

SOUTHERN LINK INLAND PORT APPLICATION

ASSESSMENT OF ENVIRONMENTAL EFFECTS - LIGHTING

Prepared for: Southern Link Property Limited

Revision: C

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Quality Assurance Statement

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Executive Summary

The proposed Southern Link Inland Port Project (**Project**) is to be developed on a rural-zoned site located at the corner of Stedman Road and Dukes Road North in Mosgiel (**site**). This Assessment of Environmental Effects - Lighting Report addresses the potential environmental impacts arising from artificial lighting associated with both the construction and operation of the Inland Port. The operational lighting design is currently at concept stage, and detailed lighting design (including photometric modelling to confirm illuminance and boundary spill light levels) will be completed as the design progresses.

A detailed site inspection (day and night) confirmed that the existing lighting environment is generally low, characterised by isolated rural-residential lighting, localised streetlighting at intersections, rail signal lighting, and floodlighting within nearby industrial properties such as the Fonterra distribution centre. The site also lies adjacent to the Taieri Aerodrome, an uncontrolled airfield that operates without runway or airfield lighting and supports only daytime Visual Flight Rules (VFR) operations, with the exception of 24/7 Instrument Flight Rules (IFR)-capable rescue helicopter activities.

This Report evaluates the proposed lighting installation against the Dunedin City Council Second Generation District Plan (**2GP**), Civil Aviation Authority (**CAA**) requirements, KiwiRail standards, and the principles of AS/NZS 4282:2023 "Control of the obtrusive effects of outdoor lighting." Potential lighting effects were assessed across key receiving environments, including residents, transport system users (road, rail, and aviation), ecological receptors, and impacts on the night sky.

This report identifies mitigation measures and design parameters to be incorporated into detailed lighting design to ensure compliance with regulatory requirements while minimising off-site light spill, glare, and sky glow. These measures include:

- defaulting to a warm-colour-temperature ($\leq 3000\text{K}$) LED luminaires for exterior lighting, with $\leq 4000\text{K}$ lighting where required for operational and safety requirements.
- full cut-off, flat-lens optics with zero upward light;
- luminaire shielding as required and precise aiming;
- restrictions on pole heights to avoid infringing Taieri Aerodrome Flight Fan height controls;
- providing light only to the minimum levels required for safe operation;
- motion detection and glazing controls for interior lighting;
- restrictions on illuminated signage;

Resource consent will be required for light spill and illuminated signage associated with the Project. These matters form part of the overall Fast-track application.

The assessment concludes that with the proposed mitigations incorporated into the lighting design, the residual environmental effects of artificial lighting associated with the Inland Port will be **no more than minor**.

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1. Introduction

Southern Link Property Ltd is seeking approvals under the Fast-track Approvals Act 2024 to develop and operate an inland port (the Southern Link Inland Port (**SLIP**) Project) on an approximately 40-ha site on the outskirts of Mosgiel located at 270 – 292 Dukes Road North, Taieri.

The site is intended to be used as an inland port bulk storage and logistics hub to stage shipping, rail and truck transport consignments.

This report has been prepared by Pedersen Read Limited for the assessment of the environmental effects of artificial lighting for the Project.

This assessment considers the existing environment, the environmental effects of the lighting on the existing environment, consequences of the proposed installation, and related mitigation. The assessment is informed by the project description set out in section 2 of this report, the permanent lighting design brief and a concept lighting plan; however, the concept lighting design is preliminary and will undergo further coordination and photometric modelling as detailed design progresses.

1.1 Code of Conduct

The author of this report is Kate Macdonald. I am an Electrical Engineer at Pedersen Read. I have a Bachelor of Engineering (Elec) w/ Honours from the University of Canterbury, am a Chartered Professional Engineer and a Chartered Member of Engineering New Zealand. I have worked at Pedersen Read for six years and have over 19 years' experience in the electrical engineering and lighting industry. In 2016, I completed the lighting design for Oi Manawa, the Canterbury Earthquake National Memorial and the project was the recipient of a 'Dark Sky' Excellence Award from the NZ Astronomical Society and an Award of Commendation from the NZ Illumination Engineering Society.

I confirm that I have read the Code of Conduct for expert witnesses contained in the Environment Court Practice Note 2023. This report has been prepared in compliance with that Code, as if it was expert evidence presented in proceedings before the Environment Court. Unless I state otherwise, this report is within my area of expertise, and I have not omitted to consider material facts known to me that might alter or detract from the opinions expressed in this report

2. Project Description

The development will occur as described in the Project Description of SLPL's Substantive Fast-track Application which should be referred to for a complete description of the Inland Port development. In summary, the Inland Port will include:

- A new rail siding off the Taieri Branch Line to enable loading, unloading and operation of a rail freight shuttle service to Port Chalmers and the wider rail network;
- Approximately 155,000 m² of high stud warehousing (chilled and ambient) and associated yard and canopy areas;
- Two road exchange areas for the loading and unloading of container trucks;
- A container depot facility enabling the inspection, cleaning, upgrading and repair of containers including for food grade repacking;
- Approximately 9 ha of container terminal for storage and movement of empty and full containers including refrigerated containers;
- Approximately 1000 m² of onsite offices ancillary to the Inland Port;
- Road widening and construction of a new intersection onto Dukes Road North;
- 24/7 operation with flood and road lighting for nighttime operation;
- Ancillary activities to support the above including vehicle parking, truck waiting areas, onsite road network, three waters and power infrastructure, flood mitigation, landscaping, security measures, acoustic barriers and lighting; and
- Ongoing management and monitoring activities including ensuring establishment of landscaping, stream health monitoring, wildlife management and effects management.

Construction of the Inland Port is anticipated to be undertaken in three stages however the timing of the delivery of each stage, and discrete works within each stage, may change in response to demand for logistics capacity at the Inland Port. Each stage of works will involve site clearance, earthworks, construction of buildings, hardstanding and access, installation of infrastructure, landscaping and works and management activities necessary to manage environmental effects during construction including erosion and sediment controls and construction management activities:

- Stage 1 is estimated to be completed 1 to 3 years following commencement of the Project and will include clearance of the southern area of the site and construction of the 'Stage 1' container storage concrete pad, rail siding, container service area, warehouses, internal roading, parking and loading, road widening and construction of the new intersection on Dukes Road North, stormwater attenuation pond, Silver Stream stormwater outlets, servicing infrastructure, flood management measures, landscaping, acoustic barriers and eastern bund, and lighting.
- Stage 2 is estimated to be completed 3 to 5 years following commencement of the Project and will include clearance of the northern area of the site and construction of the 'Stage 2' container storage concrete pad, warehouses, ancillary offices, internal roading, parking and loading, , landscaping, and extension of the servicing infrastructure and lighting.

- Stage 3 is estimated to be completed 5 to 10 years following commencement of the Project and will include clearance of the eastern area of the site, including the eastern acoustic bund, and construction of the 'Stage 3' warehouses, internal roading, parking and loading, landscaping, and extension of the servicing infrastructure and lighting

3. Existing Site

3.1 Location and Context

The existing site has an area of approximately 400,000m² and is located on the corner of Stedman Rd and Dukes Rd North in Mosgiel, refer Figure 1 below. The site is zoned as Taieri Plain Rural in the 2GP as are adjacent sites to the east and north. Adjacent sites beyond Stedman Rd to the West and South West are zoned as Industrial, Taieri Aerodrome and Rural Residential. Dukes Rd North to the North of the site is classified as a strategic road and Stedman Rd to the West is classified as an industrial road. The site also borders the KiwiRail rail corridor to the West (including an operational rail siding), and Silver Stream to the South.

Existing Zones and Road Classifications Map for Proposed Inland Port Site

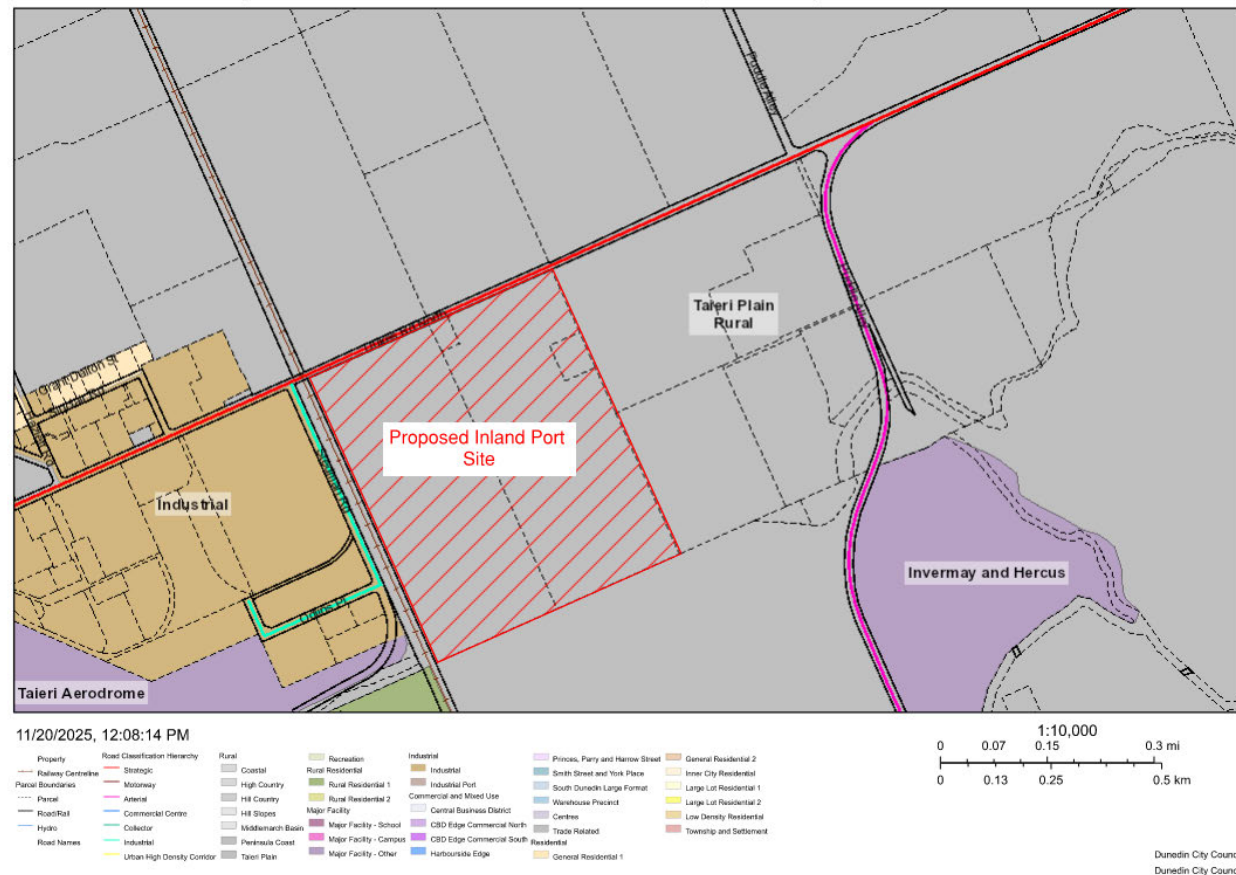


Figure 1 - Proposed Inland Port site location zoning and road classification plan

The proposed site also intersects with the Taieri Aerodrome approach and take-off flight fan, as shown below in Figure 2.

Flight Fan and Road Classifications

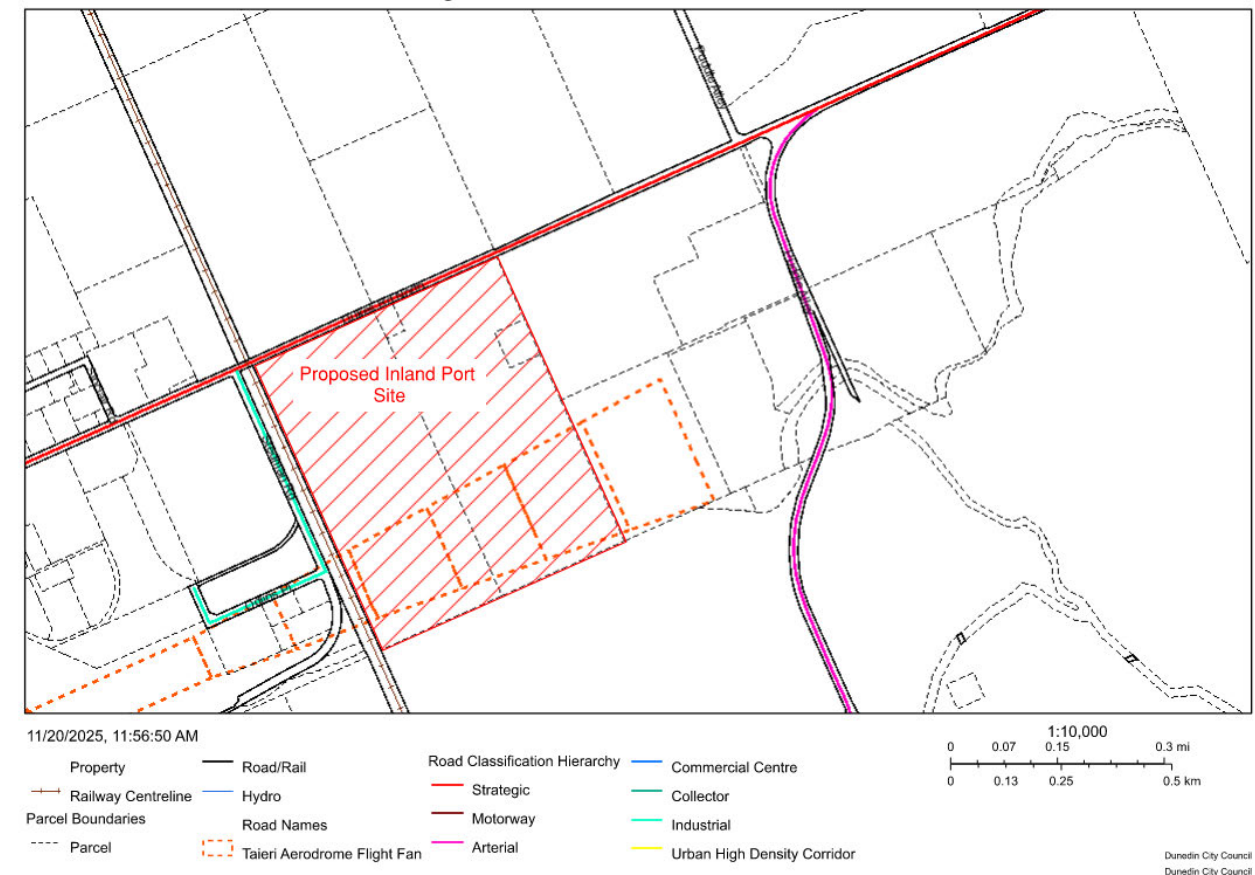


Figure 2 - Proposed Inland Port Site with Taieri Aerodrome Flight Fan overlay

3.2 Lighting Arrangement

Two site visits were undertaken (one during daylight hours and one after dark). Weather at the time of the inspections was generally as outlined below:

1. 4:30-5:30pm, 7th November 2025

Clear, ≈18°C, Visibility >10km, Wind 20km/h (E), Waning Gibbous Moon (93%), Sunrise @ 6:06am, Sunset @ 8:37pm

2. 9pm-10pm, 7th November 2025

Clear, ≈11°C, Visibility >10km, Wind 20km/h (E), Waning Gibbous Moon (93%), Sunrise @ 6:06am, Sunset @ 8:37pm

Locations from which the site was observed in the context of the surrounding environs are summarised below in **Figure 3**.



Figure 3 - Locations from which the site was observed

3.2.1 Streetlighting and signal lighting

Existing streetlighting was observed in the following locations adjacent to the site:

- At the intersection of Stedman and Dukes Rd North, refer Figure 4.
- On Stedman Rd in front of the Fonterra Factory site, refer Figure 5.
- On the railway siding adjacent to Stedman Rd, refer Figure 5.

There was also signal lighting associated with the railway crossings on Dukes Rd North and Stedman Rd.



Figure 4 - View from corner of Stedman Rd and Dukes Rd North looking down Dukes Rd North showing

①: Streetlighting and ②: Rail Signal lighting (Source, Google Maps)



Figure 5 - View from corner of Stedman Rd and Dukes Rd North looking down Stedman Rd showing

①: Rail Signal lighting, ②: streetlighting and ③: Railway siding lighting (Photo taken from location 1 in Figure 3)

3.2.2 Existing lighting on the site

The existing lighting on the site is associated with the residential and farm buildings on the site. When viewed from the public road boundaries and from locations outside of the site, most of these buildings and their associated lighting are obscured from view behind trees and hedges, apart from the house at 274 Dukes Rd North, which is visible from Dukes Rd North. Overall, there is minimal exterior lighting associated with the existing properties on the site.



