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12. Utilities and Lighting

It is the purpose of this section of the Engineering Code of Practice (ECOP) to set out design requirements and considerations for utilities and lighting that will be installed as the result of a Resource Consent or Capital Works Project.

The first part of this section will cover Utilities. Utilities are defined as services (power and telephone) that are installed within the Road Reserve but will not be maintained or owned by the Council. The design requirements of the utilities themselves are not covered here but can be obtained from individual operators. To achieve good outcomes, view The National Code of Practice for Utility Operators' access to Transport Corridors on the working road-share and the objectives agreed by the industries

The second part of this section explains Council's lighting design requirements, where lighting is (or will be) managed by the Council and connected to the electricity operator's street lighting network. Orion NZ Ltd is the current electricity operation owning the power lines, power poles, power cables, power transformers and cabinets.

It covers lighting design requirements for both privately funded developments such as subdivisions and Council funded new installation projects or upgrading of existing installations.

It details Council's lighting design requirements for roads, service lanes, cycle ways, footpaths through reserves and other pedestrians accessways and areas.

The lighting requirements in addition to those in the ECOP are subject to the provisions of the District Plan and applicable statutes, regulations, and bylaws

For construction guidance, unless stated below, SDC defer to the CCC CSS.

12.1 Referenced Documents and Legislation

Refer Part 1 'Referenced Documents', in addition to the following:

Planning:

- Electricity Act 1992.
- Resource Management (National Environmental Standards for Telecommunication Facilities) Regulations 2016 (link here)
- Electricity (Safety) Regulations 2010 (link here)
- Radiocommunications Regulations 2001 (link here)

Design:

- NZUAG The National Code of Practice for Utilities' Access to the Transport Corridors http://nzuag.org.nz/national-code/
- Worksafe Guide for Safety with Underground Services www.business.govt.nz/worksafe/information-guidance/all-guidance-items/
- New Zealand Code of Practice for Electrical Safe Distances NZECP 34: 2001 https://worksafe.govt.nz/laws-and-regulations/standards/electricity-standards-and-codes-of-practice/
- Christchurch Central Streets and Spaces Design Guide
- Strategic Guidance – https://ceraarchive.dpmc.govt.nz/sites/default/files/Documents/streets-and-spaces-design-guide-june-2015-full-document.pdf

- Technical Guidance – https://www.otakaroltd.co.nz/assets/BalanceOfLand/streets-and-spaces-technical-guide-dec-2015-full-document.pdf
- Orion NW72.21.01 Conditions for Connecting Equipment to Orion's Lighting Network
- Waka Kotahi M30 Specification and Guidelines for Road Lighting Design www.nzta.govt.nz/resources/specification-and-guidelines-for-road-lighting-design/index.html
- Waka Kotahi M26: 2012 Specification for Lighting Columns www.nzta.govt.nz/resources/lighting-columns;
- AS/NZS 1158 Set Lighting for roads and public spaces – series
- AS/NZS 3000:2007 Wiring rules and companions set
- AS/NZS CISPR 15:2011 Limits and methods of measurement of radio disturbance characteristics of electrical lighting and similar equipment
- Engineering New Zealand Practice Note 02 Peer Review – Reviewing the work of another engineer www.engineeringnz.org/resources/practice-notes-and-guidelines.

Where a conflict exists between any Standard and the specific requirements outlined in this Code of Practice, the Code of Practice takes precedence (at the discretion of Council).

12.2 UTILITIES – COUNCIL REQUIREMENTS

The planning requirements for the provision of installation of utilities are set out in The District Plan.

Ensure that the appropriate resource consents are obtained for work in the vicinity of protected trees and that the work is carried out in accordance with CSS: Part 1 Section 22 Protection of Natural Assts and Habitats.

12.3 NETWORK UTILITY OPERATOR REQUIREMENTS

Ensure that the design and construction of any network to be adopted by a utility operator complies with their standards.

Electrical design standards are written by the individual electrical utility operators to comply with the requirements of the Electricity Act and its associated regulations.

Telecommunications design standards are also written by the telecommunication utility operators. The telecommunications network is a series of separate networks with some interconnection.

Details of network utility operators can be found at:

www.ccc.govt.nz/consents-and-licences/construction-requirements/network-utility-operators/

Selwyn operators for specific utilities include:

Energy

- Orion (electricity)
- Connetics (electricity, lighting)
- Genesis (gas)

Telecommunications

- Enable
- Spark
- Vodafone
- 2 Degrees

12.4 UTILITIES – DESIGN

The design requirements for utilities will be determined and advised by each utility operator.

