

2nd March 2020

Gull New Zealand Ltd
P.O. Box 33 942
Takapuna
Auckland 0740

Attention: Julian Gray

Email: julian@gull.nz

Dear Julian,

**re: - Gull Service Station – 68-72 Great South Road, Pokeno
External Signage & Lighting Assessment**

This report is in response to a request by Hayson Knell Limited to review the expected illuminance and glare from external lighting and signage associated with the proposed development of a site for Gull NZ in Pokeno. The proposed site is located at 68-72 Great South Road, Pokeno. The proposed site is in the Waikato District Council Franklin area.

The site is located in an Operative District Plan - Business F zone with residential properties located adjacent to the proposed Gull site. Pokeno Hall is located across Great South Road. The Proposed District Plan zone for the site is Business Town Centre.

The proposed site occupies land that is generally flat and currently has two dwellings. There are residential dwellings located near the proposed site with the closest located approximately 25m away from the forecourt dispenser lighting at 25 Market Street. The dwellings are located in a Business zoned site. Residential zoned land is located to the west of the proposed site adjacent to the unformed Church Street.

There is a landscaped buffer zone proposed along the rear boundary of the site. I have not included the buffer zones in the illuminance spill light calculations. The remaining Business F zone adjacent to the site boundary have spill light controlled to effectively limit maximum vertical illuminance to 7.3 lux and horizontal spill light to 3.6 lux and will not be adversely affected by spill light from the proposed gull wing canopy lighting and signage. The maximum permitted horizontal and vertical spill light for these boundaries is 10 lux.

Each unmanned fuel dispenser and gull wing canopy will be lit using two weatherproof LED low glare linear luminaires to uplight the underside of the canopy. There will also be two LED area lights mounted on outreach brackets at 4.5m above forecourt level to provide localised lighting on the forecourt. The IT and electrical services shed will have a wall mounted security light above the door. All luminaires have been selected, aimed and located to ensure glare and spill light is kept to a minimum. Refer to the attached data sheets.

The Services IT Shed will not be occupied during normal operations.

Each unmanned fuel dispenser will have standard Gull Force 10 logo signage blades. A new 8m high Gull ID sign is proposed to be located adjacent to the road boundary. Each fuel dispenser will also have an illuminated digital panel displaying fuel pricing information. All signage will have static displays.

The proposed site will have signage located as follows:

1. 8m pylon flag sign on each of the two road frontages - 556 cd/m²
2. Canopy Gull Bullseye Sign White - 84.6cd/m²
3. Gull Force Blade signs above each gull dispenser - 375 cd/m²
4. Fuel dispenser pricing information - 75 cd/m²

The maximum luminance of the brightest part of each sign at night is noted above. Signage will not be lit during the day apart from the electronic fuel dispenser pricing display.

Image 1



Image of a typical unmanned Gull Service Station with gull wing canopies.

Image 2



Image of a typical unmanned site at night.

A new Consent application is being lodged by Hayson Knell on behalf of Gull for the proposed redevelopment of the site hence the focus of this report relates to expected spill light illuminance and glare luminance levels associated with proposed Gull lighting and signage with particular reference to nearby residential dwellings and the adjacent collector road (Great South Road).

The intent of Waikato District Plan Rules (both Operative and Proposed) are to ensure the negative effects of external lighting such as glare and spill light are appropriately managed.

Waikato District Plan Rules for Business zones are as follows:

