rubbing of the LV ABC conductor insulation or protective sheath shall occur on the bracket or luminaire.

1.3 Replacement of Pillar Standards

If a luminaire at an existing pillar-standard is no longer required because of the new design, the pillar-standard is to be replaced by a distribution pillar, see NS127. Where this occurs, rag-bolts must be decommissioned in a manner that does not obstruct the distribution pillar base.

1.4 Voltage Limits

The installation must be designed so that no lights will normally be operating outside the voltage range specified in NS238. This will be achieved within the low voltage design if the street lighting circuit or low voltage distributor to which streetlights are attached is designed in accordance with NS110.

1.5 Control

1.5.1 Streetlights shall normally be controlled by a photoelectric cell (PE cell) integrated into the luminaire. For refurbishment work, a pole mounting NEMA PE cell base is available.

1.5.2 Where a dedicated street lighting circuit is required, the streetlights shall have integrated photoelectric (PE) cell control and the street lighting cables shall be permanently energised and protected as per Clause 1.8.4.

1.5.3 If the type of luminaire approved by Ausgrid does not have integrated PE cell base and a pole mounted NEMA PE cell base cannot be used, then a single NEMA PE cell shall be installed at the Street Lighting Control Point to control the street lighting circuit. In this case, the street lighting conductors shall of necessity be de-energised during daylight hours.

1.5.4 In some locations, individual PE cells are ineffective, e.g. CBD areas with high rise buildings, wall mounted lights in underpasses. In these situations, the streetlights shall be controlled by a PE cell that will act as the switching device for a street lighting control point that will include the switching mechanism to energise the street lighting supply.

1.5.5 Pole-mounted SLCP enclosures (stock code 72793) are detailed in Ausgrid Drawing 19398.

1.5.6 Streetlights controlled by a circuit PE cell shall include a bypass switch to facilitate fault finding and other maintenance work.

1.5.7 PE cells must be positioned so that they are not interfered with by artificial light sources.

1.6 Documentation

All electrical design documentation shall comply with NS104.

1.7 Overhead Supplied Street Lighting System

1.7.1 Connection to low voltage mains shall be in accordance with NS124.

1.7.2 Streetlights installed on wood poles shall be single insulated and not earthed, relying on the insulating properties of the wood to provide additional protection for workers and the public.

1.7.3 Luminaires shall be directly connected to the overhead low voltage mains via two core 2.5mm^2 PVC insulated and PVC sheathed cable and individually controlled by a photoelectric cell.

1.7.4 The cable shall be run in flexible PVC conduit which is firmly attached to the pole by galvanised saddles fixed in place with galvanised screws or clouts.

1.7.5 Supply to the streetlight must not be taken from any dedicated street lighting circuits that are switched circuits, these circuits will be progressively made redundant. Ausgrid Drawing 242605 shows installation details for LV ABC and bare wire connections.

1.7.6 Individual streetlights shall be protected by means of a 10A HRC fuse. Installations that require a new street lighting bracket to be installed must contain the fuse at the base of the bracket. Refer to Ausgrid Drawing 66251 for details of the street lighting bracket range. Fuse arrangements are shown on each bracket specific drawing listed in Annexure D.

1.7.7 Existing installations that have a fuse installed as an attachment on the pole or contained within external control gearbox mounted on the pole are acceptable legacy installations, only if the bracket does not require replacement.

1.7.8 In circumstances where a luminaire is being replaced that has external control gear mounted on the pole, this control box may be used to house the fuse for the replacement luminaire. However, care shall be taken to bypass any existing control gear, i.e. ballast and ignitor. If the control box is not being used, it shall be removed from the pole.

1.7.9 Street lighting loads must be balanced over the three distributor phases. The Electrical Designer must indicate on the low voltage/street lighting plan the phase to which each luminaire is to be connected.

1.8 Underground Supplied Street Lighting System

The sections below detail how construction shall be carried out across Ausgrid's entire network area. Ausgrid Drawing 242606 shows standard construction for underground supplied installations.

1.8.1 Double Insulated Street Lighting System

Ausgrid has a legacy issue of double insulated systems being utilised in the Sydney and Central Coast regions and a single insulated and earthed system in the Hunter regions.

1.8.1.1 All new and replacement installations of steel lighting columns shall be constructed using the double insulated system.

1.8.1.2 Legacy single insulated steel structures which need maintenance on terminations, mains or luminaire are not required to be re-constructed as double insulated. Installations can remain as single insulated, provided all electrical characteristics of the original construction are maintained.

