PART 11: LIGHTING

CONTENTS

TABLES

11.1 REFERENCED DOCUMENTS

Planning and Policy

- Electricity Act (1992)
- Electricity Regulations (1997)
- Selwyn District Plan *(District Plan)*

  www.selwyn.govt.nz/services/planning

Design

- Christchurch City Council *Design Guide Crime Prevention Through Environmental Design (CPTED)*

  http://www.ccc.govt.nz/cityleisure/projectstoimprovechristchurch/urbandesign/urbandesignguides.aspx

- Subdivision Design Guide – *Design Guide for residential subdivision in the urban living zones*

  www.selwyn.govt.nz/__data/assets/pdf_file/0016/15163/ADOPTED-SDC-Subdivision-Design-Guide.pdf

- Selwyn District Council Trees and Vegetation in Selwyn District Management Policy Manual

  www.selwyn.govt.nz/services/facilities/draft-trees-and-vegetation-policy

- Orion NW.21.72.01 *Conditions for Connecting Equipment to Orion's Lighting Network*
- AS/NZS 1100 *Set Technical Drawing*
- AS/NZS 1158 *Set Lighting for roads and public spaces - series*
- AS/NZS 3000 *Set Wiring rules and companions*
- MfE *Urban Design Protocol*
- IPENZ Practice Note 02 Peer Review – *Reviewing the work of another engineer* *http://www.ipenz.org.nz/ipenz/forms/pdfs/*
- Electricity Commission - *Efficient Road Lighting Resource www.rightlight.govt.nz/roadlighting*
- NZUAG National *Code of Practice for Utilities' Access to the Transport Corridors March 2009*

  www.nzuag.org.nz/national-code/AdvanceCopyCodeDec08.pdf

Construction

- Christchurch City Council Civil Engineering Construction Standard Specifications Parts 1-7 (CSS)

www.ccc.govt.nz/business/constructiondevelopment/constructionstandardspecification.aspx

- SNZ HB 2002:2003 *Code of Practice for Working in the Road*

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

11.1.1 Source documents

This Part of the Engineering Code of Practice has been written principally by Connetics Limited. It is also based on Part 11 of the CCC Infrastructure Design Standard (IDS), by agreement, and with the consent of Christchurch City Council.

11.2 INTRODUCTION

This Part explains the Council's lighting design requirements where the 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 operator 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 pedestrian accessways and areas.

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

11.3 QUALITY ASSURANCE REQUIREMENTS AND RECORDS

Provide quality assurance records that comply with the requirements in Part 3: Quality Assurance and the *Construction Standard Specifications (CSS)*, during design and throughout construction.

11.3.1 The designer

The designer must be suitably qualified and experienced and have an excellent track record in road lighting design. Refer to clause 2.6.1 – Investigation and design (General Requirements) for further information. Appendix I provides an overview of the installation and renewal process. The designer must:

- be conversant with Australian/New Zealand Standards and Practices concerning lighting design for public outdoor areas;
- be suitably qualified and experienced in the respective field;
- undertake the complete lighting design, including preparing estimates, tender documents and drawings, and assisting with tender evaluation;
- provide a Design Report in accordance with clause 3.3.2 – Design report (Quality Assurance). Also refer to Appendix II and III and include all documentation. Highlight those items to be incorporated into the Contractors Quality Plan eg hold points;

- notify all adjacent residents of the proposed lighting work and light locations before the start of the physical work or as agreed with Council assist Council in undertaking the notification;
- ensure the lighting scheme meets the requirements of the COP and the construction specifications *CSS*;
- manage the lighting construction works, including regular site supervision;
- check and approve payment of all progress and final invoices;
- resolve any complaints to the satisfaction of Council, prior to final acceptance by Council;
- sign off the project at completion.

11.3.2 Design Review

The peer reviewer shall be a competent Lighting Designer as described in (clause 11.3.1 and 2.6.1).

Safety audits shall be carried out by a qualified safety auditor.
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*.

Where the project's construction is being managed or supervised by another party apart from the designer, provide the company and individual's name, qualifications and contact details in the Design Report.

11.3.3 Engineering drawings

All engineering drawings must be legible, clear, readable and complete. They must clearly illustrate the proposal and enable both assessment of compliance with the COP and provide for accurate construction.

Engineering drawings generally should show the following:

- A locality diagram giving the overall layout and location of the works;
- Detailed drawings, longitudinal sections, cross sections and diagrams of the proposed developments and/or works;
- Special details where the standard drawings are not sufficient;
- A north point, preferably pointing above the horizontal (i.e. in the top 180 degrees);

Show the following general information on the drawings:

- The extent of the works showing existing and proposed roads, and the relationship of the works with adjacent works, services and/or property;
- Proposed and existing property boundaries and lot or street numbers
- Significant existing vegetation to be removed and any special or protected trees, and any areas of heritage significance that may be affected by the works;

- The road lighting layout showing the location and type of each luminaire, proposed and existing significant road features (e.g. kerbs, property boundaries, planting and traffic management features).
- Location/warning of existing underground services.

Show the following road lighting information on the engineering drawings:

- the existing and proposed electrical load of the lighting circuits;
- the lighting design details including: lighting category that the scheme has been designed to meet, mounting height, tilt, maximum spacing and any non-complying portions or exceptions;
- a lighting schedule;
- cable offsets; (existing cable locations records and offsets are maintained by Orion)
- utility pole attachment details.

Include in the schedule the requirements for each location:

- luminaire manufacturer, model and optic used;
- lamp manufacturer, type and wattage;
- outreach arm code, outreach length and tilt angle;
- column manufacturer and type;
- mounting height to luminaire optical centre;
- offset or overhang;
- any other equipment or work required to complete the scheme.

Include the following notes;

- Alternative equipment to that specified in the schedule (poles, outreach arms, luminaires and lamps) can be provided with the tender or quotation submissions provided all requirements are met and the performance of all alternatives are equal or superior to those indicated on the drawing and the associated documents.
- Requirements for any temporary lighting.

See Appendix IV for a sample road lighting drawing.

Drawings must be legible at A3 size and can be drawn to a scale of 1:500 or 1:1000.

Prepare electronic drawings in an industry standard format suitable for later addition of as-built information and inclusion in Council's asset system. Drawings can be supplied in electronic format as dwg, dxf, pdf or tif files.

11.3.4 Design Records

Provide the following information as a minimum to support the engineering drawings, Design Report and Producer Statement, for Council acceptance before tendering. Supply this information along with a programme for implementing the physical works.

- Records of any non-compliant design elements and any departures from the design spacing that have been used in the design process;
- A completed Lighting Specification;
- A completed Lighting Equipment List (see Appendix VII – As Built Requirements)
- Complete computer analysis information required by AS/NZS 1158;
- Luminaire intensity distribution tables (in North American IES or CIE format as requested) if required;
- The name and source of the computer programme used, and a statement of its compliance or otherwise with the requirements of AS/NZS 1158;
- Details of the design method used and the values of the light technical parameters obtained, for each of the road elements involved, compared to the limiting values given in AS/NZS 1158;
- The origin of the photometric data for the luminaires and lamps;
- Details of the road surface reflection characteristics assumed in luminance-based design calculations;
- Justification for the maintenance factor used in the calculations and the associated schedule of maintenance to be adopted, e.g. the luminaire cleaning and lamp replacement intervals;
- A cross-section drawing showing the proposed type of pole, arm and luminaire.

11.3.5 Design Report

A Design Report (see Appendix II) shall be submitted for engineering acceptance.

The Design Report provides Council with specific details relating to the design including any non compliant design elements. The Design Report shall identify how construction of the project will be managed to ensure the design will be successfully implemented. It shall also describe how communication with stakeholders and other parties to the design has/will be managed.

Also see clause 3.3.2 and Appendix I and III of Part 3.

11.4 LIGHTING DESIGN

11.4.1 Project Brief

Council will 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 Council's consent conditions.

Any resource consent requirements are considered to be part of the project brief, which will also include details about the;

- scope and location of the project;
- purpose and objective of the lighting scheme;
- Project Manager, for Council funded projects;
- lighting category or level of service that applies to the project;
- specific requirements (if any), such as: a particular type of pole (e.g. frangible) or luminaire, restrictions on light locations, special features of the proposed road layout or landscaping that may influence the lighting design, traffic management devices that require supplementary lighting;
- designation of the road or area (e.g. major/minor arterial, collector, local road, pedestrian area, access way).
- maintenance period to enable the use of appropriate lamp lumen depreciation figures

11.4.2 Documents to be submitted for Council acceptance

Submit the design records, engineering drawings and any other requested information with the Design Report and Producer Statement. This information should enable the process to be followed easily and should allow for replication of the results.

Prior to accepting any newly commissioned lighting installation onto Council's network, the installation shall be checked by Council's Asset Manager or his appointed representative (Connetics Ltd). Any remedial work or improvements required to comply with the approved design shall be carried out as identified. This includes any problems, failures or defects that may arise during the stipulated defects liability period for the subdivision, or the guarantee period for individual fittings or fixtures, whichever is greater.

The costs associated with compliance, design reviews and inspections to meet Council's requirements shall be billed directly by Council's appointed representative (Connetics Ltd) to the Developer or their nominated agent.

11.4.3 Producer Statement - Design

The Producer Statement - Design (see Appendix IV) shall be submitted for engineering acceptance.

The Producer Statement - Design shall confirm that the design meets all specifications relating to the project.

11.4.4 Council acceptance

All quality aspects of the investigation, design and construction must comply with the requirements of this document.

When it is satisfied that the design and design report meets the requirements of the COP and the design brief, Council shall notify the designer that the design has been accepted. In considering the design and giving its acceptance, Council shall act without undue delay.

The "Design Review Certificate" shown in Appendix X will be used by Council (or their representative) to provide feedback to the designer and advice on decisions regarding acceptance of the design.

Work **must not** commence on site unless and until:

- A resource consent for the work has been granted, except when no such consent is required;
- Council has given engineering acceptance;
- Any other consent/approval required has been granted;
- A Traffic Management Plan has been prepared and approved by Council.

11.4.5 Control of non-conforming work

The Designer must have a procedure to ensure that design work not conforming to the specified requirements is either:

- redesigned to meet the specified requirements; or
- is accepted by written concession from Council

Record all non-conforming work on the relevant design records and the Design Report and Producer Statement. (See Appendix II and III).

11.5 CONTROL AND INSPECTION OF THE WORK

Undertake the work in a planned and controlled manner to ensure that the quality requirements are realised. Demonstrate that the following has been undertaken:

- Identify Council's key achievement criteria;
- Plan how these will be realised;
- Control the work in conformance with the project quality system;
- Check, inspect or test the work and verify that it conforms to the specified requirements;
- Record the results as documentary evidence of compliance.

This clause relates to both design and construction works and requires that all processes involved are properly managed.

