



ACT
Government

Municipal Infrastructure Standard

14 Public Lighting

January 2022



Publication number	MIS 14 Edition 1 Revision 0	
Date of effect	January 2022	
Supersedes	Design Standard for Urban Infrastructure Section 12 Street Lighting Edition 1 Revision 1 October 2007	
Endorsed by	David Hua	A/g Deputy Senior Director Infrastructure Planning
Approved by	Shelly Fraser	A/g Executive Branch Manager, Roads ACT

Document Information

Document	Key Information
Document title	MIS 14 Public Lighting
Next review date	January 2026
AUS-SPEC Base Document	Nil

Revision Register

Edition/Revision Number	Clause Number	Description of Revision	Authorised By	Date
1/0	12.2.1	Relevant standards and guidelines revised	Shelly Fraser	January 2022
1/0	12.3.7	Reference to Engineering Advisory Note 18	Shelly Fraser	January 2022
1/0	12.3.8	Earthing guidelines revised	Shelly Fraser	January 2022
1/0	12.4	Lighting Categories revised	Shelly Fraser	January 2022
1/0	12.8.1.2	Combined traffic signal columns revised	Shelly Fraser	January 2022
1/0	12.9	Glossary of terms revised	Shelly Fraser	January 2022
1/0	12.10	Column and luminaire types revised	Shelly Fraser	January 2022

Acknowledgement of Country

Transport Canberra and City Services (TCCS) acknowledge that Aboriginal people are the Traditional Owners of Australia. We acknowledge and pay respect to the Ngunnawal peoples as the custodians of the land and waters that we live and thrive on today here in the ACT.

TCCS acknowledges that Canberra’s cultural and natural heritage was maintained by the Ngunnawal people for many generations before colonial settlement on Australian soil. Aboriginal people’s management of the land preserved the natural balance of local plants and animals. This knowledge of the environment in which we live is critical to the protection and restoration of our land today.

It is our responsibility to preserve and encourage Ngunnawal, Aboriginal and Torres Strait Islander cultural integrity. When using this document, consider opportunities to incorporate Ngunnawal, Aboriginal and Torres Strait Islander culture.



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1 Public Lighting

1.1 General

Transport Canberra and City Services (TCCS) manages over 83,000 streetlight columns, 4,100 km of underground cabling, 100 km of overhead cabling, 1,280 switched control points, 46 Smart City access points and 30,000 Smart Nodes.

This Standard outlines the general requirements for public lighting including design, construction, supply, and installation of associated equipment.

Exclusions: This Standard does not include private lighting within the boundaries of a block.

1.1.1 Responsibilities

1.1.1.1 Objectives

Provide public lighting design and documentation to meet the following objectives:

- Facilitate the safe movement of people and vehicles.
- Satisfy the requirements of relevant Australian Standards, Industry Codes, and the Territory Plan.
- Increase the safety of the public and the persons directly working on the assets.
- Contribute to a sustainable urban environment through environmentally sustainable design.
- Enhance the urban environment by providing assets of social, environmental, and economic value.
- Increase security and amenity.
- Consider the full life cycle of assets from safety in design to construction to ongoing maintenance and renewal.
- Expand the capability and capacity to undertake future Smart City Internet of Things (IoT) initiatives for the benefit of the ACT economy and community.
- Consider energy efficiency.

1.1.1.2 Compliance

The public lighting design objectives are achieved when:

- The planning, design, construction, and modification of assets is adequate to service new and future developments.
- There is compatibility with existing assets, operational methods, and maintenance techniques.
- The assets provide adequate environmental, community, and asset protection consistent with the accepted design and construction requirements set out in this document and with developments in technology as approved from time to time.

- The design is consistent with the requirements of the Territory Plan, Municipal Infrastructure Standards and Municipal Infrastructure Technical Specifications.

1.1.1.3 Requirements

Requirements: The requirements for public lighting infrastructure in the ACT are set in the documents listed in **Cross references**.

1.1.1.4 Precedence

Where any document (except Legislation or the Territory Plan) issued in conjunction with this Design Standard includes technical requirements that conflict with this Design Standard the requirements of this Design Standard take precedence.

1.1.2 Cross references

1.1.2.1 Commonwealth Legislation

Australian Capital Territory (Planning and Land Management Act)

1.1.2.2 ACT Legislation

Roads and Public Places Act

Public Roads Act

Public Unleased Land Act

Work Health and Safety Act

Electrical Safety Act

Environment Protection Act

Planning and Development Act

Dangerous Substances Act

Heritage Act

Utilities Act

1.1.2.3 Environment, Planning and Sustainable Development Directorate (EPSDD)

Territory Plan and General Codes

Group and Town Centre Master Plans

National Capital Plan

1.1.2.4 Chief Minister, Treasury and Economic Development Directorate (CMTEDD)

Electrical Fact Sheet – November 2019 – Street Light Systems for Public Streets, Roadways and Arterial Roads.

1.1.2.5 Electricity Utility

Service and Installation Rules
Electrical Safety Rules
Civil Works Field Manual
Streetlight Supply Connections Approval Procedure

1.1.2.6 Design Standards

The following Design Standards are related to this standard:

MIS 01 Street Planning and Design
MIS 05 Active Travel Facilities Design
MIS 06 Verges
MIS 07 Driveways
MIS 12 Guide Signs
MIS 13 Traffic Control Devices
MIS 17 Shopping Centres and Commercial Areas

The full list of Design Standards can be accessed via the [TCCS website](#).

1.1.2.7 Technical Specifications

The following Technical Specifications are related to this standard:

MITS 00 Preliminaries
MITS 01 Traffic Management
MITS 02 Earthworks
MITS 03 Underground Services
MITS 06 Concrete Kerbs, Footpaths and Minor Works
MITS 09 Landscape
MITS 10 Concrete Works
MITS 12 Public Lighting
MITS 13 Traffic Signals

The full list of Technical Specifications can be accessed via the [TCCS website](#).

1.1.2.8 TCCS Reference Documents

The following TCCS reference documents are related to this standard:

Reference document 6 Requirements for design acceptance submissions
Reference document 7 Requirements for operational acceptance submission for hard public infrastructure works
Reference document 8 Requirements for work as executed records
Reference document 9 Requirements for final acceptance submission for hard landscape assets and civil works
Reference document 11 Drafting requirements for summary documents

The full list of Reference Documents can be accessed via [TCCS website](#).

1.1.2.9 Design Guidelines

The following design guides are related to this standard:

ACT Crime Prevention Through Environmental Design General Code (CPTED)

Canberra Central Design Manual Part B5

Canberra Central Design Manual Part C5

CASA Manual of Standards Part 139 – Aerodromes

1.1.3 Referenced documents

The design shall comply with the requirements and recommendations of the following standards, codes, regulations, and their successors:

1.1.3.1 Australian Standards

AS/NZS 1158	Lighting for roads and public spaces
AS/NZS 1158.0	Part 0: Introduction
AS/NZS 1158.1.1	Part 1.1: Vehicular traffic (Category V) lighting – Performance and design requirements
AS/NZS 1158.1.2	Part 1.2: Vehicular traffic (Category V) lighting – Guide to design, installation, operation, and maintenance
AS/NZS 1158.2	Computer procedures for the calculation of the light technical parameters for Category V and Category P lighting
AS/NZS 1158.3.1	Part 3.1: Pedestrian area (Category P) lighting – Performance and design requirements
AS/NZS 1158.4	Part 4: Lighting of pedestrian crossings
AS/NZS 1158.5	Part 5: Tunnels and underpasses
AS/NZS 1158.6	Part 6: Luminaires
AS/NZS 1170.2	Structural design actions Part 2: Wind actions
AS/NZS 1214	Hot-dip galvanized coatings on threaded fasteners
AS 1379	Specification and supply of concrete
AS/NZS 1554.1	Structural steel welding – Welding of steel structures
AS 1627.1	Metal finishing – Preparation and pre-treatment of surfaces – Removal of oil, grease, and related contamination
AS1627.4	Metal finishing – Preparation and pre-treatment of surfaces – Abrasive blast and cleaning of steel
AS 1798	Lighting poles and bracket arms – Recommended dimensions
AS 2053	Conduits and fittings for electrical installations – Set
AS/NZS 3000	Electrical Installations (Australian/New Zealand Wiring Rules)
AS 3600	Concrete structures
AS/NZS 4282	Control of the obtrusive effects of outdoor lighting
AS/NZS 4600	Cold formed steel structures
AS 4741	Testing of connections to low voltage electricity networks

1.1.3.2 Other publications

Austrroads

AGRD Austrroads Guide to Road Design

Australian Building Codes Board

NCC National Construction Code

1.1.4 Interpretation

1.1.4.1 Abbreviations

For the purposes of this Design Standard the following abbreviations apply:

AEMO	Australian Energy Market Operator
AGRD	Austrroads Guide to Road Design
CAD	Computer Aided Design
CASA	Civil Aviation Safety Authority
DALI	Digital Addressable Lighting Interface
EME	Electromagnetic energy
FCC	Federal Capital Commission
LED	Light Emitting Diode
MEN	Multiple Earth Neutral
MIS	Municipal Infrastructure Standard
MITS	Municipal Infrastructure Technical Specification
NCA	National Capital Authority
NC	National Capital
NEMA	National Electrical Manufacturers Association
PE	Photo-electric
PVC	Polyvinyl Chloride
RCD	Residual Current Device
SLCC	Street Light Control Cubicle
TCCS	Transport Canberra and City Services, ACT Government and its successors
TCD	Traffic Control Device
WAE	Works as Executed
XLPE	Cross-Linked Polyethylene
24/7	24 hours a day, 7 days a week

1.1.4.2 Definitions

For the purposes of this Design Standard, the definitions of terms used to define the components of Public Lighting are in conformance with AS 1348, *Glossary of Austroads Terms* and AGRD03.