1.8.2 Cabling

1.8.2.1 For streetlights that are near the underground low voltage network, a standalone arrangement is required.

1.8.2.2 Supply must extend from the nearest pillar using approved two core 16mm^2 copper XLPE insulated and PVC sheathed cable to the street lighting link panel in the base of the column.

1.8.2.3 Approved link panels are detailed in Annexure A.

1.8.2.4 Two core 2.5mm^2 copper PVC insulated and PVC sheathed cable shall extend from the base of each steel lighting column to each luminaire.

1.8.2.5 If the low voltage network does not extend to the location of the lights, a maximum of three lights may be looped between steel lighting columns from a single phase of a pillar, and there is no requirement for fuse protection at the pillar.

1.8.2.6 Where the low voltage network does not extend to the location of the lights for circuits that contain four or more lights, a dedicated street lighting circuit is required.

1.8.2.7 A looped arrangement supplied by a circuit of approved four core 16mm² copper XLPE insulated and PVC sheathed cable and streetlight control point (SLCP) pillar is required.

1.8.2.8 Refer to NS127 for the SLCP pillar arrangement.

1.8.2.9 Two core 2.5mm² copper PVC insulated and PVC sheathed cable shall extend from the base of the steel lighting column to each luminaire.

1.8.2.10 For dedicated street lighting circuits, lighting loads must be balanced over the three distributor phases.

1.8.2.11 The Designer must indicate on the low voltage/street lighting design the phase to which each luminaire is to be connected.

1.8.2.12 For four-core cable, all cores shall be terminated at each column so that the lamp may be connected to any phase in the future.

1.8.2.13 In areas where the streetlight (SL) cable has deteriorated, rather than replacing the SL cable, the lights shall be connected to LV mains.

1.8.2.14 The installation must comply with the requirements of NS130. In particular, the cable must be taken from the pillar into the same trench as the LV distributor to a point at right angles to the steel lighting column and then directly to the column.

1.8.2.15 New or replacement installations of street lighting cables shall not have underground tee joints.

1.8.2.16 If it is necessary for a tee connection to be made in a street lighting circuit (for example, to enable a branch in the circuit), the tee connection must be made at an appropriate link panel in a steel lighting column or at a dedicated connection pillar.

1.8.2.17 The Designer shall ensure that the cables meet the load and voltage drop limits for the particular project.

1.8.3 Link Panels

1.8.3.1 All connections made at the base of a steel lighting column shall be made on an appropriate insulating link panel.

1.8.3.2 Refer to Annexure A for details of link panels that are approved for use on Ausgrid's network.

1.8.3.3 The cables on the insulating link panel shall be tied to each other in such a way that if any cable becomes detached from its termination it is retained in position. This is a requirement so that the live conductor cannot come into contact with either the panel or the steel lighting column.

1.8.3.4 The street lighting cable:

- shall be an approved double insulated (i.e. sheathed) and retain the double insulation for the maximum length possible, and
- shall be fixed under any saddles provided, and
- shall have all single insulated coloured cores continuously mounted on the surface of, and within the insulating panel's perimeter, and
- shall have both the neutral and active cores terminated in the applicable terminal blocks.

1.8.3.5 It is not acceptable to terminate the active core of the street lighting cable at the fuse holder terminal.

1.8.3.6 All cores are to be colour identified. The phase order of neutral, A, B and C (Black, Red, White, Blue) shall be maintained at the panel.

1.8.3.7 The load street lighting cable:

- shall be an approved double insulated (i.e. sheathed) two core cable, and
- shall have both the basic and supplementary (sheath) insulation layers stripped back only as far as necessary, and

- shall be saddled to the clip provided on the insulating panel, and
- shall have both the neutral and active cores terminated in applicable terminal block.

1.8.4 Protection

1.8.4.1 Where underground supplied streetlights are supplied from a dedicated street lighting circuit, the circuit shall be fused according to its rating, but shall not use fuses larger than 32 Amps.

1.8.4.2 Fuses are to be housed in a street lighting control point (SLCP) pillar specified in NS127. The fuse shall be HRC type.

1.8.4.3 In the base of each steel lighting column, a 10A HRC fuse shall be installed on a compatible link panel to protect the luminaire wiring and hardware.

1.8.4.4 Facilities must be made available through a link or fuse located in the base of the steel lighting column sufficient to isolate the luminaire/s if remedial or maintenance work is required on the luminaires by Ausgrid or its contractors in accordance with the Ausgrid Electrical Safety Rules.

1.8.5 Conduits

1.8.5.1 Conduits for low voltage domestic services and street lighting cables shall be in accordance with NS130.

1.8.5.2 The supply cable from the pillar to the steel lighting column and between columns shall be run in a 50mm UPVC orange conduit.