29.6.4 Light Spill and Glare

1. *No welding activity shall be visible from any road or any site not zoned Business.*
2. *All outdoor lighting shall be positioned, mounted and directed in such a way that light coming directly or indirectly from it:*
 - *is not a serious distraction or danger to motorists, and*
 - *is not a serious distraction or annoyance to occupants of other sites at any time, which shall be deemed to be the case where once an effect is brought to the Council's attention the condition continues for more than 30 minutes in any 24 hour period and the affected person/s have no ready means of relief from it.*
5. *Compliance with the following standards will be considered the minimum acceptable to ensure that a nuisance situation or adverse effect does not eventuate, provided that for the purposes of these standards, land zoned Recreation is deemed to be zoned Business (and its illumination from business activities will not be controlled by these standards):*
 - i) *Where a property is deemed to have "bright" surrounds, all lighting shall be installed and operated such that the direct component of illuminance for the stated hours is less than the stated lux (lumens per square metre) on or at any point inside the closest boundary of every affected site:*
 - *0600 hours to 2230 hours: 25 lux*
 - *2230 to 0600 hours: 10 lux**(A property has 'bright' surrounds where it has any non-Business land abutting it which fits the following description: The land is within 60 metres of a road or length of road which is illuminated to the minimum standard set out in NZS 6701 for intermediate and main road streetlighting).*
 - ii) *Where a property is deemed to have 'dark' surrounds, all lighting shall be installed and operated such that the direct component of illuminance for the stated hours is less than the stated lux (lumens per square metre) on or at any point inside the closest boundary of every affected site:*
 - *0600 hours to 2230 hours: 10 lux*
 - *2230 hours to 0600 hours: 5 lux**(A subject property has 'dark' surrounds where non-Business land abutting it does not fit the description above for 'bright' surrounds).*
 - (iii) *All artificial lighting shall be installed and operated such that the luminous intensity of any light source is less than 1000 candelas in the direction of any affected property or road.*

The maximum calculated threshold increment for motorists on Great South Road is TI 0.10 indicating there will be no appreciable glare from external lighting or signage due to distance and orientation of the light sources to traffic.

Illuminated signs and area lighting used by Gull have a low glare value and are suitable for Business and residential environments. Luminance from the proposed Gull signage and external lighting will be less than maximum limits outlined in the Waikato District Plan and AS/NZS 4282 : 2019 Control of the obtrusive effects of outdoor lighting.

The above obtrusive light Standard treats Suburban areas as an Environmental Zone A3 and Table 3.5 states the maximum average luminance shall be 250 cd/m². Tests taken at similar Gull sites indicate the maximum average ID sign luminance will be less than 250 cd/m². Each ID flag sign will have four colours to the graphics being a series of dominant mid blue, red and green panels with white lettering, each having a different luminance. The average luminance for each fixed coloured portion of the sign is 219 cd/m² based on tests at similar Gull sites.

The proposed illuminated 8m ID flag signs will be located at least 2000mm away from the boundary and will face perpendicular to Great South Road boundary and will be oriented to face passing motorists travelling along the road in both directions.

Spill light from the internally lit signs and proposed external lighting will be minimal on Great South Road due to the density of the acrylic used to manufacture the signage and the downward facing exterior lighting. Tests taken at similar Gull sites indicate spill light from signage will be 0.9 lux measured in the horizontal plane and 1.1 lux in the vertical plane at a distance of 4m from the sign based on the lowest part of the graphic being 1600mm above ground level.

There will only be low spill light from signage and external lighting in nearby Business zoned land that has dwellings adjacent to the site where up to 10.0 lux spill light is permitted noting that screening from landscaped buffer zones and fences have not been considered in the calculations. The maximum spill light on residential dwellings at 25 Market Street is 7.3 lux due to the distances involved separating the lighting and signage from the dwelling being considered.

Spill light on adjacent Great South Road collector road will not exceed 5 lux on the kerb based on a calculation result of 3.0 lux.



Sign 1 - Typical Gull Pylon 8m ID Sign

The above images show a typical ID flag sign at night and in daylight to indicate typical graphics. Gull Canopy Force 10 blade signs on the dispenser canopy will also be visible to passing motorists. Canopy signs are internally lit to illuminate the graphic.