This section provides guidance for were utilities interface with Council asset infrastructure.

Where utility crossings occur on bridges and culverts, design all services to be installed on bridges and culverts to enhance the visual qualities of the site. Refer to WWDG Part B clause 13.2 - Bridges and culverts for utility design at bridges and culverts.

12.4.1 Service Plans

Designers are encouraged to access service plans for an indication of likely utilities locations. Utility location providers such as BeforeUDig can provide this service.

Use the latest service plans when preparing engineering drawings. Be aware that:

- Plans should be treated as indicative only, and locations of all services must be confirmed by the Designer/Developer though on-site investigation.
- Developing design based on assumed locations from services plans is at the Designer/Developer's own risk.
- Connections to properties from any service or utility may not be shown. There may also be differences between utility digital data and utility paper plans.

Designers are encouraged to discuss the location of all services with Council, including future planned services that may affect approvals and infrastructure locations.

12.4.2 Location of Utilities

Designers are encouraged to ensure that the design of utilities is fully coordinated with the civil infrastructure design.

For developments or projects that require significant alterations to the existing networks Council encourages the design engineers to raise potential concerns associated with physical works at the Engineering Approval Stage. Discussing significant works and the resulting traffic disruptions that may occur at an early stage with Council will help streamline approvals and design.

Consider the following when planning the layout of a development:

- Utility services are generally installed parallel to road or legal boundaries
- Laterals are perpendicular to the main supply and configured to service individual lots within one meter of a shared boundary wherever possible
- Boundary boxes and distribution pillars are installed together on a boundary junction and clear of likely vehicle access
- Allow for maintenance access

Minimise the cross-sectional area occupied by utility services by detailing shared trenches where practicable. Also consider the possible location of future cabinets in service strips or footpaths.

Consider the following when planning the location and design of structures and their corresponding utility lots:

- Anticipate future accessway locations, and place utility structure as close as possible to property boundaries
- Place and design them to minimise adverse visual impact by integrating them with the design of hard and soft landscaping
- Design to minimise the potential for damage to the structure from vandalism
- Reduce their impact on traffic movement
- Structures must not reduce vehicle sight distances and should not interrupt pedestrian and non-vehicular movement
- Ensure that they do not compromise property rights or access

- Provide access to the structure

Refer to the National Environmental Standards for Telecommunication Facilities for further information regarding telecommunications cabinets.

Some structures may contribute to the environment if designed to enhance the neighbourhood character. The inclusion of these types of structures are encouraged by Council.

Consult comprehensively with the relevant network utility operators regarding the location of utilities and the spacing and final location of the structures. Refer to clause 10.5.3 – Utilities (Reserves, Streetscape and Open Spaces) before considering locating utilities in reserves.

12.4.3 Typical Services Layout and Clearances

There are specific working clearances required between different utility services. Confirm these clearances with the network utility operators before deciding on any utility layout or trench detail. Refer to *The National Code of Practice for Utilities' Access to the Transport Corridors* and *CSS: Part 1* were working around trees. Table 1 (shown below) is included to provide an indication of the clearances necessary between utilities.

Table 1 - Utility Clearances

Utility pairing	Preferred location	Clearance	
		Parallel	Crossing
Water – pressure sewer (rising main): - < 110mm OD - >110 mm OD	Berm	 600 1000	 100
Water – gravity sewer	Carriageway	1000	100
Water – HV power	Carriageway	300	150
Water – stormwater, phone, gas	Carriageway /	450	100
Water submains – sewer, stormwater, gas, phone, low voltage power	Berm/path	300	100
Power – sewer, stormwater	Berm/path	1000	100
Sewer – stormwaters	Carriageway	1000	50
Stormwater – phone, gas	Berm	500	50

*Note: Stormwater assets also include water races and land drainage

Where the clearances in Table 1 cannot be achieved, provide a Non-Conformance Report (refer to 3.6.11 for more guidance)

The installation of Ducts may be suitable where clearances or cover are unavailable.

Where the crossing clearance is under 200mm, consider the use of alternative fillers to metal course, due to difficulties in compaction.

When designing utilities always consider the proximity of overhead power lines. Utilities infrastructure should be designed to provide the clearances required in the Code of Practice for Electrical Safe

Distances. Designers can also refer to The National Code of Practice for Utilities' Access to the Transport Corridors and CSS: Part 1 were working around trees Clause 10.9.11 - Location of trees in streets details root barrier requirements to protect underground power cables for further guidance associated with this issue.