Figure 6 – Residence at 274 Dukes Rd North which is visible from Dukes Rd North.

3.2.3 Existing lighting in surrounding environment

The adjacent properties to the North, East and South are zoned as Taieri Plain Rural, and comprise rural residential properties with limited associated exterior lighting. The neighboring properties to the Southwest of the site, along Stedman Rd, are zoned as Industrial and Taieri Aerodrome. There is a large Fonterra distribution centre and associated railway siding located on Stedman Rd, as well as some other smaller industrial properties and the Otago Aero Club / Taieri Airfield. There is exterior floodlighting associated with the industrial properties, including floodlights mounted on $\approx 20\text{m}$ poles at the Fonterra site. The pole mounted floodlights are mounted at an angle of approximately 30° and are a subsequent source of glare. Examples of the existing lighting around the site are shown in Figure 7, Figure 8 and Figure 9.

The lighting environment in the vicinity of the site is not representative of a uniformly dark rural setting, but rather a transitional environment influenced by the existing industrial lighting. The presence of visible high-mast floodlighting and associated glare contributes to elevated background brightness in parts of the surrounding area and informs the baseline against which the effects of the proposed development are assessed.

Taieri Airfield includes grass runways, hangars, operational buildings, and supporting infrastructure. Night-time operations are extremely limited, as the airfield has no runway or airfield lighting, and therefore no fixed-wing night flying occurs. Under CAA rules, standard activity at the airfield is restricted to daylight Visual Flight Rules (VFR) hours, typically within 30 minutes of sunrise and sunset. Heli Otago's rescue helicopter operations which occur from the airfield are the exception, as they operate 24/7 and are certified for Instrument Flight Rules (IFR) flight, allowing them to operate at night despite the absence of airfield lighting.

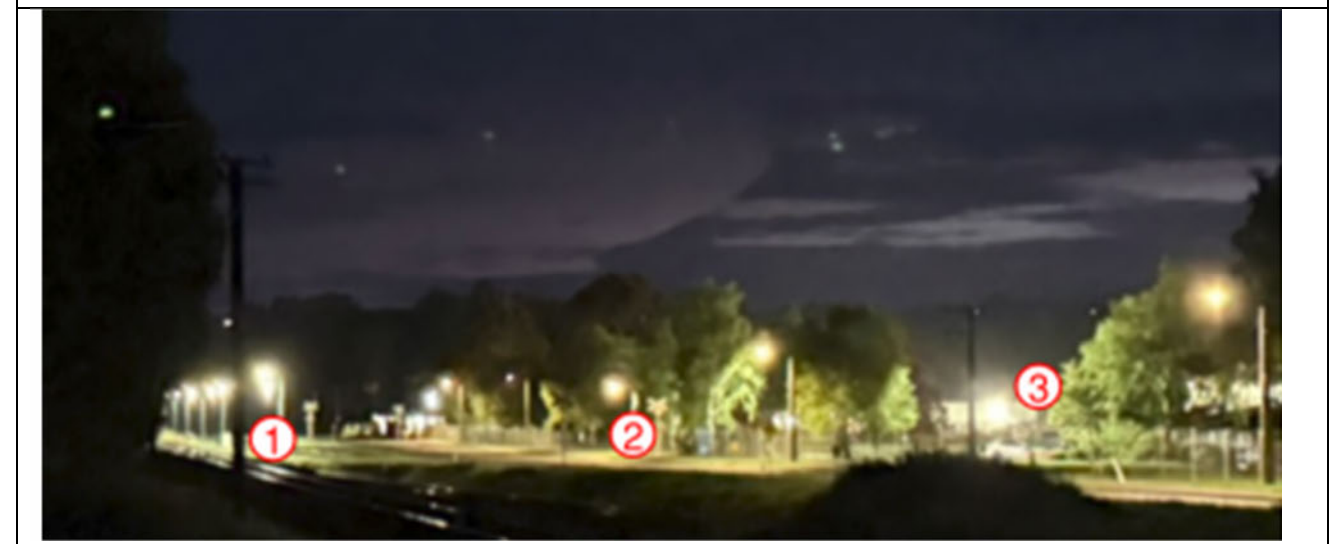


Figure 7 – Day and night view of Stedman Rd showing ①: Rail siding lighting, ②: streetlighting and ③: Floodlighting at industrial property. (Photos taken from location 1 in Figure 3)

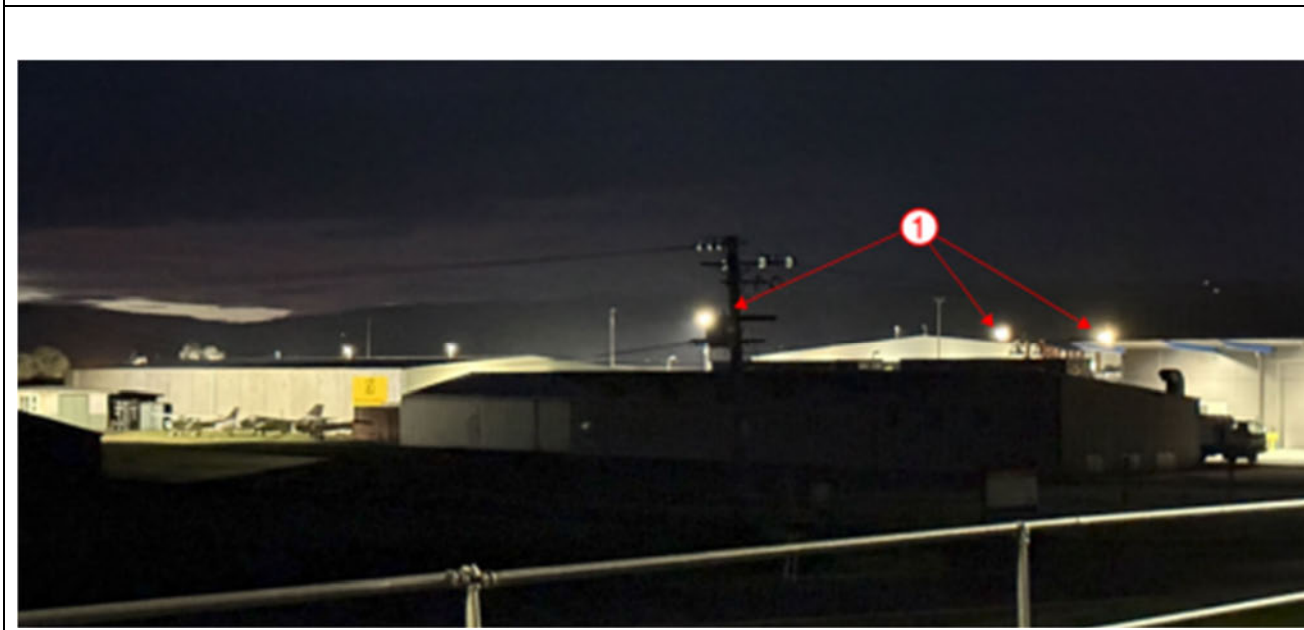


Figure 8 – Day and night view of Stedman Rd showing general floodlighting and ①: ≈20m pole floodlighting at Fonterra site. (Photos taken from location 5 in Figure 3)

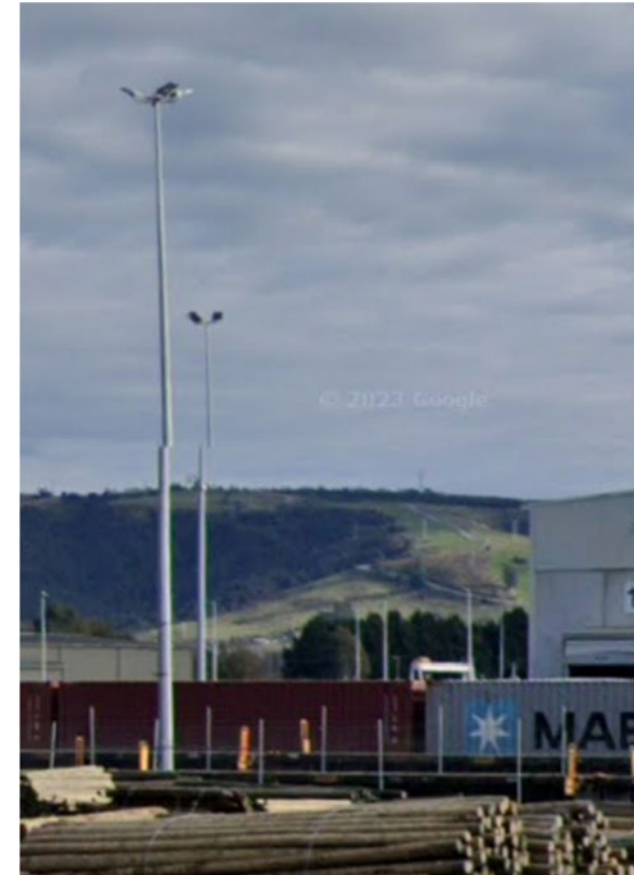


Figure 9 – Close up view of ≈20m pole floodlighting at Fonterra site, showing the lights mounted on a raised angle. (Source, Google Maps)

4. Proposed Site

4.1 Construction Lighting

Construction works (through all three stages) associated with the Inland Port development are planned to occur during standard daytime working hours. While night-time construction is not proposed to occur, there may be limited circumstances when construction occurs during low natural light levels, e.g. during winter, when it gets dark early or stays dark later, or where early morning starts are required for specific activities, such as large concrete pours.

During daylight hours, artificial lighting will generally not be required for construction activities. Where natural light levels are reduced (for example during early morning hours or periods of poor visibility), temporary construction lighting may be used to ensure safe working conditions within the approved construction hours.

Where construction works are undertaken outside of daylight hours the following additional lighting is likely to be present:

- Standard vehicle head and taillights.
 - Required to be used in low light conditions and possibly during some construction activities and at some locations.
- Flashing safety beacons
 - Construction vehicles and mobile plant may be fitted with amber flashing safety beacons, which are commonly used to indicate vehicle movement, loading operations, or the presence of hazards. These beacons are typically low-intensity, directional, and mounted at vehicle height. Their use is intermittent and task-specific, and they are designed for close-range visibility rather than area illumination.
- Mobile lighting plant.
 - Typically, these would consist of diesel-powered LED lighting plant, with three to six LED floodlights mounted on extendable poles – normally in the order of 9m high (Reference Figure 10 for a typical mobile lighting plant). Luminaires would typically be aimed at a high angle to the ground to provide broad lighting coverage across the construction area. Luminaires traditionally use 4000K to 6000K+ lamps with high components in the blue area of the lighting spectrum.
 - Mobile plant location and orientation will vary over time in response to construction activities and locations. There may be situations where mobile lighting is required to protect construction work areas overnight.
- Construction Support Portacom Facilities.
 - Interior lighting would typically consist of surface mounted 4000K LED luminaires mounted at ceiling level. Portacom do not typically have blinds on windows so that any interior lighting would be visible externally into the evening and at night. Such buildings would not normally have any exterior security lighting unless there was a high risk of theft.
- Construction area security lighting.
 - Construction wheeled vehicles would normally be returned to a yard compound when not in use.

- Tracked equipment would generally be left on site as it would be operationally challenging to move them every day over any distance.
- In both above situations, security lighting would normally only be installed where theft or material damage were thought to be a risk. In such circumstances the lighting is likely to be designed to deter criminal activity – illuminating the area around, and the vertical faces of the equipment.

It would be expected that the Inland Port construction contractor would undertake a risk analysis on the lighting requirements for each task and duration at hand. Initially vehicle headlights or sidelights would be used until a better lighting solution became paramount at which point mobile lighting plant would be used.

A typical mobile lighting plant is shown in Figure 10 and a typical civil works contract use of mobile lighting is shown in Figure 11.



Figure 10: Typical Mobile Lighting Plant



Figure 11: Typical Civil Works Mobile Lighting

4.2 Permanent / Operational Lighting

4.2.1 Design Brief

The design brief received for the permanent / operational lighting of the Project, as described by Jon Visser, Chartered Professional Engineer at Port Otago is as follows:

Floodlighting:

Yard and security lighting will be provided by floodlighting towers in accordance with WorkSafe guidelines, NZ Standard AS/NZS 1158.1.2, and industry (Port Equipment Manufacturing Association) standards for container yards. The floodlighting system will include the following components and specifications:

Towers:

- *Will be located in roadways within the facility to minimise the impact of shadows cast by container stacks.*
- *Will be the maximum height allowed for the site, within flight path restrictions.*
- *Will be spaced to achieve the lighting levels listed below.*

Lights:

- *Will be asymmetrical LEDs, of a power rating and quantity for each tower to achieve the following light levels.*
- *Will provide 50 lux average as measured 1m above ground level.*
- *Will provide 10 lux minimum for safety, security and emergency egress.*
- *Will provide 4000K colour within the container yard, required to accurately render the colours of hazardous materials signs and labels.*

- *Light spill at the boundary will be limited to that required for a Port Zone within the District Plan.*
- *Can be warmer light (3000k) in other areas such as light vehicle roadways*

Control System:

- *Yard lights will be switched on and off remotely and will only be used while mobile plant is operating in the yard.*
- *Security lights will be switched on and off automatically via daylight sensor.*
- *Each tower may include a combination of yard and security lights.*

Table 1 - Lighting design brief for the permanent lighting at the inland port, as described by Jon Visser at Port Otago

The operational lighting strategy differentiates between functional areas of the site. Container handling and yard areas will utilise luminaires with a correlated colour temperature of $\leq 4000\text{K}$ to support operational safety, visual acuity, and accurate colour recognition for signage and hazardous materials. Roadways and circulation routes, where high visual acuity and accurate colour recognition is less important from a safety perspective, will utilise warmer luminaires of $\leq 3000\text{K}$ to reduce off-site lighting effects and minimise ecological and night-sky impacts. Road and circulation lighting will operate on a continuous (24/7) basis, whereas yard lighting will be limited to periods of active yard operation.

4.2.2 Proposed Lighting

4.2.2.1 Area Lighting

International guidelines and recommendations indicate that appropriate illumination conditions are as follows:

- Container handling areas in port areas - 50 lux average horizontal illuminance at ground level

Other important features include:

- Lighting from more than two directions to mitigate the effect of obstructions and to provide "depth of field" to assist with visual assessment of distance to objects.
- Appropriate levels of vertical illuminance.
- Minimisation of strong shadows.
- Minimisation of disability glare to vehicle drivers.

AS/NZS 1680.5 and EN 12464-2 provide consistent task-based guidance for outdoor industrial workplaces. EN 12464-2 is referenced specifically in relation to rail operations due to its adoption within KiwiRail standards.

The Australian / New Zealand Standard AS/NZS 1680.5:2012 "Interior and workplace lighting Part 5: Outdoor workplace lighting" provides recommended lighting technical parameters in Table 3.1. Recommendations for situations relevant to the Project are shown below in Table 1, noting that these activities are likely to be undertaken within the warehouse area rather than in the outdoor yard.

Description	Basic operating characteristics	Average illuminance (lux)	Minimum illuminance (lux)	Uniformity of illuminance	CIE glare rating (maximum)
Loading and unloading – manual	Loading and unloading of trucks by manual labour including manually moving objects between truck and another form of transport.	40 lux	5 lux	5	45
Loading and unloading – fork lift	Loading and unloading of trucks by forklift, the area surrounding the truck and the route of the forklift.	40 lux	5 lux	5	45

Table 2 - Recommended Light Technical Parameters for General Outdoor Areas

These illuminances apply to the primary working plane(s) on which the work task(s) is(are) being undertaken. The working planes will vary throughout the site.

Uniformity is given in AS/NZS 1680.5 as the ratio of maximum illuminance to the average illuminance.

The illuminance requirements of the container terminal areas are considered more demanding than that required for "loading and unloading – forklift" given in Table 1 above. This is due to the operation of the straddle carriers, where the drivers are situated well above the ground and have a restricted view of ground level and the containers being stored at 15m to 18m above ground level.

Lighting level and good uniformity are necessary for creating a safe working environment with movement of large machinery and heavy containers.

AS/NZS 1680.5 states the roads for vehicular traffic should be designed in accordance with the recommendations of AS/NZS 1158.3.1 (Lighting for roads and public spaces) depending on the nature of usage.

An assessment of the needs for the vehicular roads for the site puts the roadway lighting subcategory between the requirements of PA2 and PA1 with average horizontal illuminance between 14 to 21 lux and appropriate vertical illuminance.

The actual illumination levels on the site will be provided with consideration to the above requirements, the specific activities to be undertaken, the type of machinery operating on the site, task lighting provided on the machinery and procedures for access control to ensure a safe working environment.