No light source will be evident from any sign at ground level and there are no floodlights directed upward. All light sources are totally concealed behind the acrylic sign. Night tests from installed signage at a similar Gull site confirm the following luminance values for proposed signage:

Pylon Sign Blue top panel graphic	- 117cd/m ²
Pylon Sign LED fuel lettering	- 75cd/m ²
Pylon Sign White lettering	- 556cd/m ²
Pylon Sign mid panel letters	- 142cd/m ²
Pylon Sign Green panel	- 78cd/m ²
Pylon Sign red panel	- 343cd/m ²
Pylon Gull Bullseye Sign White	- 84.6cd/m ²
Force 10 Blue blade panels at dispenser	- 375cd/m ²


There will be very low spill light from the proposed Gull signage or external lighting on the nearest residential dwelling to the Gull development at 25 Market Street due to the distance from the proposed Gull site.

I consider the effects of this lighting proposal is negligible for the following reasons:

- proposed signage has acceptable luminance intensity and low glare
- proposed signage lighting complies with the intent of Waikato District Plan Rules for Business areas
- gull wing canopy lighting will utilise low glare LED products
- very low spill light on nearest residential property boundaries
- spill light on Great South Road will be low
- spill light on adjacent Business zoned properties will be less than 10 lux
- luminous intensity will be less than 1,000cd in the direction of the road and adjacent residential dwellings
- lighting and signage has been design, located and aimed so it is not a distraction for motorists or residents in the vicinity of the site
- compliance with AS 4282 control of the obtrusive effects of outdoor lighting requirements
- negligible glare for motorists and pedestrians
- low glare results for nearest residential properties
- negligible threshold increment for motorists
- sign luminance and floodlighting will not exceed 600 cd/m² when viewed from adjacent dwellings

Please contact the writer should you require further clarification.

Yours faithfully
Kern Consultants Ltd

A handwritten signature in dark ink, appearing to read 'Russ Kern', with a stylized, cursive script.

Russ Kern MIES

XSP2™ IP66 — BXSPA2F

XSP Series LED Street Light – IP66 – Double Module
Horizontal / Vertical Tenon Mount – Type II Short

Product Description

Designed from the ground up as a totally optimized LED street light system, the XSP Series delivers incredible efficiency without sacrificing application performance. Beyond substantial energy savings and reduced maintenance, Cree achieves better optical control with our NanoOptic® Precision Delivery Grid™ optic than a traditional cobra head luminaire. The Cree XSP Series LED Street Light is the best alternative for traditional street lighting with better payback and better performance.

Performance Summary

Utilizes BetaLED® Technology

NanoOptic® Precision Delivery Grid™ optic

CRI: Minimum 70 CRI

CCT: 4000K (+ / - 300K), 5700K (+ / - 500K)

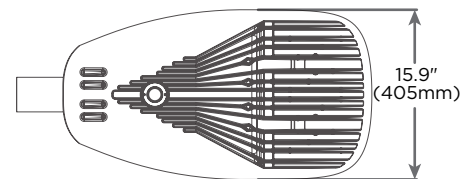
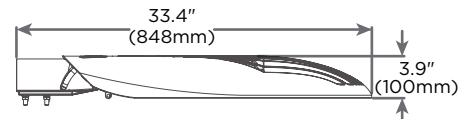
Limited Warranty†: 10 years on luminaire / 10 years on Colorfast DeltaGuard® finish

Accessories

Field Installed Accessories

XA-XSPFTRKIT

- Fitter kit to mount to 1.25" (32mm) tenon



Ordering Information

Example: BXSPA2FHA-US-OPTIONS

BXSP	A	2	F		A	-			
Product	Version	Mounting	Optic	Modules	Input Power Designator	-	Voltage	Color Options	Options
BXSP	A	2 Horizontal / Vertical Tenon	F Type II Short	H 4000K P 5700K	A 102W	-	U Universal 120-277V V 347-480V*	S Silver (Standard) T Black Z Bronze B Platinum Bronze W White	F Fuse - When code dictates fusing, use time delay fuse - Not available with V voltage K Occupancy Control - Refer to Occupancy Control spec sheet for details N Utility Label and NEMA Photocell Receptacle - Includes Q option - Refer to Field Adjustable Output spec sheet for details Q Field Adjustable Output - Refer to Field Adjustable Output spec sheet for details R NEMA Photocell Receptacle - Photocell by others U Utility - Label per ANSI C136.15 - Includes exterior wattage label that indicates the maximum available wattage of the luminaire - Includes Q option - Refer to Field Adjustable Output spec sheet for details

† See www.cree.com/lighting/products/warranty for warranty terms.