Typically, utilities are installed as indicated in *Table 2* (shown below)

Table 2 - Utility preferred locations

Utility	Location
Sewer	Centrally in the road or ROW formation
Stormwater	Located between the sewer and 1.5m inside the kerb, or Directly under the kerb & channel or Under the median swale or side swale
Watermains	Centre of the side berm (not under the footpath) or In the carriageway with the agreement of Council between 2.0 – 2.5m off the kerb
Submains	150mm off the property boundary
Power	0.6-2.1m from the road boundary 0.6m from the legal boundary in a ROW
Telecoms	Preferably within the berm/footpath
Gas	Preferably within the berm/footpath

Where possible locate service covers outside of potential cycle lanes and wheel tracks within the berm.

New parallel reticulation services shall cross as close as practicable to 45°.

12.4.4 Network Reticulation

The telecommunications layout is not usually designed until the electricity layout is substantially complete - this is an economic decision as the layouts are inter-related and, in land developments, service trenches are shared wherever possible. Ensure that power is provided to telecommunication cabinets, cable television cabinets and amplifiers.

Ensure that drawings sent to the utility designer and the network utility operator show all the existing services. Ideally, these drawings should be the approved subdivision consent or engineering drawings. This reduces the likelihood of conflicts between existing and new services and increases the cost-efficiency of service provision.

12.4.5 Above Ground Utilities

Locate above-ground utilities within legal road to provide the clear zone required by clause 11.13.5 – Clear zones (Roading). Locate street light columns in accordance with 12.10.7– Column locations (Lighting). In addition to clear zone distances within the 50km/hr speed environment, locate new utilities clear of the footpath, at least 1.0m away from kerb cutdowns and at least 0.7m behind the kerb.

12.4.6 Cover to utilities

Provide unprotected pipes less than 100 mm in diameter with a minimum cover of 750 mm below the road surface in carriageways and with a minimum cover of 600 mm in berms. For pipes 100 mm diameter or greater provide a minimum cover of 750 mm in carriageways and 600 mm in berms.

12.5 UTILITIES – CONSTRUCTION

Refer to CCC CSS for guidance unless stated below.

12.5.1 Proposed installation method

There are various methods of installing underground services. These include open trenching, directional drilling, pipe bursting, slip-lining, pipe ramming and thrusting. Refer to Part 6: Wastewater Drainage for further information.

Factors that may affect the choice include the ground conditions, disruption to traffic, presence of trees, site safety, the availability of Council blue ducts and redundant services, e.g. old gas mains or their offsets. Council Roading Hierarchy refers to Arterial and Collector Roads. The preferred method of trenching across these roads is via a trench less method. Council preferred method of trenching in grass or within new developments is via open trench.

When the intention is to lay several utilities in a common trench, ensure the minimum covers and separation distances for each utility in the trench cross-section are obtained. Bedding materials should comply with the network utility operators' requirements.

Specify backfill materials individually. The material used must be capable of achieving the backfill compaction required. All surface restoration must match existing surfaces. Orion has specific requirements for trench restoration on hillsides.

12.5.2 Installing new reticulation within legal roads

Wherever utility services are installed along existing legal roads, the network service operator shall advise Council of its intentions after the utility reticulation layouts are confirmed and obtain approval for new work (unless the works form part of an approved roading design.) This approval will not be unreasonably withheld.

Apply for a Corridor Access Request (CAR) at www.beforeudig.co.nz . Typically, the WAP is obtained after the utility reticulation layouts are confirmed.

The Council's requirements for the restoration of the construction within the legal road should comply with *Construction Standard Specifications (CSS).* Any constraints on the permitted hours of work within that road will be provided by Council. To avoid possible conflicts, ensure that the requirements of the Council approvals are included in any contract documentation.

12.5.3 Pipe Depths

Minimum and maximum covers specified elsewhere in the Code of Practice are summarised in Table 3 (shown below). Where values are not provided, use the manufacturer's specifications or values from the relevant and appropriate standard.

Table 3 - Minimum Pipe Depths

Installation depth for material types (m)	Within carriageway (m)		Other trafficked areas		Un-trafficked areas	
	Min	Max	Min	Max	Min	Max
Rising, vacuum and PSS main			0.75	1.5	0.75	1.5
PSS and vacuum sewer laterals			0.6	1.5	0.45	1.5
Wastewater gravity plastic (LRI <2)	0.75	3.5	0.6	3.5	0.5	3.5
Wastewater gravity other (LRI <2)		3.5		3.5		3.5
wastewater gravity plastic (LRI >2)	0.75	5.0 (or 3.0 below watertable)	0.6	5.0 (or 3.0 below watertable)	0.5	5.0 (or 3.0 below watertable
wastewater gravity other (LRI >2)	wastewater gravity	wastewater gravity	wastewater gravity	wastewater gravity	wastewater gravity	wastewater gravity
Stormwater gravity concrete						
Stormwater gravity plastic	0.75		0.6		0.5	
Watermain >100mm			0.75	1.1	0.75	1.1
Water submain <100mm (metal)			0.5	0.7	0.3	0.7
Water submain <100mm (plastic)			0.6	0.7	0.45	0.7
Enable cables					0.5	

12.5.4 Backfill

Bedding materials should comply with the network utility operator's requirements.

