

Chapter 19

**Street  
Lighting**

# 19 Street Lighting

## 19.1 Introduction

**Purpose** This document provides a guide to everyone involved in the management and design of public lighting installations on Auckland Transport routes or associated infrastructure. Its application will ensure that consistent standards are maintained.

**Differences from standards** Where clauses in this chapter differ from the standards referred to, this document takes precedence. See Section 19.9 for a list of differences.

**Updating** This document will be reviewed and updated from time to time. Please make sure you use the most up to date version.

**Scope** The scope of the document is outlined below.

Includes	Excludes
Outdoor car parks	Building facades
Pedestrian and cycle paths	Building interiors
Pedestrian crossings	Council parks
Public precincts, e.g. for shopping	Indoor car parks
Roads	Signs
Steps, stairs, ramps, subways and footbridges	Sports fields
Walkways & Access ways	Private Roads

**Principles of street lighting** Part of Auckland Transport's role is to ensure that the public lighting network is attractive, of good quality, easy to maintain, and cost effective. Public lighting is there to provide a safe environment for pedestrians and vehicles and to discourage illegal acts. At the same time, care must be taken to minimise spill light onto neighbouring properties and upward light (sky glow).

**Other consents** Note that lighting may require resource and building consents, unless it is street lighting in a designated public road.

**→ Read governing principles first** Before reading the rest of this chapter, please read the Asset Management Guidelines on street lighting. This is available [here](#).

## 19.2 Applicable standards

### Design standards

Street lighting must be designed in accordance with all applicable New Zealand standards, including the current version of AS/NZS 1158 *Lighting for Roads and Public Spaces*.

### Legal Frameworks & Regulatory

All works must be carried out in accordance with all relevant statutes, bylaws and regulations, e.g.:

- The Electricity Act 1992, Electricity Regulations 2010, the relevant Electrical Codes of Practice (ECP) referred to in this, and relevant standards referenced in ECP3.
- New Zealand Radio Interference Notices 1958 and 1985 and Radio (Television) Interference Notice 1961.
- Electrical Safety Act 1992.
- Electrical Safety Regulations 2010.
- Health and Safety Employment Act 1992.
- Health and Safety Amendment Act 2001 and regulations.
- Relevant Statutory Acts, Regulations and Bylaws.
- The requirements of Network Supplier's Health and Safety Standards (NHSS).
- AS/NZS3000 – *Australia/New Zealand Wiring Rules*.
- AS/NZS1158 – *Lighting for Roads and Public Spaces*.
- AS/NZS 7000 - 2010 *Overhead Line Design*.
- NZ Transport Agency Infrastructure Design Standard (IDS) M30:2014 *Specification and Guidelines for Road Lighting Design*.

## 19.3 Lighting design

### 19.3.1 Road Classification

Lighting requirements are largely determined by the road classification and sub-category. The road classification and sub-category are specified by Auckland Transport, and may change over time.

The AS/NZS 1158.1.1 and AS/NZS1158.3.1 standards should be used to determine the appropriate lighting classification and sub-category. To assist this process, use the V and P Category Calculator Tools in Appendix G.

The road classification and sub-category must be agreed by the Auckland Transport Team Leader Street Lights before the design process begins.

### Access ways

Access ways must be lit to the appropriate P category, as set out in the current version AS/NZS1158 3.1. Table 2.2 of that document defines the criteria for determining the lighting subcategory. Then use the Auckland Transport P Category Calculator Tool (Appendix G) to assist with the classification.

Where access ways are bordered by wooden fencing on the residential property boundary, light spill over these properties must be limited.

Luminaires must be pole top mounted to allow access from a ladder.

### Other spaces

Other spaces (e.g. public precincts, transport terminals) will be classified as per AS/NZS 1158 Part 3.1.

## Lighting design

The lighting design must comply with requirements set out in the *Auckland Transport Code of Practice* as well as the current version of:

- AS/NZS 1158 and all current parts.
- AS 4282 for control of the obtrusive effects of lighting.
- ECP34 Electrical Code of Practice.

## Checklist

The checklist below must be completed when submitting a proposed lighting design for approval.