11.5.1 Checking, Inspection, Testing and Recording

Check, inspect or test against all key achievement criteria to verify compliance during design and construction and on final completion.

Clearly indicate any "hold' or "witness points" in the Design Report, Completion Certificate or Contract Quality Plan, where the project requires checking, an inspection and/or approval to proceed (i.e. internally and/or from Council).

11.5.2 Completion Certificate

The installation Contractor will be required to send a completion certificate to the Designer (or project manager) at practical completion. The Designer after inspecting the work shall provide certification of practical completion by submitting a Completion Certificate (see Appendix VI) to Council. All other paperwork including audit records, "As Built Drawings" etc will be submitted with the Completion Certificate to Council.

11.6 INSTALLATION AND COMMISSIONING

Carry out installation and commissioning in accordance with *CSS: Part 5*.

The contractor/Designer must have a procedure to ensure that construction work that does not conform to the specified requirements is either:

- reworked to meet the specified requirements;
- accepted with or without repair by concession from Council;
- rejected and replaced.

Record all non-conforming work on the relevant construction check sheet.

If the construction non-conformance is significant in that it either:

- results in the need for written concession;
- results in delay or interference to the work or to other parties;
- indicates that the fault has occurred due to the use of incorrect work practices and/or failure of materials and could have been prevented;
- occurs sufficiently frequently as to indicate a problem in training or procedures,
- is a safety issue;

then the Contractor shall produce a Non-Conformance Report and send it to the Designer. The report and supporting documentation must clearly indicate the action to be taken to rectify the fault, the timeframe and responsibilities. It must be authorised by the Designer and forwarded to Council.

In cases involving concessions, the Designer and Council must accept the proposed rectification (the corrective action) of the non-conforming work in writing and prior to implementation.

11.6.1 Testing

Any work required to be tested by the contractor in the presence of Council must be pre-tested and proved satisfactory before test witnessing by Council is requested.

11.7 COMPLETION PROCEDURES AND CERTIFICATION

At the completion of the physical works, check and then certify that:

- the project has met all the requirements of the project brief, the standards and specifications;

- all the documentation detailed below has been completed, is correct and has been forwarded to Council.

At the end of the defects liability period, carry out an audit and certify that lighting poles are vertical and lights have been installed and operate correctly and are at the correct mounting height and at the correct tilt.

Provide the following documentation:

- Test Certificates for each lighting pole;
- Electrical Certificate of Compliance for the complete scheme;
- As-built information in a format suitable to be loaded into Council's Road Lighting Asset System (see Appendix VII);
- Completion Certificate (see Appendix VI);
- Contractor documentation required by the construction specifications e.g. construction completion certificate;
- Any special maintenance requirements e.g. shear base poles or pole painting.

11.8 BENEFIT COST AND LIFE 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.

11.9 LIGHTING DESIGN STANDARDS

11.9.1 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 high output 4Y, tubular high pressure sodium (HPS) lamps are preferred as they have high efficacy, long life and appropriate colour properties. Council may accept the use of metal halide lamps in town centres where the colour rendering and/or colour appearance of HPS is considered less appropriate.

Permissible lamp and luminaire types must meet the requirements detailed in AS/NZS1158.
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 the minimum permitted straight road design spacing between poles for a typical sub category V4 road lighting scheme is 40m using a preferred lamp of 150W HPS mounted on a column with a minimum height of 9m.

Refer to Appendix VIII (drawings 001 to 004) for preferred column concept drawings.

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.

11.9.2 Category P (local road and pedestrian area) lighting

Category P lighting should assist pedestrians to orientate themselves and detect potential hazards, and discourage fear of crime and crime against the person. This lighting is generally provided on the roads with lower traffic volumes – local roads and walkways.

Table 2 – 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 3 Lighting Category Selection details the existing roads where lighting categories have been specified.
Council.

Design the lighting to accord with AS/NZS 1158.3.1 *Road lighting - Pedestrian area (Category P) lighting*. The principles of "Crime Prevention through Environmental Design" (CPTED). The luminaires must meet the requirements for type 4 luminaires detailed in AS 1158.3.1, Table 2.10.

The minimum maintained illuminance for Category P3 must be 0.35 lux, and the horizontal illuminance uniformity U_p (that is, the ratio of maximum horizontal illuminance to average horizontal illuminance within a defined area) for Category P3R and P4R shall be less than or equal to 10:1.

In order to control the variety of lamp types and wattages used, the preferred lamp sources:- 50W, 70W or 100W HPS 4Y Super lamp. However calculations should be undertaken during the design process to ensure other lamp wattages and technologies that maximise efficiency and minimise the number of lights installed for the particular situation are considered. Other technologies may include compact fluorescent (CFL), metal halide (MH) and new generation metal halide (NGMH).

For example AS/NZS1158.3.1 applies a multiplier of 0.75 for high pressure sodium lamps when used for subcategories P3 and P4 due to the reduced sensitivity of the eye to yellow light at these low lighting levels. Therefore ceramic metal halide, new generation

metal halide or compact fluorescent lamps may provide a more energy efficient solution for these subcategories in certain situations.

(Note: Before allowing extensive use of a new technology on the lighting network Council needs to be confident that it will **NOT** have a negative impact on long term operating costs e.g. lamp and electronic control gear will achieve expected life).

To maximise efficiency and minimise the number of lights installed use Table 1:

Table 1 Minimum light spacing for local roads

Legal road width[1] (m)	20	18	16	14	12
Minimum design spacing P3 (m)	42	45	50	50	50
Minimum design spacing P4 (m)	54	55	55	56	56

Note: 1) Road reserve width not carriageway width

The spacing in this table can limit the type of luminaires that are acceptable by ensuring only good performing luminaires are used at appropriate mounting heights.

For walk ways and cycle ways the minimum design spacing is 40m for P3 and 50m for P4.

The minimum mounting heights are:

- 6.0m in residential areas.
- 7.0m in industrial areas.

The preferred mounting heights are:

- 7.4m in residential & industrial areas (refer to Appendix VIII drawing 005).
- 6.0m for walkways and cycle ways (refer to Appendix VIII drawing 005).

Refer to Appendix VIII (drawings 006 & 007) for preferred decorative column base concept drawings.

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. Council currently accepts rangoon green and black colours.

11.9.3 Category P (cycleways and paths in reserves) lighting

Design the lighting to comply with AS/NZS 1158.3.1 *Road Lighting - Pedestrian Area (Category P) Lighting*. The lighting category is usually Category P3 or P4.

The principles of "Crime Prevention through Environmental Design" (CPTED) should be considered. Council prefers to illuminate only those paths and cycle ways that are designated safe routes.

The luminaires must meet the requirements for type 3, 4 or 6 as detailed in AS/NZS 1158.3.1, Table 2.10 to help control upward waste light, glare and spill light.

The minimum mounting height is 6.0 metres and the maximum is 7.5 metres. However, if the lights are located near trees it may be appropriate for the lights 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.

Council in general prefers not to use bollard lighting as an acceptable method of lighting paths and walk ways within reserve areas. At some specific sites bollards may be used as noted:

- In narrow walkways with a high public presence or public area's e.g. there are generally a lot of people around and there is usually another form of lighting in the vicinity. Bollards are not considered good sources for providing vertical identification.

- There is a need to enhance a horizontal area such as flower garden or similar.

- There is a need to identify a change in level or steps or change in direction.

- There is a need to be sympathetic with the surrounding landscape or primary view plus it is generally only used during daylight hours (except winter).

- If a walkway is a link between two category P4 roads and the risk of crime is such that it is considered unimportant to light the walkway to any apparent standard.

When not to use bollards:

- To provide sufficient illumination on any walkway between two sub category P3 roads. The lighting level for the walkway could be illuminated to one level below the roads i.e. category P4.

- On a walkway that is used by other types of road users or is considered a cycle way. The minimum standard for any cycle way should be category P4.

- If the walkway is wider than 4m it should be illuminated with column mounted luminaires for better distribution and uniformity. Consideration should be given to controlling glare and spill lighting.

- If the lighting is considered necessary for security or crime prevention. Column mounted lights are preferred for a more efficient coverage and the area should be illuminated to a minimum category P4. Bollards can provide good horizontal illumination but don't provide good vertical illumination hence it can be difficult to identify faces etc.

- In an area that is prone to vandalism or vandalism is a strong possibility. Consider the possibility of bollards being damaged or painted over.

- If low height objects such as parked cars can create shadows.

Comparison of pole mounted luminaires versus bollards:

- Two calculations should be done to meet the same category of lighting required. This will give a comparison on the number of lights required. An assessment is then done for both installations to compare the life cycle costs of each option over a 20 and 40 year period with consideration given to depreciation, energy and maintenance costs. The developer may need to fund the additional energy and maintenance costs of the installation over its expected life.

If the installation of bollards is considered acceptable then the following are the minimum attributes the bollard luminaire should have:

- The lamp is shielded from direct view.
- A reflector or louvre is incorporated to direct the light downwards or to control the optic performance.
- The lamp and reflector is protected behind toughened glass or polycarbonate.
- The preferred mounting of a bollard is via a ground mounting stub set in concrete not flange mounted to a concrete base.
- Spare parts are readily available.
- Has the ability to accept a range of different wattage lamps.
- Simple but restricted access for lamp replacement and reflector cleaning.
- Each fitting incorporates an isolation fuse.
- Has an expected service life of at least 20 years.

11.9.4 Lighting Category Selection

The lighting category required for a road can be obtained from AS/NZS 1158.1.1 Table 2.1 or the Electricity Commission selection tool (Category V lighting) and from AS/NZS 1158.3.1 Table 2.6 (Category P lighting).

Table 2 Lighting categories

Road classification	Other criteria	Traffic volume	Lighting category
Urban			
Arterial		7,000 to 15,000	V3
Arterial		3,000 to 7,000	V3
Collector		7,000 to 15,000	V3
Collector		3,000 to 7,000	V4
Collector		1,000 to 3,000	P3
Local			P3
Rural			
Arterial		3,000 to 7,000	V4
Collector		7,000 to 15,000	V4
Collector		3,000 to 7,000	V4
Local	Footpath and/or on road cycle lanes		P3
Local			P4

Note

1) This table is intended to be a guide only for lighting on new roads and the final decision will be made by Council.
2) Some rural roads may not require lighting.
3) P3 and P4 lighting categories must comply with clause 11.9.2 – Category P (local road and pedestrian area) lighting.

To ensure consistency with the level of service in Council's roading network based on the road hierarchy and local township preference Table 3 sets out the lighting category to be used. This takes precedence over the above standards for determination of the lighting category unless agreed with Council.

Note that the existing lighting category for any particular road may be below that shown in the table but Council will upgrade to this standard when new work is undertaken such as during street wide roading upgrade projects.