Specify backfill materials individually. The material used must be capable of achieving the backfill compaction requirements set out in *CSS: Part 1* clause 29.0 - Backfilling. The Council approval

specifies the final surfacing to the excavation or refer to the NZUAG *National Code of Practice for Utilities' Access to the Transport Corridors draft April 2011 for* further information.

12.5.5 Marking location

Pipe or cable location details shall be provided to Council for inclusion in Council's records.

The location of the pipe or cable should be clearly marked near the fence line.

12.6 UTILITITES – COMPLETION DOCUMENTS

Once construction has been completed designers are required to provide Council with the following completion documents:

- Confirmation that utilities meet the installation requirements set out by the utility's provider
- Evidence in writing from the utility provider stating that properties located within a township boundary are connected to the utility network
- Evidence in writing from the utility provider stating that the network has capacity to connect properties located outside of the township boundary to the network

12.7 LIGHTING – COUNCIL REQUIREMENTS

Provide quality assurance records that comply with the requirements in Part 2: General Requirements and the Construction Standard Specifications (CSS), during design and throughout construction.

12.7.1 Project Brief

The Council must provide or agree to the lighting requirements for a project before any detailed design is undertaken. These lighting requirements will be specified in a project brief or, for developer-funded projects, in the Council's consent conditions. The project brief does not require updating within 12 months of design.

12.7.2 The Designer

The designer must be suitably qualified and experienced and have an excellent track record in road lighting design. Refer to NZTA M30 Specification and Guidelines for Road Lighting Design and clause 2.7.1 – Investigation and design (General Requirements) for further information. Contact Council or Orion for a list of pre-approved designers for street lighting connected to the Orion network.

The designer must ensure the lighting scheme meets the requirements of the IDS and the CSS. Where the role of the engineer for the lighting component of the project's construction is being undertaken by another party apart from the designer, provide the company and individual's name, qualifications and contact details in the Design Report.

12.7.3 Design Peer Review

Where a peer review is required as a condition of consent, peer review the design in accordance with Peer Review – Reviewing the work of another engineer.

12.8 LIGHTING – DESIGN RECORDS

Provide the following information in addition to that required by NZTA M30 Specification and Guidelines for Road Lighting Design, to support the Design Report defined in clause <<REF>>- Design Report.

A comparative whole of life cost analysis between the options considered:

- Records of any non-compliant design elements and any departures from the design spacing that have been used in the design process in the form required in Part 2 (REF)- Control of non-conforming work
- A safety audit complying with clause (REF)- Safety audit.

12.8.1 Engineering Drawings

Provide drawings complying with clause (REF) - Drawings and NZTA M30 Specification and Guidelines for Road Lighting Design. Title blocks shall include:

- The peer reviewer's name and signature (where a reviewer was specified)
- An amendment box providing for a brief description of each amendment and sign off by the designer and peer reviewer.

12.8.2 Acceptance of design

Submit the Design Report for acceptance under clause 2.10.3 - Engineering acceptance, including the Lighting Design Statement (LDS1) - Design (refer NZTA M30 Specification and Guidelines for Road Lighting Design). Supply the lighting related documents as one package along with ALL other disciplines in the project's Design Report.

Where materials are not ordered within 12 months of the completed design's date of acceptance by Council, the acceptance is revoked.

12.8.3 Engineers Report

The engineer must be suitably qualified and experienced and have an excellent track record in road lighting construction. The engineer may also be the designer but cannot be the contractor.

The engineer must provide in the design report the following:

- Evidence that the lighting installation meets the requirements of the ECOP, the CSS, and best practice
- Any non-conformances with the point above and suitable resolutions for Council approval
- Manage the lighting construction to its conclusion, including regular site supervision and inspection
- Resolve any complaints to the satisfaction of the Council, prior to S224c

12.9 LIGHTING – DESIGN

The lighting design must maximise safety and efficiency while minimising the life cycle cost and impact on the environment.