1.8.5.3 The street lighting supply cables shall be mechanically protected where they enter and leave a direct buried steel lighting column by means of appropriate 50mm UPVC orange conduit bends.

1.8.6 Insulated Spigots

1.8.6.1 Insulated spigots are required to achieve an additional layer of insulation between the streetlight and the steel lighting column. These are required on all new installations where a steel lighting column is used.

1.8.6.2 Steel lighting columns of 6.5m and 7.5m are primarily used for residential road (Category P) installations; the spigot size on these steel lighting columns has been designed for Category P luminaires which is 34mm. Accordingly, a 34mm ID (inside diameter) to 34mm OD (outside diameter) insulating spigot shall be used on these steel lighting columns.

1.8.6.3 For steel lighting columns greater than 7.5m which are primarily used for Category V installations, the spigot size is 42mm to cater for heavier luminaires. A 42mm ID to 42mm OD insulated spigot is to be used on these installations.

1.8.6.4 Refer to Annexure A for details of Insulating Spigots that are approved for use on Ausgrid's network.

1.8.7 Floodlight Brackets

To maintain double insulation on floodlights, the floodlighting brackets detailed in Annexure A shall be used.

2 Lighting Design

2.1 Lighting Design Brief

2.1.1 The Street Lighting Customer is to provide the Designer with sufficient information to define the scope of the lighting design.

2.1.2 The design brief will state whether Australian Standard compliance is required, and if so, will nominate a lighting sub-category. Refer to AS/NZS 1158 series for sample lighting design briefs.

2.2 Australian Standard Compliance

2.2.1 The lighting design is to comply with Australian Standard AS/NZS 1158 unless otherwise specified by the Street Lighting Customer. In the case of pedestrian crossings and roundabouts that will be maintained by Ausgrid, all designs must comply with AS/NZS 1158.

2.2.2 The Designer shall provide documentation demonstrating compliance with AS/NZS 1158 series to the Street Lighting Customer.

2.3 Obtrusive Light

2.3.1 The effect of obtrusive light on the surrounding properties must be considered during design. Refer to AS/NZS 4282. Standard glare control devices are listed in Annexure A.

2.4 Street Lighting Equipment

2.4.1 Lighting Designs shall be carried out using Ausgrid's standard lighting equipment.

2.4.2 The maintenance factor and design lumens to be used in lighting designs for all standard luminaires is supplied in Annexure A of this Network Standard.

2.4.3 The maintenance factor and design lumens for illumination designs for Non-Standard luminaires will need to be calculated in compliance with AS/NZS 1158.

2.4.4 As stated by AS/NZS 1158 series, the Designer shall state the maintenance factor and design lumens used in calculations.

2.5 Lighting of Cul-de-sacs

2.5.1 If the luminaire is to be installed at the end of a cul-de-sac, a reduced Roadway Reserve Width luminaire shall be used to minimise obtrusive light.

2.6 Placement of Steel Lighting Columns

2.6.1 Steel lighting columns must be located in accordance with NS167 and AS/NZS 1158. It is acknowledged that some older suburbs have very narrow footpaths, which preclude compliance with the setbacks preferred in modern road design.

2.6.2 Where roll kerbs are provided in the subdivision, due consideration shall be given to the road controlling authority's requirements for streetlight columns' lateral location.

2.6.3 The spacing of the columns and lights shall be determined by lighting design.

2.6.4 The column shall be installed vertically with the outreach arm projecting at right angles to the kerb and towards the road's centre line. This situation does not take precedence over the requirements of special designs.

2.7 Rag-bolt Mounted Steel Lighting Columns

2.7.1 Wherever possible, e.g. in greenfield sites, in uncongested footpath, the steel lighting columns shall be the rag-bolt mounted type.

2.7.2 Direct buried steel lighting columns are available, but their use shall be limited to where rag-bolt mounted columns cannot be installed.

2.7.3 Rag-bolt assemblies must always be installed in accordance with Ausgrid Drawing 514087.

2.7.4 Table 1 on Ausgrid Drawing 514087 details the required pile depths for various mounting heights and outreach configurations.

2.8 Pedestrian Crossing Lighting

2.8.1 The Designer shall note that the approved floodlights in Annexure A are the asymmetrical type. Therefore, the design shall accurately describe installation parameters to ensure that lights can be installed to the compliant design.

2.8.2 In the planning stage, field confirmation of the lighting support locations may be required to ensure that aim points of the design are accurate. Clause 2.9 contains additional information.