SLPL have advised that, for operational safety and security purposes, lighting is to be designed such that a minimum maintained illuminance of 3 lux is achieved across the whole site, including the site boundary.

At the time of preparing this assessment, detailed photometric modelling has not been completed. However, for the purposes of this assessment of environmental effects, it has been assumed that spill light of up to 3 lux (measured at 1.5m above ground level) may occur at the site boundary.

4.2.2.2 Boundary Lighting

For the purpose of spill light considerations, the above spill light limits shall apply at the site boundaries at the north, west and east of the site, and at the acoustic barrier along the southern (Silver Stream) interface, which shall be treated as the effective spill light assessment line.

4.2.2.3 Warehouse Building Lighting

At night, internal lighting may be visible through roller doors and warehouse entrances. To manage this effect, internal lighting visible through openings will be subject to controlled operation, including slow transition times, infrequent switching events, and avoidance of abrupt changes in luminance. Taieri Aerodrome does not support routine night-time fixed-wing aircraft operations, and potential aviation effects are therefore limited to infrequent rescue helicopter activity.

4.2.2.4 Private Rail Siding Lighting

The proposed development includes a new private rail siding that will connect to and operate in conjunction with the national rail network. While the siding will be located on private land, its design and operation will be subject to KiwiRail's safety and operational requirements where it interfaces with the rail network. In relation to lighting, KiwiRail standards and guidance, including E-ST-EL-0131 Rail Yard Lighting, set expectations for lighting in rail yards and siding environments to support safe train movements, shunting, inspection, and rail interface activities.

These requirements focus on providing task-appropriate lighting levels consistent with the operational function of the siding, controlling glare to train drivers, avoiding confusion with railway signalling, and ensuring lighting does not adversely affect rail operations. The standards also emphasise the use of controlled optical distributions, appropriate mounting heights and aiming, and limiting lighting to the minimum necessary for safe operation. Lighting associated with the private railway siding will be designed having regard to these principles, with detailed design and verification to occur at the detailed design stage in coordination with the rail operator, as required.

4.2.3 Concept Lighting Design

A concept lighting plan has been received from SLPL for the proposed Inland Port which is included as Appendix B. The lighting concept design has been prepared separately to this report, and is therefore indicative only, having not yet been informed by the recommendations contained in this report. The design is preliminary and illustrates the intended lighting approach, luminaire types, pole heights and indicative locations only, and does not include calculated illuminance levels or spill light assessments at this stage. The proposed use of modern LED luminaires with flat lens optics and controlled light distribution is generally suitable for managing glare, skyglow and light spill subject to detailed design, final specification, and installation. Further coordination with the lighting designer needs to continue as the design progresses to confirm operational requirements, assess potential lighting effects, and to ensure there is compliance with the relevant District Plan standards.

5. Lighting Effects

5.1 Basis For Assessment (Rules and Constraints)

5.1.1 Assessment Methodology

The assessment of potential artificial lighting effects associated with the Project has been undertaken in accordance with the relevant provisions of the Dunedin City Council Second Generation District Plan (2GP). The assessment is further informed by the principles of AS/NZS 4282:2023 Control of the obtrusive effects of outdoor lighting, relevant Civil Aviation Authority (CAA) Rules, applicable KiwiRail standards, and the Australian National Light Pollution Guidelines for Wildlife.

The assessment is based on the Williams Architects Master Plan, the concept lighting plan received from SLPL, observations made during day and night site visits, and professional judgement informed by lighting practices typically applied to comparable 24/7 industrial and logistics facilities.

At this concept stage, the assessment identifies key lighting effect pathways — including spill light, glare, sky glow, transport system effects, and ecological effects — and outlines the mitigation measures necessary to ensure compliance with statutory requirements and best-practice guidance can be achieved. Detailed lighting design and photometric modelling will be undertaken at the detailed design stage to confirm illuminance levels, boundary spill light levels, luminaire aiming, shielding, and control strategies.

5.1.2 Civil Aviation Authority Rules

The Civil Aviation Authority of New Zealand (CAA) is the government agency responsible for ensuring aviation safety and security in New Zealand. It oversees and regulates all aspects of civil aviation, aiming to protect people, property, and the environment.

Civil Aviation Rules (CAR) part 77 and 139 include rules regarding the use of lights within navigable airspace, including ground lights outside an aerodrome. SLPL will be required to notify the CAA under CAR Part 77.7 as it is proposed to operate lights on the site which has the potential to endanger aircraft due to the proximity of the site to the Taieri Aerodrome. Once notified the CAA will prepare an aeronautical study (an aviation-specific risk assessment) on the proposal and will determine if it is going to be a hazard to aviation or not. This notification can occur once detailed design has been completed.

CAA Advisory Circular AC139-6 issued 24 November 2021 provides an acceptable means of compliance with CAR139, and is an appropriate document against which to measure lighting in the vicinity of an aerodrome.

Specifically, section 5.3 of AC139-6 states that:

- **5.3.1 Lights which may endanger the safety of aircraft**

“A non-aeronautical ground light near an aerodrome which may endanger the safety of aircraft should be extinguished, screened or otherwise modified so as to eliminate the source of danger.”

- **5.3.2 Lights which may cause confusion**

“A non-aeronautical ground light which, by reason of its intensity, configuration or colour, might cause confusion or prevent the clear interpretation of aeronautical ground lights should be extinguished, screened or otherwise modified so as to eliminate such a possibility.”

In our assessment, we expect that general accordance with these clauses can be achieved via detailed design and appropriate mitigation measures, noting final determination on if the lighting is a hazard to aviation from the CAA will still be required.

5.1.3 2GP Rules

5.1.3.1 Introduction

The Dunedin City Second Generation District Plan (2GP) includes city wide provisions to manage the adverse effects of artificial lighting. For example, Part C: City-wide Provisions / 9 Public Health and Safety / 9.1 Introduction states:

...while artificial light is essential for security and safety, activities that generate artificial light have the potential to impact upon other activities, particularly when in proximity to residential areas and other places where people sleep. Light spill has the potential to disrupt sleeping patterns and adversely affect the health of people, and also the safety of people if light spills to the roading network. Therefore, activities that generate light need to be managed to ensure that these activities do not compromise the health and safety of people.

5.1.3.2 Light Spill

Rule 9.3.5 Light Spill relates to the spill light restrictions for activities at the boundary with residentially zoned sites or in any other zone the notional boundary of any residential buildings. It states:

1. *Light spill measured at any point of the vertical plane that marks the boundary of any site within a residential zone, or in any other zone the notional boundary of any residential building must not exceed the following limits:*

	Time	Limit
a.	7.00am - 10.00pm	10 Lux
b.	10.00pm - 7.00am	3 Lux

c. This standard does not apply to light spill from the headlights of motor vehicles or trains, or from street lighting

2. *Light spill must not be emitted in the angles above the horizontal.*
3. *All outdoor lighting, except street lighting, must be shielded from or directed away from adjacent roads and site boundaries.*
4. *Activities that contravene Rule 9.3.5.2 or Rule 9.3.5.3 or the limit in Rule 9.3.5.1 by 25% or less are discretionary activities.*
5. *Activities that contravene any light spill limit in Rule 9.3.5.1 by greater than 25% are non-complying activities.*

Furthermore, Rule 16.5.5 Light Spill relates to the spill light restrictions for lighting on rurally zoned sites. It states:

1. *Light spill measured 1.5m above ground level at the boundary of a site must not exceed 1 Lux between 10:00pm and 7:00am.*
2. *Lights must be:*
 - a. *cut-off or fully shielded; and*
 - b. *directed away from roads and any adjacent property.*
3. *Light spill measured at the boundary of the residential zone or any site used for residential purposes between 7:00am and 10:00pm must not exceed 3 Lux, except this standard does not apply to light spill from the headlights of motor vehicles.*
4. *Activities that contravene rules 16.5.5.1 and 16.5.5.2 are discretionary activities.*
5. *Activities that contravene any light spill limit in Rule 16.5.5.3 by 25% or less are discretionary activities.*
6. *Activities that contravene any light spill limit in Rule 16.5.5.3 by greater than 25% are non-complying activities.*

Light Spill Rule 9.3.5 applies to the development as there are residential dwellings located on surrounding Taieri Plain Rural Zone sites whose notional boundary must be considered. Light Spill Rule 16.5.5 applies to the development as lighting is proposed on the rurally zoned Site.

SPLP require a maintained illuminance at all times of 3 lux across the site, including at the site boundary. Application of a 3 lux limit at the rural site boundary between 10pm-7am constitutes a non-compliance with rule 16.5.5.1 and will require resource consent.

5.1.3.2.1 Plain English Context – What is 3 Lux?

Lux is a measure of how much light falls onto a surface (illuminance), refer to Appendix D for a glossary of lighting terms. For context, some typical lighting levels are:

- Bright sunshine: ~100,000 lux.
- Typical office lighting: 300–750 lux.
- Inside a house at night: 50–100 lux.
- Under a suburban streetlight: 5–30 lux.
- Full moonlight: approximately 0.5–1 lux.

A spill light of 3 lux at the site boundary is:

- About three times brighter than full moonlight.
- Comparable to the lower end of illumination under a suburban streetlight.
- Similar to the light level you would experience standing at the edge of a lit carpark or industrial yard, rather than directly beneath a light pole.

3 lux is not a brightly lit environment. It allows for safe orientation and movement, but does not enable detailed tasks.

Under the 2GP, the rural night-time spill limit is 1 lux between 10:00pm and 7:00am. The proposed 3 lux boundary level:

- Exceeds the 2GP limit by 2 lux.

- Remains well below typical suburban or commercial lighting levels.
- Is still within the range commonly experienced near roads with streetlighting.

In effect, the proposal is not seeking floodlighting at the boundary, it is seeking to ensure that the perimeter remains at a low but functional light level consistent with safe industrial operation.

5.1.3.3 Illuminated Signage

The Project has road boundaries adjoining both rural and non-rural zones. Accordingly, the illuminated signage provisions of Rules 16.6.7.1 and 6.7.3 apply.

Rule 16.6.7.1 relates to signage in rural zones (emphasis the author's):

16.6.7.1 General

- a. *A maximum of one sign attached to a building and one freestanding sign is allowed per site, except:*
 - i. *only one sign may be located in any part of a site in an ONF, ONL, SNL, ONCC, HNCC or NCC overlay zone.*
- b. *Signs visible from a public place must meet all of the following performance standards, except that regulatory signs, directional signs and warning signs that do not exceed 0.25m² are exempt from these standards.*
- c. *Signs that only give address, occupant or place name information (not including any commercial business names) do not count toward maximum sign numbers.*
- d. *Signs must comply with rule 6.7.3 where visible from a road.*
- e. *Signs must not be illuminated or digital.*
- f. *Signs that contravene the performance standard for number, location and design of ancillary signs are restricted discretionary activities.*

Rule 16.6.7.1(e) states that signs within the rural zone must not be illuminated or digital, except that regulatory signs, directional signs and warning signs not exceeding 0.25m² are exempt. Accordingly, any illuminated signage associated with the Project that is visible from a public place will require resource consent. The applicant is seeking resource consent for illuminated signage as part of the overall Fast-track application.

All illuminated signage on the site visible from a public place (apart from regulatory signs, directional signs and warning signs that do not exceed 0.25m²) will require resource consent under 16.6.7.1(a) and 16.6.7.1(e).

The public places from which potential signage for the Project will be visible includes the street boundaries on Stedman Road and Dukes Road North and the Silver Stream reserve.

Rule 16.6.7.1d states that "Signs must comply with rule 6.7.3 where visible from a road.". Rule 6.7.3 includes the illuminated signage requirements of 6.7.3.3 as set out below:

6.7.3.3. Illuminated and digital signs must:

- a. *have the sign's light source shielded so that its glare does not extend beyond the sign;*
- b. *have all floodlights or concealed lighting directed solely on the sign;*
- c. *not use images that are flashing or animated;*

- d. have a minimum display time of 10 seconds per image; and
- e. have a maximum luminance (cd/m^2) of:
 - i. 2000 where the sign has an illuminated area less than or equal to 0.5m^2 ;
 - ii. 1600 where the sign has an illuminated area greater than 0.5m^2 , but less than or equal to 2m^2 ;
 - iii. 1200 where the sign has an illuminated area greater than 2m^2 , but less than or equal to 5m^2 ;
 - iv. 1000 where the sign has an illuminated area greater than 5m^2 , but less than or equal to 10m^2 ; and
 - v. 800 where the sign has an illuminated area greater than 10m^2 .

No advertising or promotional illuminated signage is proposed. Illuminated signage will be limited to entrance signage for the facility and signage for operational, safety, and wayfinding purposes only, including status indicators and directional signage necessary for the safe and efficient operation of the facility.

Such signage represents a minor and localised lighting effect. Potential effects will be mitigated through the use of low-intensity lighting, shielding, controlled directionality, avoidance of flashing or rapid transitions, and minimisation of upward light. Where practicable, signage lighting will avoid blue-dominant spectra and will not be oriented toward aerodrome approach paths or the adjacent rail corridor.

5.1.3.4 Lighting of Parking and Loading Areas

Rule 6.6.1.6 relates to Lighting of Parking Areas. It requires that:

Parking areas must be illuminated to a minimum maintained level of 2 lux, with high uniformity, during the hours of operation, if all of the following circumstances apply:

- i. the parking area is provided for any activity other than standard residential;
- ii. the parking area is designed to accommodate 4 or more vehicles; and
- iii. the parking area will be used at night.

Rule 6.6.2.4 relates to Lighting of Loading Areas. It requires that:

- a. Loading areas, including associated access and manoeuvring areas, that are used at night must be illuminated to a minimum maintained level of 2 lux, with high uniformity, during the hours of operation.
- b. Activities that contravene this performance standard are restricted discretionary activities.

The Project will have both parking and loading areas. The minimum illuminance levels described in rule 6.6.1.6 and 6.6.2.4 are substantially lower than the levels anticipated to be required for safe and efficient operation of the Inland Port, as outlined in Section 4.2 Permanent / Operational Lighting. Accordingly, compliance with these performance standards will be readily achievable through the careful design of the exterior lighting system for the site.

5.1.3.5 Taieri Aerodrome Flight Fan Height Restrictions

Policy 9.2.2.12 relates to height restrictions associated with the Taieri Aerodrome Flight Fan. Refer to Figure 2 above for the location of the Taieri Aerodrome Flight Fan in the context of the site. Policy 9.2.2.12 states:

Require buildings and structures within the Taieri Aerodrome flight fan mapped area to be of a height that enables the safe operation of the aerodrome.

Height restrictions imposed by the Taieri Aerodrome Flight Fan vary across the site, ranging from approximately 18.5 m at the Stedman Road boundary to approximately 49 m at the eastern boundary. These restrictions will limit the maximum permitted height of built infrastructure on the site, including lighting poles.

5.1.3.6 2GP Rules Summary

This assessment has been informed by a concept lighting plan, and a detailed lighting plan will be prepared for the site in future detailed design.

Resource consent is required for the proposed illuminated signage onsite, and light spill generated from the site, however, we consider lighting for the site can otherwise be designed to comply with the requirements of the 2GP.

5.1.4 KiwiRail Rules

KiwiRail manages and operates the national rail network and sets safety and operational requirements for infrastructure that interfaces with it, including private rail sidings. While KiwiRail standards are not statutory planning instruments under the Resource Management Act 1991, they are relevant to the proposed development insofar as they relate to safe rail operations and the interface between private infrastructure and the operational rail corridor.

The proposed development includes a new private railway siding on private land that will connect to and operate in conjunction with the national rail network. Accordingly, KiwiRail standards are relevant where they address operational safety, visibility, and the avoidance of adverse effects on rail operations. Any KiwiRail approvals required for the siding will be addressed through separate rail operator approval and agreement processes, rather than through the resource consent framework.

There are no specific KiwiRail standards relating to spill light and glare restrictions onto the rail corridor, however KiwiRail standard T-ST-DE-5215 Public Pathways on the Rail Corridor, rule 8.6 requires that:

Lighting of a pathway (if provided) shall be designed and located so as to:

- o Avoid glare or reflections to the eyes of train drivers;
- o Avoid being confused with railway signals;
- o Minimise the impact on residents of adjoining properties

Whilst the proposed Inland Port is not a public pathway within the rail corridor and therefore the standard does not apply directly, the site is immediately adjacent to the rail corridor on the western side. The underlying intent of Rule 8.6—to ensure lighting does not compromise rail operations or create adverse effects to the rail corridor—is appropriate to be considered for the site.