Design the lighting to blend in with adjacent street lighting, complement the neighbourhood character and, as far as is reasonably practicable, minimise the impact on the neighbouring properties and environment with regard to aesthetics, glare and spill light. Appendix I – Lighting Categories explains how the different categories identified in AS/NZS 1158.1.1 and 1158.3.1 apply to the Council's roads.

Reticulate all 'Greenfields' developments underground. In areas where the existing overhead network is for street lighting only, or where the Electricity Distribution Asset Owner network is underground, cable the power supply for the new lighting underground. The overhead network must not be extended.

The Electricity Distribution Asset Owner network usually determines whether the lighting will have an overhead or underground power supply. When lighting is being upgraded in an area where the

Electricity Distribution Asset Owner network is overhead and is not part of an underground conversion project, use the Electricity Distribution Asset Owner poles to support the lights. Obtain the permission of the pole owner beforehand. This solution minimises the number of poles in that area.

This Part defines the minimum standards, but it is important not to over-design and provide a standard of lighting higher than that required. Ensure that all parts of the lighting installation conform to the following:

- NZTA M30 Specification and Guidelines for Road Lighting Design
- AS/NZS 1158
- Electricity Distribution Asset Owner's requirements
- AS/NZS 3000

Refer to Streets and Spaces Design Guide were designing lighting in the central city. Council prefers lights to be located on columns due to issues securing electricity supply for building mounted lights.

12.9.1 Benefit Cost and Lift Cycle Costing

Where requested by Council as part of a project brief or a resource consent, carry out a benefit cost and/or a life cycle costing for the scheme. Life cycle costing may be used to consider options within a scheme or a scheme as a whole.

In undertaking life cycle costing, consider the initial costs borne by the developer and the maintenance and replacement costs borne by Council. This can include the maintenance costs associated with painted poles versus galvanised poles or the number of decorative luminaires versus higher performing less appealing conventional road lighting luminaires i.e. aesthetics versus operating and maintenance costs.

12.9.2 Street Lighting Materials

Street lighting materials must be specified in the design report for Council approval.

12.9.3 Luminaires

Due to the ever-growing list of M30-approved LED Luminaire SDC prefers to agree luminaire selection with design consultants early to ensure maintenance considerations are incorporated.

Please Note:

- The Light Emitting Diode (LED) luminaires listed above have been selected from the NZTA M30 LED Luminaire approved list assessed by Selwyn District Council and are accepted for use on the Council's Road lighting network. A detailed design is required to determine the best suited luminaire for the application.
- All LED drivers shall be dimmable. Acceptable dimming options are 0-10V or DALI protocols.
- Maintenance Factors (MF) for all Luminaires shall be calculated from data supplied via a certified Test Laboratory and in conjunction with AS/NZS1158.

As lighting technologies are changing rapidly and manufacturer comes and go this list will be updated.

12.9.4 Poles and Outreach Arms

When applying for acceptance for poles and outreach arms, provide the associated manufacturer's drawings, specifications and Producer Statements (PS1).

If non-frangible poles are proposed, clearly state this on the drawings.

The following ground planted frangible column, outreach arm and adaptor drawings provide dimensions which must be achieved to obtain acceptance.

Decorative column shall be using an SDC standard stepped column as a base, additional casting and different outreach arms are acceptable.

- 9.0m octagonal SL column with mitred outreach [PDF, 1 MB]
- 10.0m octagonal SL column with mitred outreach [PDF, 1 MB]
- 11.0m octagonal SL column with mitred outreach [PDF, 1 MB]
- 12.0m octagonal SL column with mitred outreach [PDF, 1 MB]
- Octagonal subdivisional SL column with curved outreach [PDF, 1 MB]
- Octagonal sectional steel column [PDF, 1.1 MB]
- Decorative straight column base for decorative extension and outreach arm [PDF, 1 MB]
- Decorative stepped column base for decorative extension and outreach arm [PDF, 1.1 MB]
- Side mounted straight S302 outreach arm [PDF, 975 KB]
- Side mounted straight S318 outreach arm [PDF, 989 KB]
- Pole top adaptor PA76 – for dia 76mm spigot [PDF, 1.1 MB]
- Twin pole top adaptor PA76 – for dia 76mm spigot [PDF, 1.1 MB]

12.10 LIGHTING DESIGN STANDARDS

12.10.1 Category V (traffic route) lighting

Category V lighting should provide a lit environment conducive to the safe and comfortable movement of vehicular and pedestrian traffic at night and the discouragement of illegal acts. The visual requirements of the motorist predominate.

This lighting is generally provided on the roads with higher traffic volumes – arterial and collector roads.

Design the lighting to comply with AS/NZS 1158.1 Road lighting - Vehicular traffic (Category V) lighting.