Table 3 Lighting category selection

Township	Road Status	Main Roads through Townships [1]		Local Township Roads [2]	
				Urban	Rural Residential
		Category [3]	Road(s)	Lighting category [3]	
Arthur's Pass	Secondary	Note 4	State Highway 73	P5	
Castle Hill	Secondary	Note 4	State Highway 73	P4	
Coalgate	Secondary	P3	Bridge St	P4	
Darfield	Primary	Note 4	State Highway 73	P3	
Doyleston	Secondary	P3	Leeston Rd	P4	
Dunsandel	Secondary	P3	Hororata Dunsandel Rd, Browns Rd, Tramway Rd, Leeston Dunsandel Rd	P4	
Glentunnel	Secondary		State Highway 77	P4	
Hororata	Secondary	P3	Hororata Rd, Bealey Rd	P4	
Greenpark Huts	Secondary			P5	
Kirwee	Secondary	P3	Courtenay Rd (north SH73)	P4	
Lake Coleridge	Secondary			P4	
Leeston	Primary	V4	High St, Station St, Leeston Lake Rd (north Station St)	P3	
Lincoln	Primary	V4	Birchs Rd, James St, Edward St, Gerald St, Ellesmere Junction Rd, Southfield Drive	P3	
Prebbleton	Primary	V4	Springs Rd, Birchs Rd	P3	
Rakaia Huts	Secondary			P5	
Rolleston	Primary	V4	Tennyson St, Springston Rolleston Rd, Rolleston Dr, Byron St (and extension), Brookside Rd, Levis Rd, Lowes Rd, Dunns Crossing Rd (north of Lowes Rd), Jones Rd, Hoskyns Rd, Izone Dr	P3	
Selwyn Huts (upper and lower)	Secondary			P5	
Sheffield	Secondary	Note 4	State Highway 73	P4	
Southbridge	Secondary	P3	High St	P4	
Springfield	Secondary	Note 4	State Highway 73	P4	
Springston	Primary/Secondary	V4 / P3	Ellesmere Junction Rd, Leeston Rd, Waterholes Rd	P4	
TaiTapu	Secondary	P3	Lincoln Tai Tapu Rd, Old Tai Tapu Rd	P4	
West Melton	Secondary	P3	Weedons Ross Rd (north SH73)	P4	
Waddington	Secondary	P3	Old West Coast Rd, Waimakariri Gorge Rd	P4	
Whitecliffs	Secondary			P4	

1. Main roads through townships consist of Council's Arterial and Collector Roads and some Local Roads.
2. Local roads consist of smaller urban streets cul de sacs in urban and Business Zones. Urban is defined as those areas zoned Living 1 and Business while Rural residential are those areas zoned Living 2.
3. Category refers to that contained in AS/NZS1158.1.1 Table 2.1 or AS/NZS1158.3.1, Table 2.6 Values of Light Technical Parameters.
4. NZTA is the road controlling authority responsible for lighting state highways through townships, usually to minimum V4 category.
5. Additional roads may be added to the above table at Council's discretion.

To ensure consistency across the road network determine the category for each route in the network rather than one section of road at a time as this may produce varying lighting levels along a route with the same operating characteristics.

Consider if the category selected will be appropriate over the life of the installation. e.g. do not "over light" if demand for lighting will not be justified for several years (it may be more cost effective to upgrade later). If the result is bordering on a higher category and road user demand is expected to increase it may be appropriate to select the higher category. Where possible provide lower intensity lights with cabling and pole spacing to suit a later upgrade.

11.9.5 West Melton Lighting

In the West Melton Observatory lighting area restrictions on lighting are outlined in Rule 9.18 of the *District Plan*.

Outdoor lighting shall be shielded to avoid upward light spill as detailed in Rule 9.18.

11.9.6 Rural Lighting

At isolated rural intersections:

- Consider using "flag" lighting to identify the intersection at night. If there is no electricity network available consider solar powered lighting.
- Enhanced signage and markings may be a suitable alternative to installing lighting which could be costly.

Council's current policy, which may be set down as a condition of a resource consent, is that at the intersection of a road and a private right of way, where there are 5 or more lots off the right of way, that a street light shall be installed as agreed with Council.

11.9.7 Intersections

Wherever an existing Category V road intersects 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 intersecting 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. The minimum lamp size would normally be 100 watt high-pressure sodium light. (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 must 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.

11.9.8 Traffic management devices

Traffic management devices must be considered as part of the lighting design.
See AS/NZS 1158.3.1.

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 at a similar level to the normal road lighting.

11.9.9 Pole locations

Ideally, lighting poles should be positioned in line with the common boundary between properties; however, these locations do not always coincide with the spacing requirements of the lighting design. If an adjacent property has not been developed (e.g. a new subdivision) and the pole cannot be positioned in line with the common boundary, locate the pole at least six metres from the boundary to allow for a future vehicle entrance. Ensure that there is no aerial trespass due to outreach arms or poles crossing the boundary onto private property.

Position poles at least one metre away from a vehicle entrance or pedestrian kerb cutdown, including in traffic islands. Keep poles clear of any tree canopies in the street or in adjacent properties. Trees in a legal road or on Council land must be at least six metres away from lighting poles 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 16.0 – Protection of Natural Assts and Habitats, when locating lighting poles or as agreed with Council.

Where possible, poles should be located close to reserves and other open spaces to provide light in these areas and improve safety.

Consider traffic safety when placing lighting poles, especially when they are on or near bends, intersections, threshold treatments, road humps and roundabouts.

Avoid locating poles within stormwater swales or retention areas.

11.9.10 Site requirements

Poles shall be installed in accordance with the manufacturer's recommendations. Poles are normally ground planted. When ground planting is not practicable, detail a special foundation. A Producer Statement shall be provided to Council by the designer. Design Certificate for this when applying for engineering acceptance. Where retaining walls are being constructed in the likely area of pole locations, consider incorporating pole foundations into the walls. Allow inspection of the foundation by Council before concrete is poured.

If the road is at a different level to the area where the pole is being planted, specify pole lengths to achieve the correct mounting height, so ensuring the installed lighting complies with the design requirements. For each light type the mounting height must be uniform and consistent. Where different length poles are required to achieve the luminaire's mounting height, highlight this in the Design Report.

Where the longitudinal grade may exceed 1 in 6, the crossfall of a road may exceed 6% or the poles cannot be easily serviced from a elevated work platform vehicle or cherry picker or similar machine, discuss alternative pole types with the Council so that may be serviced by a ladder.

Poles 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.

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 VII for typical concept drawings. The use of any other type of column must have Council's approval prior to any installation.

11.9.11 Pole setback from road or path

Pole setback must be considered as part of the lighting design. See AS/NZS1158.1.3.

Minimum preferred pole setback from the kerb face in urban areas is 1.0m for a frangible pole but this can be reduced to a minimum setback of 0.7m for straight sections of urban road away from intersections and roundabouts.

If the pole is a rigid type (non frangible) it must be setback minimum of 3.0m for roads with a speed limit not exceeding 70km/hr or 6.0m for roads with a speed limit exceeding 70km/hr.

Preferred location of all frangible poles is 3.0m minimum behind kerb or back on property boundary but not within footpaths, stormwater retention areas or swales.

For traffic safety reasons, position rigid Category V poles to comply with clause 8.17.10 – Clear zone (Roads and Transport). This is generally achieved by locating the pole near the property boundary. Wherever the required setback cannot be achieved, it may be necessary to locate the pole closer to the kerb. In such instances, use frangible poles and locate the poles to comply with AS/NZS 1158.1.3 Appendix B.

Rigid Category P poles in urban areas should also be positioned to comply with clause 8.17.10 – Clear zone (Roads and Transport), where possible. Where these setbacks are not achieved, provide frangible poles, positioned to comply with Table 4 or discuss alternative options with the Council early in the design process.

Table 4 Clearance to support

Traffic speed 70km/hr or less	
Kerbed road	**Unkerbed road**
0.7m behind kerb, increasing to 1.0m at tee intersections and on curves	3.0m from shoulder

Where installing a pole against the building line, ensure that it is installed on the legal road or on Council land, and not on private property. Where poles are in the footpath, ensure the path width is adjusted to compensate. Refer to clause 8.17.1- Footpaths (Roads and Transport) for footpath widths.

11.9.12 Signs

Identify any signs that need to be altered, relocated on to lighting poles or onto their own posts. Locate these to comply with clause 8.12.5 - Permanent signs and markings (Roads and Transport). Ensure the poles will support the added load of the sign. Confirm with Council the requirements regarding location of signs.

11.9.13 Lighting equipment

The design lifetime of equipment is shown in Table 5.

Table 5 Expected lifetime of lighting equipment

Component	Design life
Poles (concrete and steel)	40 years
Outreach arms	40 years
Luminaires	20 years
Lamps HPS	16,000 hours
MH	12,000 hours
Fluorescent	12,000 hours
Painted / powdercoated surfaces	10 years

Note: 1) Powder coating is approved on luminaires only.

The luminaires, poles and outreach arms that are used in new installations should be compatible with adjacent lighting and, where practicable, visually match.

For efficient maintenance, the types of lighting equipment used are usually limited to those already in the lighting network. The installation of new equipment requires specific approval from Council. Also see the approved materials list on the Christchurch City Council website at
www.ccc.govt.nz/business/constructiondevelopment/approvedmaterials.aspx

Provide detailed information on the design drawings about the poles, outreach arms, luminaires and lamps used in an installation on the Lighting Equipment List (see Appendix II).

11.9.14 Outreach Arms for Overhead Installations

All outreach arms are to be designed to have an expected design life of 40 years, and to support loadings from AS/NZS 1170 - *Structural design actions*. They shall have corrosion protection complying with AS/NZS 4680 *Hot-dip galvanised (zinc) coatings on fabricated ferrous articles*.

A Producer Statement is required for the manufacture of all outreach arms.

When the Network Operator (Orion NZ Ltd) allows outreach arms to be attached to their distribution poles or cross arms the preferred outreach arm types are:

- 0.6m overall length with 32mm OD spigot at 15˚ above horizontal bolted to LV cross arm via 2 x M16 bolts, washers and nuts.
- 1.7m overall length with 42mm OD spigot at 15˚ above horizontal bolted to LV cross arm via 2 x M16 bolts, washers and nuts.
- 3.0m vertical extension and 2m outreach at 15˚ above horizontal bolted to pole via approved outreach arm plate, spacer and 2 x M16 bolts, washers and nuts. Spigot to be 150mm long and 42mm OD.
- 3.0m vertical extension and 3m outreach at 15˚ above horizontal bolted to pole via approved outreach arm plate, spacer and 2 x M16 bolts, washers and nuts. Spigot to be 150mm long and 42mm OD.
- 3.4m vertical extension and 4m outreach at 15˚ above horizontal bolted to pole via approved outreach arm plate, spacer and 2 x M16 bolts, washers and nuts. Spigot to be 150mm long and 42mm OD.