<b>Lighting Design Submission Checklist</b>	
<b>1. Initial considerations</b> a. A holistic approach to the lighting design has been considered. b. A night site visit (where applicable) has been completed, identifying features such as CCTV cameras, trees and neighbouring properties.	<input type="checkbox"/> <input type="checkbox"/>
<b>2. Area classification</b> An appropriate lighting sub category classification has been agreed with Auckland Transport for all roads with the design scheme. The lighting classification/sub category for each road is:	<input type="checkbox"/>
<b>3. Light source</b> Define which light source has been utilised in the design – LED, ceramic metal halide or high pressure sodium. <i>Generally, a LED luminaire included in the Auckland Transport approved list must be used in all new designs, for both Category P and Category V roads.</i> The light source for each road is:	
<b>4. Luminaire selection</b> Only luminaires included on the Auckland Transport LED (Appendix F) road lighting specification approved lists are being used in the design scheme. <i>Alternative luminaires (including those in Appendix E) may be submitted for approval on a specific project, however these will have to be assessed against the standards in Appendix A and Appendix B and must be approved by Auckland Transport before design begins.</i>	<input type="checkbox"/>
<b>5. Lighting column</b> Only lighting columns on the Auckland Transport Lighting Column (Appendix D) Specification Approved List were used in the design. <i>Alternative lighting columns may be submitted for approval on a specific project. However, these will have to be assessed against the respective standards in Appendix C and must be approved by Auckland Transport before design begins.</i>	<input type="checkbox"/>
<b>6. Electrical considerations</b> Electrical reticulation has been specified (where applicable).	<input type="checkbox"/>
Prepared By:      Date:	
Checked by:      Date:	



### 19.3.2 Design criteria

- Maximise spacing** The lighting design must maximise the spacing between luminaire positions by optimising the mounting height, luminaire type and lamp output.
- Power vs. spacing** For category P3 and P4 roads, one of the primary objectives is to reduce the luminaire power to less than 28W per luminaire. Designs using luminaire power above 28W will only be considered if this yields significant gains in the spacing of lighting columns.
- Lighting spill** The lighting design must minimise glare and light spill onto neighbouring properties and environment. Designs must show horizontal isolines.
- AS/NZS 1158 *Lighting for Roads and Public Spaces* gives requirements on the obtrusive effects of public lighting. Further guidance is provided in AS 4282 *Control of the Obtrusive Effects of Lighting*.
- In addition:
- The maximum tilt for a luminaire must be 5° from the horizontal. Tilts of up to 10° from the horizontal may be used in exceptional cases, at Auckland Transport's discretion.
  - The threshold increment along the road must be no greater than 10%, with the pedestrian traffic lights as well as the adjacent street lights included in the calculation.
  - External screens may not be used.
- Luminous intensity** For new designs, Auckland Transport is currently assessing the luminous intensity at Gamma 80 with a view to limiting the light output to 400 cds. As part of the design submission, the luminous intensity must be considered and the Gamma 80 lumens stated.
- ### 19.3.3 Trees and road lighting luminaires
- Coordinate trees and planting** There is no simple single solution for roads or streets with existing trees. However, the placement of lighting columns should always be coordinated with the trees to provide an acceptable urban landscape.
- Existing trees** For mature tree-lined roads with trees on one side, poles should be on the opposite side. If there are trees on both sides, lighting columns on each side may be required, located midway between trees, with long outreach arms to reach out under the canopy. Pruning trees as part of the design is not recommended, as this would require ongoing maintenance.
- Lighting columns should be located at least 5m from the centre of any tree. Place street light columns where the tree root structure cannot interfere with underground cabling or other underground services, unless tree pits are used to confine the root structure.
- New subdivisions** In new subdivisions, lighting columns must be located first to provide the correct lighting levels in accordance with AS/NZS 1158 and this manual. Only then should trees be placed to create the future daytime aesthetics. Consider the potential impact of shadows from road lighting when the trees are mature. Exercise care when selecting the species of trees and positioning them relative to street lights.

Also consider the use of 6m poles in treed subdivisions. This will result in additional lights, but will better distribute light onto the road from under the tree canopy and limit light spill.

#### 19.3.4 Overhead reticulation

If there is overhead reticulation, consult with the power and telecommunications utilities. Consider supplementing the light from the other side of the road. Brackets on distribution company poles must comply with their standard.

#### 19.3.5 Maintenance factor

The design engineer should use the maintenance factor provided by the luminaire supplier. Calculations may be requested.

### 19.4 Lighting columns

#### 19.4.1 Compliance

→ [Compliance, Appendix C](#)

All street light columns must comply with the *Street Lighting Column Specification and Assessment Methodology* in Appendix C. All columns used in design must be on the approved list.