2.8.3 **Note:** The Australian Standard for pedestrian crossing lighting specifies vertical illuminance values at ground level and at 1.5m above ground. Therefore, in general, for a two-way street, two floodlights are needed in total to achieve vertical illuminance values from the two directions of travel. These light technical parameters are meant to allow drivers approaching the pedestrian crossing to clearly see persons using the crossing. The use of floodlights directly above the pedestrian crossing, while providing horizontal illuminance of the crossing, will not comply with the lighting technical parameters because vertical illuminance will not be achieved.

2.9 Pedestrian Crossing Design Guidelines

2.9.1 Minimum required detail to be included on Pedestrian Crossing Illumination Design

2.9.1.1 The following details are to be provided as a minimum, on the pedestrian crossing illumination design:

- Illumination design must be compliant with AS1158.4:2015.
- Illumination design can be provided as a separate drawing to the electrical design or may be incorporated into the electrical design.
- Lux levels – Traffic Features (if compliance requested by customer), Pedestrian Crossings, Roundabouts.
- Pedestrian Crossing lux levels and Glare compliance can be provided by including image of calculation results generated by illumination design software or table and notes where applicable.

2.9.2 Electrical Design

2.9.2.1 Electrical Design must provide adequate detail to allow construction.

2.9.2.2 Location of support (if applicable) floodlight, orientation of bracket and aim point must be included. Locations must be detailed on horizontal plane at ground level.

2.9.2.3 Detail of locations can be provided using:

- Dimensions from existing easily identifiable feature in near vicinity of crossing e.g. leading edge of crossing, kerb, existing support.
- Degrees from existing easily identifiable feature in near vicinity of crossing and associated dimensions; or degrees from North and associated dimensions.
- Upcast must be provided in Construction Table in separate column labelled ‘Upcast’.

2.9.3 Minimum Construction Detail to be provided on the Electrical Design

2.9.3.1 The following minimum construction details shall be provided on the electrical design:

- Bracket angle relative to:
  - the perpendicular of the kerb, or
  - the parallel with the kerb, or
  - North.
- Flood light upward tilt angle relative to the road surface.
- Flood light rotation angle relative to the traffic direction or North.
- Flood light height relative to the road surface.

- New lighting support location relative to the distance of the leading edge of the crossing and the distance behind the kerb.

2.10 Poles with Pole Mounted Substations

2.10.1 Refer to NS122 for restrictions on street lighting equipment near Pole Mounted Substations. Floodlights shall not be installed on poles containing Pole Mounted Substations.

2.11 Decorative Lighting

2.11.1 Ausgrid has a limited range of standard decorative style street lighting that is only available for road lighting in new developments.

2.11.2 Ausgrid will continue to maintain legacy decorative in parks and other public spaces.

2.11.3 Ausgrid will retire streetlighting assets where they have reached the end of their serviceable life or where access or other factors have made maintenance no longer economically feasible.

2.12 Painting of Street Lighting Furniture

2.12.1 Where the Street Lighting Customer requires a coloured steel lighting column, an Australian Standard colour shall be selected from the range of colours specified in AS 2700 "Colour Standards for General Purposes".

2.12.2 The painting process shall use a two-part polyurethane paint finish applied over the exterior galvanised surface of the steel lighting column and bracket arm.

2.12.3 The surface preparation and the application of the finish coats shall be to the paint manufacturer's directions.

2.12.4 Powder coat finishes shall NOT be used on steel lighting columns and bracket arms.

2.12.5 Powder coat finishes may be used on decorative luminaires.

2.12.6 The Street Lighting Customer shall advise Ausgrid of the Australian Standard colour coding for the paint finish as part of the Asset Information provided at hand over.

2.12.7 **Note:** All painting or re-painting will be at a direct cost to the Street Lighting Customer.

2.12.8 Where it is necessary for Ausgrid to replace a painted steel lighting column and/or luminaires, the following will apply:

- **General Steel Lighting Column**: will be replaced with equivalent galvanised but unpainted type.
- **Decorative:** will be replaced with the closest matching colour available.
- **Luminaires:** will be replaced with an equivalent luminaire of the nearest colour.

2.12.9 This clause does not obligate Ausgrid to replace pre-2010 non-standard decorative columns, luminaires, or colours in a like-for-like fashion.

2.13 Repainting for Aesthetic Reasons

2.13.1 Repainting for aesthetic reasons can only be carried out after consultation with Ausgrid.

2.13.2 All associated costs will be at the customer's expense.

2.13.3 Customer must supply scope of works, materials, methodology, details of contractor and Safe Work Method Statement. Conditions including:

- no load to be applied to structure, e.g. ladder, and
- assets confirmed to be at earth potential by suitably trained personnel prior to commencement of works each day will apply.