- 4.4m angled outreach attached to pole and LV cross arm bolted to pole via approved outreach arm plate, spacer and 1 x M16 bolt, washer and nut plus "J" bolt attached to cross arm. Spigot to be 150mm long and 42mm OD angled at 15˚ above horizontal.

- 1.2m vertical extension and 1.2m outreach at 10˚ above horizontal bolted to pole via approved outreach arm plate, spacer and 2 x M16 bolts, washers and nuts. Spigot to be 42mm OD.

The electrical connection to the overhead conductor (demarcation point) must be to Orion Standard "Typical Overhead Street Light Attachment and Electrical Connection Detail".

11.9.15 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.

11.9.16 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.

11.9.17 Construction method, backfill and bedding

There are various methods of installing underground services. These include trenching, directional drilling, pipe bursting etc.

Factors that may affect the choice include ground conditions, disruption to traffic, and presence of trees, site safety, and the availability of knowledge to location of existing or redundant services.

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 a number of utilities in a common trench, ensure the minimum cover and separation distances for each utility in the trench cross-section is 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.

11.9.18 Lighting 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 responsible for its operation at all times. 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 maintained at all times. (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 maintain the required clearances from any existing overhead lines at all times.
- 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

In order 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.

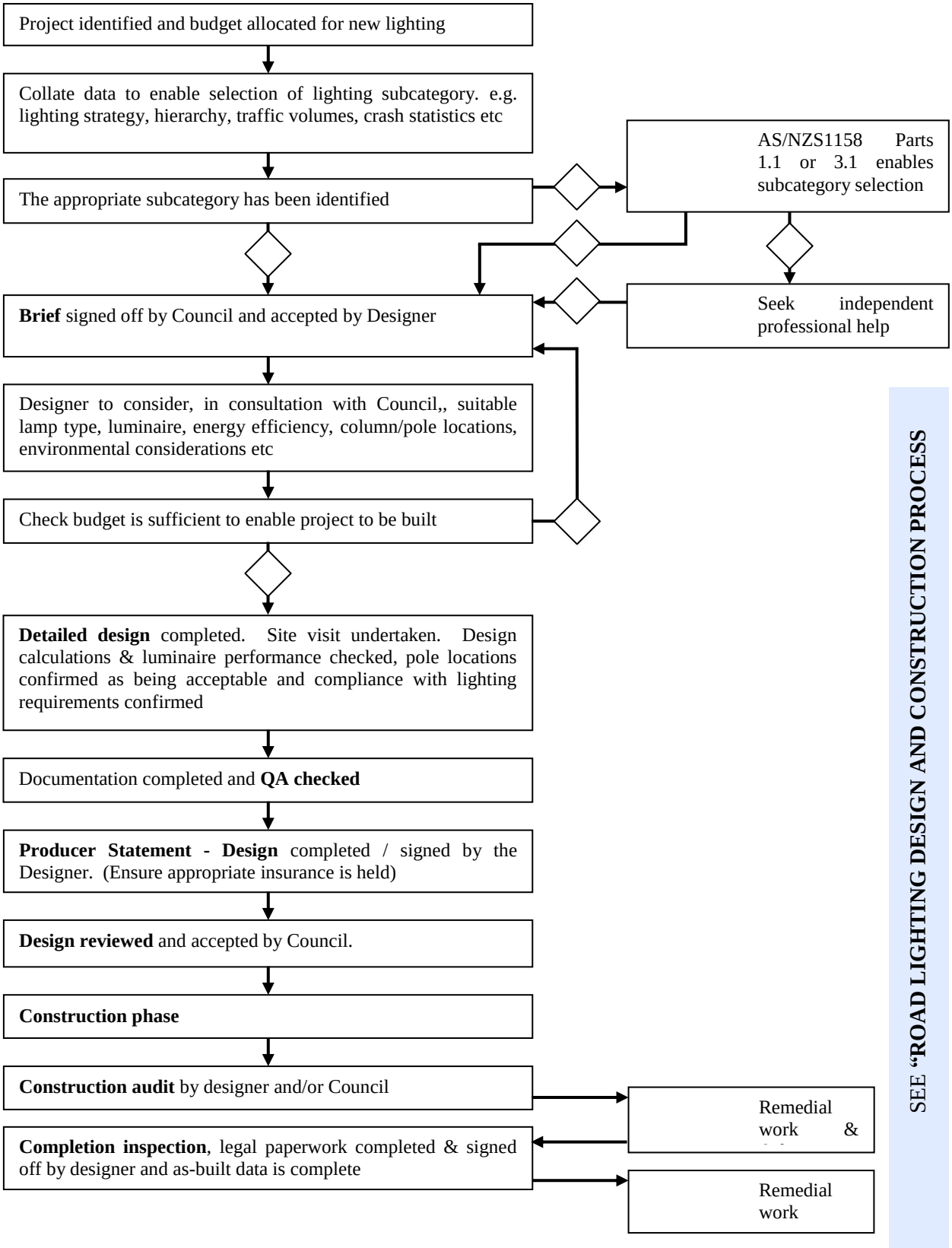
11.10 ELECTRICAL STANDARDS AND REQUIREMENTS

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

- all of 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.

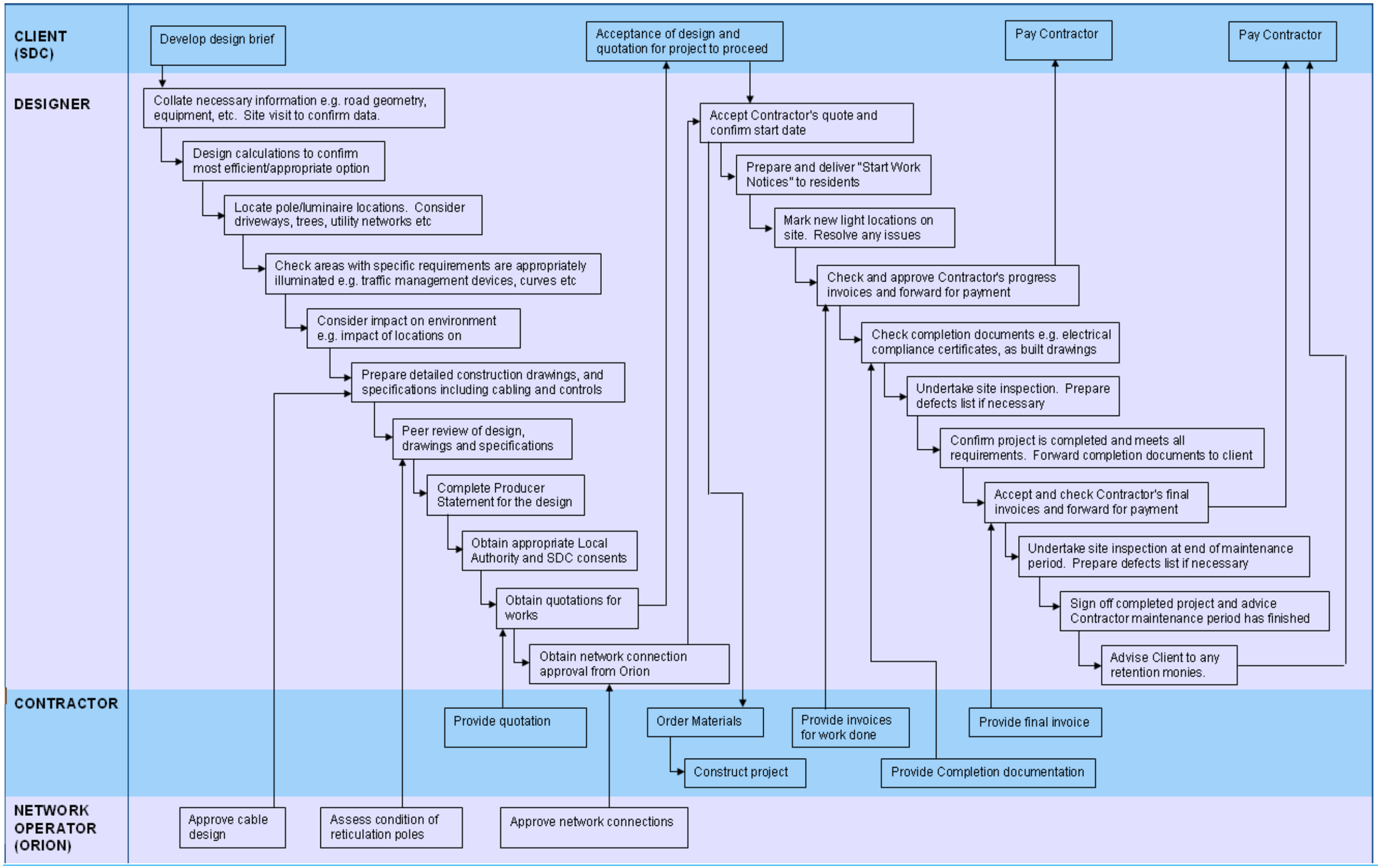
APPENDIX I INSTALLATION/RENEWAL PROCESS

This process chart shows the steps to be taken for a typical road lighting scheme or renewal project. The "Road Lighting Design and Construction Process" chart provides greater detail for design and construction. It is important that the design process starts with a clear detailed design brief, developed by, or in consultation with Council.



Maintenance Audit completed after one years operation. Sign off any retention.

APPENDIX II COUNCIL ROAD LIGHTING DESIGN AND CONSTRUCTION PROCESS



APPENDIX III DESIGN REPORT

(project name)

(project number)

Revision: _____ Date of Issue: _____

Project Personnel

Designer:		
Title:	Address:	
Telephone:	Mobile:	Email:

Client:		
Title:	Address:	
Telephone:	Mobile:	Email:

Design Reviewer:		
Title:	Address:	
Telephone:	Mobile:	Email:

Project Manager:		
Title:	Address:	
Telephone:	Mobile:	Email:

Full Description of Work

Concessions

Identify any work which does not conform to the specified requirements which will require a concession from Council. The concession(s) proposed will be discussed and must be accepted by Council in writing prior to execution.

Design Records

The following design records were produced for this design and are appended where noted:
(e.g. engineering drawings, specifications, calculations, and material specifications where not detailed elsewhere, column details, photos etc.)

Project Management
Detail how construction of the project will be managed to ensure the design will be successfully implemented. Include details of the project manager.

Communication with stakeholders and other parties
Describe how communication with stakeholders and other parties will be managed.