[Numbering](#)

Each column must be individually numbered at time of manufacture, together with the month and year of manufacture. In addition to the unique column number, a QR code must be attached for easy on-site data access. These labels must be 2m above ground level.

#### 19.4.2 Lighting column location within the road reserve

[Minimum set back](#)

The minimum column set back, from kerb face to the face of the column, must be 450mm, unless otherwise agreed with Auckland Transport.. At intersections it is recommended that columns are placed at the back of the footpath.

[New subdivisions](#)

In new subdivisions, lighting columns must be located:

- a) At the common boundary between adjacent property lots OR
- b) On the build-line, i.e. the corner of a building within the property lot. (This is particularly relevant in regards to point c below.)
- c) Within 15m of the corner if it is the first lighting column in a side street. Measure from the kerb-line of the street that vehicle has turned from. The column should be on the driver's left side.

[Footpaths](#)

Street lighting columns should be clear of footpaths. Where this is not possible, place them towards the back edge of the footpath. Maintain a clear 1.5m minimum footpath space.























































*Note: If any column submitted does not comply fully with the above points, please provide all the necessary information (i.e. design calculations or manufacturer's warranty) for alternative design consideration.*

**New Zealand Distributor**

Company Name:

Contact Name:

Position:

Phone Number:

Email Address:

Signature:

Date:

Draft

C5.2 Detailed independent assessment

Verify initial evaluation

The checklist below show results for the column’s structural performance. This assessment must verify that the initial evaluation is accurate and that the column has no major design issues in relation to the specification outlined above.

Auckland Transport's role

If the lighting column passes this assessment, it may be placed on the approved light column list (Appendix D) at the discretion of Auckland Transport. It is recommended that the supplier of the lighting column pays Auckland Transport a fee of \$1000 to undertake the independent assessment. This will demonstrate the commitment of the supplier to the quality, performance and support of the product.

<b>Detailed Independent Assessment: Verification of Initial Evaluation Checklist</b>		
	<b>Aspect</b>	<b>Result</b>
<b>1</b>	Height and Outreach Length	Pass/Fail
<b>2</b>	Tilt Angle	Pass/Fail
<b>3</b>	Permanent Design Load	Pass/Fail
<b>4</b>	Wind Design Load	Pass/Fail
<b>5</b>	Structural Steel Thickness	Pass/Fail
<b>6</b>	Steel Properties	Pass/Fail
<b>7</b>	Deflections	Pass/Fail
<b>8</b>	Dynamic Response	Pass/Fail
<b>9</b>	Switchboard Door Cavity Opening	Pass/Fail
<b>10</b>	Protective coating	Pass/Fail
<b>11</b>	Base Section	Pass/Fail
<b>12</b>	Welding	Pass/Fail
<b>13</b>	Design Life	Pass/Fail
<b>Identify any issues with the column</b>		
<b>Recommend Column for Auckland Transport Approved Column List</b>		<b>Yes / No</b>
<b>Assessment Completed By:</b>		
Company Name:		
Contact Name:	Position:	
Phone Number:	Email Address:	
Signature:	Date:	

## Appendix D

### Lighting column approved list (AT-LCAL)

Lighting Column Approved List (AT-LCAL)					
Manu- facturer	Model Name/Number	NZ Supplier	Road Category	Date Approved	Notes
<b>Street Light Column</b>					
Vicpole	Vicpole 6m; 8m	ADLT	P		
HiSpec	HiSpec slim square 6m; 8m; 10m	HiSpec	P sub- divisions	3/03/2014	Subdivisions only.
Kendellier	Round steel tapered 6m; 8m	Kendellier		3/03/2014	
Spunlite	Octagonal 6m; 8m; 10m; 12m	Spunlite	P & V	3/03/2014	
Steelgal	Octagonal tapered steel columns supplied in sections 6m; 8m; 10m; 12m; 14m Tamaki round steel column; AT MFP pole (Elliott Street style) Approved flange and shear base mounting plus double outreach arms for each size pole.	Steelgal	P & V	3/03/2014	Approval extended to double outreach arms and flange and shear base mounting for each pole size.
CSP Pacific Ltd	Octagonal tapered steel columns supplied in sections 6m; 8m; 10m; 12m; 14m Tamaki round steel column; AT MFP pole (Elliott Street style) These size poles approved for flange and shear base mounting.	CSP Pacific Ltd	P & V	3/03/2014	
GESS	Steel tapered section octagonal poles 6m, 8m, 10m, 12m and 14m	GESS	P & V		
GESS	Tamaki round steel column; AT MFP pole (Elliott Street style)	GESS	P & V	3/03/2014	