2.14 Approved Street Lighting Equipment List

2.14.1 Street lighting designs must specify equipment approved by this Network Standard. Annexure A lists specific equipment which complies with Ausgrid specifications contained in Section 3.

2.14.2 Photometric data for Luminaires

2.14.3 Annexure A details the photometric data (I-tables) associated with approved luminaires. Photometric files can be accessed via Ausgrid's website (www.ausgrid.com.au/ASPs-and-Contractors/Technical-documentation/Network-Standards/NS119-drawings).

2.14.4 Alternatively, ASP's can source files from suppliers or manufacturers.

2.15 Documentation

2.15.1 Lighting design documentation shall comply with the relevant parts of AS/NZS 1158 series and be provided to the Street Lighting Customer.

3 Equipment and Purchasing

3.1 Equipment Specification

3.1.1 Equipment specifications are available for new street lighting assets, and for some older style equipment used to maintain assets. Approved materials are regularly reviewed, and specifications shall not be read as current.

3.1.2 Steel lighting column, bracket, and rag bolt assembly specifications can be found in equipment drawings as listed in Annexure A and Annexure D. Drawings can be accessed on the Ausgrid website.

3.1.3 Luminaire, lamp, and control gear specifications are listed in Annexure A and, if required, additional data is available on request from Ausgrid.

3.2 Approved Equipment List

3.2.1 Approved materials can be found on Ausgrid's Approved Material List (AML) which is published on Ausgrid's website. See Annexure A.

3.2.2 The approved street lighting equipment range is periodically reviewed by Ausgrid in consultation with the Street Lighting Customers. Equipment supply tenders are periodically issued, and contracts established.

3.3 Purchase Materials through Ausgrid Stores

3.3.1 Only approved materials and equipment shall be used in the construction of infrastructure which ultimately forms part of Ausgrid's electrical network. These approved materials and equipment are detailed in Ausgrid's Approved Material List (AML) with manufacturer and supplier information and Ausgrid stockcodes where appropriate. Ausgrid will consider adding alternative materials and equipment to the AML in accordance with NS181.

3.3.2 ASPs may obtain approved materials and equipment items as listed in the AML from any source. Where an ASP wishes to use alternative materials and equipment, application to have the materials or equipment considered for approval is to be made in accordance with NS181.

3.3.3 Where approved materials and equipment are held as stock in Ausgrid's stores system, ASPs may purchase them from Ausgrid. All enquiries and requests for quotations should be directed by email to aspsales@ausgrid.com.au and should include the appropriate stockcode numbers.

3.3.4 All materials used on Ausgrid's network must be new.

3.4 Asbestos

3.4.1 All materials and equipment used for construction of Ausgrid's assets are to be free from Asbestos and or asbestos related products.

Suppliers shall comply with the Work Health and Safety Act 2011 (NSW) together with the Work Health and Safety Regulation 2017 (NSW) and confirm in writing that all products supplied to Ausgrid contain no asbestos related materials.

4 Construct

4.1 Construction Planning

4.1.1 The Designer is responsible for providing local authorities and Transport for NSW (as appropriate) with copies of the proposed construction plans at least 40 days before work is to commence where required under section 45 of the Electricity Supply Act, and must give due consideration to any special requirements of these authorities.

4.1.2 Designated underground asset information provider request shall be submitted during the planning stage and prior to any excavation.

4.2 Installation of Steel Lighting Columns

4.2.1 Steel lighting columns shall be erected in accordance with the applicable requirements of NS128.

4.2.2 The centre line of the installed steel lighting columns shall be vertical, and the columns must be stable.

4.2.3 Backfilling shall be in accordance with NS128.

4.2.4 Burial depths shall be in accordance with AS 1798.

4.2.5 Access door to equipment shall be orientated away from traffic as much as practicably possible.

4.3 Finished Ground Levels

4.3.1 The construction of the subdivision sometimes involves significant changes in the ground level. Since the electricity supply assets are progressively installed as the subdivision is constructed, it is important that the assets are installed relative to the finished ground levels.

4.3.2 Refer to NS130 for the installation level of rag-bolt assemblies.

4.4 Installation of Bracket Arms

4.4.1 Installation of bracket arms on wood poles shall comply with the Work Health and Safety Regulation 2017 (NSW) with respect to controlling and lifting of loads.

4.5 Installation of Steel Lighting Column Wiring

4.5.1 All items of equipment within steel lighting columns which are intended to be attached to supports must be firmly attached so that no item will dislodge and become hazardous, especially when access covers are opened.