Producer Statement Design is attached

This Design Report has been:

Prepared by: _____
(Designer) (Name/Signature/Date)

Reviewed by: _____
(Peer Reviewer) (Name/Signature/Date)

Approved by: _____
(Principal Designer) (Name/Signature/Date)

APPENDIX IV PRODUCER STATEMENT - DESIGN

Issued by: _____ *(Designer's name)*

To: **Selwyn District Council**

In respect of: _____ *(Description of design)*

at: _____ *(Location)*

_____ *(Address)*

Lot: _____ **DP:** _____

_____ *(Design Company)* has been engaged by

_____ *(Client)* to provide design services for

_____ in respect of the project requirements

described above for All ☐ Part only as specified ☐

The design has been prepared in accordance with AS/NZS 1158 _____ *(category)* and the work is described on _____ drawing titled _____ and numbered sheet _____ of _____ and the specification plus other documents according to which the construction is proposed to be constructed.

I _____ *(name)* have the necessary qualifications and experience as an independent design professional covered by a current policy of Professional Indemnity Insurance to a minimum value of $_____ and **I BELIEVE ON REASONABLE GROUNDS** that subject to:

(i) The verification of the following design assumptions:___

_____

_____

and (ii) all proprietary products meeting the performance specification requirements, the drawings, specifications, and other documents according to which the development is proposed to be constructed will result in a compliant design.

_____ Date: _____

(Signature suitably qualified Design Professional)

Qualifications and experience_____

APPENDIX V DRAWING LAYOUT AND FORMAT REQUIREMENTS

Provide drawings to a minimum standard that complies with AS/NZS 1100.

Where road lighting will be altered, label all affected poles/columns and lights as detailed in table below:

- Label poles to be removed with "R".
- Number each affected road luminaire with the related number from the lighting schedule on the drawing. For example L1, L2 L3 etc.
- Label existing poles / columns / luminaires that won't be affected as "E". Show the lighting wattage of all proposed and remaining lights.

Symbols

Symbol	Use	Numbering system
Pxxx	Every pole/column upon which work is to be carried out shall be identified. Existing poles/columns shall have construction material and manufacturer's pole code shown on the drawing	Prefix to be followed with unique identifier either Orion's pole number or sequential column number for the project.
Lxxx	Any alteration to the existing lighting or proposed new installation. Provide separate codes for replacement, new and differing luminaire, lamp, column or outreach arm details	Prefix to be followed with unique identifier.
Rxxx	Any lighting equipment to be removed that is not covered by a "L" reference	Prefix to be followed with unique identifier.
E	Existing luminaire to remain	Not applicable

Title blocks

The title block must include the following information:

- A project title, including street address;
- A unique number or identifier, preferably the consent or project number;
- The designer's name, signature and contact details;
- The design reviewer's name and signature;
- The stage of work e.g. "acceptance", "tender", "construction", "as-built";
- The date of preparation and of approval;
- The scale or scales used;
- The original sheet size;
- Sheet numbers, including the number in the set;
- An amendment box, including brief description of amendment and sign off by designer/reviewer.

Format

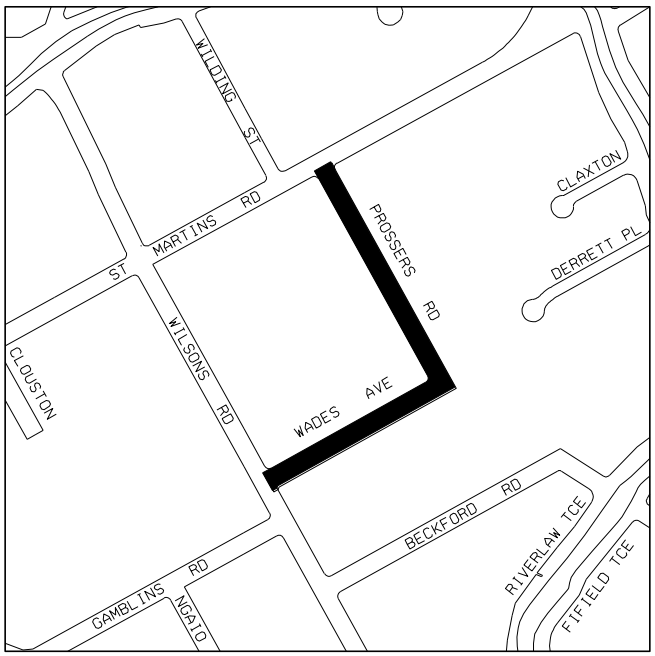
Drawings must be legible at A3 size and can be drawn to a scale of 1:500 or 1:1000.

Prepare electronic drawings in an industry standard format suitable for later addition of as-built information and inclusion in the RCA's asset system. Drawings can be supplied in electronic format as dwg, dxf, pdf or tif files.

Locality Diagram

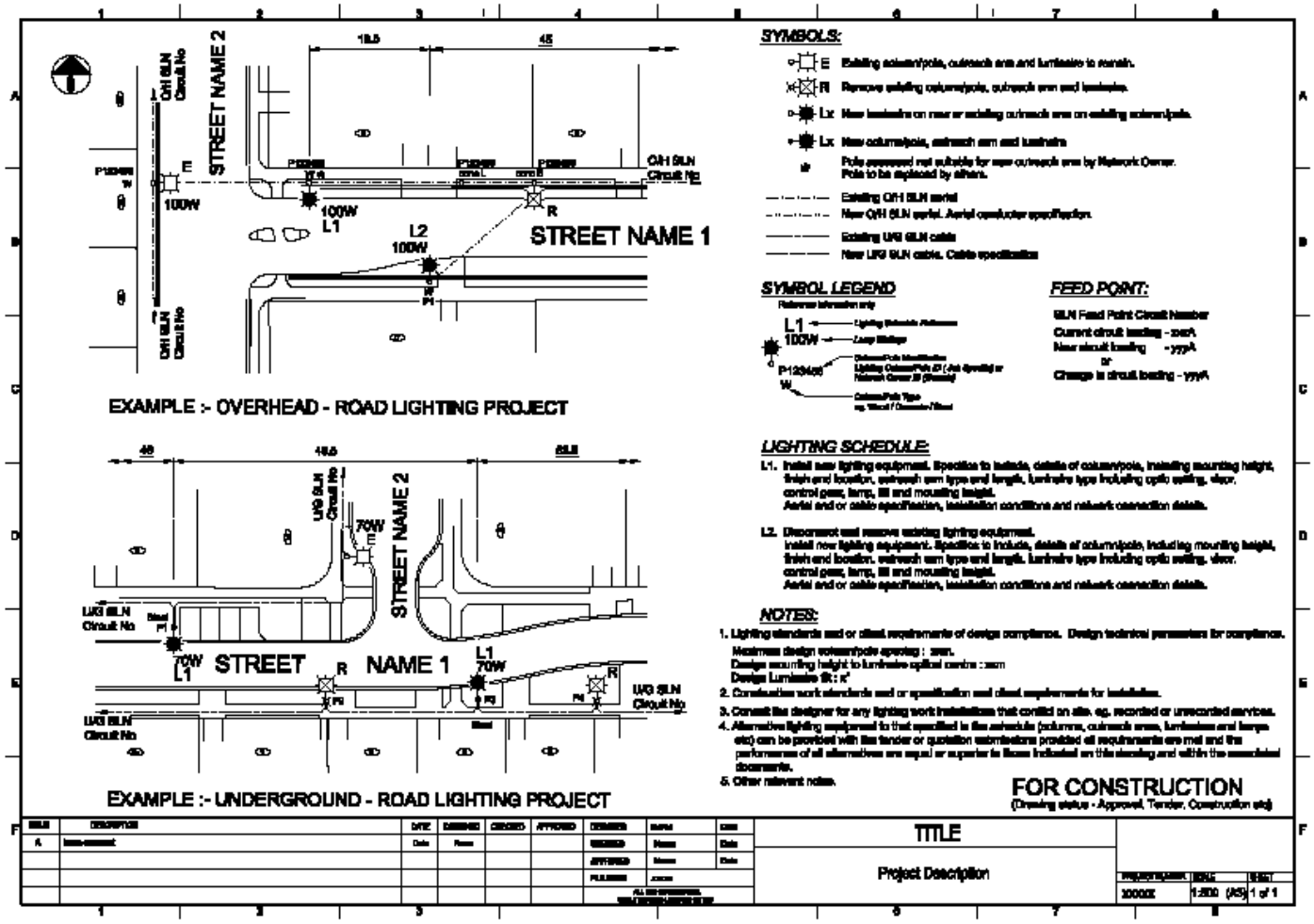
Show the road boundaries and street names where considered necessary. Show the limit of the development. Draw the locality diagram true to the map orientation or at the same orientation as the engineering drawing.

Example Locality Diagram



LOCALITY DIAGRAM

Example - Road lighting drawing



APPENDIX VI COMPLETION CERTIFICATE

To: _____ *(Asset Manager)*

Selwyn District Council

P.O. Box 90

Rolleston 7643

From: _____ *(Designer's Name)*

_____ *(Designer's Address)*

_____

Lighting installation works at: _____ *(Location)*

The above project has been completed by _____ *(Contractor's Name)*

All work has been carried out in accordance with AS/NZS1158, the Road Controlling Authorities' "Infrastructure Design Standard", scheme design, construction specifications and approved variations plus any additional requirements specific to this project that were indicated within the project brief.

All the tests were successfully completed and the lights were livened on _____ *(Date)*

and the maintenance period can commence from this date

The following documentation is enclosed:

- ☐ Test Certificate for each Lighting Standard
- ☐ Electrical Certificate of Compliance
- ☐ As Built Information
- ☐ Removed Lighting Equipment List
- ☐ Cable recording information

_____ *(Signature)*

_____ *(Print Name)*

_____ *(Date)*

Note:
A completion certificate similar to this can be used by the Contractor to submit to the Designer when construction is completed. This certificate can then be forwarded to Council by the Designer with the completion documentation.

APPENDIX VII AS-BUILT DATA REQUIREMENTS

INTRODUCTION

Provide as-built drawings clearly identifying any changes or alterations from the construction drawings.

AS-BUILT ACCURACY

GPS locations shall be provided in the X, Y plane to ±200mm.

AS-BUILT RECORDS

Provide as-built drawings, in the same form (e.g. scale, size) as the approved construction drawings and to at least the same level of detail. They must show all built assets to be taken over by the Council and all items to be removed.

Where providing paper copies, mark as-built details in red on as-built plans. Clearly mark plans as "As-built" by stamping or changing the title block. Date and sign the as-built plans.

Provide a schedule of all removed equipment for valuation purposes.

Where required by Council load as-built road lighting assets, in Council's Road Lighting Asset System. Details of the approved contractor, currently able to carry out this work is Connetics Ltd

As Built Schedule of Components.