Other definitions that pertain to this Design Standard are outlined below:

Aeroscreen: A luminaire where the intensity at or near the horizontal is restricted in accordance with the requirements of the aviation authorities and AS/NZS 1158.1.1. Typically used near airports and Mount Stromlo Observatory.

Asset Number: Each streetlight needs to be recorded as an asset of TCCS with relevant details of make, model, lamp type, optics and wattage and full column details. A unique number dependent on suburb is issued and fixed to the lighting column. The numbers are to be recorded on the work as executed drawings and entered in the TCCS database.

Baseplate Foundation: Term applies to a method of mounting lighting columns where there is a steel reinforced mass concrete footing with cast-in threaded fasteners. A steel baseplate is welded to the base of the column and the plate is bolted onto a structurally engineered rag-bolt concrete footing.

DALI: A digital intra-luminaire control protocol complying with IEC 62386 series, for two-way communication and control between the LED Power Supply (driver) and a lighting control system CMS. DALI-2 is an updated and enhanced version of DALI that is backwards compatible with DALI.

DWG: A form of computer aided design (CAD) drawing, specifically with the .dwg file format. This is the native file format to variety CAD software suites.

Carriageway Width: The portion (width) of the roadway that is devoted to the use of vehicles.

Circuit Breaker: A protective device included within each lighting column which will automatically trip and isolate streetlight luminaires should there be an overload or short circuit caused by the installation within that lighting column.

Co-located Asset: A public lighting asset located on or within another asset other than a public lighting asset e.g., public lighting on traffic signal columns, streetlight controllers location with Electricity Utility substation and public lighting outreach arm located on Electricity Utility distribution pole.

Conduit: Electrical enclosure or duct used for the installation and protection of streetlight wiring.

Control Point: A device to isolate a streetlight circuit at the point of supply. See also Service Protection Device.

Direct Buried: Term applies to describe a column mounting method whereby part of the length of the column is buried in the ground to provide stability for the column.

Distribution Network: The system managed by the electricity utility responsible for the distribution network.

Driveway: The paved area between the road kerb and the property boundary where a vehicle can access a property.

Electricity Utility: The licensed entity that manages the electricity distribution network, previously known as Electricity Supply Authority.

Impact Absorbing Column: A column designed to deform around a vehicle upon impact and gradually slow the vehicle.

Integral Control Gear: Control gear that is housed inside the luminaire.

Lighting Category: A lighting performance category with minimum requirements as defined in AS/NZS 1158.

Light Point Controller: The device that originates a command to execute a lighting action at the luminaire. Usually connected via a NEMA ANSI C136.41 5 or 7-pin photocell receptacle, or a Zhaga Book 18 receptacle. LPC receptacles are usually mounted on the luminaire body, on either upper or lower surfaces.

Lighting Sub-Main: Power supply conductors originating from the one single circuit breaker or fuse located at a streetlight control point. Several lights may be connected to the same sub-main.

Luminaire: A complete light fitting including light source/lamp.

MAC address: Media Access Control address.

Mounting Height: The vertical distance from the roadway surface to the photometric centre of the luminaire.

Nature Strip: The area of the road reserve between the kerb and the property boundary.

Outreach: Outreach is measured horizontally from the centreline of the pole to the photometric centre of the luminaire.

Outreach Arm: Bracket extending out from lighting column on to which the luminaire is mounted.

Overhang: The horizontal distance from the edge of the kerb to the photometric centre of the luminaire.

Overhead Electricity Conductor: Aerial Electricity Utility conductor used for the distribution of electricity.

Overhead Streetlight Conductor: Aerial streetlight conductor used for the electrical supply to streetlights mounted on Electricity Utility and TCCS owned poles.

Photo-Electric Cell (PE Cell): A device which automatically switches on or off depending upon the ambient lighting level.

Point of supply: Or point of connection. The point at which the electrical utilities distribution network ends and the customer's electrical installation begins.

Pole setback: The horizontal distance between the edge of the kerb (or edge of the traffic lane if no kerb) and the centreline of the lighting pole, measured normal to the direction of traffic.

Road Reserve: The section of land that includes the carriageway and nature strips on both sides of the carriageway, usually measured from property boundary to property boundary.

Service protection device: A protection device located at the point of supply.

Shared Path: Path provided for cyclist and pedestrian use.

Smart Cell: A smart node compatible with iTron Network with PE cell and diming capability connected to an individual luminaire via a 7-pin NEMA base.

Substation: Location where a transformer steps down the voltage from high voltage to low voltage for distribution.

Uncontrolled pedestrian crossing: A pedestrian (zebra) crossing where there are no traffic signals to control the flow of traffic.

Underpass: A pathway which passes underneath a roadway.

Unmetered supply: An electricity supply provided by the Electricity Utility which does not have electricity consumption metered.

Upcast (tilt angle): The angle between the axis of the fixing spigot entry is tilted above the horizontal when the luminaire is installed.

White light: Light that has a balanced mix of the primary colours of the visible spectrum of light.

XLPE Cable: Cross Linked Polyethylene insulated cable.

1.2 Pre-design planning

1.2.1 Consultation

1.2.1.1 TCCS and other Authorities

Requirement: Consult with TCCS and other relevant Authorities during the pre-design stage for public lighting infrastructure. In addition to the requirements of this Design Standard, identify the specific design requirements of relevant Authorities.

A large portion of the public lighting infrastructure are co-located and interdependent with the Electricity Utility electricity distribution network. Some streetlight controllers are located within substations and mounted on distribution poles or directly connected to the Electricity Utility overhead network and some outreach arms and luminaires are mounted on Electricity Utility distribution poles.

Design documentation must consider the strict requirements for work near the Electricity Utility and TCCS asset interface.

1.2.1.2 Utilities services plans

Existing site conditions:

Obtain plans from all relevant utilities and other organisations whose services, or other assets exist within the area of the proposed works. Plot this information on the relevant drawings. As a minimum, designs should refer to 'Dial-Before-You-Dig' information that is readily available in most areas.

Responsibility:

Confirm service plans accuracy with onsite inspection and potholing if deemed necessary. Protect existing assets to the satisfaction of asset owners. Confirmation of services plans accuracy with onsite inspection and potholing may be required before the design process can begin if deemed necessary by TCCS. This is more likely in areas that have significant inground services, which may restrict the ability to add or modify existing circuiting.

Proposed new services:

Detail any new services proposed, relocated, or removed as part of the proposed works.

1.2.2 Planning

1.2.2.1 Design Intent

Requirement: The street lighting performance shall meet the requirements of the Australian Standards. The design shall also comply with the criteria and guidelines set out herein. These requirements are to ensure that the design is:

- Consistent with policy objectives of the ACT Government.
- Compatible with existing infrastructure and can be maintained economically and safely.
- Meets the requirements of the Electricity Utility.
- Carried out in consultation with other relevant Authorities where applicable.
- Undertaken to mitigate obtrusive lighting.
- Consistent with the purpose of the relevant lighting scheme.
- Consistent with the objectives of the Territory Smart City Network.

1.2.2.2 Safety in Design

Requirement: Implement safety in design processes in accordance with the *Work Health and Safety Act*. Include consideration for the following:

- Traffic management
- Identification and protection of existing services
- Maintenance access for services
- The presence of 'normally open points' in the public lighting network
- Inadvertent interconnection of public lighting circuits from different power supplies
- Consideration for telecommunication electromagnetic frequency exposure
- The presence of hazardous materials or chemicals

Adequate provision for safety shall be included in the design of all public lighting infrastructure. This includes safety of the public and safety of persons constructing or maintaining the assets.

1.2.2.3 Hazardous Materials and Chemicals

Hazardous materials or chemicals may be found while working on public lighting infrastructure. Hazardous chemicals such as mercury in lamps, polychlorinated biphenyl (PCB) in capacitors and asbestos within panels, insulation, lining, fuse cartridges and/or conduits. Appropriate safety in design considerations for potential hazardous materials and chemicals should be utilised.