4.5.2 Allen keys provided by manufacturers must be removed from inside link covers.

4.6 Labelling of Street Lighting Assets

4.6.1 Wood poles and steel lighting columns shall be numbered and labelled in accordance with NS148 and NS158.

4.7 Data Capture

4.7.1 Equipment and repair data must be recorded for all customer requests, ad-hoc repairs, pole/steel lighting column replacement, bulk lamp replacement (BLR) follow up work, night patrol work, minor capital and contestable work.

5 Commission

Prior to commissioning, the following visual checks shall be performed:

- Verify that the installation has been installed consistent with the project design.
- Verify that the correct insulation system has been constructed, i.e. double insulated.
- Verify that the correct wattage and type of luminaire has been installed.
- Verify that the luminaire mounting height is as specified on the design.
- Verify that approved street lighting materials have been used for the construction.

- Verify that all streetlights switch on at dusk and operate correctly. This can be achieved by covering the photoelectric cell, excluding all light.
- Where underground cabling is involved, witness final cable testing and/or verify receipt of all cable test results as detailed within NS161.

6 Maintain

6.1 Luminaire Markings including Lamp Shape

6.1.1 Luminaire markings must be in accordance with AS/NZS TS 1158.6. The luminaires are generally marked with coded information on its exterior to facilitate their identification and maintenance. LED luminaires are marked with their total system watts and traditional lamp-based technology is marked with the nominal lamp wattage. For example:

S250 C 09 means sodium 250W, clear (tubular) lamp. The luminaire was manufactured in 2009.

M400 99 means mercury 400W lamp. The luminaire was manufactured in 1999.

S150 D A 07 means sodium 150W, diffused (elliptical) lamp, aeroscreen. The luminaire was manufactured in 2007.

L17 18 means an LED with total 17 total system watts. The luminaire was manufactured in 2018.

Additionally, in the Sydney and Central Coast regions, the codes ‘DI’ and ‘SI’ have been specified by Ausgrid for luminaires.

DI means double insulated luminaire.

SI means single insulated luminaire, and therefore insulating spigots are required if installing on DI installations.

6.2 Pedestrian Crossing Floodlights

6.2.1 All pedestrian crossing floodlighting installations must be constructed in compliance with an associated lighting design, the floodlight is to be installed with the lens aimed and tilted as specified on the design.

6.2.2 For maintenance situations where an LED floodlight is replacing a HID floodlight, a lighting redesign is required.

6.3 Spot Maintenance

6.3.1 Spot maintenance personnel shall determine the component which has failed and replace that component. For LED streetlights, the only replaceable component of the luminaire is the PE cell. If this is not the cause of failure, then the luminaire shall be replaced with the current default luminaire.

6.3.2 All failed LED streetlights must be returned to the Somersby store so that warranty claims can be made.

6.3.3 Annexure B lists spare parts available for the maintenance of legacy streetlights.

6.4 Removal of Overhead Street Lighting Circuits

6.4.1 This clause applies to existing streetlights connected to a dedicated overhead street lighting circuit, where an overhead low voltage mains circuit is also available.

6.4.2 Luminaires shall be installed on LV distribution mains.

6.4.3 If the existing streetlights are connected to a dedicated overhead SL main with available overhead LV distribution mains, the luminaires shall be reconnected to the distribution mains and controlled via photoelectric cell.

6.4.4 The overhead connected streetlight cable shall be upgraded to comply with Ausgrid Drawing 242605 if the bracket is to be replaced, or where the condition of the cable is degraded.

6.4.5 **Note:** Ausgrid Drawing 242605 shows installation details for connections to both Open Wire Mains and ABC Mains.

6.4.6 Incidental Work

6.4.7 When replacing an existing luminaire, ensure that the new luminaire is:

- directly connected to the overhead low voltage mains, and
- controlled individually by a photoelectric cell.

6.5 Replacement of Existing Luminaires

6.5.1 Luminaires must be replaced in their entirety with the default replacement luminaire under the following circumstances:

- cover needs replacement and is no longer held as a stock item
- external control gear whether pole mounted (on timber poles) or panel mounted (in steel lighting columns) fails
- internal control gear fails
- luminaire has required spot maintenance more than 2 times within 6 months.

6.5.2 Where existing luminaires have glare control fitted this shall be replicated on the replacement luminaire.

6.5.3 All failed LED streetlights must be returned to the Somersby store so that warranty claims can be made.

6.5.4 Overhead Connected Fuse Arrangement

6.5.5 When replacing luminaires where the bracket is not planned for replacement, and the existing fuse is a legacy remote type (which is not integrated at the base of bracket), the existing fuse arrangement can be maintained.