*Note: The street light luminaire performance and data will be assessed from time to time. This could result in the need to reassess the product for inclusion on the approved list. Should this be necessary the supplier will be advised.*

## Appendix E

### Road lighting HID approved list (AT-HALL)

Road lighting Auckland Transport - HID approved list (AT-HALL)					
Manu- facturer	Model Name/Number	NZ Supplier	Road category	Date Approved	Notes
<b>Category V</b>					
AEC	KAOS1	Tech Light	V	31/10/2011	
AEC	KAOS2	Tech Light	V	31/10/2011	
Schröder	Ambar2	Betacom	V	31/10/2011	
Schröder	Ambar3	Betacom	V	31/10/2011	
<b>Category P</b>					
AEC	KAOS1	Tech Light	P	31/10/2011	
Schröder	Ambar2	Betacom	P	31/10/2011	
Schröder	Nano	Betacom	P	31/10/2011	
<b>Pedestrian Crossing ( Zebra )</b>					
AEC	KAOS 1 OPSX/OPDX	Tech Light	Ped	31/10/2011	
Schreder	Amber /Ped	Betacom	Ped	23/07/2014	CosmoPolis lamp - low CCT (2900k) and low CRI (65) compared to MH lamp. (AS/NZS 1158.4)

*Note: The street light luminaire performance and data will be assessed from time to time. This could result in the need to reassess the product for inclusion on the approved list. Should this be necessary the supplier will be advised.*

## Appendix F

### LED approved luminaire list (AT-LALL)

Auckland Transport LED approved luminaire list (AT-LALL)					
Manufacturer & Luminaire	Luminaire Model	System Wattage (W)	LED Count /Module	Category	Supplier
AEC A2 LED	A2 LED	37 - 71	20-30	P only	Techlight
AEC LED-in (ST/OC)	4.5-18 - 4.5-90	28-145	18-90	P and V	
	4.7-27 - 4.7-54	60-118	27-54	P and V	
AEC Italo	Italo 1	15 - 35	1 - 2 M	P only	Techlight
	Italo 1	15 - 103	1 - 4 M	V	
	Italo 2	60 - 154	4 - 8 M		
	Italo 3	132 - 289	7 - 15 M		
DLEDS Stratos	Stratos N 6M W23A only	12 - 35	6	P only	Globelink
Betacom GL520P	GL520 Premium Driver - Optic 5032	29 (33 max)	24	P only	Betacom (1988) Ltd
Scheder Teceo	Teceo 1 - Optic 5068 Only	35 max	24	P only	
	Teceo 2 - Optic 5118 Only	86 - 279	80 - 128	V only	
Iguzzini Wow	Wow Mini - BU59/60/62/63	37/29/31/35	24	P only	ECC Limited
	Wow Small- BH34/38/41	38/68/80	24	P and V	
	Wow Large - BH59/60	118/116	24	V only	
CREE	LEDway XIL 3M Optic 'Series E'	Up to 35	20 (525mA)	P only	Advanced Lighting Technologies
	LEDway XIL 3M Optic 'SeriesE'	Up to 35	30 (350mA)	P only	
	LEDway XIL 'Series E'	35 - 279	Up to 120	V only	
	Edge Round/Square Series E	Up to 66 (max)	40 (350mA)	P only	
	XSP1	52	N/A	V only	
	XSP2	101 - 153	N/A	V only	
LED Roadway Lighting (LRL) NXT Series	NXT-24S - 4AH	28 (max)	24	P only	EnergyLight
	NXT-48M	53 - 108	48	V only	
	NXT-60M	65 - 133	60		
	NXT-72M	78 - 158	72		
Orangetek Ltd	TerraLED Mini WX1 & MX1	12 - 36	12 - 30	P only	Orangetek Ltd
Philips	Stela+Gen 2	36 (max)	24	P only	Kendellier Lighting
Sylvania	StreetLED ( Aero screen only )	26.7	18	P only	Aesthetics Lighting
KTL	KTL Shard	28	Cluster	P only	Brilliant Limited

Note: The blue shaded areas are the luminaires suitable for subdivisions. This is the approved list as at August 2015.



## Appendix G

### V and P Category Calculator Tools for Road Classification

V category calculator tool <https://at.govt.nz/media/1972108/street-lighting-category-v-road-calculator.xlsx>

P category calculator tool <https://at.govt.nz/media/1972107/street-lighting-category-p-road-calculator.xlsm>

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