Plan: Identify as part of the safety in design risks associated with contact with hazardous materials and chemicals.

1.2.2.4 Whole of Life Cycle

Whole of life cycle cost shall be considered in the design process by reducing ongoing maintenance requirements. This includes ensuring the Territory Smart City Network is taken into consideration for all public lighting designs, with the aim of expanding the network and providing remote monitoring of the public lighting network. Additionally, designs should wherever possible incorporate existing approved equipment to support cost effective asset management and maintenance.

1.2.2.5 Site Specific Planning

Site assessment: Assess the existing physical and natural attributes of the site including the following:

- Area, slope, and shape of the site
- Available space
- Proximity to existing infrastructure
- Proximity to natural resources
- Territory Plan
- Group and Town Centre Master Plans
- National Capital Plan
- Environmental constraints
- Near Electricity Utility infrastructure
- Heritage constraints

Documentation: Document the site specifics and constraints that may affect the design.

1.2.2.6 Access Requirements

General: Designers must ensure the following:

- Minimum clearances and ease of access to perform maintenance activities on street light control cubicles, column control panels, columns, and luminaires.
- Minimum clearances from services and infrastructure such as trees, driveways, stormwater sumps, telecommunications, Electricity Utility distribution network, natural gas network, sewer manholes, water meters, valves, hydrants, and underground/overhead services.
- Minimum clearances from transport routes and infrastructure such as roads, paths, and light rail.
- Future urban design considerations and developments.

1.2.2.7 Return of Public Lighting Infrastructure to TCCS

It should be clear in design documentation that redundant solid state lighting luminaires, smart nodes and any other public lighting asset in operational condition shall be either reused or returned to TCCS. Where suitable existing public lighting infrastructure such as columns and luminaires can be safely reused this outcome is generally preferred.

Public lighting assets are continually being upgraded, replaced, extended, modified, or removed. Therefore, it is important during the planning stage that the designer has the most recent specification of the public lighting asset.

Designers should make it clear that Smart Nodes shall be either:

- Reused on the original asset (if the location has not changed), or
- Returned to TCCS for decommissioning.

Smart Nodes that are made redundant because of any works shall be returned to TCCS.

1.2.2.8 Unapproved Modifications to Public Lighting Infrastructure

Should a designer propose to use an 'equivalent' manufacturer the proposal requires a specific approval request submitted by the designer at design stage.

Note: Proposals for 'equivalents' at construction stage may not be approved.

Unapproved modifications to public lighting infrastructure including additional or remedial works may lead to the installation not being energised or accepted.

Consideration for Replacement of Underground Cabling

Where the designer anticipates earthworks during construction phase may damage existing underground cabling and conduiting, consideration shall be given to replacing affected spans of underground cabling and conduiting in their entirety as part of the works.

2 Design Criteria

2.1 Objectives

The purpose of this chapter is to provide the basis for the design of public lighting infrastructure used in public spaces including roads, carparks, pedestrian areas, underpasses, and cycleways.

This chapter is to be read in conjunction with the relevant Australian Standards and the TCCS [MITS 12 Public Lighting](#).

Public lighting design be carried out by persons with relevant qualifications, having experience and understanding of public lighting design using AS/NZS 1158 and AS/NZS 3000 and all referenced Standards, the application of compatible lighting design software and knowledge of the *International Commission on Illumination (CIE)* public lighting design principles.

The design processes in the relevant Australian Standards should be followed with records of the design process and engineering assumptions kept. Refer particularly to Section 6 of AS/NZS 1158.1.3 'Design Process for design checklists', AS/NZS 1158.1.1 Appendix D, AS/NZS 1158.3.1 Appendix C and AS/NZS 1158.4 Appendix D 'Documentation required for demonstrating compliance with this standard'.

Clarification shall be sought should any discrepancy exist between this design standard and the Australian Standards.

2.2 Design Locality

2.2.1 General

The road type classification shall be determined in conjunction with Section 2.3, Section 2.4, relevant Design Guidelines, Road Classifications (ACTSD-4210 and ACTSD-4211) and AS 1158 to determine the appropriate road lighting category.

Table 12-1 Road Classification Lighting Category

Road Classification	Lighting Category
Arterial	V3
Major Collector	V5
Minor Collector	PR3
Residential	PR5
Pedestrian/Cyclist Pathways	PP5
Off-road Pathways	PP5
Underpasses	PA3

Road Classification	Lighting Category
Shopping Centre Precincts	PR2
Outdoor Public Activity/Transport Terminals	In accordance with AS/NZS1158
Carparks	In accordance with AS/NZS1158
Pedestrian Crossing (V category road)	In accordance with AS/NZS1158
Pedestrian Crossing (P category road)	In accordance with AS/NZS1158

2.3 Lighting for Vehicular Traffic (Category V lighting)

2.3.1 Performance Criteria

Category V lighting shall be designed in accordance with the following Standards:

- AS/NZS 1158.1.1 Vehicular traffic (Category V) lighting - Performance and design requirements
- AS/NZS 1158.1.2 Vehicular traffic (Category V) lighting – Guide to design, installation, operation, and maintenance
- AS/NZS 1158.1.4 Lighting of pedestrian crossings
- AS 1798 Lighting poles and bracket arms – Recommended dimensions

2.3.2 Arterial Roads

Arterial roads shall be illuminated to lighting subcategory V3 unless otherwise approved.

2.3.3 Major Collector Roads

Major Collector Roads shall be illuminated to lighting subcategory V5 unless otherwise approved.

2.3.4 Roundabouts

Roundabouts shall be illuminated based on the lighting subcategory of the connecting roads.

The preferred design arrangement for the illumination of roundabouts with a radius of 6 m or more is to use a central column with dual outreach arms.

For larger roundabouts the preference is to illuminate the roundabout from the perimeter. Refer to AS/NZS 1158.1.2 for recommended luminaire layouts.

All lighting to roundabouts shall appropriately consider conflict zones. Guidance on conflict zones is provided in AS/NZS 1158.1.2 and should be determined as part of the overall road design.

2.3.5 On Road Parking

On road parallel parking, excluding disabled parking bays, shall be included in the carriageway width used to determine the lighting design for the road.

On road nose-in parking or disabled parking bays shall be treated as a car park.

2.3.6 Bus Stops

Bus stops should have a direct buried impact absorbing column located within 5 m of the drop off area.

2.3.7 Pole Setback

Columns shall maintain the clearances as shown on the Public Lighting Standard Drawings (Section 5.1.6 Column Setbacks & Clearances).

Where posted speeds are equal to or exceed 60 km/h, all columns shall be frangible in accordance with AS/NZS 1158.1.2. Columns used adjacent to foot or cycle paths or where residential blocks abut the roadway shall be of the frangible impact absorbing type.

2.4 Lighting for Pedestrian Area (Category P lighting)

2.4.1 Performance Criteria

Category P lighting shall be designed in accordance with the following Standards:

- AS/NZS 1158.3.1 Pedestrian area (Category P) lighting - performance and design requirements
- AS/NZS 1158.1.4 Lighting of pedestrian crossings
- AS 1798 Lighting poles and bracket arms – recommended dimensions

2.4.2 Minor Collector Roads

Minor Collector roads shall be illuminated to lighting subcategory PR3 unless otherwise approved.

2.4.3 Residential Roads

Residential roads shall be illuminated to lighting subcategory PR5 unless otherwise approved.

Consideration must be given to obtrusive light.

Local roads shall typically be designed using 6.5 m columns with 1.5 m outreach arms.

2.4.4 Roundabouts

Roundabouts shall be illuminated based on the lighting subcategory of the connecting roads.

The preferred design arrangement for the illumination of roundabouts with a radius of 6 m or more is to use a central column with a dual outreach arm of 1.5 m.

2.4.5 On Road Parking

On road parallel parking, excluding disabled parking bays, shall be illuminated to the same category as the road reserve in which it is located.

On road nose-in parking or disabled parking bays shall be treated as a car park.

2.4.6 Bus Stops

Bus stops should have a direct buried impact absorbing column located within 5 m of the drop off area.

2.4.7 Pole Setback

Columns shall maintain the clearances as shown on the Public Lighting Standard Drawings (Section 5.1.6 Column Setbacks & Clearances).

Where posted speeds are equal to or exceed 60 km/h, all columns shall be frangible in accordance with AS/NZS 1158.1.2. Columns used adjacent to foot or cycle paths or where residential blocks abut the roadway shall be of the frangible impact absorbing type.

2.4.8 Pathways for Pedestrians or Cyclists

Where pathways form part of Arterial and Collector roads, no special lighting requirements apply as suggested by the Australian Standards provided that PR5 levels are maintained from property boundary to property boundary. Paths that link residential roads through open parkland are to be lit to the *Territory Plan Part 3*. Consideration shall be given to the effects of mature vegetation planting adjacent to the pathways.