In relation to lighting, KiwiRail standard E-ST-EL-0131 Rail Yard Lighting provides guidance for lighting in rail yards, freight tracks, and siding environments. Table 11.1 of the standard identifies recommended maintained illuminance levels for different rail operational areas, distinguishing between sidings with infrequent or short-duration movements and areas where loading, unloading, or shunting activities occur. The standard also emphasises the need to minimise glare to train drivers, avoid confusion with railway signalling, and control luminaire aiming and light distribution.

At this stage, detailed lighting design has not been completed. However, the proposed lighting strategy has been developed having regard to the principles of the KiwiRail standard, including matching lighting levels to operational function, limiting lighting to that necessary for safe operation, and managing glare and visibility within rail sightlines. Detailed lighting design, photometric modelling, and coordination with the rail operator will occur at the detailed design stage to confirm compliance with KiwiRail requirements.

Careful lighting design of the proposed private railway siding will allow compliance with KiwiRail's safety and operational requirements.

5.1.5 Standards, Guidelines and Best Practice

As noted in the previous section, it is expected compliance with the activity specific standards within the 2GP can be achieved via careful design and selection of appropriate, modern LED exterior luminaires. However, current professional practice in evaluating the effects of artificial lighting goes beyond the 2GP, requiring consideration of the additional impacts and mitigation strategies outlined in the latest version of AS/NZS 4282:2023 "Control of the obtrusive effects of outdoor lighting".

Australian and New Zealand Standard AS/NZS 4282: 2023, "Control of the obtrusive effects of outdoor lighting", is the recognised standard in Australasia for managing the effects of outdoor lighting. AS/NZS 4282:2023 considers the effects of outdoor and interior lighting that emits directly into the outdoor environment and the lighting associated with lit vertical surfaces.

The Project has therefore been assessed against the 2GP, the CAA and KiwiRail requirements and the principles of AS/NZS 4282:2023.

5.1.5.1 AS/NZS 4282: 2023, "Control of the obtrusive effects of outdoor lighting"

AS/NZS 4282:2023 identifies that the control of obtrusive light is strongly influenced by luminaire geometry, shielding and light distribution. and are taken directly from the standard and demonstrate simplified luminaire types and their associated abilities to control obtrusive light. The proposed luminaire types which have been proposed in the concept lighting design (Appendix B) are all downward directed fittings consistent with best practice options illustrated in and .

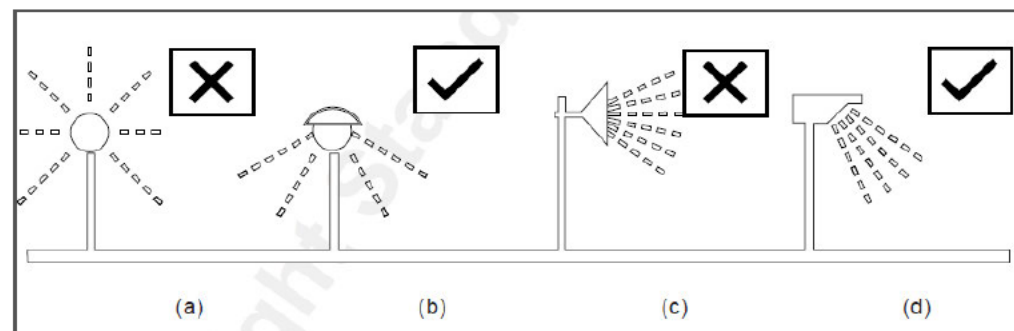


Figure 12 - Simplified Lighting Types and their Ability to Control Obtrusive Light (AS/NZS 4282:2023 Appendix A, Figure A1)

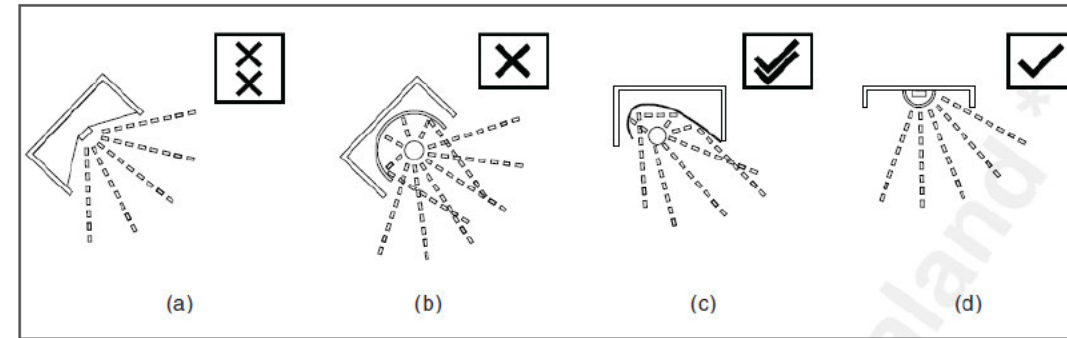


Figure 13 - Effect of the Light Distribution of the Luminaire on the Ability to Control Obtrusive Light (AS/NZS 4282:2023 Appendix A, Figure A2)

The impact of artificial lighting on the night-time environment can be characterised by the following effects (refer to Appendix D for a Glossary of Lighting Terms):

- a. Spill Light
- b. Glare
- c. Sky Glow

AS/NZS 4282: 2023, Section 2.3.1 "Effects on Residents" outlines the specific effects that need to be considered with respect to residents:

"2.3.1 Effects on residents"

Effects on residents generally involve a perceived reduction of amenity arising from light technical factors such as the following:

- (a) The **illumination from spill light being obtrusive**, particularly where the **light enters habitable rooms**. The illuminance on surfaces, particularly vertical surfaces, is an indicator of this effect.
- (b) The **direct view of bright luminaires** from normal viewing directions causing annoyance, distraction or even discomfort or disability glare. The luminous intensity of a luminaire, in a nominated direction, is an indicator of this effect.
- (c) Changes in luminance in the peripheral vision due to effects such as variable content in signage or trees moving across bright lights.

The tolerable levels of each of these **light technical parameters** will be **influenced by the ambient lighting existing** in the environment where the light technical parameters are being calculated."

(Note: "**Bolding**" of text added in this document).

"Obtrusive" light is defined as follows:

"1.3.21 Obtrusive light"

Spill light which, because of quantitative or directional attributes, gives rise to annoyance, discomfort, distraction or a reduction in the ability to see essential information such as transport signals."

AS/NZS 4282: 2023 uses various Light Technical Parameters (LTP) to assess potential lighting effects. Different limits for the parameters are applied based upon the ambient light conditions. These ambient conditions are set for various environmental zones.

AS/NZS 4282: 2023 introduces the concept of lighting curfew periods, during which lower light technical parameters are set. Unless otherwise specified by the controlling authority, the lighting curfew period is taken as between 11:00pm and 06:00am.

AS/NZS 4282: 2023, Section 2.4.2 "Effects on transport system users" addresses the specific effects that need to be considered with respect to transport corridors, e.g. roads or rail corridors:

"2.4.2 Effects on transport system users"

*Effects on transport system users (e.g. pilots, water craft operators, **train drivers, motorists, cyclists, pedestrians**) normally involve a reduction in the ability to see caused by disability glare from bright light sources. The contrast of other objects and the surrounds to the user will be lowered, rendering them less visible or even invisible, especially if the environment is intrinsically dark. The magnitude of the effect will depend on the level of lighting to which the user is adapted. The relevant indicator for transport system users is the threshold increment (TI).*

(Note: "**Bolding**" of text added in this document).

The transport system users potentially affected by the project include road users, aviation users and users of the rail corridor and rail siding. The environmental zones (AS/NZS 4282: 2023 Table 3.1 "Environmental Zones") potentially applicable to the Project are as follows:

Environmental Zone A2: Described as "Low district brightness. Sparsely inhabited rural and semi-rural areas. Generally roadways without streetlighting through suburban, rural or semi-rural areas other than intersections."

and/or

Environmental Zone A3: Described as "Medium district brightness" with examples: "Suburban areas in towns and cities" and "Generally roadways with streetlighting through suburban, rural or semi-rural areas".

In considering the proposed location of the Project and its environs, the location could be assessed as Zone A2 and/or Zone A3.

5.1.5.2 Australian National Light Pollution Guidelines for Wildlife.

Australian and New Zealand Standard AS/NZS 4282: 2023, "Control of the obtrusive effects of outdoor lighting" refers to the United Nations Environment Program Convention on Migratory Species Resolution 13.5 (Light Pollution Guidelines for Wildlife), which urges parties to use the guidelines in order to minimise the impact of lighting on migratory animals. The guidelines endorse the use of the Australian National Light Pollution Guidelines for Wildlife.

While the Project site is understood to be a modified rural environment rather than a high-value natural habitat, the principles of these guidelines remain relevant as best-practice measures to minimise potential lighting effects on fauna that may occur within the wider surrounding landscape.

The aim of the Australian National Light Pollution Guidelines (**guidelines**) is to assist in the management of artificial light such that wildlife is:

- Not disrupted within, or displaced from, important habitat
- Able to undertake critical behaviours such as foraging, reproduction and dispersal.

The guidelines state that they "... do not infringe on human safety obligations. Where there are competing objectives for lighting, there may be a need for creative solutions that meet both human safety requirements for artificial light and threatened and migratory species conservation".

The guidelines recognise that animals perceive light differently from humans, with most animals being sensitive to ultraviolet/violet/blue light. Figure 14 is taken directly from the guidelines (guidelines Figure 2) and illustrates comparative light perception among a selection of different species groups.

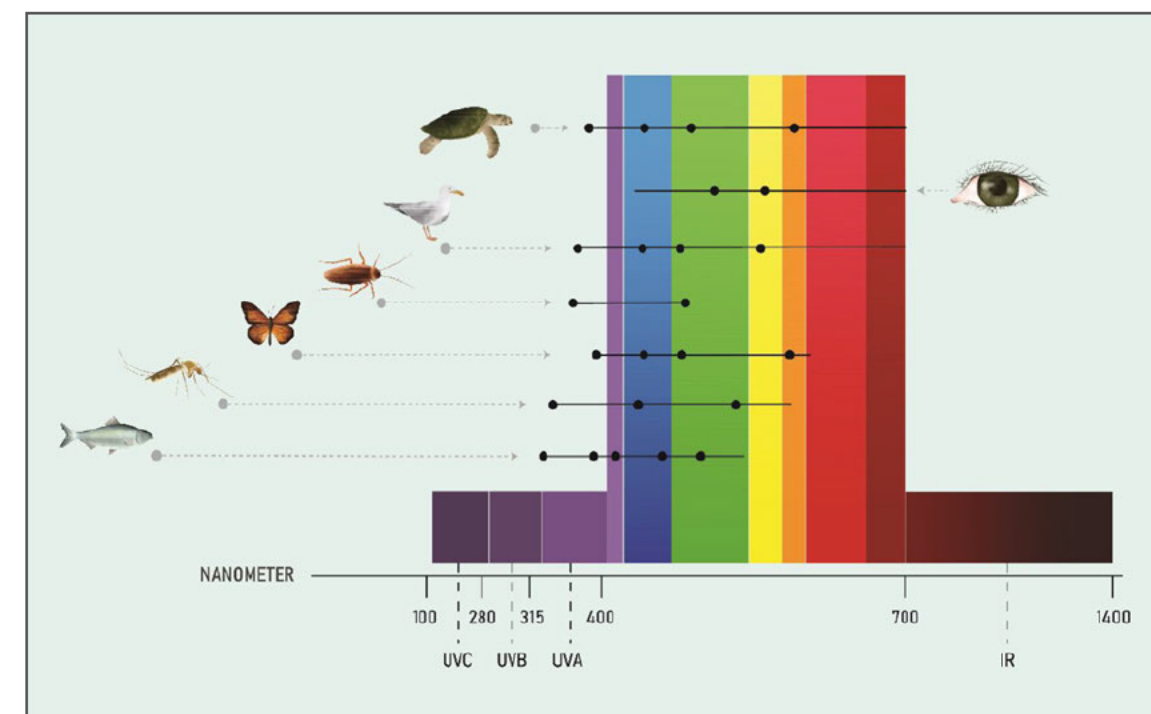


Figure 14: Comparative light perception among different species groups (peak sensitivity shown as black dots)

The guidelines recommend:

- Always using best practice lighting design to reduce light pollution and minimise the effect on wildlife.
- Undertaking an environmental impact assessment of effects of artificial light on listed species for which artificial light has been demonstrated to affect behaviour, survivorship or reproduction.

According to the guidelines, best practice lighting design incorporates the following design principles:

1. Start with natural darkness and only add light for specific purposes.
2. Use adaptive light controls to manage light timing, intensity and colour.

3. Light only the object or area intended – keep lights close to the ground, directed, and shielded to avoid light spill.
4. Use the lowest intensity lighting appropriate for the task.
5. Use non-reflective, dark-coloured surfaces.
6. Use lights with reduced or filtered blue, violet and ultraviolet wavelengths.

An assessment of the effects of lighting on terrestrial ecology has been undertaken and is provided in the Inland Port Ecological Impact Assessment (EclA) (E3 Scientific, November 2025) provided with the application.

5.1.5.3 Overall assessment against standards and guidelines

Overall, the Project’s proposed lighting strategy is consistent with the intent of AS/NZS 4282:2023 and the Australian National Light Pollution Guidelines for Wildlife, in that it adopts best-practice measures to minimise obtrusive light effects (spill light, glare and sky glow) while still meeting operational safety and security requirements for a 24/7 facility.

5.1.6 Summary of Ecological Effects (FEclA and EclA)

5.1.6.1 Freshwater Ecological Impact Assessment

The Inland Port Freshwater Ecological Impact Assessment (FEclA) (E3 Scientific, November 2025) identifies stormwater, sediment, contaminants, and flow regime changes as the primary freshwater ecological effect pathways and does not identify lighting as a freshwater ecological stressor.

Notwithstanding this, it is proposed that the exterior lighting be designed in line with the best practice guidance from the Australian National Light Pollution Guidelines for Wildlife, as described above in section 5.1.5.2 of this report.

5.1.6.2 Terrestrial Ecological Impact Assessment

The terrestrial ecological effects of the Southern Link Inland Port have been assessed separately in the Terrestrial Ecological Impact Assessment (EclA) prepared by e3Scientific (January 2026). That assessment identifies artificial lighting as a potential indirect effect pathway, particularly in relation to nocturnal fauna, insect attraction, and species using riparian and edge habitats. As such, artificial light spill into this area, particularly during dawn and dusk periods, has the potential to disrupt fauna behaviour and should be appropriately managed. The EclA acknowledges that operational lighting may result in spill light onto the riparian corridor (up to 3 lux at the site boundary). Mitigation and management of potential ecological effects of lighting, including monitoring and offset provisions where required, are addressed in the EclA and will be implemented alongside the lighting design measures set out in this report.

The lighting design principles and mitigation measures set out in this assessment have been developed to align with the recommendations of the EclA. In particular, the use of controlled lighting distribution, shielding, minimisation of spill beyond operational areas, warm-spectrum lighting where practicable, and avoidance of unnecessary illumination near stream margins and revegetated areas directly respond to the ecological sensitivities identified.

With these measures in place, lighting is not identified as a primary ecological stressor, and any residual ecological effects associated with artificial lighting are anticipated to be low and consistent with the effect ratings and conclusions of the EclA.

5.2 Assessment of Effects

A full assessment of the environmental effects (lighting) is contained within Appendix A: Assessment of Effects Matrix.

Remnant effects associated with the proposed development following implementation of the mitigations identified in Appendix A and summarised in section 5.3.3 (below) are assessed to be **no more than minor**.

5.2.1 Effect Severity Definitions

This assessment of environmental effects uses the following effect severity definitions, as informed by Quality Planning New Zealand in their AEE guidance.

Effect Severity	Description
Nil	No effects at all.
Less than minor	Effects that are discernible day-to-day effects, but too small to affect other persons.
Minor	Effects that are noticeable but will not cause any significant impacts.
More than minor	Effects that are noticeable that may cause an adverse impact but could be potentially mitigated or remedied.
Significant	An effect that is noticeable and will have a serious impact on the environment but could be potentially mitigated or remedied.
Unacceptable	Extensive adverse effects that cannot be avoided, remedied or mitigated.

Table 3 - Effect Severity Definitions

5.2.2 Lighting Control Performance Parameters

Where motion detection or automated controls are used for interior or exterior lighting that is visible from outside the site, changes in lighting level shall, as far as reasonably practicable, occur gradually. For the purposes of this assessment, a “slow” lighting transition is defined as a minimum fade time of 10 seconds between lighting states.

In locations where operational or safety requirements necessitate lighting to activate instantly, potential effects associated with abrupt changes in luminance shall instead be mitigated through alternative measures, including the use of tinted glazing, skylight treatments, shielding, or other design measures to limit visibility of the light source from outside the site. Rapid switching, flashing, or unnecessary step changes in luminance are otherwise not proposed.