(Project Description)

(Project location)

(Resource Consent Reference Number)

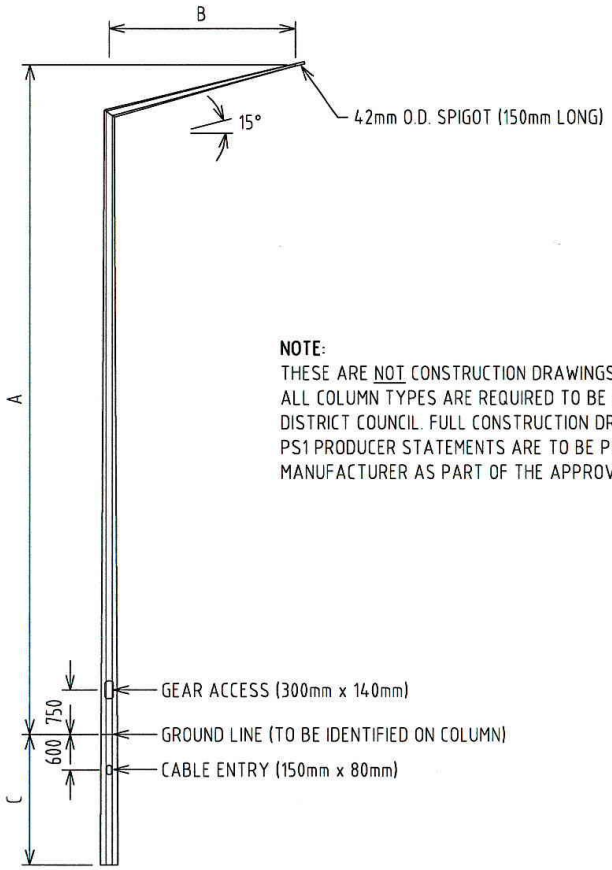
(Commissioning Date)

	Type	Model	Height	Tilt	Wattage	Manufacturer	IP Rating	Surface Treatment Colour	GPS Location
Column									
Outreach Arm									
Luminaire									
Lamp									
Mounting									
Other									

APPENDIX VIII COUNCIL PREFERRED POLE

SELWYN DISTRICT COUNCIL SPECIFIED COLUMN SIZES 9.0m RANGE

TYPE	DIM 'A'	DIM 'B'	DIM 'C'
9.3m	9.3m	2.0m	1.8m min
9.6m	9.6m	3.0m	1.8m min



NOTE:
THESE ARE NOT CONSTRUCTION DRAWINGS.
ALL COLUMN TYPES ARE REQUIRED TO BE APPROVED BY THE SELWYN DISTRICT COUNCIL. FULL CONSTRUCTION DRAWINGS, SPECIFICATIONS & PS1 PRODUCER STATEMENTS ARE TO BE PROVIDED BY THE MANUFACTURER AS PART OF THE APPROVAL PROCESS

PRELIMINARY COPY
NOT FOR TENDER USE

Selwyn DISTRICT COUNCIL

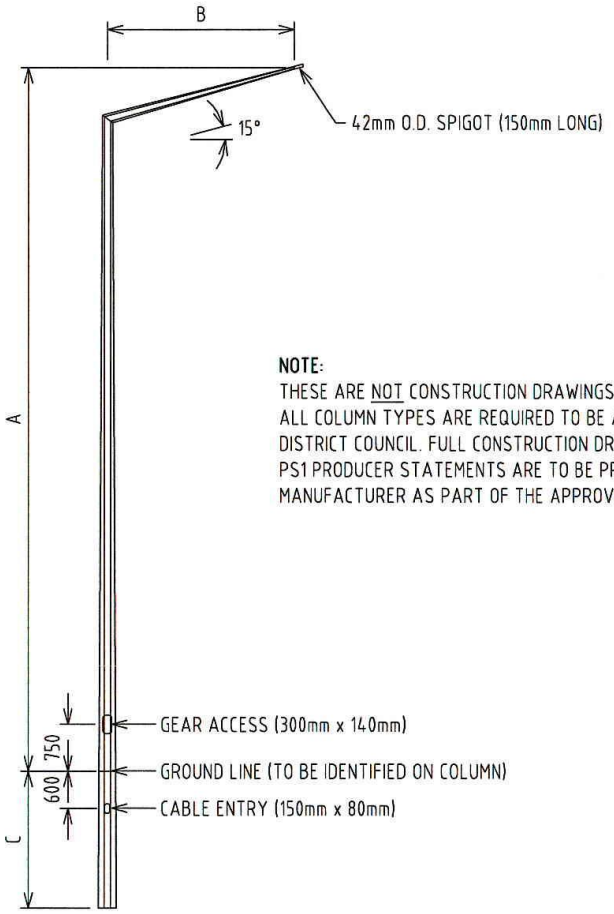
REV	DESCRIPTION	DATE
A	ORIGINAL ISSUE	10-11-09

GROUND PLANTED 9.0m FRANGIBLE OCTAGONAL SECTIONAL STEEL COLUMN WITH MITRED OUTREACH

REVISION	SIZE	SCALE	DRAWING NUMBER	SHEET
A	A4	NTS	001	1/1

SELWYN DISTRICT COUNCIL SPECIFIED COLUMN SIZES 10.0m RANGE

TYPE	DIM 'A'	DIM 'B'	DIM 'C'
10.3m	10.3m	2.0m	2.0m min
10.6m	10.6m	3.0m	2.0m min
10.9m	10.9m	4.0m	2.0m min



NOTE:
THESE ARE NOT CONSTRUCTION DRAWINGS.
ALL COLUMN TYPES ARE REQUIRED TO BE APPROVED BY THE SELWYN DISTRICT COUNCIL. FULL CONSTRUCTION DRAWINGS, SPECIFICATIONS & PS1 PRODUCER STATEMENTS ARE TO BE PROVIDED BY THE MANUFACTURER AS PART OF THE APPROVAL PROCESS

PRELIMINARY COPY
NOT FOR TENDER USE

Selwyn DISTRICT COUNCIL

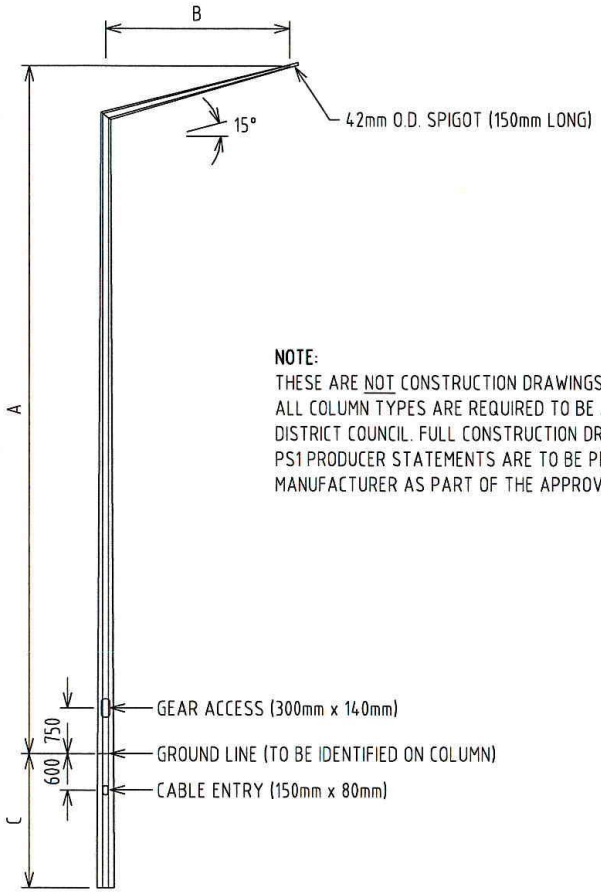
REV	DESCRIPTION	DATE
A	ORIGINAL ISSUE	10-11-09

GROUND PLANTED 10.0m FRANGIBLE OCTAGONAL SECTIONAL STEEL COLUMN WITH MITRED OUTREACH

REVISION	SIZE	SCALE	DRAWING NUMBER	SHEET
A	A4	NTS	002	1/1

SELWYN DISTRICT COUNCIL SPECIFIED COLUMN SIZES 12.0m RANGE

TYPE	DIM 'A'	DIM 'B'	DIM 'C'
12.6m	12.6m	3.0m	2.4m min



NOTE:
THESE ARE NOT CONSTRUCTION DRAWINGS.
ALL COLUMN TYPES ARE REQUIRED TO BE APPROVED BY THE SELWYN DISTRICT COUNCIL. FULL CONSTRUCTION DRAWINGS, SPECIFICATIONS & PS1 PRODUCER STATEMENTS ARE TO BE PROVIDED BY THE MANUFACTURER AS PART OF THE APPROVAL PROCESS

PRELIMINARY COPY
NOT FOR TENDER USE

Selwyn DISTRICT COUNCIL

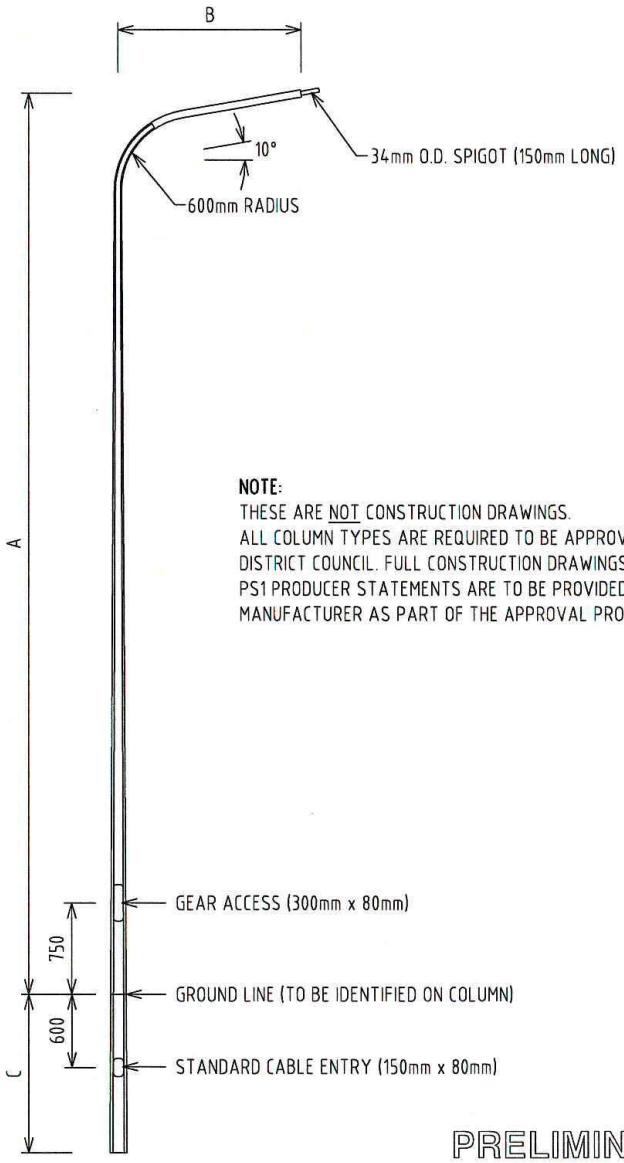
REV	DESCRIPTION	DATE
A	ORIGINAL ISSUE	10-11-09