2.4.8.1 Off Road Pathways

Off Road Pathways shall be lit on a case-by-case basis. Typically, suburban developments will provide lighting to off road pathways that provide access to and from local shops and public transport. Where Off Road Pathways are illuminated, they shall be illuminated to lighting subcategory PP5 unless otherwise approved.

Off Road Pathways shall typically be designed using 6.5 m columns with 0.15 m outreach arms and columns shall be provided with ladder rests.

2.4.8.2 Underpasses

Underpasses shall be illuminated to lighting subcategory PA3 unless otherwise approved.

Preferably column mounted lights will be located adjacent to the approach and exit of underpasses. The underpass will also contain additional surface mounted luminaires as required.

Underpass lighting shall have an appropriate Vandal Resistant Rating (IK Code). All conduits are to be rigid steel, including all junctions. The use of flexible steel conduit is to be used at bends.

2.4.8.3 Shopping Centre Precincts

Shopping Centre Precincts shall be illuminated to lighting subcategory PR2 unless otherwise outlined or directed by TCCS. This is consistent with crime prevention and amenity. Trunk pathways shall be illuminated on approach to and through shopping centres.

2.4.8.4 Medium Density and Cluster Housing

Where there is significant night-time pedestrian movement from this type of development to shopping centres/restaurants Category PR2 lighting should be used. Generally lighting shall be designed in accordance with the provisions of AS/NZS 1158.3.1, Section 2.5.3.4 *Part A* where spill light could become problematic.

2.4.8.5 Open Pedestrian Areas, Malls, Arcades, Town Squares

Open Pedestrian Areas primarily for pedestrian movements shall be illuminated to lighting subcategories in accordance with AS/NZS 1158.

2.4.9 Carparks

Carparks shall be illuminated to lighting subcategories in accordance with AS/NZS 1158.

2.4.10 Obtrusive Lighting

Where Category P lighting installations are near residential housing, luminaires with glare shields or equivalent optics to control glare and reduce spill light shall be used.

Consideration shall be given to obtrusive lighting requirements of AS/NZS 4282, specifically that in *Table 3.2*.

2.5 Lighting for Pedestrian Crossings

2.5.1 Performance Criteria

Pedestrian crossing lighting shall be designed in accordance with the following Standard:

- AS/NZS 1158.1.4 Lighting of pedestrian crossings

2.5.2 General

Pedestrian crossings on V and P category roads shall be illuminated to subcategories in accordance with AS/NZS 1158.

Raised pedestrian crossings (also known as Wombat crossings), without the black and white markings, are not required to be illuminated to any PX category. These crossings shall have reflective markers and be treated as traffic controlling devices as per AS/NZS 1158.3.1.

Pedestrian crossing lighting shall be mounted on impact absorbing columns.

Any specific luminaire orientation and aiming points required to adequately illuminate the pedestrian crossing, shall be clearly shown on the design drawings. At the completion of the installation of pedestrian crossing lighting, the contractor shall verify the luminaire orientation installed meets the design as part of their commissioning.

2.6 Lighting for Specific Locations

2.6.1 General

Exceptions to the above lighting design criteria exist for some specific locations throughout the ACT. In these locations additional standards and design guidelines shall be adhered to as outlined below.

2.6.2 Heritage Areas

Under the *Heritage Act* (the Act) the ACT Heritage Council is responsible for keeping a register of places and objects in the ACT which have heritage significance at the Territory level. These heritage places and objects have cultural and historical significance and have been identified as important to the history of the ACT.

Lighting in heritage areas shall be designed, constructed, and maintained using only the materials described in the *Heritage Lighting Design and Maintenance Policy* as outlined in Appendix A and the *ACT Heritage Register*.

2.6.3 Group and Town Centre Master Plans

Group and Town Centre Master Plan documents set out how a particular area can (as opposed to will) develop and redevelop into the future. They are high level plans intended to set out objectives and strategies to manage development and change over time and defines what is important about a place and how its character and quality can be conserved, improved, and enhanced.

Public lighting design shall be in accordance with the applicable Master Plan where available.

2.6.4 Adjacent to Mt Stromlo Observatory

Any development within the defined low light zone of the Mount Stromlo Observatory ([as shown on Map 11 – Clearance Zones](#)) must be in accordance with acceptable operational requirements of the Observatory to minimise the night sky impact of light pollution from urban development in the Molonglo Valley. Measures shall be taken at design stage to reduce the upward spillage of light and adverse impact of light from public lighting infrastructure on the Observatory.

Lighting within a 5 km radius of Mount Stromlo Observatory shall utilise aeroscreen luminaires with a zero upward waste light ratio where the intensity at or near the horizontal level is restricted. This restriction also includes the entire proposed development of Molonglo.

2.6.5 Canberra Airport and South Care Heliport Aerodromes

The requirements of the Civil Aviation Safety Authority (CASA) shall be adhered to in the design of public lighting infrastructure within the vicinity of an Aerodrome. Refer to *CASA Manual of Standards Part 139 – Aerodromes* in particular Chapter 7 *Obstacle Restriction and Limitation* and Section 9.21 *Lighting in the Vicinity of Aerodromes*.

Lighting within the vicinity of aerodromes shall utilise aeroscreen luminaires with a zero upward waste light ratio where the intensity at or near the horizontal level is restricted in accordance with the aviation authorities.

Designers should consider seeking approvals of their public lighting design and include in the design documentation the requirement to notify relevant Authorities before work is conducted near aerodromes.

2.6.6 City Centre Precinct

Lighting in the City Centre Precinct should encourage streets and public spaces to be used by enhancing the character of the City including its natural features, heritage areas, prominent buildings, and public art.

Designs within the city centre precinct shall be in accordance with the *Canberra Central Design Manual Part B5 and Part C5 Lighting, City Centre Development Code*, and the *City Master Plan*.

2.6.7 National Capital Authority Areas

The National Capital Authority (NCA) manage and maintain some of the most nationally and culturally significant landscapes and attractions in the ACT.

The requirements of the NCA and the National Capital Plan shall be considered for all types of public lighting within areas near or under their planning control. Refer to the NCA when working in these areas.

Any existing circuits which supply street lighting within both TCCS and NCA jurisdictions shall be separated where practical. The designer shall liaise with both authorities to confirm the final requirements as part of the initial planning phase.

2.6.8 Luminaires in Proximity of Trees

In areas where trees are planted or are to be planted, the lighting design shall consider the reduction of light levels that may be caused by trees and adjust mounting locations and mounting heights appropriately.

Refer to Section 2.7.5 for further details on the location of lighting columns in proximity of trees.

2.6.9 Luminaires Fixed to Buildings

Luminaires fixed to buildings which will become TCCS assets for the purpose of public lighting, will generally not be accepted.

However, with specific written approval from TCCS during the design stage, an appropriate deed shall be prepared and approved by the Government Solicitor and registered on the Territory Lease. The cost of the deed shall be borne by the lessee.

The design should consider provision for 24/7 external access to luminaires, cabling and control isolation.

2.6.10 Luminaires Fixed to Electricity Utility Assets

Installation of luminaires on Electricity Utility distribution poles should be avoided where practical. Where existing infrastructure requires luminaires to be mounted on Electricity Utility assets, they must be approved by TCCS and may not be undertaken without written permission from the Electricity Utility.

There are instances when public lighting assets interface closely with Electricity Utility assets. It is important at the design stage that consideration (for safety in design) is given to strict requirements such as safe approach distances and network boundaries when working near the Electricity Utility network. At a minimum the following documentation shall be consulted:

- Service and Installation Rules
- Electrical Safety Rules
- Civil Works Field Manual
- Streetlight Supply Connections Approval Procedure

2.6.11 Environmental Design Requirements

Consideration shall be given to the provision of the most energy efficient design. Designs shall utilise approved Solid-State Luminaires to provide minimum illumination levels consistent with the requirements of AS/NZS 1158.

The designer should be able to demonstrate that the installation has been designed to be energy efficient and does not 'over light' the area.

Where Category P lighting installations are close to residential housing, luminaires with glare shields or equivalent optics to control glare and reduce spill light shall be used. Obtrusive lighting requirements shall be considered as outlined in section 2.4.10.

2.7 Public Lighting Columns

2.7.1 General

Lighting columns shall be of the types, heights and outreaches as shown on the Public Lighting Standard Drawings and shall conform with the requirements of the relevant Australian Standards.

Columns shall be selected and arranged appropriately to satisfy the relevant requirements within Section 2 – Design Criteria.

Refer to Section 3 – Approved Materials for details on specific columns.

2.7.2 Column Material

Column material shall be galvanized light gauge sheet steel or aluminium. Allowance shall be made for use with luminaires of up to 12 kg weight with a projected windage area of 0.2 m².