5.2.3 Mitigation Summary

A summary of proposed effect mitigations can be found below in Table 4. Refer to Appendix A for a matrix containing the full assessment of the environmental effects (lighting), and proposed mitigations.

Mitigations described are intended to be read as potential resource consent conditions appropriate for the development of the site for the Project.

Lighting effects will be managed through both the resource consent process and the Civil Aviation regulatory framework. Construction and operational lighting will be addressed through a Construction Management Plan (CMP) and a Lighting Management Plan (LMP), respectively, to be certified by Dunedin City Council and incorporating the mitigation measures identified in this report.

Separately, once detailed lighting design is complete, the proposal will be notified to the CAA under CAR Part 77.7, and any requirements arising from the resulting aeronautical study will be incorporated into the final lighting design. The Taieri Aerodrome operator will be provided an opportunity to comment as an interested party, however certification of management plans will remain with Council.

Where referenced, "slow" lighting transitions are defined in Section 5.2.2 Lighting Control Performance Parameters.

Type	#	Proposed Mitigation
General	1	Construction works associated with the Project are proposed to be undertaken during standard daytime working hours. In limited circumstances, such as early morning starts required for specific activities (e.g. large concrete pours), temporary construction lighting may be used to maintain safe working conditions. Details of the mitigation measures used to mitigate construction lighting effects, including during low natural light levels, will be detailed in the Construction Management Plan to be prepared by the applicant, and certified by Dunedin City Council, as a condition of consent,
	2	Prior to submission of the Construction Management Plan and the detailed lighting drawings, respectively, to Dunedin City Council for certification, provide the Construction Management Plan and the detailed lighting design drawings to the operator of Taieri Aerodrome for their review and feedback.
	3	Notification to affected neighbours regarding construction activities, if there is a specific need to undertake works at night / outside daylight hours.
	4	Lighting shall be designed to manage spill light in accordance with the 2GP. A spill light limit of 3 lux at the site boundary (measured at 1.5m above ground level) is proposed to apply at the north, west and east boundaries and at the acoustic barrier along the southern interface, including at night. This exceeds spill light limit in Rule 16.5.5.1 and will require resource consent.
	5	For the purposes of managing ecological effects at the Silver Stream edge and riparian margin, the acoustic barrier along the southern boundary shall be treated as the effective spill light assessment line. Lighting shall be designed, located and controlled to minimise light intrusion beyond this interface, consistent with the proposed 3 lux boundary spill light approach. Monitoring and any offset requirements relating to potential ecological effects of operational lighting shall be implemented in accordance with the Terrestrial EclA.
	6	Utilise exterior lighting of $\leq 3000\text{K}$ (warm) colour temperature for exterior lighting and $\leq 4000\text{K}$ if required for operational and safety requirements.
Streetlighting	7	Streetlights within the development to be flat glass with zero upward component and installed without tilt.
	8	Utilise shielding to ensure spill light is controlled.
	9	Minimise lighting brightness to achieve minimum required lighting levels, appropriate to the activity.
Exterior Lighting Buildings	10	Lighting design to consider the Taieri Aerodrome Flight Fan height limitations such that all lighting infrastructure is installed within the allowable height limits.
	11	All exterior lighting to be flat glass with zero upward component and installed without tilt.
	12	No feature uplighting of to be undertaken.

	13	Exterior lighting shall utilise no or very slow transition motion detection, as defined in Section, 5.2.2, except where safety and security requirements necessitate the use of faster switching. Where faster switching is required, alternative measures such as shielding, aiming control, or reduced visibility of the light source from outside the site shall be used to mitigate potential effects.
	14	No coloured lighting.
	15	No decorative lighting of facades.
	16	Consider rail corridor/rail siding user and road user sight lines with luminaire placement to avoid glare to transport users.
	17	Minimise lighting brightness to achieve minimum required lighting levels, appropriate to the activity.
	18	Utilise shielding to ensure spill light is controlled.
	19	Use dark coloured surfaces for building walls to minimise reflected upward light: light reflectance value (LRV) for building walls shall be $\leq 30\%$.
Interior Lighting	20	Interior lighting will be designed having regard to potential visibility from outside the site. Measures to reduce visibility and glare may include appropriate luminaire selection and orientation, controlled light distribution, and building design measures such as tinted glazing, screening, or internal shielding, where practicable.
	21	Interior lighting with the potential to be visible from outside the site shall utilise slow lighting transitions, as defined in section 5.2.2, except where safety or operational requirements necessitate the use of faster switching. In such cases, effects shall be mitigated through building design measures including tinted glazing, internal shielding, or other methods to limit external visibility.
	22	No coloured lighting in spaces with the potential for visibility from the exterior.
	23	No transparent or translucent façades.
Illuminated Signage	24	All illuminated signage to be lit from above utilising flat glass fittings with zero upward component and no tilt.
	25	Illuminated signage to be lit with lighting of $\leq 3000\text{K}$ (warm) colour temperature.
	26	Operational and wayfinding signage lighting shall avoid flashing or rapid transitions and shall utilise slow changes in luminance where practicable. Where faster switching is required for safety or operational reasons, lighting shall be low intensity, shielded, and directed to minimise visibility beyond the immediate operational area.
	27	Minimise lighting brightness to achieve minimum required lighting levels, appropriate to the activity.

Table 4 - Effect Mitigation Summary

6. Conclusion

This assessment has considered the lighting-related environmental effects associated with the construction and operation of the proposed Southern Link Inland Port, including impacts on residents, transport system users, ecological values, the Taieri Aerodrome, and the night sky. The site occupies a transitional context between rural and industrial land, with the adjacent aerodrome and rail corridor requiring particular care in the control of glare, spill light, and luminance contrasts.

The proposed lighting design philosophy is consistent with AS/NZS 4282:2023, the 2GP, CAA rules, and relevant KiwiRail considerations. Through careful luminaire selection, shielding, control strategies, warm-spectrum light sources, and height and directional constraints, the development can be designed to achieve compliance, as far as reasonably practicable, with relevant lighting performance standards, with resource consent sought where specific non-compliances are proposed (including for spill light and illuminated signage). Importantly, the lighting infrastructure can be designed to avoid or appropriately manage potential effects on aviation safety, rail corridor users, and neighbouring residential properties. The operational lighting design is currently at concept stage, and detailed design and photometric modelling will be undertaken to confirm illuminance levels, boundary spill light levels and any refinements to luminaire selection, aiming, shielding and controls.

Based on the assessments and the comprehensive suite of mitigation measures outlined in this report, the residual lighting effects associated with the Project are assessed as no more than minor. Accordingly, artificial lighting—when designed and implemented in accordance with the mitigation summarised in Table 4— is able to both meet the operational and safety requirements of the project, while avoiding unacceptable adverse effects on the surrounding environment. Any remaining effects can be appropriately managed through standard resource consent conditions.

Appendix A. Assessment of Effects Matrix

Effect Definitions

This assessment of environmental effects uses the following effects definitions, as informed by Quality Planning New Zealand in their AEE guidance.

Effect Severity	Description
Nil	No effects at all.
Less than minor	Effects that are discernible day-to-day effects, but too small to affect other persons.
Minor	Effects that are noticeable but will not cause any significant impacts.
More than minor	Effects that are noticeable that may cause an adverse impact but could be potentially mitigated or remedied.
Significant	An effect that is noticeable and will have a serious impact on the environment but could be potentially mitigated or remedied.
Unacceptable	Extensive adverse effects that cannot be avoided, remedied or mitigated.

Assessment Matrix

Lighting Type	Phase	Lighting Subtype	Effect Type ³	Identified Effect	Proposed Mitigation	Mitigated Severity
Construction	1	-	Transport Systems and Users	Construction lighting associated with vehicle headlights and area lighting results in glare to airport users when viewed from elevated viewpoints, including by helicopter pilots during infrequent night-time operations at Taieri Aerodrome. Given the limited frequency of night-time aviation activity and the presence of existing industrial lighting within the wider area, any such effects are anticipated to be low in magnitude and duration.	Construction limited to standard daytime working hours, apart from limited circumstances e.g. during winter, when it gets dark early or stays dark later, or when early morning starts are required for specific activities, such as large concrete pours. Details of the mitigation measures used to mitigate construction lighting effects, including during low natural light levels, will be detailed in the Construction Management Plan to be prepared by the applicant, and certified by Dunedin City Council, as a condition of consent,	Less than minor
				Flashing construction lighting (eg. amber beacons) confused for ground control lights during nighttime construction when viewed from elevated viewpoints, including by helicopter pilots during infrequent night-time operations at Taieri Aerodrome. Given the limited frequency of night-time aviation activity and the presence of existing industrial lighting within the wider area, any such effects are anticipated to be low in magnitude and duration.	Construction limited to standard daytime working hours, apart from limited circumstances e.g. during winter, when it gets dark early or stays dark later, or when early morning starts are required for specific activities, such as large concrete pours. Details of the mitigation measures used to mitigate construction lighting effects, including during low natural light levels, will be detailed in the Construction Management Plan to be prepared by the applicant, and certified by Dunedin City Council, as a condition of consent, Prior to submission of the Construction Management Plan to Dunedin City Council for certification, provide the Construction Management Plan to the operator of Taieri Aerodrome for their review and feedback on the proposed construction lighting control measures and how they will impact on the operation of the Aerodrome.	Less than minor

				Construction lighting associated with vehicle headlights and area lighting results in an increase in insect activity and associated insectivorous bird activity, increasing bird strike risk.	Construction limited to standard daytime working hours, apart from limited circumstances e.g. during winter, when it gets dark early or stays dark later, or when early morning starts are required for specific activities, such as large concrete pours. Details of the mitigation measures used to mitigate construction lighting effects, including during low natural light levels, will be detailed in the Construction Management Plan to be prepared by the applicant, and certified by Dunedin City Council, as a condition of consent,	Less than minor
		Flora & Fauna		Construction lighting associated with vehicle headlights and temporary area lighting may result in spill light onto the Silver Stream edge and riparian margin, including potential nesting and foraging habitat for local fauna, particularly during dawn and dusk periods.	Any temporary construction lighting required outside full daylight hours shall be minimised, positioned and shielded to avoid illumination of the Silver Stream edge and riparian margin. Spill light at the acoustic barrier interface along Silver Stream shall not exceed 3.0 lux at any time (measured at 1.5m above ground level). Details of the mitigation measures used to mitigate construction lighting effects, including during low natural light levels, will be detailed in the Construction Management Plan to be prepared by the applicant, and certified by Dunedin City Council, as a condition of consent,	Less than minor
				Construction lighting associated with vehicle headlights and area lighting results in an increase in insect activity and associated insectivorous bird activity.	Construction limited to standard daytime working hours, apart from limited circumstances e.g. during winter, when it gets dark early or stays dark later, or when early morning starts are required for specific activities, such as large concrete pours. Details of the mitigation measures used to mitigate construction lighting effects, including during low natural light levels, will be detailed in the Construction Management Plan to be prepared by the applicant, and certified by Dunedin City Council, as a condition of consent,	Less than minor
		Night Sky and Astronomy		Construction lighting produces light above the horizontal plane, increasing sky glow and blue light component.	Construction limited to standard daytime working hours, apart from limited circumstances e.g. during winter, when it gets dark early or stays dark later, or when early morning starts are required for specific activities, such as large concrete pours. Details of the mitigation measures used to mitigate construction lighting effects, including during low natural light levels, will be detailed in the Construction Management Plan to be prepared by the applicant, and certified by Dunedin City Council, as a condition of consent,	Less than minor
		Cultural ²		-	-	-
		Residents		Lighting from construction activities is noticed by nearby residents.	Construction limited to standard daytime working hours, apart from limited circumstances e.g. during winter, when it gets dark early or stays dark later, or when early morning starts are required for specific activities, such as large concrete pours.	Less than minor

					Details of the mitigation measures used to mitigate construction lighting effects, including during low natural light levels, will be detailed in the Construction Management Plan to be prepared by the applicant, and certified by Dunedin City Council, as a condition of consent,	
Permanent	1	Street	Transport Systems and Users	Permanent lighting causing disability glare for train drivers in the adjacent rail corridor.	Careful placement and aiming of luminaires and use of shielding where required to minimise visibility of bright sources from rail sightlines.	Less than minor
				Permanent lighting causing disability glare for motorists, cyclists and pedestrians in the adjacent roads.	Careful placement and aiming of luminaires and use of shielding where required to minimise visibility of bright sources from roads	Less than minor
				Permanent lighting affecting the visibility of nearby railway signal lights.	Exterior lighting will be designed to avoid or minimise the potential for interference with railway signalling by using full cut-off luminaires, mechanical shielding, and controlled optical distributions to eliminate high-angle spill toward the rail corridor. Luminaire placement, aiming, and mounting heights will be coordinated having regard for KiwiRail signal sightlines. Neutral-white light sources will generally be used to avoid spectral conflict with coloured signals.	Less than minor
				Street lighting within the runway end area increases insect activity and associated insectivorous bird activity, thereby increasing bird strike risk.	Utilise exterior roadway and security lighting of $\leq 3000\text{K}$ (warm) colour temperature, flat glass with zero upward component, and installed without tilt. Minimise light levels to achieve minimum required lighting levels. Applicant to prepare and implement a Wildlife Hazard Management Plan, to be certified by Dunedin City Council, as a condition of consent to manage bird activity on the site,	Less than Minor
				Permanent lighting infringing the Obstacle Limitation Surface (OLS) of the Taieri Aerodrome Flight Fan creating an aviation hazard and conflicting with Policy 9.2.2.12, which requires all structures within the Flight Fan to remain below the height necessary to ensure aerodrome safety.	Lighting design to consider the Taieri Aerodrome Flight Fan height limitations such that all lighting infrastructure is installed within the allowable height limits.	Nil
				Lighting in a previously unlit area close to the Taieri Aerodrome runway results in complaints from pilots and other aerodrome users.	Prior to submission of the detailed lighting design drawings to Dunedin City Council for certification, provide the detailed lighting design drawings to the operator of Taieri Aerodrome for their review and feedback on proposed lighting, and how it will impact on the operation of the Aerodrome.	Less than minor
			Flora & Fauna	High blue light component in exterior lighting increases insect activity, associated insectivorous bird activity and other avifauna sensitive to blue spectrum lighting.	Exterior lighting to default to a correlated colour temperature of $\leq 3000\text{K}$. Lighting of up to 4000K to be used only where operational or safety requirements necessitate enhanced colour recognition (e.g. container handling areas).	Less than minor
			Light spill and upward light causes disruption to nocturnal birds.	Exterior lights to be flat glass with zero upward component and installed without tilt. Utilise shielding to ensure spill light is controlled. Minimise light levels to achieve minimum required for operational safety.	Nil	

				Permanent exterior lighting (including yard, building, and security lighting) may result in spill light onto the Silver Stream edge and riparian margin, including potential nesting and foraging habitat for local fauna, particularly during dawn and dusk periods.	All permanent exterior lighting shall be designed to achieve a maximum spill light level of 3 lux (measured at 1.5m above ground level) at the site boundary, including during night-time hours. This shall apply to the north, west and east site boundaries, and to the acoustic barrier along the southern (Silver Stream) interface as the effective spill light assessment line. Lighting shall utilise full cut-off luminaires, shielding where required.	Less than minor
			Night Sky and Astronomy	Upward component of lighting direct and reflected results in increased sky glow and increased blue spectrum component, affecting astronomical observance.	Exterior lights to be flat glass with zero upward component and installed without tilt. Utilise shielding to ensure spill light is controlled.	Nil - Less than minor
			Cultural ²	-	-	-
			Residents	Residents adjacent to the site notice the addition of lighting within the development.	All permanent exterior lighting shall be designed to achieve a maximum spill light level of 3 lux (measured at 1.5m above ground level) at the site boundary, including during night-time hours. This shall apply to the north, west and east site boundaries, and to the acoustic barrier along the southern (Silver Stream) interface as the effective spill light assessment line.	Less than minor
	2	Interior	Transport Systems and Users	Flashing, coloured or quickly changing interior office lighting penetrating through glazing confused for ground control lights when viewed from elevated viewpoints, including by helicopter pilots during infrequent night-time operations at Taieri Aerodrome. Given the limited frequency of night-time aviation activity and the presence of existing industrial lighting within the wider area, any such effects are anticipated to be low in magnitude and duration..	Interior lighting with the potential to be visible from outside the site shall utilise slow lighting transitions, as defined in section , 5.2.2 , except where safety or operational requirements necessitate the use of faster switching. In such cases, effects shall be mitigated through building design measures including tinted glazing, internal shielding, or other methods to limit external visibility. No coloured lighting in spaces with the potential for visibility from the exterior.	Less than minor
				Interior lighting penetrating through glazing or open roller shutter doors results in glare to airport users including pilots. Interior lighting visible through glazing or open roller shutter doors has the potential to result in localised glare or visual distraction when viewed from elevated viewpoints, including by helicopter pilots during infrequent night-time operations at Taieri Aerodrome. Given the limited frequency of night-time aviation activity and the presence of existing industrial lighting within the wider area, any such effects are anticipated to be low in magnitude and duration.	Interior lighting in the vicinity of roller shutter doors shall be zero-degree flat glass type. Motion detection to be utilised in all interior spaces with the potential for visibility from the exterior. No transparent or translucent façades. Interior and exterior lighting will be designed having regard to potential visibility from outside the site, including elevated viewpoints associated with infrequent night-time helicopter operations. Measures to reduce visibility and glare may include appropriate luminaire selection and orientation, controlled light distribution, and building design measures such as tinted glazing, screening, or internal shielding, where practicable. Interior lighting with the potential to be visible from outside the site shall utilise slow lighting transitions, as defined in Section 5.2.2, except where safety or operational requirements necessitate faster switching. Where faster switching is required, effects shall be mitigated through building design measures to limit external visibility.	Less than Minor