GROUND PLANTED 12.0m FRANGIBLE OCTAGONAL SECTIONAL STEEL COLUMN WITH MITRED OUTREACH

REVISION	SIZE	SCALE	DRAWING NUMBER	SHEET
A	A4	NTS	004	1/1

SELWYN DISTRICT COUNCIL SPECIFIED COLUMN SIZES

TYPE	DIM 'A'	DIM 'B'	DIM 'C'
6.0m	6.0m	0.9m	1.0m min
7.4m	7.4m	1.5m	1.3m min



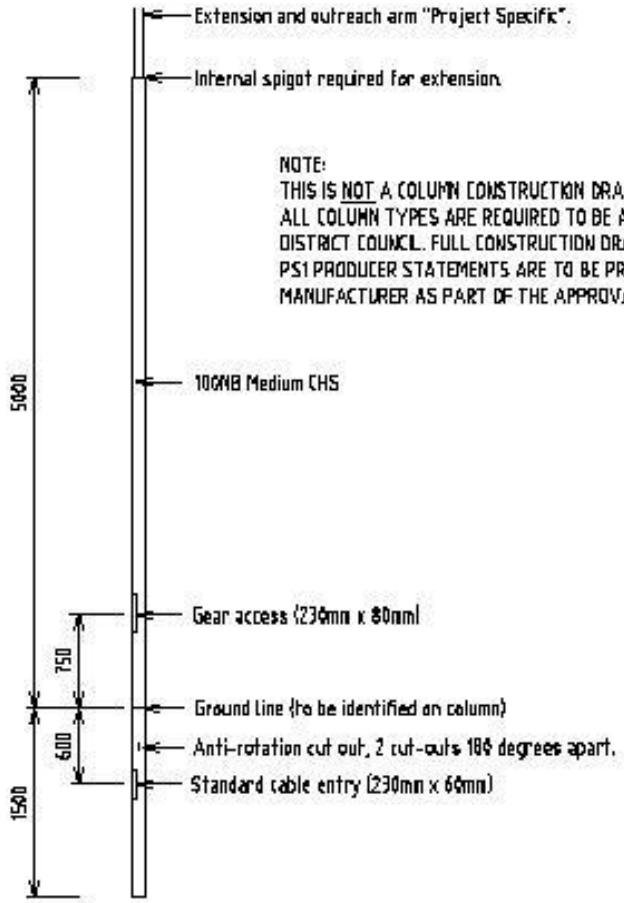
NOTE:
THESE ARE NOT CONSTRUCTION DRAWINGS.
ALL COLUMN TYPES ARE REQUIRED TO BE APPROVED BY THE SELWYN DISTRICT COUNCIL. FULL CONSTRUCTION DRAWINGS, SPECIFICATIONS & PS1 PRODUCER STATEMENTS ARE TO BE PROVIDED BY THE MANUFACTURER AS PART OF THE APPROVAL PROCESS

PRELIMINARY COPY
NOT FOR TENDER USE

REV	DESCRIPTION	DATE
A	ORIGINAL ISSUE	10-11-09

GROUND PLANTED FRANGIBLE OCTAGONAL SECTIONAL STEEL COLUMN WITH CURVED OUTREACH

REVISION	SIZE	SCALE	DRAWING NUMBER	SHEET
A	A4	NTS	005	1/1



Standard Decorative Straight Column Base.

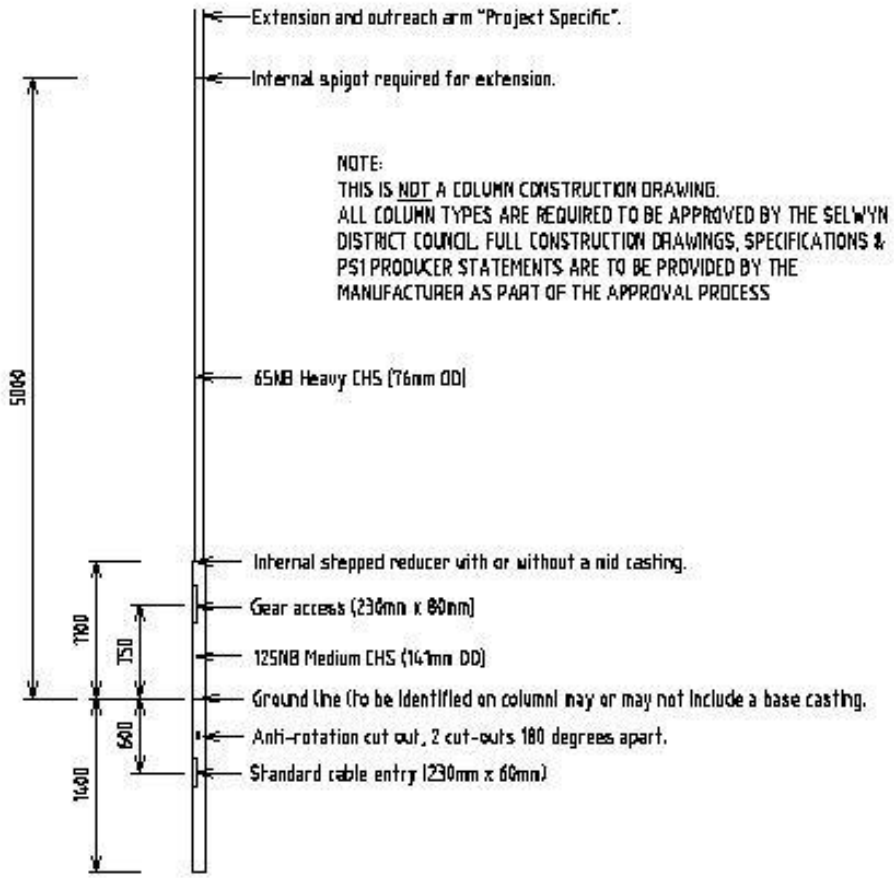
PRELIMINARY COPY
NOT FOR TENDER USE

REV	DESCRIPTION	DATE
A	ORIGINAL ISSUE	10-11-10

Selwyn DISTRICT COUNCIL

GROUND PLANTED FRANGIBLE DECORATIVE STRAIGHT COLUMN BASE FOR DECORATIVE EXTENSION AND OUTREACH ARM.

REVISION	SIZE	SCALE	DRAWING NUMBER	SHEET
A	A4	NTS	006	1/1



Standard Decorative Stepped (one piece) Column Base.

PRELIMINARY COPY
NOT FOR TENDER USE

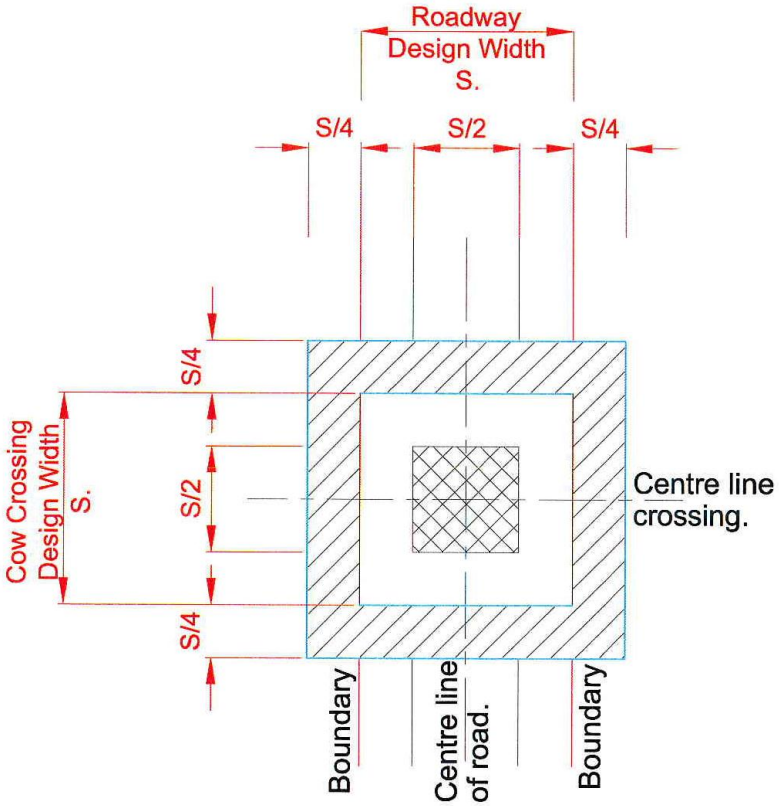
REV	DESCRIPTION	DATE
A	ORIGINAL ISSUE	18-11-09

GROUND PLANTED FRANGIBLE DECORATIVE STEPPED COLUMN BASE FOR DECORATIVE EXTENSION AND OUTREACH ARM.

REVISION	SIZE	SCALE	DRAWING NUMBER	SHEET
A	A4	NTS	007	1/1

SELWYN DISTRICT COUNCIL
Standard for Dairy Cow Crossings.

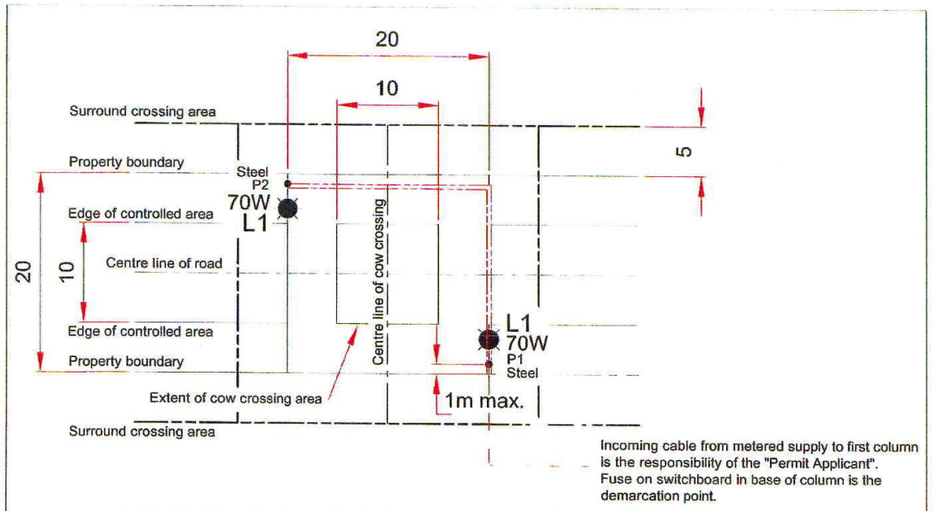
Technical Lighting Requirements -
Minimum Illuminance Calculation Values and Area.



Cow crossing area minimum horizontal illuminance 5 lux.