Appendix I – Lighting Categories explains how the different categories identified in AS/NZS 1158.1.1 apply to the Council's roads based on traffic volumes and road hierarchy. Table 2 Lighting Category Selection details the existing roads where lighting categories have been specified.

For category V roads LED (3000k, 4000k) lamps are preferred as they have high efficacy, long life and appropriate colour properties. Council may accept the use of 3000k lamps in town centres where the colour rendering and/or colour appearance of 4000k is considered less appropriate.

Permissible lamp and luminaire types must meet the requirements described in NZTA M30 accepted luminaires.

The use of decorative or semi-decorative luminaires is permitted if the design parameters provide an inherent lighting scheme that minimises the life cycle costs and energy consumption. This may mean the designer will need to forward more than one design proposal to demonstrate that the preferred scheme has minimized the life cycle energy of the scheme, commensurate with reliability and cost.

To maximise efficiency and minimise the number of poles/luminaires installed refer to M30.

Painted Poles are acceptable provided the colour is approved by Council, is consistent throughout the network, blends in with adjoining roads or environment and is identified at design stage.

12.10.2 Category P (Local Roads and Pedestrian Area) Lighting

The luminaires must meet the requirements for type 4 luminaires detailed in AS 1158.3.1, Table 2.10.

Specify a minimum maintained illuminance for Category P3NZ of **0.22 lux** and a horizontal illuminance uniformity U_P (that is, the ratio of maximum horizontal illuminance to average horizontal illuminance within a defined area) less than or **equal to 10**.

Specify mounting heights:

- Between 6.0m and 7.5m in residential areas
- Between 7.0m and 9.0m in industrial areas
- Consistent along the street on each column type

12.10.3 Category P (Cycleways and Paths in Reserves) Lighting

The lighting category is usually Category P3NZ or P4.

Submit a non-conformance report where proposing the lighting of paths or cycleways that are not designated safe routes.

If the lights are located near trees, it may be appropriate for them to be mounted at a lower height, to illuminate underneath the tree canopy and avoid shadowing. In this case a minimum mounting height of 4.5 metres may be accepted.

12.10.4 Pedestrian Crossings

Design the lighting to comply with AS/NZS 11584 *Lighting for roads and public spaces – Lighting of Pedestrian Crossings.* The luminaires must meet the light technical parameters for New Zealand conditions detailed in AS1158.4, Table 3.5.

12.10.5 Intersections

Wherever an existing Category V Road intersections with a new Category V road or an existing Category V road being upgraded, apply the requirements of AS/NZS 1158.1 *Road Lighting – Vehicular traffic (Category V) lighting* to the intersection, even if the intersection road is not lit to the appropriate Category V standard.

Wherever an existing minor (Category P) road intersects with a new Category V Road or an existing Category V Road being upgraded, apply whichever of the following options provides the higher lighting standard:

- The requirements of AS/NZS 1158 for such intersections
- The provision of a new light positioned in the side road near the intersection. (for an underground power installation the light shall be less than 10 metres away from the kerb line of the Category V road)

The first light from an intersection on a Category P Road shall be less than 10 metres away from the through road, measured from the kerb line. Where the lighting is attached to reticulation poles, this distance can be increased to 0.4 of the designed light spacing. The design light spacing requirements for the through road continue through the intersection.

12.10.6 Traffic Management Devices

Design lighting of traffic management devices to support the purpose of the device:

- Where the device is intended to slow traffic, the lighting may need to be installed to a higher standard than normal road lighting. This will provide sufficient visibility to alert the drivers of the presence and speed constraint of the device.
- Where the device is intended to deter through traffic, the device may be identified by reflectors or by road lighting.

Ensure all lighting is designed to AS/NZS 1158 Set Lighting for roads and public spaces – series.

12.10.7 Column Locations

If an adjacent property has not been developed (e.g., a new subdivision) and the column cannot be positioned in line with the common boundary, locate the column at least **8 metres** from the boundary to allow for a future vehicle entrance.

Position columns at least one metre away from a vehicle entrance or pedestrian kerb cutdown, including in traffic islands. Refer to NZTA M30 *Specification and Guidelines for Road Lighting Design* for guidance on locating columns.

Trees in a legal road or on Council land must be at least **6 metres** away from lighting columns and more clearance may be necessary for some tree species or if the tree is protected. Consider the requirements for working near existing trees in CSS: Part 1 clause 19.0 – Protection of Natural Assets and Habitats, when locating lighting columns.

Where retaining walls are being constructed in the likely area of column locations, consider incorporating column foundations into the walls.