			Flora & Fauna	Interior lighting penetrating through glazing results in light spill and upward light causing disruption to nocturnal birds.	Interior and exterior lighting will be designed having regard to potential visibility from outside the site. Measures to reduce visibility and glare may include appropriate luminaire selection and orientation, controlled light distribution, and building design measures such as tinted glazing, screening, or internal shielding, where practicable.	Less than minor
			Night Sky and Astronomy	Interior lighting penetrating through glazing results in upward lighting increasing sky glow and blue spectrum lighting, affecting astronomical observance.	Interior and exterior lighting will be designed having regard to potential visibility from outside the site. Measures to reduce visibility and glare may include appropriate luminaire selection and orientation, controlled light distribution, and building design measures such as tinted glazing, screening, or internal shielding, where practicable.	Less than minor
			Cultural ²	-	-	-
			Residents	Residents adjacent to the site notice the addition of lit interiors within the development.	Motion detection to be utilised in all interior spaces with the potential for visibility from the exterior. Maximum spill light limit of 3 lux at the boundary / acoustic barrier as described above.	Less than minor
	2	Illuminated Signage	Transport Systems and Users	Illuminated signage resulting in glare and distraction to rail corridor users, including train drivers.	All illuminated signage to be lit from above utilising flat glass fittings with zero upward component and no tilt. Internally illuminated or digital signage not to be utilised.	Less than minor
				Illuminated signage resulting in glare and distraction to road users, including motorists, cyclists and pedestrians	Compliance with 2GP Rule 6.3.3 relating to illuminated signage visible from roads. All illuminated signage to be lit from above utilising flat glass fittings with zero upward component and no tilt. Internally illuminated or digital signage not to be utilised.	Less than minor
				Flashing, coloured or quickly changing illuminated signage confused for ground control lights when viewed from elevated viewpoints, including by helicopter pilots during infrequent night-time operations at Taieri Aerodrome. Given the limited frequency of night-time aviation activity and the presence of existing industrial lighting within the wider area, any such effects are anticipated to be low in magnitude and duration.	No transitioning signage or coloured lighting. Lighting shall generally be low intensity, shielded, non-flashing, and directed to minimise visibility beyond the immediate operational area. Where faster switching or status indication is required for safety or operational reasons, lighting shall avoid unnecessary brightness and shall not create glare, distraction, or confusion for aerodrome operations.	Less than minor
				Illuminated signage results in glare to airport users including by helicopter pilots during infrequent night-time operations at Taieri Aerodrome. Given the limited frequency of night-time aviation activity and the presence of existing industrial lighting within the wider area, any such effects are anticipated to be low in magnitude and duration.	Illuminated signage will be designed to minimise glare and visibility from outside the site through appropriate luminaire selection, shielding, controlled directionality, and avoidance of upward light. All illuminated signage to be lit from above utilising flat glass fittings with zero upward component and no tilt. Internally illuminated or digital signage not to be utilised.	Nil
				Illuminated signage located close to aerodrome operational areas has the potential to result in visual distraction or concern for aviation users during infrequent night-time helicopter operations, if not appropriately designed..	Illuminated signage will be designed having regard to aviation context, including avoidance of glare, flashing, or confusing visual cues through appropriate luminaire selection, shielding, controlled directionality, and avoidance of upward light. All illuminated signage to be lit from above utilising flat glass fittings with zero upward component and no tilt. Internally illuminated or digital signage not to be utilised.	Less than minor

				Illuminated signage within the runway end light control area increases insect activity and associated insectivorous bird activity, thereby increasing bird strike risk.	Illuminated signage will utilise warm colour temperatures (generally $\leq 3000\text{K}$), controlled optical distribution, and minimal upward light output, with lighting levels limited to the minimum required for operational purposes. Illuminated signage to be lit with lighting of $\leq 3000\text{K}$ (warm) colour temperature, flat glass with zero upward component, and installed without tilt. Dim lights to achieve minimum required lighting levels.	Less than minor
		Flora & Fauna		High blue light component in LED lighting associated with illuminated signage increases insect activity, associated insectivorous bird activity and other avifauna sensitive to blue spectrum lighting.	Illuminated signage to be lit with lighting of $\leq 3000\text{K}$ (warm) colour temperature. Internally illuminated or digital signage not to be utilised.	Less than minor
				Light spill and upward light causes disruption to nocturnal birds.	All illuminated signage to be lit from above utilising flat glass fittings with zero upward component and no tilt.	Less than minor
		Night Sky and Astronomy		Upward component of lighting (direct and reflected) results in increased sky glow and increased blue spectrum component, affecting astronomical observance.	All illuminated signage to be lit from above utilising flat glass fittings with zero upward component and no tilt. Internally illuminated or digital signage not to be utilised.	Nil
		Cultural ²		-	-	-
		Residents		Residents adjacent to the site notice the addition of illuminated signage within the development.	.. All illuminated signage to be lit from above utilising flat glass fittings with zero upward component and no tilt. Internally illuminated or digital signage not to be utilised.	Less than minor

1. There is minimal existing lighting within the proposed development area, beyond the minor street lighting at the existing intersections, and a small amount of residential lighting. It is assessed that the existing lighting has Nil effects across all categories.
2. Cultural Impact Assessment TBC
3. Effect types as defined by AS/NZS 4282:2023, and then further grouped and refined.
4. For the purposes of this assessment matrix, "slow" lighting transitions are defined in section 5.2.2.

Appendix B. Concept Lighting Design

Background Email

From: Joanne Dowd [REDACTED]
Sent: Wednesday, December 10, 2025 2:13 PM
To: Kate Macdonald; Justin Evans; Bryony Miller; Glenn Davis
Cc: Kevin Kearney
Subject: FW: Floodlighting Plan
Attachments: [Southern Link Draft Lighting Plan.pdf](#)
Follow Up Flag: Filed to: \\Intapp Documents\Project Emails\5572 Port Otago Inland Port AEE
Categories: Filed

Please see below and attached.

Thanks
Joanne

From: Jon Visser [REDACTED]
Sent: Wednesday, 10 December 2025 12:33 pm
To: Joanne Dowd [REDACTED]
Cc: Kevin Kearney [REDACTED] Grant Driver
Subject: Floodlighting Plan

Hi Joanne,

Attached is a draft floodlighting plan for Southern Link:

- 6x 30m tall floodlighting towers in the straddle row/reefer tower area, spaced around 120m apart (yellow). The two nearest the rail line constructed in stage 1 and the other four in stage 2. These are all outside the flight fan. These will each have 9x Philips BVP528 1.5kW LED floodlights on them.
- 14x 24m tall towers spaced around 50m to 80m apart, 13 in the sideloader operating area constructed in stage 1 and one at the road interchange for stage 2 (cyan). These are all either outside the flight fan or within the section of the flight fan limited to 25m. These will each have 6x Philips BVP518 LED 1kW floodlights on them.
- 3x 12m tall towers at the Depot and southern end of rail pad, stage 1 (purple). These are in the 20m-to25m section of the flight fan. These will each have 4x Falcon Pro 0.6kW LED floodlights on them.

In addition there will be the following, not shown on the diagram:

- Low-level (12m or less) street lighting poles around the roadways and boundary line along the rail pad facing into the terminal
- Lights mounted on the buildings and canopies for lighting the loading areas.
- Security lighting around entranceways/gates.

A good example of the 24m towers in a block stack can be found here:

<https://maps.app.goo.gl/xmTAhFQ8dNN7Wh4a8>

An example of high-level straddle row & reefer tower floodlighting can be found here:

<https://maps.app.goo.gl/uf13jrS7v22UYrTw6>

All of the tower locations and heights take into consideration:

- The heights of the surrounding container storage types.
- Avoiding having the light towers block access to the straddle rows or block stacks.
- The possibility that we may swap between straddle rows and block stacks in future.
- The need to illuminate predominantly the driving lanes, working faces and rail pad.
- The heights of the mobile plant operators, i.e. the lights cannot be at eye height.

This lighting plan is indicative only, pending final design of each part of the site. Final locations, heights and light fitting types and numbers may vary to achieve the required light levels.

Let me know if any questions.

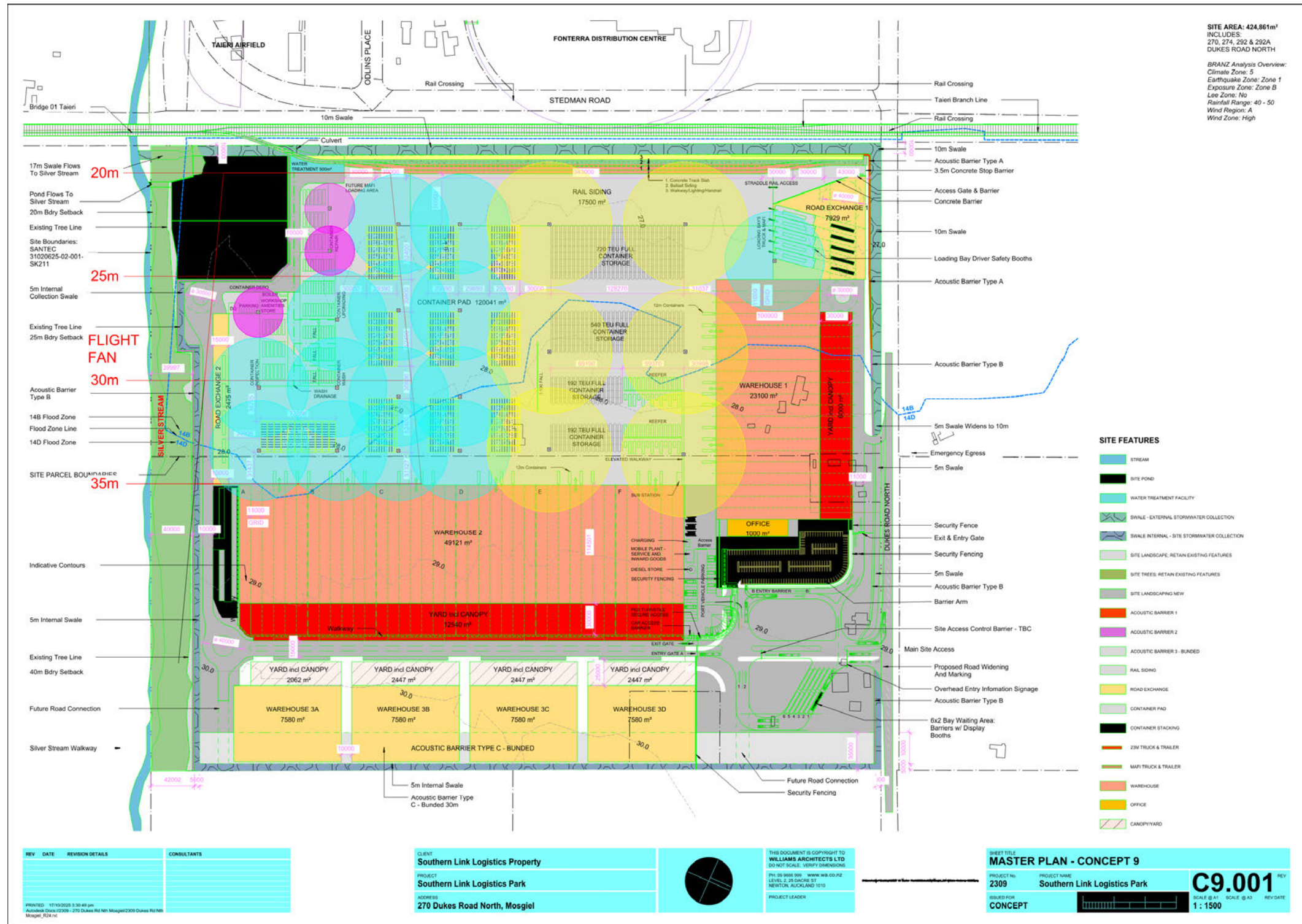
Kind regards,



Jon Visser
Infrastructure Asset Engineer

Mobile: [REDACTED]
Email: [REDACTED]
15 Beach St, Port Chalmers 9023
New Zealand
www.portotago.co.nz

Preliminary Lighting Layout Plan



Proposed luminaire types (indicative)



OptiVision LED gen3.5

BVP528 2470/730 BV A35-WB D9 T35 OUT LO

OptiVision LED gen3.5, Floodlight for sports and area, 1500 W, 170430 lm, 3000 K, CRI70, Asymmetrical, IP66

The OptiVision LED gen3.5 floodlighting system provides a complete lighting solution for the simplest through to the most complex area and recreational sports lighting applications. The high-efficiency floodlight comes with a single piece die cast housing, hosting 2 and 3 LED engines respectively, which also function with an external driver box – separate for use at a distance from the floodlight (BV), or pre-fixed onto the mounting bracket of the floodlight (HGB) for ease of installation and lower initial cost. It meets the highest performance standards, provides outstanding light, quality, uniformity and ensures safety and visual comfort.

Product data

General Information	
Lamp family code	LED2500 [LED module 250000 lm]
Number of gear units	1 unit
Driver included	Yes
Light source engine type	LED
Service tag	Yes
Lighting Technology	LED
Value ladder	Specification
Serviceability class	Class A, luminaire is equipped with serviceable parts (when applicable). LED board, driver, control units, surge protection device, optics, front cover and mechanical parts
Warranty period	5 years

Sustainability rating	Signify Circle
Light Technical	
Upward light output ratio	0
Luminous Flux	170.430 lm
Correlated Color Temperature (Nom)	3000 K
Luminous Efficacy (rated) (Nom)	113 lm/W
Color rendering index (CRI)	70
Light source color	730 warm white
Luminaire light beam spread	5° - 13° x 120°
Optic type outdoor	Asymmetrical
Effective projected area	0.512 m²
Operating and Electrical	
Input Voltage	230-400 V

Datasheet, 2025, December 3

data subject to change

OptiVision LED gen3.5

Line Frequency	50 to 60 Hz
Inrush current	20 A
Inrush time	0.160 ms
Power Consumption	1.500 W
Power Factor (Fraction)	0.9
Connection	Connection unit 5-pole
Cable	-
Number of products on MCB of 16 A type B	1
Protection class IEC	Safety class I
Surge Protection (Common/Differential)	Surge protection level until 10 kV differential mode
Total harmonic distortion	16 %
Controls and Dimming	
Dimmable	Yes
Driver/power unit/transformer	Power supply unit with DALI interface
Constant light output	No
DALI Standard	DALI

Mechanical and Housing

Housing Material	Aluminium
Reflector material	-
Optic material	Polycarbonate
Optical cover material	Polycarbonate
Fixation material	Aluminium
Housing Color	Aluminium
Mounting device	Mounting bracket adjustable
Optical cover shape	Flat
Optical cover finish	Clear
Overall length	695 mm
Overall width	695 mm
Overall height	655 mm
Dimensions (Height x Width x Depth)	655 x 695 x 695 mm
Ingress protection code	IP66 [Dust penetration-protected, jet-proof]
Mech. impact protection code	IK08 [5 J vandal-protected]
Standard tilt angle posttop	0°
Standard tilt angle side entry	-
Optical cover type	Polycarbonate bowl/cover clear
Net Weight (Piece)	33.000 kg

Datasheet, 2025, December 3

2

data subject to change

Approval and Application	
Flammability mark	-
CE mark	Yes
ENEC mark	ENEC mark
EU RoHS compliant	Yes
Performance ambient temperature Tq	25 °C
Ambient temperature range	-40 to +55 °C

Initial Performance (IEC Compliant)