6.5.6 PVC supply cable shall be replaced if signs of degradation are identified.

6.5.7 Where the existing bracket has the facility for a fuse, but the fuse holder is unserviceable, replace the fuse holder and maintain the bracket.

6.5.8 If the existing fuse arrangement cannot be maintained and the bracket is greater than 2m, follow the requirements in Clause 6.5.1.1 or 6.5.1.2 depending on the type of overhead mains. If the bracket is less than 2m replace.

6.5.9 Remove any remanence of unserviceable protection device to ensure there is no confusion in relation to the isolation of equipment.

6.5.10 Refer to Annexure A for details of Overhead Fuse Equipment that are approved for use on Ausgrid's network.

6.5.10.1 Aerial Bundled Conductor Low Voltage Mains

6.5.10.2 Connect streetlight supply to ABC Low Voltage Mains using IPC. Install an Inline Fuse Holder (cartridge installed) in the supply cable between the LV mains and the luminaire.

6.5.10.3 Open Wire Conductor Low Voltage Mains

6.5.10.4 Connect streetlight supply to open wire Low Voltage Mains using a suitably approved overhead connector. Install an Inline Fuse Holder (cartridge installed) in the supply cable between the LV mains and the luminaire.

6.5.11 Category V Default Luminaires

6.5.11.1 Details of the types of V Category LED luminaires currently approved for use can be found in Annexure A.

6.5.11.2 Ausgrid's current default luminaires for replacement of failed category V luminaires are detailed in Table 1 below.

Table 1 – Default Category V Replacement

Legacy Luminaire	LED Replacement Luminaire
High Pressure Sodium 100W (all types)	LED subcategory V5
Mercury Vapour 250W (all types)	LED subcategory V3
High Pressure Sodium 150W (all types)	
Mercury Vapour 400W (all types)	LED subcategory V1
High Pressure Sodium 250W (all types)	
High Pressure Sodium 400W (all types)	LED subcategory V1 High

6.5.12 Category P Default Luminaires

6.5.12.1 Details of the types of P Category LED luminaires currently approved for use can be found in Annexure A.

6.5.12.2 Ausgrid's current default luminaires for replacement of failed category P luminaires are detailed in Table 2 below.

Table 2 – Default Category P Replacement

Legacy Luminaire	LED Replacement Luminaire
Mercury Vapour 125W	LED subcategory PR3
Sylvania StreetLED 31W LED	
Sylvania Suburban 80W MV	LED subcategory PR5/PR6
Sylvania Suburban 42W CFL	
Sylvania StreetLED 29W LED	
Sylvania StreetLED 22W LED	
Sylvania StreetLED 17W LED	
GE Evolve 17W LED	
Sylvania StreetLED 17W LED Aero	
Sylvania StreetLED 17W LED RRW[1]	Cat PR5/PR6 LED Reduced RRW[1]

[1] RRW (Reduced Roadway Width) to be used in Cul-de-sacs and where roadway width is less than 12 metres (<12m)

6.5.13 Pedestrian Crossing Floodlighting - Category PX Recommended Luminaires

6.5.13.1 Details of the types of PX Category LED luminaires currently approved for use can be found in Annexure A.

6.5.13.2 Ausgrid's current recommended luminaires for replacement of failed category PX luminaires are detailed in Table 3 below.

6.5.13.3 **Note:** This Table is indicative only. Illumination compliance is mandatory for all pedestrian crossings. Illumination design must be compliant with AS1158.4:2015

Table 3 – Recommended Category PX Replacement

Legacy Luminaire	LED Replacement Luminaire
Sylvania Sylflood 250W HPS	LED subcategory PX1
Sylvania Sylflood 400W HPS	
Sylvania Sylflood 150W HPS	LED subcategory PX2
Sylvania Sylflood 250W HPS	
Sylvania Sylflood 150W HPS	LED subcategory PX3

7 Replace

7.1 Use of Frangible Steel Lighting Columns

7.1.1 In accordance with AS/NZS 1158.1.3, where a lighting column is replaced due to damage or age, a rigid lighting column should be placed at the stated setback from the kerb. Ausgrid has not approved the ongoing use of frangible steel lighting columns (slip base or energy absorbing). This will be Ausgrid's position until a product is designed, manufactured, and tested in accordance with a suitable standard.

8 Privately Owned Streetlights

8.1 Not installed on Ausgrid Assets

8.1.1 Where the Public Lighting Customer decides to assume complete responsibility for their street lighting installation, Ausgrid's only requirements are that the installation conforms to AS/NZS 3000 and Service and Installation Rules of NSW.