2.7.3 Column Heights

The height of columns shall be determined to give vertical heights from ground level to the centre of the luminaire spigot of 6.5 m, 9.0 m, 10.5 m, and 12.0 m. Any other non-standards pole sizes will require TCCS approval. Lighting columns of 9 m height or greater shall be of the frangible type, either slip base or impact absorbing.

Low height poles situated in parks, cycleways, walkways and adjacent to underpasses and shopping centres are more susceptible to vandalism than higher poles. Pole heights in locations that are more prone to vandalism shall be at least 6.5 m unless the designer can establish to the satisfaction of TCCS that vandalism will not be a problem.

2.7.4 Column Setbacks and Clearances

Lighting columns shall maintain the clearances as shown on the Public Lighting Standard Drawings.

For maintenance personnel safety, column access hatches shall be placed either facing away from the road or to the side facing away from the oncoming traffic.

Place columns on the line of boundaries between blocks. In suburban developments, columns shall be placed in-line with block boundaries where practical. Seek approval for all other locations before design acceptance.

Consideration shall be given to the recommendations on minimum pole setback in AS 1158.1.2 Appendix B.

2.7.4.1 Rear Entrance Alleyways

Columns placed in these locations may be situated 1 m from the back of kerb providing the column is adequately protected from damage by vehicles e.g., protected by bollards of enough strength to prevent vehicular impact.

Without exception, 1 m clearance must be maintained within the road reserve around the column to permit maintenance and replacement as required. Column access hatches shall be placed either facing away from the roadway or away from the oncoming traffic.

Where a column is within 1 m of a property boundary the column access hatch shall be placed so that it is accessible without entering the adjacent property.

2.7.5 Columns in Proximity of Trees

Preservation and protection of trees shall be in accordance with the Municipal Infrastructure Standards [MIS 02 Earthworks and Site Grading](#) and [MIS 24 Soft Landscape Design](#).

In areas where trees are planted or are to be planted, the lighting design shall consider the reduction of light levels that may be caused by trees on the lighting design and adjust mounting locations and mounting heights appropriately.

Public lighting shall be placed so that the luminaires are below the mature tree canopy or are at least 2 m clear of the mature tree canopy. Documentation shall be provided with the lighting design to show the likely mature tree canopy footprint and lower level of canopy.

Columns shall be located halfway between individual proposed or existing tree canopies where practical.

This will necessitate liaison between the landscape designer and lighting designer to establish optimum spacing of trees and public lighting.

2.7.6 Columns not Accessible by Service Vehicles

Lighting columns located such that they are not accessible by service vehicles (e.g., pathways through public parks, gardens and easements) shall have mounting heights of 6.5 m and be provided with ladder rests unless otherwise approved.

2.7.7 Columns in Close Proximity

Where two columns are located within 5 m or less of each other, they shall be combined unless otherwise approved.

2.7.8 Columns in Proximity of Electrical Utility Infrastructure

In the absence of any conflicting requirements of the Electrical Utility, the following minimum clearances between electrical distribution infrastructure and lighting columns shall be maintained.

2.7.8.1 Impact Absorbing Columns

The distance between the column and the closest overhead electricity conductor shall exceed 0.6 times the height of the highest point on the lighting column. For example, a 12 m impact absorbing column shall maintain a clearance of at least 7.2 m to the closest overhead electricity conductor.

2.7.8.2 Slip Base Columns

Typically slip base columns are not acceptable. Refer to section 3.2.

When the conductors of overhead powerlines are parallel to the direction of travel of all vehicles along the road:

- The distance between the column and the closest overhead electricity conductor shall exceed 0.6 times the height of the highest point on the lighting column.

When the conductors of overhead lines are not parallel to the direction of travel of all vehicles along the road:

- The distance between the column and the closest overhead electricity conductor shall exceed 1.2 times the height of the highest point on the lighting column.

Note that at a roadway intersection, some traffic will be travelling normal to powerlines when the powerlines run parallel to one road or the other.

2.7.8.3 Chamber and Pad-mount Type Substations

Earthing rings are installed around chamber and pad-mount type substations. Public lighting columns must be clear of the earthing ring, which is at a distance dependent upon the ground resistivity. A streetlight column clearance of 5 m from the outer perimeter of the chamber or pad-mount type substation shall be maintained unless prior written approval is obtained from the Electricity Utility.

2.7.9 Columns in Proximity of Telecommunications Infrastructure

Telecommunication infrastructure is installed on or near the public lighting network. This includes, but is not limited to:

- Small Cell equipment (4 G or 5 G)
- Radio base stations with a low power output

The designer must ensure that safe electromagnetic emission levels are met in accordance with the Australian Radiation Protection and Nuclear Safety Agency during construction and maintenance of public lighting infrastructure. Refer to the electromagnetic energy (EME) report for telecommunication sites.

EME reports provide calculations of the maximum levels of radiofrequency electromagnetic energy around an existing and/or proposed wireless base station that may include mobile telephony, broadband and data services. The report is generally produced by a network operator (such as a mobile phone company) or consultants working on their behalf.

2.7.10 Columns in Proximity of Bus Stops

Columns shall not be located at the entry or exit points of the bus stop roadway. Where this cannot be avoided, the bus turning template shall be reviewed and the columns shall be setback to provide a minimum clearance of 1.7 m from the turning template.

2.7.11 Banner Mounting

Banner mounting shall be provided to columns where required.

Each banner shall be attached top and bottom to prevent entanglement with the column, luminaire, regulatory signs and guide signs. Banners shall be mounted at a minimum height of 2.4 m and at a maximum height of no greater than 6 m. Banners shall have a quick release mechanism on the lower mounting that will 'break away' should the wind load exceed the design parameters.

Category V columns shall be designed to permit banner installation between 2.4 m and 6 m maximum to a serviceability limit state loading of 1 kN. No permanent deformation or excessive vibration should occur under wind Loading as described in AS 1170.2.

Refer to [MITS 12 Public Lighting](#) for additional requirements on banner mounting.

2.7.12 Installation of Decorative Strings and Fibre Optic Lighting

Overhead catenary and tree branch (bud lighting) shall use lighting columns designed to accept the catenary loadings or alternatively free-standing columns with a minimum catenary mounting height of 4.5 m in pedestrian areas and 7 m over roadways.

All overhead decorative lighting shall be 24-volt extra-low voltage design. Decorative lighting in public places shall have a minimum clearance of 3 m from the finished level or any climbable object in non-trafficable areas. In trafficable areas or over roadways clearances shall be in accordance with the requirements of the *Utilities Act*.

Optical fibre installations shall utilise solid state LED light sources and shall be installed without colour wheels and motor drives. Optical driver units shall be installed in an environment where lamp heat is dissipated effectively and moisture ingress into the lamp chamber is avoided. Consideration shall be given for installation of multiple drivers in a centralised location within a weatherproof enclosure.

Power supply for decorative lighting shall be supplied through a metered electricity account with a unique national meter identifier, unless otherwise approved.

2.7.13 Complementing Traffic Control Device Design

2.7.13.1 Combined Traffic Control Device Guide Signage

To minimise streetscape clutter, during the public lighting design process the designer shall collaborate with the Traffic Control Device (TCD) designer to establish common placement of TCD and guide signage onto lighting columns wherever practicable.

2.7.13.2 Combined Traffic Signal Columns

TCCS Traffic Signals Manager shall approve design of this type of lighting system. Wiring of this type of installation shall be in accordance with the *Electrical Fact Sheet – November 2019 – Street Light Systems for Public Streets, Roadways and Arterial Roads*, or any other advice as provided by Access Canberra Electrical Inspectorate from time to time.

Combined streetlight columns shall be supplied from a single source of power supply originating from the traffic signal controller. This single source shall supply both public lighting luminaires and traffic signalisation and lighting equipment. Non-combined public lighting columns shall not be supplied from the traffic signal controller. In combined traffic signal columns, the full extent of the public lighting power and control circuits to the luminaire shall be shown in the design.

The multiple earth neutral (MEN) connection is to be located at the main switchboard and have an earth electrode installed. Any exposed metal of columns and equipment should be earthed by means of an

earthing conductor originating from the main switchboard. There should be no interconnection, at any column, between neutral and earth.

2.7.14 Relocation or Removal of Existing Columns

Steel streetlight columns may only be relocated if the column meets current Standards. Concrete streetlight columns may only be relocated if they have heritage value, otherwise they will need to be replaced with a steel galvanised streetlight column.

Apart from concrete columns with heritage value in designated heritage areas, concrete streetlight columns do not comply with current Australian Standards and are no longer manufactured, therefore only acceptable replacement steel options shall be provided.

Refer to *Engineering Advisory Note EAN 18 Relocation of Streetlight Columns* for specific requirements.

A design review of the lighting installation may be required if the relocation of an existing steel streetlight column(s) is of a significant nature (greater than 5 m).

All major roadway lighting columns above 8 m in height will require redesign before relocation is permitted.

Existing steel non-frangible street light columns, less than 5 years old, can be relocated provided they are structurally sound and not damaged during the relocation process.