Luminous flux tolerance	+/-7%
Initial chromaticity	(0.438, 0.403) SDCM<5
Power consumption tolerance	+/-10%
Init. Color Rendering Index Tolerance	+/-2
Standard Deviation of Colour Matching (McAdam ellipse)	SDCM<5

Over Time Performance (IEC Compliant)

Control gear failure rate at median useful life 100000 h	5 %
Lumen maintenance (EN-IEC 62722-2-1) at median useful life* 50000 h	-
Lumen maintenance (EN-IEC 62722-2-1) at median useful life* 100000 h	L90

Product Data

Order product name	BVP528 2470/730 BV A35-WB D9 T35 OUT LO
Full product name	BVP528 2470/730 BV A35-WB D9 T35 OUT LO
Full product code	872016955332300
Order code	912300060444
Material Nr. (12NC)	912300060444
Numerator - Quantity Per Pack	1
EAN/UPC - Product/Case	8720169553323
Numerator - Packs per outer box	1
EAN/UPC - Case	8720169553323
Product family code	BVP528 [OPTIVISION LED GEN3.5 LARGE]

FALCON PRO 640W

EVOLVE
LIGHTING

PROFESSIONAL SERIES HIGH OUTPUT LED FLOODLIGHT

 **170lm/W**
System Efficacy
  **7 Year**
Warranty
  **IK10**
Rated
  **IP67**
Rated

- ✓ Ultra efficient system efficacy of up to 170lm/W
- ✓ Long lifetime of >102,000hrs to L70
- ✓ High quality Lumileds LED chips and Mean Well Driver
- ✓ Multiple beam angles available
- ✓ Tough IP67 and IK10 construction
- ✓ Suitable for coastal areas (with optional 316 stainless steel bracket)
- ✓ Durable Interpon Polyester coating



CODE

FALCONPRO-640-750

LIGHTING DATA

Light Source	Lumileds 5050
Lumen Output	108,800lm*
Luminaire Efficacy	170lm/W*
Lifetime @L70 (TM-21)	>102,000hrs
Lifetime @L80 (TM-21)	74,000hrs
Lifetime @L90 (TM-21)	36,000hrs
CCT	5000K (Further CCTs on request)
CRI	>70 (CRI80, CRI90 on request)
SDCM	<5
Beam Angle	30°, 60°, 90°, 85°x135°, 60°x130°

DESIGN / CONSTRUCTION

Housing Material	Corrosion-resistant aluminium
Lens Material	Polycarbonate
Bracket Material	Hot-dip galvanised steel
Bracket Type	Oblique
Powder Coat	Interpon Polyester
Colour	Graphite Black (RAL 9011) (White available on request)
Weight	23.5kg

ELECTRICAL DATA

Power Source	Mean Well HLG-320H-48A x2
System Wattage	640W
Mains Voltage	AC100-277V / 50-60 Hz
Power Factor	>0.95
THD	<10%
Inrush Current	70A
Surge Protection	10kV
Driver Lifetime	Up to 100,000hrs
Connection	1.2m 3 core cable via connection box
Dimmable Options	DALI, 1-10V

TECHNICAL DATA

IP Rating	IP67
IK Rating	IK10
Operating Temp	-30° to +45°C
Protection Class	Class 1
Certifications	SAA
Documentation	LM-79, LM-80, ISTMT, TM-21
Warranty	Standard 7 year warranty

* Achieved with 90° beam angle

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P 0800 357 6311 E sales@evolve-lighting.co.nz

FALCON PRO

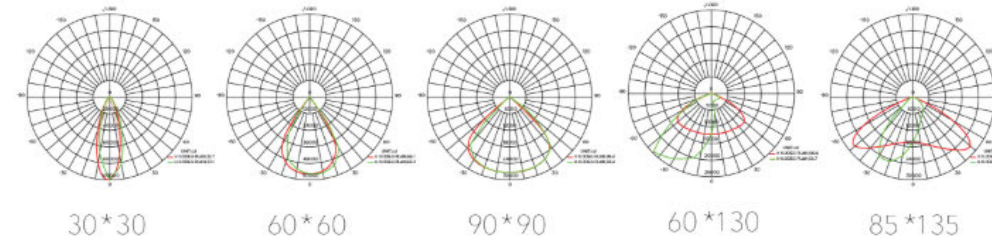
TECHNICAL DETAILS

EVOLVE
LIGHTING

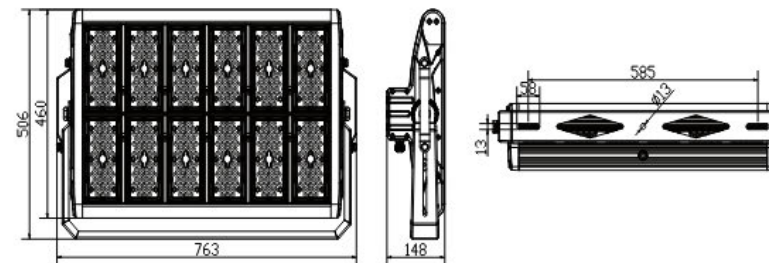
IMAGES



PHOTOMETRIC DIAGRAMS



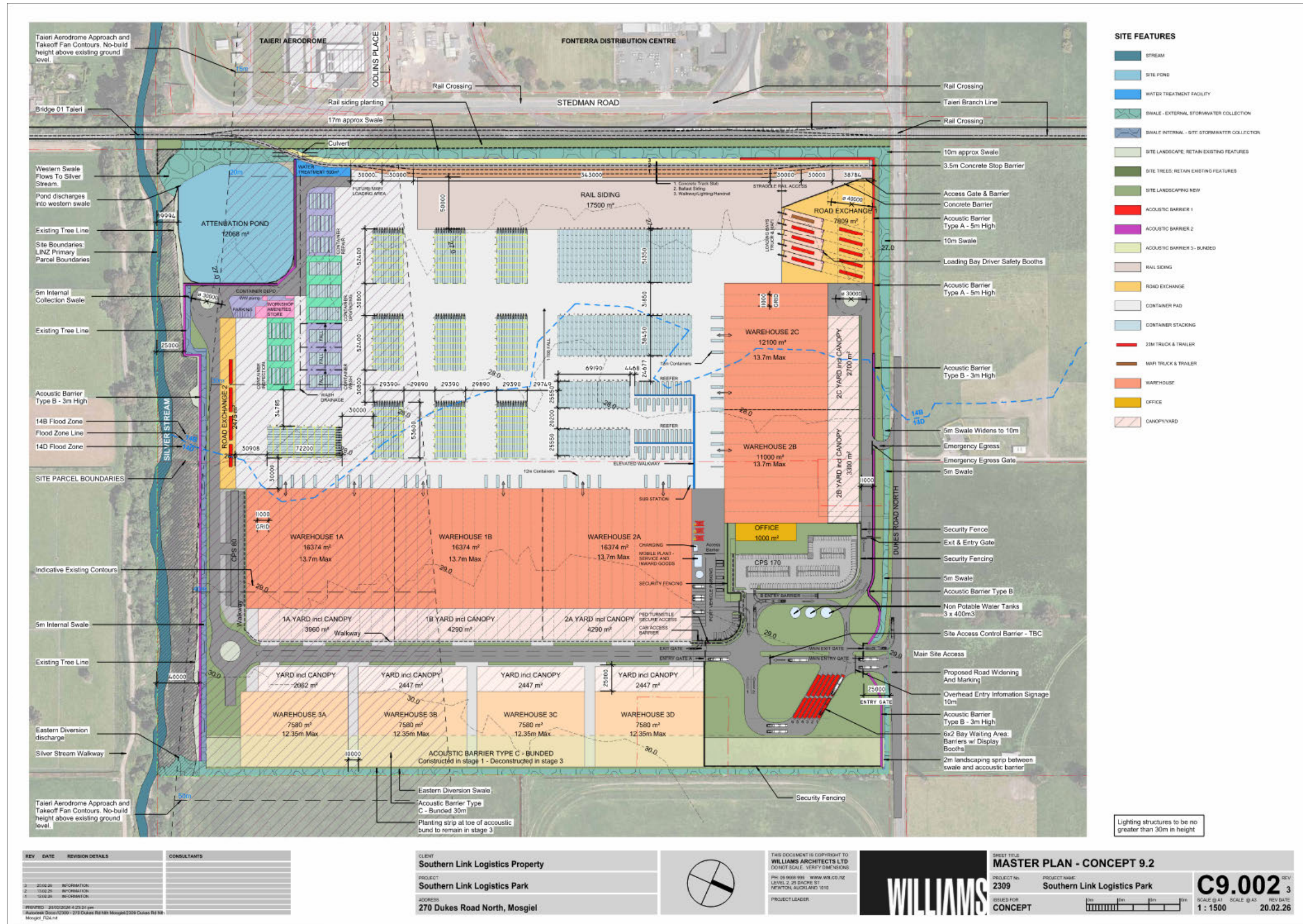
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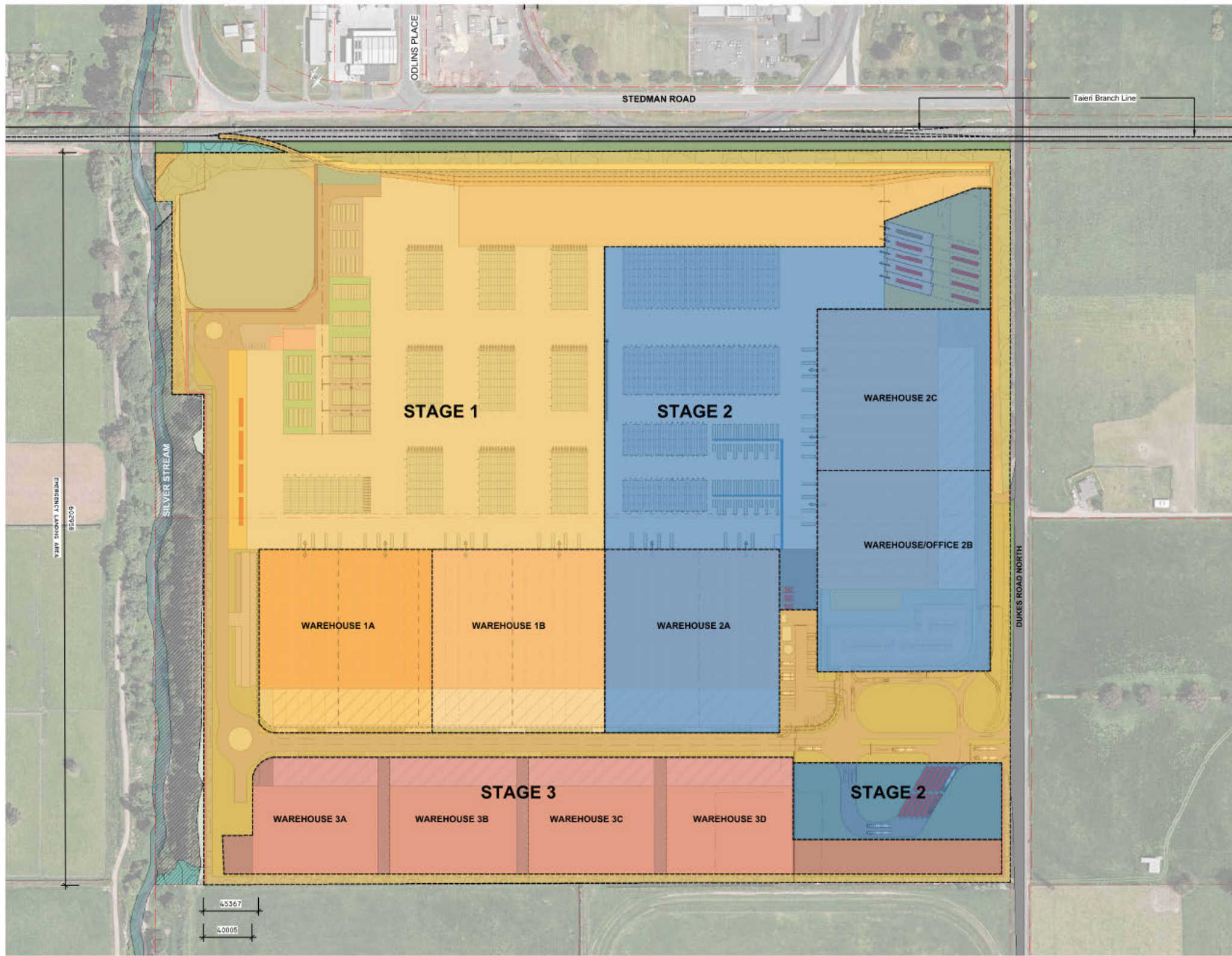


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Appendix C. Master Plan

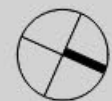




REV	DATE	REVISION DETAILS	CONSULTANTS
1	20/02/26	INFORMATION	
2	19/02/26	INFORMATION	
3	12/02/26	INFORMATION	
4	16/01/26	INFORMATION	

PRINTED: 25/02/2026 4:25:28 pm
 Author: Doss/12/2025 - 270 Dukes Rd Nth Mosgiel 2309 Dukes Rd Nth Mosgiel, 7024.M

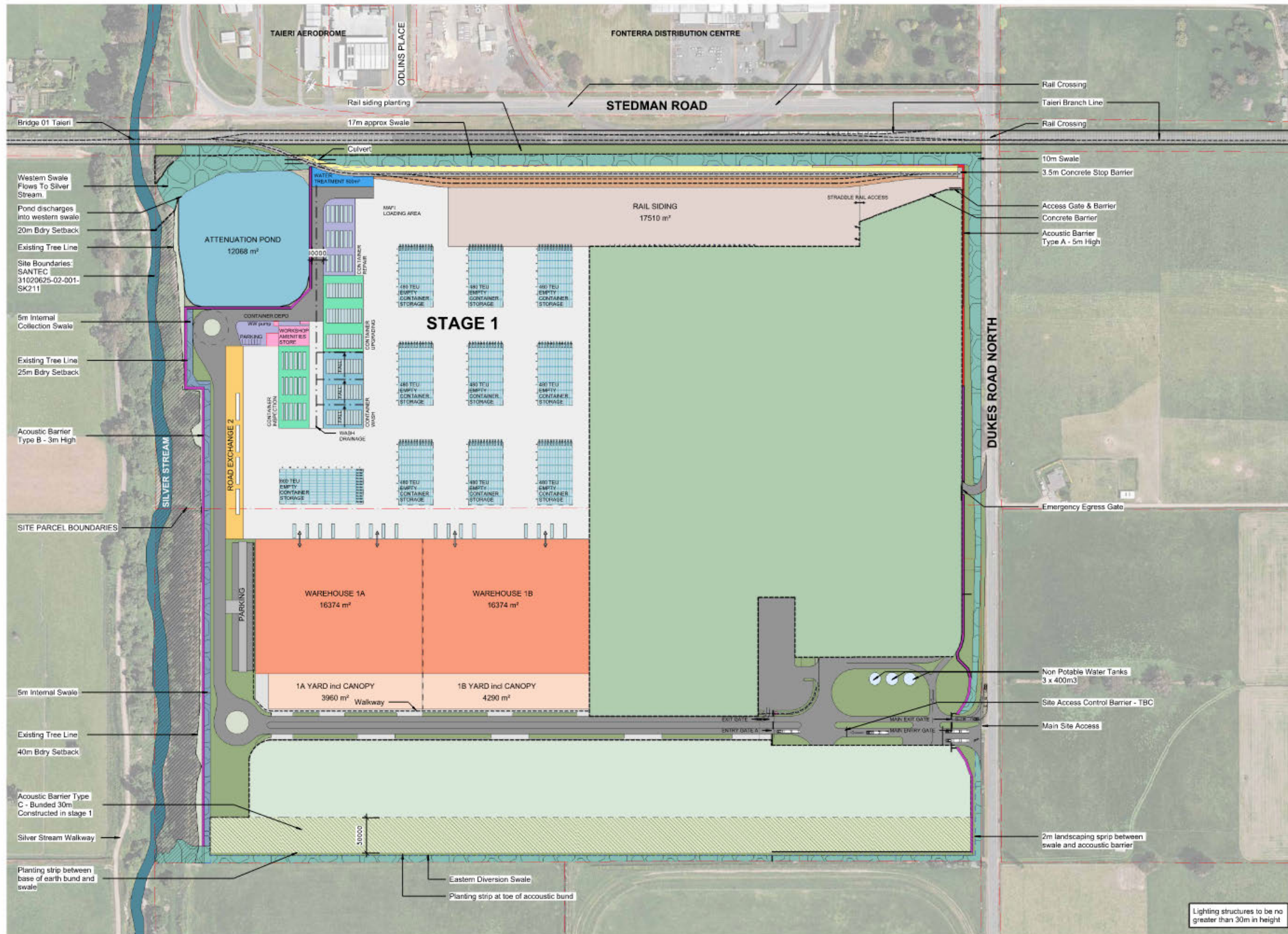
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 PROJECT
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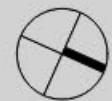
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 PROJECT NAME:
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 SCALE @ A1: 1:1500 SCALE @ A3: 1:1500
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REV	DATE	REVISION DETAILS	CONSULTANTS
1	20.02.20	INFORMATION	
2	13.02.20	INFORMATION	
3	12.02.20	INFORMATION	
4	10.01.20	INFORMATION	