Columns should not be installed in swales. This is because of the additional details for this installation type that are required to comply with AS/NZS 3000 and because of the use of geotextiles in swale construction.

Excluding columns located on the boundary, provide **0.5m clearance** between the column face and the footpath edge. Where columns are in the footpath, ensure the path width is adjusted to compensate. Refer to clause 8.15.1- Footpaths (Roading) for footpath widths. Specify frangible columns that comply with the requirements of NZTA M26 *Specification for Lighting Columns*. If non-frangible poles are being specified, clearly state this on the drawings.

12.10.8 Signs

Identify any signs that need to be altered, relocated onto lighting columns or onto their own posts. Locate these to comply with NZTA M30 Specification and Guidelines for Road Lighting Design and clause 8.11.5 – Permanent signs and markings (Roading).

12.10.9 Lighting Equipment

NZTA M30 Specification and Guidelines for Road Lighting Design details the design life of lighting equipment. The design life for lighting columns shall be a minimum of **40 years**.

Luminaires and control systems must comply with the requirements of AS/NZS CISPR15 about electromagnetic compatibility. Non-compliance with this standard is an offence under the Radiocommunications Regulations 2001. All luminaires and columns must also comply with those listed on the Council's web page for approved materials at www.ccc.govt.nz/consents-and-licences/construction-requirements/approved-materials-list/streetlighting-materials. Luminaires shall be LED and include a DALI dimmable driver, 7 pin NEMA socket and Luminaire Controller programmed to work on the Council's Central Management System (Outdoor Lighting Network).

12.11 LIGHTING DESIGN REQUIREMENTS FOR DAIRY CROSSINGS

Council have introduced new guidelines for lighting Dairy Cow Crossings. The purpose of the lighting is to provide sufficient illumination so that other road users approaching the crossing from either direction can see Dairy Cows crossing the road during darkness. Refer to Appendix IX.

The permit holder shall indemnify Council against any claim, all costs, actions, demands, suits, damages, and any proceedings of any kind for any loss or damage that may result to any property of

any person or agency that may result from the provision and use of a crossing during the hours of darkness. This includes that relating to the movement and control of stock on the road reserve.

To meet the standard set by Council the crossing must include:

- All new lighting must consider all other requirements of the Stock Droving Bylaw 2008 (e.g. warning lights, signage etc).
- Luminaire types, lamp wattage and installation methods to comply with AS/NZS 1158.
- Qualified lighting designers shall undertake the lighting design and submit to Council for approval prior to any construction as part of the permit application process. Prior to accepting any newly commissioned lighting the installation shall be checked by Council's representative. Any remedial work required to comply with the approved design shall be completed before the issuing of the permit is completed.
- The ownership of the lighting and associated infrastructure is held with the permit holder, who shall be always responsible for its operation. The supply and establishment and ongoing cost of power supply to operate the installation.
- The permit holder is responsible for all energy related costs.
- Minimum lighting levels over the crossing area are to be always maintained. (Refer to technical requirements and a typical layout drawing attached in Appendix IX).
- Mounting height and positioning of all luminaires must consider any possible glare to other road users, road traffic and nearby dwellings and other buildings.
- An amber flashing light of a type and size approved by Council to be installed at a minimum height of 3 metres so it can be seen from either direction.
- All lighting to be fully operational and up to full brightness (5 minutes) before allowing any cow movement across the road. All luminaires (including the amber flashing light) must remain fully operational throughout the time period required for all the cows to cross the road. When the operation of moving the cows across the road is completed all luminaires must be switched off.
- Switching or control of all luminaires is to be from one location and are to occur at the same time.
- All incoming cabling installed must be contained on private property within PVC duct and to fully comply with AS/NZ Wiring Regulations. All cabling is to originate from a metered power supply. The first column is to be located on boundary or a maximum distance of 1m within the road reserve. Outgoing cable within the road reserve from the first column must be installed within 100mm diameter orange PVC duct and recorded accurately on the "As Built" documentation. (See drawing Appendix VIII for typical arrangement).
- Written approval is required before commencing any cabling within road reserve.
- No lighting is to be installed on any existing Network Operators overhead distribution poles or Council owned lighting poles without prior written approval.
- Location and height of all new poles must always maintain the required clearances from any existing overhead lines.
- Solar powered or standby generator powered lights are permissible provided they meet all the requirements indicated.
- As built record of the completed installation is to be forwarded to Council for entering on Council's GIS mapping system.
- The consent holder is responsible for all energy and vandalism costs. Council will provide maintenance (lamp replacement) on notification by the permit applicant.
- The poles used to mount the luminaires are to be frangible and located on the boundary or a maximum distance of 1m within the road reserve

To control the variety of lamp types and wattages used the preferred lamp sources are 50W, 70W or 100W HPS 4Y Super lamp however calculations should be undertaken during the design process to ensure other lamp wattages and technologies do maximise efficiency and minimise the number of lights installed for the particular situation being considered. Other technologies may include CFL, MH and NGMH.