Minimum distances shall be maintained from service utilities, vegetation, roadways and driveways.

Columns cannot be removed without written authorisation. Where the removal is temporary suitable alternative lighting shall be arranged and approved prior to the works being carried out.

All removed columns shall be recorded on Works as Executed (WAE) drawing(s) to enable the spatial mapping to be updated and decrease in energy consumption to be adjusted where necessary.

2.8 Power Supply and Control

2.8.1 Power Supply

The designer shall make arrangements with the Electrical Utility (where the existing lighting network is not capable of supplying the proposed lighting scheme) to provide a point of supply for the lighting sub-mains. Refer to requirements in the *Evoenergy Streetlight Supply Connections Approval Procedure*.

This should be undertaken at the preliminary design stage. The power supply shall have provision for a future meter if one is not required initially. TCCS will need to be provided with the following preliminary design information:

- Number of lights per sub-main
- Wattage of each light
- Voltage drop to last light
- Proposed point of supply e.g., standalone/pillar/pad mount/chamber/pole-mounted
- Proposed lighting layout

- Protective device ratings
- Evidence that maximum trip time requirements are satisfied.

Where general power outlets are added to the circuit, the voltage drop calculations shall incorporate the maximum demand of those outlets.

The designer shall obtain from TCCS the details of the adjacent lights as needed for the design process by requesting this information by emailing tccs.streetlighting@act.gov.au with a list of the asset numbers on a per suburb basis.

Evidence of Electricity Utility supply approval (Request for service marking, connection request or network alteration request, as necessary) shall be presented with the completed design for final design acceptance. This shall occur prior to any onsite public lighting works commencing.

Street Light Control Cubicles (SLCC) shall be free standing and located in a publicly accessible location suitable for 24/7 maintenance access. They shall not be located within Electricity Utility substations (indoor or pad mounted) or buildings.

SLCC design shall be in accordance with the Public Lighting Standard Design Drawings. Unless specific written permission is granted, only electrical supply for TCCS public lighting may be taken from the street light side of the cubicle.

2.8.2 Control

The required method of control is by individual Smart Node control integral with each luminaire via a National Electrical Manufacturers Association (NEMA) base that is compatible with the Itron ACT Networking Specification for the Smart City network.

As part of the Smart City network installation, a large portion of the public lighting asset has been installed with Smart Nodes. The ACT Government aims to expand the coverage of the Smart City network and expand remote monitoring of all newly installed public lighting assets. For this aim to be realised all proposed and newly installed luminaires shall be compatible with the existing Smart City network.

Smart Nodes shall be integral with the luminaire via the NEMA base. Where the installation is an extension to the existing streetlight network and is centrally controlled, a shorting cap shall be provided in lieu of the PE-cell.

Refer to [Appendix B – ACT Smart City Network](#).

2.8.3 Cable Route

Cable routes shall be in accordance with [MIS 06 Verges](#).

Module width: 0.6 m.

Location:

- Clearance to underground services: 0.5 m
- Typical clearance to kerb: 1.7 m

The designer shall utilise DBYD services and request all existing utility asset information to determine their impact on the proposed design.

Should the need arise to utilise the utility shared trench systems, the designer shall provide a shared trench arrangement with a separate layer in the shared trench to maintain working and maintenance clearances from all other utility assets.

For cabling that emanates from a control point, sub-main conductors shall loop in and out of large (suitable for 4 core 16 mm² conductors minimum) terminal links provided in the base of columns.

Where slip base columns are installed, provision shall be made for disconnect plugs and flex assemblies in the base of each column.

Cable routes shall be outside all mature tree canopy drip lines where possible.

Where cables are required to cross a road or cycleway, the crossing shall be perpendicular to the direction of traffic and within conduit, unless agreed otherwise.

2.8.4 Leased Land and Easements

Where overhead or underground public lighting cables are proposed on or over leased land an easement shall be established. Easement width for overhead cabling shall extend 1.5 m either side of each of the outermost conductors. Underground easements shall be a minimum easement width of 2 m with the proposed conduit and cabling established along the centre line of such an easement.

Whenever currently unleased land is to be gazetted as leased land by the ACT government, existing public lighting assets within the new lease that are required to be retained in order to maintain public lighting on adjacent unleased land shall be relocated outside the lease or have an easement placed over them. The cost of the relocation or easement shall be borne by the lessee.

2.8.5 Cable Types

For new installations three phase sub-mains shall be used for streetlighting, where possible. Where the lighting column and associated terminal block does not have sufficient space to accommodate all three phases, single phase installations can be adopted. This is typically on 6.5 m or lower columns in local road areas.

Subject to compliance with AS/NZS 3008.1.1, cable sizes and types shall be in accordance with [MITS 12 Public Lighting](#). A minimum of 4 core 16 mm² multi strand copper cable shall be used for three phase lighting sub-mains. A minimum of 16 mm² multi strand copper cable shall be used for single phase lighting sub-mains. A minimum of single core 6 mm² multi strand copper cable may be used from the Electricity Utility mini pillars to an individual public lighting asset in existing areas where a control cubicle is not practical.

Ensure that the same neutral source is used for the entire sub-main length. Cabling shall be XLPE insulated/PVC sheathed or equivalent installed in heavy duty Category A rigid PVC conduit.

Connections made in cable pits should be avoided unless prior approval has been granted. Where approved, the connections shall be designed for full submersion. All connectors used for aluminium cable shall be the fully sealed insulation piercing connector (IPC) type.

Where insulated cables terminate in an outdoor environment (e.g., pole top) weather loops shall be adopted to prevent water ingress.

2.8.5.1 Overhead Cabling

Any existing overhead cabling shall be removed as part of any upgrade works, unless otherwise approved.

2.8.6 Circuit Protection

Pathway and park lighting shall be installed in accordance with AS/NZS 3000, specifically clause 2.6.3.2.3.3 *Requirements for additional protection*.

Protection shall be installed in accordance with AS/NZS 3000 Electrical Installation (Wiring Rules) and *Electrical Fact Sheet – November 2019 – Street Light Systems for Public Streets, Roadways and Arterial Roads*.

Each lighting column shall have individual automatic circuit breaker or residual current device (RCD) protection fitted inside the column. A maximum of three sets of terminations shall be made at any column.

All new or modified circuits shall be protected by a circuit breaker or RCD. Existing fuses shall be replaced as part of the works.

2.8.7 Earthing

Earthing of public lighting columns shall comply with *Electrical Fact Sheet – November 2019 – Street Light Systems for Public Streets, Roadways and Arterial Roads* and AS/NZS 3000.

Earth electrodes shall be installed in accordance with AS/NZS 3000.

All exposed conductive parts, including metallic parts of all fittings, shall be earthed in accordance with AS/NZS 3000.

Refer to drawing ACTSD-4020 for typical earthing arrangements.

Refer to [MITS 12 Public Lighting](#) for technical specification requirements of earthing.

3 Approved Materials

3.1 Luminaires

3.1.1 General

TCCS prefers the use of pre-approved luminaires listed on the Public Lighting Standard Drawings. TCCS pre-approved luminaires have been determined based on ease of installation, ease of maintenance, luminaire performance, zero upward waste light ratio, whole of life costs, warranty provisions, as well as forms that are complementary to the various ACT streetscapes.

Should a designer propose to use an 'equivalent' luminaire from those listed on the Public Lighting Standard Drawings, the proposal requires a specific approval request by the designer to TCCS at the design stage. Note proposals for 'equivalents' at construction stage may not be approved.

Where 'equivalent' proposals are made, TCCS requires the submission of comprehensive product data sheets, a Statement of Compliance and photometric data provided in a format required by AS/NZS 1158.2, IES LM-63-02 and LM-79-19.

Every luminaire installed as an unmetered connection point must be listed on the Australian Energy Market Operator (AEMO) National Electricity Market Load Table for Unmetered Connection Points.

There are special areas of consideration that are exempt from the above as outlined in Section 2 - Design Criteria.

Aeroscreen luminaires shall be used unless agreed otherwise.

At a minimum, luminaires shall be provided with the following (unless otherwise agreed):

- Class II double insulation (Class I luminaires are acceptable if approved by TCCS at design stage)
- Integral control gear
- 7-pin NEMA type socket
- DALI control gear, including wiring to the NEMA socket
- Surge protection of 10 kV/10 kA
- Minimum specified Impact Protection of IK08 (or in accordance with AS 1158.6)
- Minimum specified Ingress Protection IP65 (or in accordance with AS 1158.6)
- Pre-terminated cable tails of sufficient length to connect to the column link panel
- Smart Node compatible with the Itron ACT Networking Specification

Refer to [MITS 12 Public Lighting](#) for technical specification requirements of luminaires and the above equipment.