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Southern Link Logistics Property
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Southern Link Logistics Park
 ADDRESS
270 Duker Road North, Mosgiel



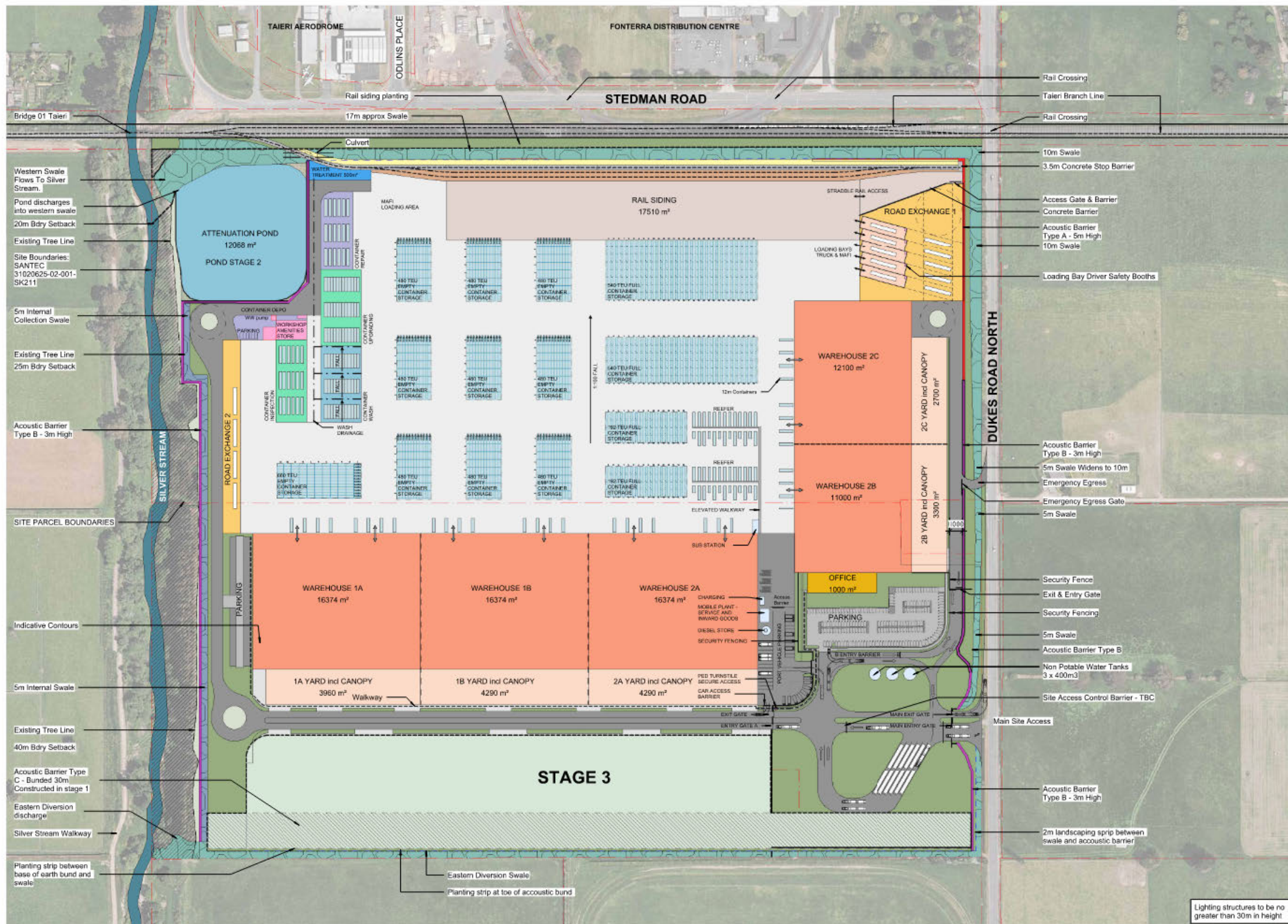
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2309
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C9.004 REV. 4
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 SCALE @ A3: 1:1500
 REV DATE: 20.02.26

Lighting structures to be no greater than 30m in height

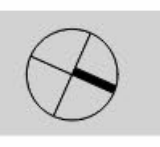


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2	12.02.20	INFORMATION	
3	12.02.20	INFORMATION	
4	19.02.20	INFORMATION	
5	19.02.20	INFORMATION	

CLIENT
Southern Link Logistics Property

PROJECT
Southern Link Logistics Park

ADDRESS
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SHEET TITLE
MASTER PLAN STAGE 1 & 2

PROJECT NO.
2309

PROJECT NAME
Southern Link Logistics Park

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CONCEPT

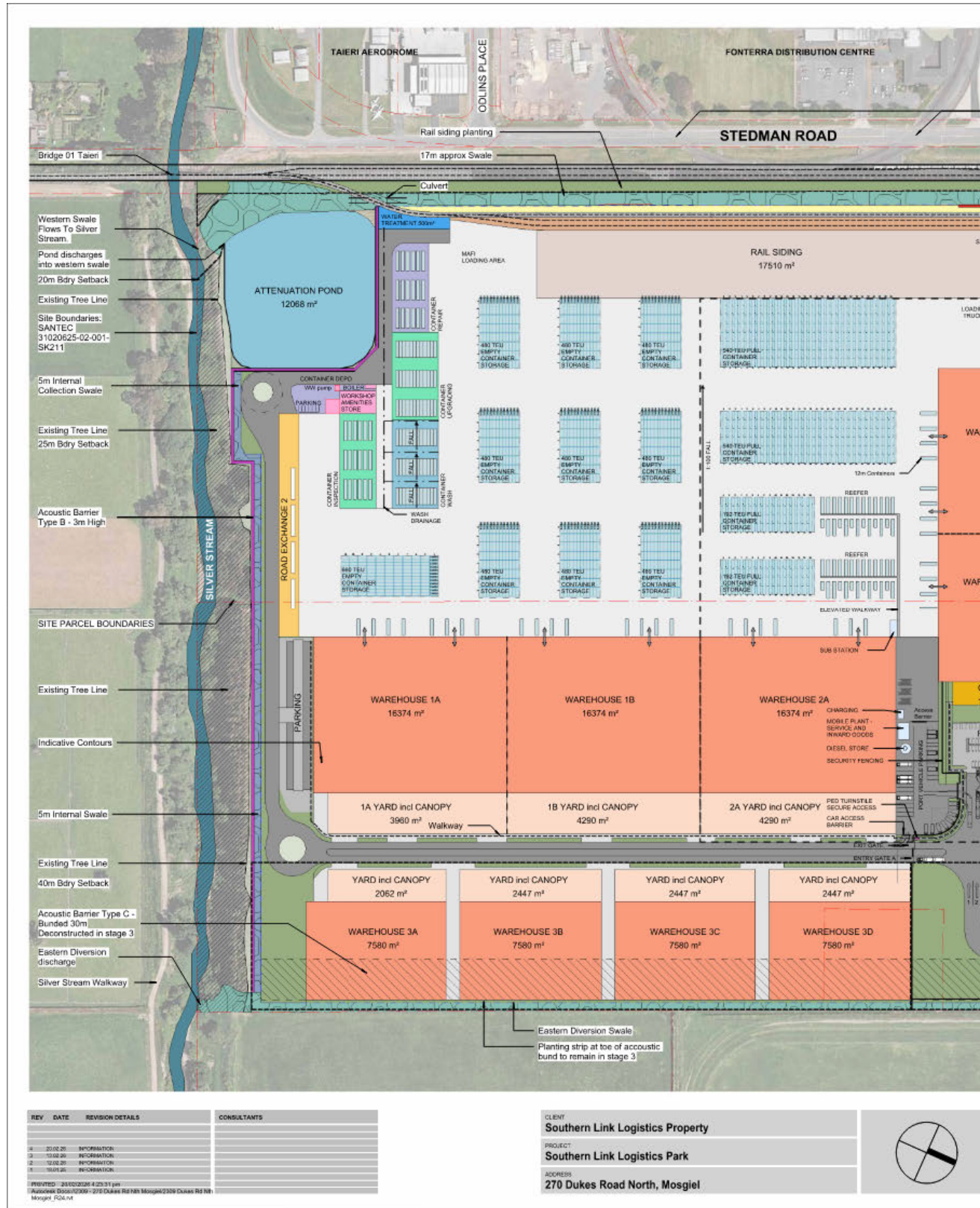
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20.02.26

C9.005

Lighting structures to be no greater than 30m in height



Appendix D. Glossary of Lighting Terms

The following simple definitions are based upon those within AS/NZS 4282:2023 "Control of the obtrusive effects of outdoor lighting" and apply to terms used in this report:

- **Asymmetric and Symmetrical Light Distribution**

The term asymmetric light output is the term to describe a system where light is directed sideways (or in an asymmetric pattern). Symmetrical lighting in comparison spreads the light equally in all directions.

- **Backlight Shields**

Backlight shields are barriers mounted on or in the luminaire to minimise light spilling behind the primary aiming direction of the light.

- **Colour Rendering Index (CRI)**

A numerical measure (on a scale from 0 to 100) of a light source's ability to accurately reveal the colours of objects compared with a reference light source of the same colour temperature, with higher values indicating better colour discrimination and visual clarity.

- **Environment Impact Assessment (EIA)**

An environmental Impact Assessment (EIA) is a process of evaluating the likely environmental impacts of a proposed project or development, considering the inter-related socio-economic, cultural and human safety impacts, both beneficial and adverse.

- **Glare**

Condition of vision in which there is discomfort or a reduction in the ability to see, or both, caused by an unsuitable distribution or range of luminance, or extreme contrasts in the field of vision.

The two terms that are normally used to describe the effects of glare on the ability to see are *disability* and *discomfort*.

- **Disability Glare**

Glare that impairs the visibility of objects without necessarily causing discomfort.

A typical example of *disability* glare is the glare from approaching headlights on the open highway at night, which prevent anything else being seen on the road. The eye is unable to adapt to the bright headlight and to the significantly lower brightness on the road at the same time. Hence the glare is having a disabling effect. This disabling effect is related to the intensity of the source in the direction of the eye with respect to the brightness of the surroundings. As a comparison, the same car approaching with its headlights on during the day would cause almost no disability because of the brightness of the surroundings.

- **Discomfort Glare**

Glare that causes discomfort without necessarily impairing the visibility of objects.

An example of discomfort glare is a bright sky on a sunny day can cause discomfort, particularly to those used to wearing sunglasses who are without them, however the ability to see is not impaired.

The key difference between the two is that disability glare has a physiological effect and can be objectively measured, whereas discomfort glare has a psychological effect and is much more subjective. What may not cause discomfort to one person may cause significant discomfort to another person.

Both *disability* and *discomfort* glare may be present concurrently.

- **Illuminance**

The measure of illumination level, which is the amount of light or luminous flux (i.e. Lumens) incident on a surface, per unit area, measured in Lux (1 Lux = 1 Lumen /m²).

- **Luminaire**

The international term for a lighting fitting, which is the assembly that contains a light source and distributes the light output.

- **Luminance**

The measure of brightness, which is a function of concentration or density of luminous intensity (i.e. Candelas) in a given direction per unit area, measured in Candela/m² (Cd/m²).

- **Lux**

The International System (SI) unit of illuminance and luminous emittance, measuring luminous flux per unit area. It is equal to one lumen per square metre.

- **Skyglow**

The brightening of the night sky that results from the reflection of radiation (visible and non-visible), scattered from the constituents of the atmosphere (gas molecules, aerosols and particulate matter), in the direction of observation.

It comprises two separate components as follows:

- **Natural Sky Glow**

That part of the sky glow that is attributable to radiation from celestial sources and luminescent processes in Earth's upper atmosphere.

- **Man-Made Sky Glow**

That part of the sky glow that is attributable to man-made sources of radiation (e.g. outdoor lighting).

- **Spill Light**

Light emitted by a lighting installation that falls outside the boundaries of the property for which the lighting installation is designed.

Kate Macdonald

Senior Electrical Engineer (Bachelor of Electrical & Electronic Engineering)



Kate is a Chartered Professional Engineer, Chartered Member of Engineering New Zealand, and a Practice Area CPEng Assessor.

Kate is an enthusiastic Wonder Project Ambassador for Engineering NZ. She believes that increased gender diversity in the engineering profession is great for the industry, so she is doing her bit to make that happen by being a role model whenever possible. She is also the champion of Pedersen Read's Diversity Agenda.

Some recent project highlights include:

Senior Electrical Engineer | Various Assessments of Environmental Effects | Various locations across NZ | 2023 – 2026

Kate has contributed as a lighting expert to the preparation of Assessments of Environmental Effects (AEEs) for multiple resource consent applications across the mining sector, industrial developments and community facilities. Her role has included authoring AEEs, reviewing resource consent applications submitted by others and preparing expert witness evidence for the Environment Court. She enjoys applying district plan lighting provisions and technical standards and guidelines to real world applications across a range of sectors, resulting in lighting solutions that are functional and safe, whilst minimising the impact of glare, spill light and sky glow on the surrounding environs, the night sky and the environment.

Senior Electrical Engineer | Te Hurihanga Ō Rangatahi – The Youth Hub | Christchurch | 2021 - 2024

Kate was honoured to be on the design team delivering the Electrical Services design for this flagship project, which comprises supported housing, apartments, wrap around services, community facilities and an urban market garden specifically designed for the rangatahi of Ōtautahi.

Senior Electrical Engineer | Christchurch International Airport Ltd | Various Projects | 2020 - Present

Kate has been involved providing electrical services design for various projects at CIAL since starting at Pedersen Read in 2020. These include Emergency lighting upgrades, general lighting upgrades, Carpark lighting upgrades, Apron lighting upgrades and amenities block refurbishment. Kate enjoys the complexity involved with completing projects in an operational airport.

Senior Electrical Engineer | Foodstuffs Bottling Plant | Christchurch | 2020 - 2021

Kate was responsible for the Electrical Services Design. Including safety interlocks for hazardous zoning, pump station, site power quality analysis, contract admin; including management of multiple electrical contractors.

**Senior Electrical Engineer | Haere-Roa - University of Canterbury Student's Association Building
| GHD | Christchurch | 2016 – 2020**

Kate was responsible for delivering the Electrical Services for this flagship project at the University of Canterbury. The building comprises 4,000m² and includes several bars, multi-use space and function area, a 200 seat full purpose theatre / 900-person gig space, UCSA offices, club space and student social areas.

Through her role with the UCSA project, Kate was the recipient of the highly commended award in the 'Outstanding Achievement in Design' category for the 2018 Hays National Association of Women in Construction (NAWIC) Excellence Awards.

Senior Electrical Engineer | Canterbury Earthquake Memorial Wall | Christchurch | 2015 - 2017

Kate was responsible for the electrical services design for this landmark project. The electrical design was complicated because the entire electrical installation is below the floodplain.

The project was the recipient of the Property Council Urban Design Award 2017, The Property Council Supreme Award 2017, a 'Dark Sky' Excellence Award from the NZ Astronomical Society and an Award of Commendation from the NZ Illumination Engineering Society.

EDUCATION AND QUALIFICATIONS

- Bachelor of Engineering, Electrical and Electronic with Honours, Canterbury University
- Chartered Member of Engineering New Zealand (CMEngNZ)
- Chartered Professional Engineer (CPEng)
- Licensed as a Security Consultant under the Private Security Personnel Licensing Authority

EMPLOYMENT HISTORY

2020 – Present	Senior Electrical Engineer, Pedersen Read Ltd, Christchurch, NZ
2015 – 2020	Senior Electrical Engineer, GHD, Christchurch, NZ
2009 – 2015	Parent
2009 – 2010	Senior Electrical Engineer, PFC, Christchurch, NZ
2008 – 2009	Senior Electrical Engineer, NDY, Melbourne, Australia
2006 – 2008	Senior Electrical Engineer, Murchie Consulting, Melbourne, Australia
2004 – 2006	Controls Engineer, Australian Synchrotron Project, Melbourne, Australia
2003 – 2004	Electrical Engineer, SKM, Melbourne, Australia
2001 – 2003	Electrical Engineer, PFC, Christchurch, NZ