12.12 LIGHTING – CONSTRUCTION GUIDANCE

Carry out installation and commissioning in accordance with the utility provider guidance and CSS:Part 5. Prior to accepting any newly commissioned lighting installation onto Council's network, Council will audit the installation.

The MAC ID and location of the Luminaire Controller shall be accurately captured when installed. Failure to provide this information will prevent practical completion.

12.12.1 Electrical Standards and Requirements

Ensure that all parts of the lighting installation conform to the following:

- All the electricity operator's requirements for connection, supply and installation of cables, and attachment of lighting equipment to their poles
- Orion's NW.21.72.01 Conditions for Connecting Equipment to Orion's Lighting Network
- the Electricity Act, Electricity Regulations and approved Codes of Practice issued by the Minister
- AS/NZS 3000

12.12.2 Light Pole Installation and Foundations

Poles shall be installed as per the manufacturer's recommendations.

If the road is at a different level to where the column is being located, specify poles that will achieve the correct mounting height above the road surface to ensure the installed lighting complies with the design requirements. For each light type the mounting height must be uniform and consistent.

Where the longitudinal grade may exceed 1 in 6 or the cross fall of a road may exceed 6%, it may not be possible to service the light from an elevated work platform vehicle (EWPV). In these situations discuss alternative column types with Council (e.g. poles that will allow the light to be serviced via a ladder).

When a special foundation is required provide a producer statement when applying for engineering approval. Include a hold point for construction to allow inspection of the foundation before concrete is poured.

When poles requiring special maintenance visits are specified (e.g. frangible – shear base poles), provide Council with a maintenance plan detailing maintenance intervals and work/inspections that need to be carried out. Council preferred column types are ground planted refer to Appendix VIII for typical concept drawings. The use of any other type of pole must have Council's approval prior to any installation.

12.12.3 Backfill and Bedding

Specify backfill materials individually. The material used must be capable of achieving the backfill compaction requirements set out in CSS: Part 1 clause 23.0 Backfilling. Bedding materials should comply with the electricity operator's requirements. Carry out trench restoration in accordance with CSS: Part 1 clause 24.0 – Restoration and Final Surfacing.

12.13 LIGHTING – COMPLETION DOCUMENTS

A completion certificate is required by Council as part of the 224 Certificate application.

At the completion of the physical works, and after receiving the lighting contractor's Completion Certificate, inspect the work and certify that:>the project has met all the requirements of the project brief, the standards, and specifications; and>all the documentation detailed below has been completed, is correct and has been forwarded to the Council.

Provide the following documentation:

- Test Certificates for each lighting standard (audit documents)
- Compliance Certificate for the complete installation
- As-built drawings of Council owned cables, to Electricity Distribution Asset Owner requirements
- As-built information in RAMM format (refer to Section 4: As-Builts)
- Engineers Completion Certificate
- Lighting Design Statement (LDS4) - Construction Review and Audit (refer NZTA M30 Specification and Guidelines for Road Lighting Design)
- Contractor documentation required by the CSS
- Luminaire Controller e.g., MAC ID

At the end of the defect's liability period, carry out an audit and certify that lighting columns are vertical, and lights have been installed correctly and are at the correct mounting height in compliance with CSS: Part 5.

APPENDIX 1 – LIGHTING CATEGORIES

This table is intended as a guide only. Some rural roads may not require lighting – consult with Council staff early to determine this.

P3NZ and P4 lighting categories must comply with clause 11.4.4 – Category P (local road and pedestrian area lighting)

Road classification	Other criteria	Traffic volume	Lighting category
Urban			
Arterial	Major shopping area with bright surroundings	<20,000	V1
		>15,000	V2
		7,000 – 15,000	V3
		3,000 – 7,000	V3
Collector		>15,000	V2
		7,000 – 15,000	V3
		3,000 – 7,000	V4
		1,000 – 3,000	P3NZ
Local			P3NZ
Rural			
Arterial		<15,000	V3
		7,000 – 15,000	V3
		3,000 – 7,000	V4
Collector		<15,000	V3
		7,000 – 15,000	V4
		3,000 – 7,000	V4
Local	Footpath and/or on road cycle lanes		P3NZ
			P4