3.1.2 Decorative Luminaires

In some instances, decorative luminaires may be provided for enhanced amenity which are not deemed 'equivalent' by TCCS. In these instances, the general design principles shall be approved by TCCS. Lighting of this nature shall be excluded from any compliance calculations to meet AS/NZS 1158.

3.2 Columns

3.2.1 General

Public Lighting columns shall be of the types, heights and outreaches as shown on the Public Lighting Standard Drawings. The height of the columns shall be such as to give vertical heights from ground level to the centre of the luminaire spigot.

Should a designer propose to use an 'equivalent' column from those listed on the Public Lighting Standard Drawings, the proposal requires a specific approval request by the designer to TCCS at the design stage. Note proposals for 'equivalents' at construction stage may not be approved.

Base Plate mounted columns may be used to suit the site conditions (e.g. avoid inground services) however this should be highlighted and approved during the design stage. Columns shall be frangible direct buried impact absorbing unless otherwise approved. There are special areas of consideration that are exempt from the above as outlined in Section 2 – Design Criteria.

All columns shall be provided with:

- Access hatch
- Cable termination panel
- Circuit breaker to protect the public lighting internal wiring and luminaire
- Column identification plate
- Asset number.

Refer to [MITS 12 Public Lighting](#) for technical specification requirements of columns and the above equipment.

3.2.2 Outreach Arms

Public lighting outreach arms shall be of the types, and lengths as shown on the Public Lighting Standard Drawings.

Should a designer propose to use an 'equivalent' outreach arm from those listed on the Public Lighting Standard Drawings, the proposal requires a specific approval request by the designer to TCCS at the design stage. Note proposals for 'equivalents' at construction stage may not be approved.

There are special areas of consideration that are exempt from the above as outlined in Section 2 – Design Criteria.

Luminaire outreach arms shall be curved or straight, and on roadside of 1.5 m, 3.0 m, and 4.5 m in length, and on Pedestrian side of 0.15 m, 0.5 m and 1.5 m in length. The spigot shall be set at an installed angle horizontal to the pavement with a final uplift of 0°. The length of the outreach is the horizontal distance from the vertical centre line of the column to the tip of the outreach, excluding the lamp mounting spigot.

In plan the orientation of the outreach arm shall be at right angles to the traffic lane, or 90° to the tangent point of the curve.

All outreach arms shall be secured to the column so that the outreach arm cannot be displaced from its intended position.

Refer to [MITS 12 Public Lighting](#) for technical specification requirements of outreach arms.

3.2.3 Access Panels

All column access panels shall have a permanently connected earth cable. The cable shall be of sufficient length to lower the cover panel to the ground.

Any column which is modified by any new works (including changing the luminaire) shall have the access link panel upgraded to meet the current requirements, if required. This includes, as a minimum, the link panel meeting current Standards and the provision of cover earthing as outlined above.

3.2.4 Non-lighting equipment

Where non-lighting equipment is proposed to be mounted onto a TCCS asset, a rental agreement shall be undertaken.

All cabling for the additional equipment shall be segregated from the lighting cabling in accordance with Australian Standards. Additional conduits shall be provided within the column for cable reticulation of non-lighting equipment. Any cable joints or connections shall be installed within a permanently fixed IP rated junction box mounted on the link panel.

The installation of non-lighting equipment requires assessment of the circuit capacity and cable installation. For small additional loads (e.g., Wi-Fi router, CCTV camera, equipment with a load under 100W), this assessment can be undertaken in a similar manner to adding a luminaire of an equivalent load. For larger loads (e.g., power outlets or equipment over 100W) a more detailed assessment of the circuit is required. In the case of adding power outlets to the circuit, detailed information on the proposed connected loads shall be provided to the designer for assessment.

4 Documentation

4.1 Design Documentation

Design acceptance requirements are outlined in TCCS [Reference Document 6 – Requirements for design acceptance submissions](#). Reference Document 6 establishes mandatory design requirements to be included in any submission requesting design acceptance for proposed public infrastructure works.

Requirement: Comply with TCCS [Reference Document 6 – Requirements for design acceptance submissions](#).

4.1.1 TCCS Streetlight Guideline for Third Party Works

The Streetlight Guideline for Third-Party Works is an advisory guide prepared to inform any Third-Party applicants who intend to undertake work on the streetlight network of the necessary requirements before making a booking an isolation or energisation.

TCCS [Streetlight Guideline for Third-Party Works](#) can be retrieved from the TCCS website.

4.1.2 Design Review

When TCCS is requested to review the streetlighting design, they shall be submitted to TCCS with the following information:

- Point of supply (e.g., standalone/pillar/pad mount/chamber/pole mounted)
- Method of control of the lights
- Voltage drop at the light positions at the end of every run (including ends of branches)
- Earth fault loop impedance
- Schedule of proposed 'normally open points'
- The categories (as defined by the relevant Australian Standard) of lighting included in the design
- For vehicular traffic (Category V) lighting, the information listed in Appendix C of AS1158.1.1 Documentation Required for Demonstrating Compliance with this Standard
- For lighting in accordance with AS/NZS 1158.3.1 (Category P) provide installation design data in accordance with Appendix C of AS/NZS 1158.3.1
- Electricity Utility connection approval where required

TCCS may request, at their discretion, a copy of any relevant design calculations for review and assessment.

4.1.3 Asset Numbers

Asset numbers shall be requested from TCCS on successful approval via the online Smart Form:

<https://form.act.gov.au/smartforms/servlet/SmartForm.html?formCode=1416>

The designer or contractor shall pay for the provision of asset numbers when submitting the above form. Asset numbers shall appear on the design when submitted to TCCS for final approval. The Contractor shall fix the numbers to the asset in accordance with [MITS 12 Public Lighting](#).

4.2 Work As Executed Documentation

4.2.1 General

TCCS [Reference Document 8 – Requirements for works as executed records](#) establishes the requirements for documentation to be included in Operational Acceptance or Practical Completion submissions lodged upon completion of the Works.

Requirement: Comply with TCCS [Reference Document 8 – Requirements for works as executed records](#).

5 Standard Drawings

5.1 Public Lighting

5.1.1 Wiring, Cables, and Information

Drawing Name	Drawing No.
Blank Panels for Streetlight Columns	ACTSD-4001
Minor Streetlight Panel for Integral Luminaires on Concrete Post Top Columns	ACTSD-4002
Slip Base Panel Layout Wiring Diagram	ACTSD-4003
Slip Base Column Base Wiring	ACTSD-4005
Single Line Diagram for Ground Mounted Streetlight Control Cubicle	ACTSD-4015
Streetlight Control Cubicle	ACTSD-4016
Streetlight Control Cubicle Evoenergy Service Connection Arrangement	ACTSD-4017
MEN Earthing of Streetlight Columns	ACTSD-4020
Streetlighting 1 Ø Neutral Screen Straight Through Joint	ACTSD-4021
Streetlighting 3 Ø Neutral Screen Straight Through Joint	ACTSD-4022
Streetlight Column Identification Plate	ACTSD-4023

5.1.2 Footings

Drawing Name	Drawing No.
Streetlighting Column Installation	ACTSD 4051
Concrete Footing Details & Streetlight Control Cubicle	ACTSD 4052

5.1.3 Columns

Drawing Name	Drawing No.
Complap Concrete Streetlight Column	ACTSD-4101
4.5 m Post Top Tapered Streetlight Column Bas Mounted	ACTSD-4103
6.5 m Tapered Streetlight Column with Ladder Rest Direct Buried	ACTSD-4104
6.5 m Single Tapered Octagonal Direct Buried	ACTSD-4105
9.0 m Impact Absorbing Column Direct Buried	ACTSD-4107
10.5 m Impact Absorbing Column Direct Buried	ACTSD-4109
12.0 m Impact Absorbing Column Base Plate Mounted	ACTSD-4110
12.0 m Impact Absorbing Column Direct Buried	ACTSD-4111
6.5 m Dual Tapered Octagonal Direct Buried	ACTSD-4115
6.5 m Decorative Column Direct Buried	ACTSD-4116
4.5 m Single Forde Decorative Column Direct Buried	ACTSD-4117
4.5 m Post Top Forde Decorative Column Direct Buried	ACTSD-4118
6.5 m Dual Multi Height Forde Decorative Column Direct Buried	ACTSD-4119
6.5 m Single Forde Decorative Column Direct Buried	ACTSD-4120
9.0 m Single 4.5 m Forde Decorative Column Direct Buried	ACTSD-4121
9.0 m Single 3.0 m Forde Decorative Column Direct Buried	ACTSD-4122
Canberra Multipole Streetlight	ACTSD-4123
12.0 m Tapered Octagonal Column Base Plate Mounted	ACTSD-4124