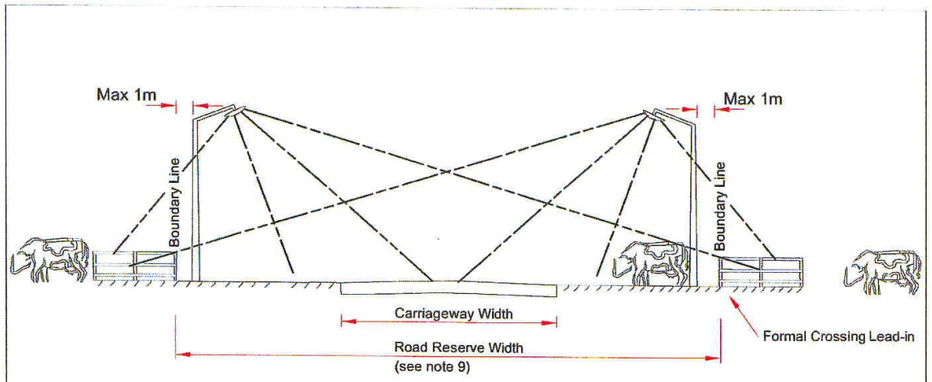
Cow crossing controlled area minimum horizontal illuminance 1.5 lux and minimum average illuminance of 8 lux.

Surround crossing area minimum horizontal illuminance 0.7 lux and minimum average illuminance of 3 lux.



Incoming cable from metered supply to first column is the responsibility of the "Permit Applicant". Fuse on switchboard in base of column is the demarcation point.

TYPICAL DAIRY COW CROSSING LIGHTING ARRANGEMENT.



TYPICAL LIGHTING OF DAIRY COW CROSSING.

SYMBOLS:

- L1 New column, outreach arm and luminaire
- Centre line of road and cow crossing area.
- Extent of crossing surround.
- New Ø100 Cable Duct, colour - Orange

LIGHTING SCHEDULE:

L1. Supply and install a new Sectional Steel 7.4m mounting height lighting column with a 1.5m curved outreach at 10° above horizontal.
Supply and install a new luminaire complete with control gear and a new 70W HPS NAV-T Super lamp.
Column to be located in the grass berm, maximum 1.0m from boundary, at marked position.
Supply and install new cable to columns within new 100mm diameter PVC duct within road reserve as indicated.
Connect to private metered supply via fused switchboard within the base of each column . Ensure location of column is clear of all services.

NOTES:

1. Illumination is designed to comply with SDC Lighting Standard for Dairy Cow Crossings.
2. Lighting works to comply to SDC Engineering Code of Practice.
3. Luminaires to comply with AS/NZS 1158.
4. Key driver for lighting upgrade was : Dairy Cow Crossing Permit application.
5. Consult the designer for any lighting installation works that conflict on site. eg. recorded or unrecorded services.
6. On completion documentation, record GPS location of all new Lighting columns and record "As Built" cable information.
7. Cable to originate from permit application's private metered supply to first column located on boundary or a maximum of one meter within the road reserve. Switchboard and fuse link to be provided within the base of each pole for maintenance by others.
8. Each crossing site shall be assessed and the lighting installation designed to met the characteristics of that site.
9. Width of carriageway and road reserve may differ.

connetics
CONNETICS LIMITED P.O. BOX 2237 CHRISTCHURCH

ISSUE	DESCRIPTION	DATE	DESIGNED	CHECKED	APPROVED
-					
-					
-					

DESIGNED	SJM	16-10-09
CHECKED		5-11-09
APPROVED		5-11-09
FILE NAME	750572	

CONNETICS LTD. -- ALL RIGHTS RESERVED. UNAUTHORISED USE PROHIBITED

PROJECT NUMBER
750572

LIGHTING FOR DAIRY COW CROSSING

Lighting Requirements for a Typical Dairy Cow Crossing.

Selwyn DISTRICT COUNCIL

PROJECT NUMBER	SCALE		SHEET
RD 5.0	NTS	(A3)	1 of 1

APPENDIX IX LIGHTING DESIGN REVIEW CERTIFICATE TEMPLATE

Project Description: _____

Client: _____

Asset Owner: _____

Drawing Reference Number: _____ **Drawing Issue:** _____

Review Date: _____

A review of the lighting design information provided has been completed with reference to the following criteria:

1. AS/NZS1158 category _____ This has been confirmed by the asset owner as the most suitable design criteria for this application	Yes ☐ No ☐
2. Any specific asset owner requirements as identified within the brief or consent application have been met:	Yes ☐ No ☐
3. Photometric data provided confirms compliance with AS/NZS1158 category _____	Yes ☐ No ☐
4. Photometric data provided originated from a certified laboratory and the calculations have been produced from an industry accepted source.	Yes ☐ No ☐
5. Proposed lighting columns, utility poles, outreach arms and luminaries etc are acceptable for use by the asset owner. *Equipment not used previously needs the prior acceptance of the asset owner*	Yes ☐ No ☐
6. Producer statements (PS 1) for design, luminaire and column manufacture with reference to complying standards have been provided.	Yes ☐ No ☐
7. All landscaping, kerb build-outs and/or traffic management devices that are included in the project area are indicated on the drawings and are to be illuminated to the required level.	Yes ☐ No ☐
8. Environment and maintenance issues such as water ingress, column/pole attachments, replacement parts, lamp access, glare and upward waste light etc have been considered.	Yes ☐ No ☐

9. Affect of the new lighting on adjacent residents, adjoining roads, construction methodology and surrounding area has been considered.	Yes ☐ No ☐

10. Cable design has been reviewed by the Designer ☐ Network Company ☐ and all requirements considered. *Note the lighting designer may not always be responsible for the Network Cable Design.*	Yes ☐ No ☐

Any non compliance requiring action

Comments

A copy of the information reviewed is attached. **Yes** ☐ **No** ☐

After reviewing this lighting design I believe it is acceptable and it **complies with / does not comply with** (*delete one*) the requirements of the asset owner referred to above.

Design reviewed by:

Signed: _____ **Date:** _____

Name: _____ **Position:** _____

Company: _____

Lighting Category	Suggested lamp wattage	Suggested luminaire [1]	Suggested pole Mounting Height [2]	Outreach arm for U/G installation [3]	Outreach arm for O/H installation [4]	Glass or acrylic diffuser	Spare luminaire	Switchboard	Tilt Wedge [5]	Outreach arm spacer [6]	Spigot adaptor [7]	Hold down bolt set	Photo-cell
V1	250W or 400W	Standard road lighting luminaire with "Dished" Bowl reflector or High Performance semi-decorative.	11m to 12.5m	3m									
V2	150W or 250W	Standard road lighting luminaire with "Dished" Bowl reflector or High Performance semi-decorative.	10.5m to 11.5m	2m or 3m	2m, 3m or 4m								
V3	140W, 150W or 250W	Standard road lighting luminaire with "Dished" Bowl reflector or High Performance semi-decorative. Flat Glass or Aero screen.	9.5m to 11m	2m or 3m	2m, 3m or 4m	✓	✓	✓	✓	✓		✓	✓
V4	90W, 100W, 140W or 150W.	Standard road lighting luminaire with "Dished" Bowl reflector or High Performance semi-decorative. Flat Glass or Aero screen.	9.5m to 10.5m	2m or 3m	2m or 3m	✓	✓	✓	✓	✓	✓	✓	✓
P3	45W, 60W,70W, 90W or 100W	Street lighting luminaire with "Dished" Bowl reflector, flat glass or aero screen, decorative or semi-decorative.	6.0m to 8.5m	1.0m to 2m	0.5m to 2m	✓	✓	✓		✓	✓		✓
P4	35W, 45W, 50W, 60W or 70W	Street lighting luminaire with "Dished" Bowl reflector, flat glass or aero screen, decorative or semi-decorative.	6.0m to 7.5m	1.0m to 1.5m	0.5m to 2m	✓	✓	✓			✓		✓
Flood lighting	250W or 400W	Asymmetric flood light.	12m to 14m.		Double, triple or quad spigot cross arm.	✓	✓	✓				✓	✓
Outdoor Parking Area's	150W or 250W	Full cut off or forward throw luminaires.	10m to 14m		Single, double, triple or quad spigot cross arm.	✓	✓	✓				✓	✓
Pedestrian Crossings	150W	Full cut off or forward throw luminaires.	6m pole with 300mm wide black & white painted strips or reflective tape up to 3m minimum above ground.			✓	✓	✓					✓

Notes:

1 All luminaires should be fully compliant with AS/NZS1158.6 before being accepted onto any road lighting network.

2 Expected design life of a pole is 40 years, designed to meet loads imposed by NZS 4203 and to have corrosion protection to AS/NZS 4680. Producer Statement design is required for each pole. Recommended height is the mounting height above ground. Most tower trucks cannot access heights over 14m above ground. An access door (300mm x 80mm) to the switchboard is required minimum 600mm above the ground line and a cable entry hole (150mm x 80mm) is required a minimum 600mm below the ground line. Ground line should also be indicated on the pole. Steel poles constructed to comply with AS/NZS 1554.

3 Expected design life of an outreach arm is 40 years, designed to meet loads imposed by NZS 4203 and to have corrosion protection to AS/NZS 4680. Producer Statement design is required for each outreach arm. Outreach arms associated with an under ground installation can be "curved" or "mitred" at 10 or 15 degrees above horizontal. They maybe single or double depending on where the pole is located. An outreach arm usually includes a 150mm long by 42mm spigot.

4 Outreach arms associated with an over head installation attached to a distribution pole can be "curved" or "mitred" at 10 or 15 degrees above horizontal (to maintain consistency across the network a common arm angle can be used and the spigot angle can be changed or tilt wedges used to achieve the correct luminaire tilt). Expected design life of an outreach arm is 40 years, designed to meet loads imposed by NZS 4203 and to have corrosion protection to AS/NZS 4680. Producer Statement design is required for each outreach arm. Any welding is to comply with AS/NZS 1554 and all welders to be qualified to AS/NZS 4711. Outreach arms are usually manufactured from 33mm OD to 76mm OD tubular steel with a 34mm to 42mm spigot. When attaching an outreach arm to a distribution pole it should be assessed to confirm it is suitable to support the proposed outreach arm and luminaire.

5 Tilt wedges maybe internal or external to allow the luminaire to be tilted to various degrees without the need to change the spigot angle of the outreach arms. Common tilt wedge angles available are 5^0 or 10^0. When using a luminaire at 0^0 tilt care should be taken to ensure water cannot enter the fitting via the spigot mounting and the weight of the luminaire does not cause a negative tilt.

6 Outreach spacer plates are required to ensure the outreach arm has sufficient bearing area on a wooden distribution pole. They are also required to pack the outreach arm out from the pole to allow clearance from an existing cross arm. One standard spacer should be capable of meeting all situations.

7 A spigot adaptor allows the same luminaire to be used on different diameter outreach arms / spigots.