8.1.2 Examples of private street lighting installations are Community Title Developments or schemes which do not comply with this Network Standard.

8.2 Recording of Connections to the Ausgrid Network

8.2.1 All private lighting installations are to be shown in the GIS as connection points only. Refer to NS100.

Annexure A: Standard Equipment List

This annexure is stored externally to this document.

Annexure B: Legacy Materials Maintenance Only

This annexure is stored externally to this document.

Annexure C: Lighting Solutions Floodlighting

This annexure is stored externally to this document.

Annexure D: List of Ausgrid Drawings

Drawing Number	Title
Construction Standards:	
242605	Standard construction street lighting overhead connected on wooden pole installation detail
242606	Standard construction street lighting underground connected steel column URD installation detail
118244	Street lighting columns wind loading allowable conditions
Control and Link Panels:	
19398	Pole mounted street lighting control panel general assembly
62525	Street lighting lamp supply panel layout
228838	Link panel for street lighting standards
Steel Lighting Columns:	
63060	Street lighting modified Rocks style lighting columns (in-ground & BPM) limiting dimensions
66271	Street lighting steel post top columns in-ground mounted limiting dimensions
66272	Street lighting steel curved bracket arm standards in-ground mounted limiting dimensions
66273	Street lighting steel curved bracket arm standards baseplate mounted limiting dimensions
66637	Street lighting steel standards with 4.5 or 6m outreach arm in-ground mounted limiting dimensions
115041	Street lighting steel standards with 4.5 or 6m outreach arm base plate mounted limiting dimensions
514087	Standard construction street lighting column pile footing details
514607	Street lighting ragbolt assembly for steel light standards arrangement and details
520427	Street lighting outreach arm single hook arm arrangement and details
520430	Street lighting outreach arm curve fancy straight out arm arrangement and details
565306	Street lighting outreach arm double hook arm arrangement and details
565780	Street lighting 4.5m pole arrangement and details

Drawing Number	Title
Brackets:	
23227	Street lighting 2m outreach elevated pole mounted bracket type 1 arrangement & details
29188	Street lighting floodlight bracket mounted arrangement & details
32329	Street lighting 0.5m outreach wall mounted bracket arrangement & details
32330	Street lighting 2m outreach pole mounted bracket arrangement and details
36355	Street lighting 4m outreach pole mounted bracket arrangement and details
46911	Street lighting 3.5m outreach pole mounted bracket arrangement and details
48728	Street lighting 0.5m outreach pole mounted bracket arrangement and details
58188	Street lighting 3m outreach elevated pole mounted bracket type 2A arrangement and details
59737	Street lighting 4.5m outreach elevated pole mounted bracket type 3A arrangement and details
62405	Street lighting 0.5m outreach 0 degree upcast pole mounted bracket arrangement and details
62980	Street lighting floodlight luminaire mounting bracket arrangement and details
63736	Street lighting 6m outreach elevated pole mounted bracket type 6 arrangement and details
65411	Street lighting 1 metre outreach extension arrangement and details
66251	Street lighting range of pole and wall mounted street lighting brackets
66439	Street lighting 4m outreach elevated pole mounted bracket type 7 arrangement details
231819	Street lighting post top to short outreach conversion bracket
515156	Street lighting pole mounted bracket 3.25m outreach x 0.84m uplift DN 32 spigot arrangement and details
519502	Street lighting steel post top to outreach conversion bracket arrangement and details

Drawing Number	Title
Spigots:	
43238	Post top lantern insulated spigot for 3m 4.5m 7m and 8.5m street lighting columns arrangement and details
117697	Street lighting DN 32 to DN 32 angled adapter details
125149	Insulated spigot for V category lantern street lighting column arrangement and details
151959	Street lighting Insulated spigot clamp type for street lighting columns arrangement and detail
240795	Street lighting 3.7mm insulated spigot clamp type for street lighting columns arrangement and details
514011	Street lighting adaptor spigot DN 32 to DN 25 clamp type arrangement and details
520422	Street lighting luminaire fixing spigot nominal size DN65 arrangement and details
Legacy Drawings for Maintenance:	
24969	Mercury vapour lamp choke panels for street lighting standards
41826	Street lighting insulated spigot threaded type for street lighting column arrangement and details
56312	HPS lamp choke panels for street lighting standards
66145	Street lighting equipment FM and HPS lamps aluminium alloy choke box details
116157	Street lighting 3m Macquarie St type post top columns limiting dimensions
116183	70W metal halide street lighting control panel public works type
119084	125 watt mercury vapour lamp panels for 4.5 & 6.5m street lighting standards general arrangement & details


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