5.1.4 Outreach Arms & Brackets

Drawing Name	Drawing No.
Electrical Pole Bracket	ACTSD-4151
Streetlight Bracket Arm for Wood Poles	ACTSD-4152
0.5 m Outreach Pole Mounted Bracket	ACTSD-4155
1.5 m 4-way Pipe Outreach Arm	ACTSD-4156
Decorative Hook Outreach	ACTSD-4157
1.5 m Single Outreach Arm	ACTSD-4159
3.0 m Dual Outreach Arm	ACTSD-4160
3.0 m Single Outreach Arm	ACTSD-4161
VPACTORW3.7D Dual 3.5 m Outreach	ACTSD-4162
VPACTORW3.7D-90 Dual 3.5 m Outreach 90 Degree	ACTSD-4163
VPACTORW3.75S 3.5 m Single Outreach	ACTSD-4164
4.5 m Dual Outreach Arm	ACTSD-4165
4.5 m Single Outreach Arm	ACTSD-4166
4.5 m Dual 90 Degree Outreach Arm	ACTSD-4167
Galvanised Steel Spigot Adaptor to Suit 3.5 m Post Top Column	ACTSD-4168

5.1.5 Luminaires

Drawing Name	Drawing No.
Pre-Approved Luminaire Table	ACTSD-4201

5.1.6 Road Classification

Drawing Name	Drawing No.
Road Classification Sheet 1	ACTSD-4210
Road Classification Sheet 2	ACTSD-4211

5.1.7 Column Setbacks & Clearances

Drawing Name	Drawing No.
V Category Lighting Streetlight Column Offsets Sheet 1	ACTSD-4251
V Category Lighting Streetlight Column Offsets Sheet 2	ACTSD-4252
P Category Lighting Streetlight Column Offsets Sheet 1	ACTSD-4261
P Category Lighting Streetlight Column Offsets Sheet 2	ACTSD-4262
P & V Category Lighting Services & Barrier Clearances	ACTSD-4271

Appendix A

Heritage Lighting Design and Maintenance Policy

Objective

The objective of this policy is to conserve remaining original heritage light fittings, posts and poles, and where replacement is necessary to nominate suitable modern fittings so as to achieve a uniformity of pedestrian lighting fixtures which are sympathetic to the style of original lighting in each precinct, and which prevents an ad hoc approach to conservation, maintenance and replacement.

Scope

This policy relates to the conservation and replacement of all public lighting assets in the following residential precincts as listed in the ACT Heritage Places Register.

Table A-1 Heritage Lighting Locations

Heritage Lighting Locations		
Alt Crescent	Corroboree Park	Reid
Barton	Forrest	Tocumwal
Blandfordia 5	Kingston	Wakefield Gardens
Braddon	Redhill	

This policy includes all public lighting assets in any street bounding a residential heritage precinct.

Process

Public lighting assets due for replacement or repair shall be checked against the Heritage Register. Items in residential heritage precincts or streets that are adjacent to heritage precincts will be identified and will trigger the use of this policy. Resources from the ACT Heritage Register and ACTmapi Heritage Map Viewer provide further information and guidance.

Policy

Luminaires

- All original light fittings shall be conserved in their existing locations.
- Original fittings shall be properly maintained.
- Every effort shall be made to repair existing fittings rather than replace them. Repairs shall not detract from overall appearance.

- Every effort shall be made to upgrade existing fittings to modern technological or functional standards rather than replace them. Upgrading shall not detract from overall appearance.
- Existing original fittings shall be replaced only where repair is technically or financially unreasonable. Replacement items shall be in accordance with the recommendations for each precinct.
- Removed fittings including non-operational fittings shall be returned to TCCS in as found condition so that they can be reused, repaired or recycled (components salvaged to maintain remaining heritage luminaire).
- Fittings deemed necessary for adequate pedestrian lighting shall be installed in accordance with this Policy.
- Where existing original pedestrian lighting is inadequate for roadway illumination the existing fittings shall be conserved or replaced in accordance with this Policy and supplemented with modern outreach roadway lighting to meet illumination requirements.

Lamp Posts and Poles

- Original lamp posts and poles shall be conserved in their existing locations.
- Original fittings shall be properly maintained.
- Every effort shall be made to repair existing fittings rather than replace them. Repairs shall not detract from overall appearance.
- Every effort shall be made to upgrade existing fittings to modern technological or functional standards rather than replace them. Upgrading shall not detract from overall appearance.
- Original fittings shall be replaced only where repair is technically or financially unreasonable.
- Replacement items shall be in accordance with the recommendations for each precinct.
- Suitable National Capital (NC) Columns from outside heritage precincts shall be replaced with modern columns and stockpiled for use as replacements in heritage precincts where nominated below.
- Where re-location of original NC Columns is judged infeasible replacement columns shall be 3.5 m high tapered galvanised steel known as *National Construction Code* (NCC).
- Original Federal Capital Commission (FCC) Columns are extremely rare and shall be conserved in their existing locations for as long as possible. They are known to exist outside Manuka Pool (pair), Griffith, outside Screen Sound, Acton (pair) and one fitting in Murray Crescent, Griffith. When replacement is unavoidable stockpiled original NC Columns shall be installed. Where more than one original FC column is found at a particular place and one requires replacement, all columns shall be replaced regardless of condition.
- Existing timber poles shall be retained and replaced, when necessary, with the same.
- Existing non-FCC and NC columns shall be replaced, when necessary, with 3.5 m high tapered galvanised steel known as NCC. If higher than 3.5 m, available columns of the required height shall be used.
- Where serviceable columns are removed, these shall be returned to TCCS in as found condition for refurbish and re-use.

Fittings Schedule by Precinct

The following schedule is the Policy for replacement of light fittings, posts and poles for each heritage precinct when replacement is permitted under this Policy. Numbered alternatives indicate priorities.

Table A-2 Fitting Schedule by Precinct

Precinct	Luminaire	Support
Alt Crescent	Darwin Canopy Lantern	1. Relocated original NC column 2. NCC 2005
Barton	Darwin Canopy Lantern	1. Relocated original NC column 2. NCC 2005
Brassey House	Relocated original or reproduction brass lantern subject to approval by Heritage Council	Original NC column
Blandfordia 5	Darwin Canopy Lantern	1. Original NC column relocated 2. NCC 2005
	Modern outreach arm	Timber or steel pole depending on existing being replaced
		Conserve FCC column in Murray Crescent
Braddon	Reproduction Radial Wave on decorative steel bracket	Timber pole
	Supplementary modern roadway lighting where Category V required	Steel outreach arm
	Conserve reproduction lanterns at Gorman House	Relocated original NC columns
Corroboree Park	Reproduction Radial Wave on decorative steel bracket to park perimeter and opposite sides of bounding streets	Timber pole
	Selected modern outreach arm elsewhere	Timber or steel pole
Forrest	Darwin Canopy Lantern	1. Original NC column relocated 2. NCC 2005
	Selected modern outreach arm	Timber or steel pole

Precinct	Luminaire	Support
Kingston	Selected modern outreach arm	Timber or steel pole
Redhill	Darwin Canopy Lantern	1. Original NC column relocated 2. NCC 2005
	Selected modern outreach arm	Timber or steel pole
Reid	Reproduction Radial Wave on decorative steel bracket	Timber pole
	Darwin Canopy Lantern	1. Original NC column relocated 2. NCC 2005
	Selected modern outreach arm	Timber or steel pole
Tocumwal	Darwin Canopy Lantern	1. Original NC column relocated 2. NCC 2005
	Selected modern outreach arm	Timber or steel pole
Wakefield Gardens	Selected modern outreach arm	Timber or steel pole

Appendix B

ACT Smart City Network

Objective

To establish and expand the Territory Smart City network to provide the capability and capacity to undertake future Internet of Things initiatives for the benefit of the ACT economy and community.

Background

The Smart City network is defined as IEEE 802.15.4G technology and Wi-SUN compliant mesh network with connectivity to a network management system.

The Smart City network provides remote monitoring and control of individual luminaires through the installation of Smart Nodes and provides capability for connecting additional smart city devices and equipment.

The network will be made available to third-party stakeholders to connect compatible devices to undertake future Internet of Things initiatives.

Benefits

Smart City infrastructure has been installed on existing public streetlighting assets to provide full coverage across the urban areas of the ACT.

The Smart City network includes capabilities to automatically identify and detect public lighting faults, provide real-time asset information, profiles demand and measures performance. Forty-six 'access points' and 30,000 'smart nodes' are being installed on existing streetlight infrastructure to establish a fully capable Smart City network.

Design considerations

Engineers designing public lighting infrastructure in the ACT should consider the Smart City network as part of their design considerations. Existing Smart Nodes can be reused in the exact same location or they should be returned to TCCS.

Public lighting designs in the ACT should specify the method of control through individual Smart Nodes integral with each luminaire via a NEMA base. All luminaires installed as new public lighting shall have a Smart Node.

All Smart Nodes installed on the public lighting infrastructure are to be compatible with the Itron ACT Networking Specification for the Smart City network.

Smart Nodes installed on public lighting infrastructure shall have the Media Access Control (MAC) address for each public lighting asset number within a schedule.