* 347-480V utilizes magnetic step-down transformer. For input power for 347-480V, refer to the Lumen Output, Electrical, and Lumen Maintenance data table below.



Rev. Date: 06/25/13



Product Specifications

CONSTRUCTION & MATERIALS

- Die cast aluminum housing
- Tool-less entry
- Luminaire is designed to mount to 2" IP (2.375" [60mm] O.D.) tenons, accommodating tenons up to 2.5" (64mm) in diameter
- Luminaire will also mount to 1.25" (32mm) IP, (1.66" [42mm] O.D.) tenon with XA-XSPFTRKIT accessory
- Fitter is capable of mounting to both vertical and horizontal tenons and can be tilted + / - 5°
- Designed with 0-10V dimming capabilities. Controls by others
- Exclusive Colorfast DeltaGuard® finish features an E-Coat epoxy primer with an ultradurable powder topcoat, providing excellent resistance to corrosion, ultraviolet degradation and abrasion. Standard is silver. Black, bronze, platinum bronze and white are also available

ELECTRICAL SYSTEM

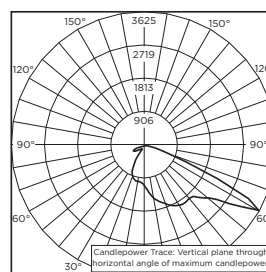
- **Input Voltage:** 120-277V or 347-480V, 50 / 60Hz
- Class 2 output
- **Power Factor:** > 0.9 at full load
- **Total Harmonic Distortion:** < 20% at full load
- Integral 10kV surge suppression protection standard
- To address inrush current, slow blow fuse or type C / D breaker should be used

REGULATORY & VOLUNTARY QUALIFICATIONS

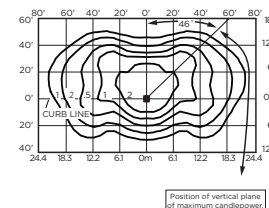
- cULus Listed
- Suitable for wet locations
- Enclosure rated IP66 per IEC 60529
- Pending certification to ANSI C136.31-2001, 3G bridge and overpass vibration standards
- 10kV surge suppression protection tested in accordance with IEEE / ANSI C62.41.2
- Pending CALTrans 611 Vibration testing
- Luminaire and finish endurance tested to withstand 5,000 hours of elevated ambient salt fog conditions as defined in ASTM Standard B 117
- Meets Buy American requirements within ARRA

Photometry

All published luminaire photometric testing performed to IESNA LM-79-08 standards by a NVLAP certified laboratory.



ITL Test Report #: 77144
BXSPA*FGA-U
Initial Delivered Lumens: 4,920



BXSPA*FHA-U
Mounting Height: 25' (7.6m)
Initial Delivered Lumens: 9,612
Initial FC at grade

EPA and Weight

Weight 120-277V	Weight 347-480V	EPA				
		1@90	2@90	2@180	3@90	4@90
31 lbs (15.0 kg)	36 lbs (16.3 kg)	0.692	1.140	1.384	1.832	2.280

Lumen Output, Electrical, and Lumen Maintenance Data

Type II Short Distribution													
Input Power Designator	4000K		5700K		System Watts 120~277V	System Watts 347~480V	TOTAL CURRENT						50K Hours Calculated Lumen Maintenance Factor @ 15° C (59° F)***
	Initial Delivered Lumens*	BUG Ratings** Per TM-15-11	Initial Delivered Lumens*	BUG Ratings** Per TM-15-11			120V	208V	240V	277V	347V	480V	
A	9,612	B2 U0 G2	10,680	B2 U0 G2	102	105	0.86	0.49	0.43	0.38	0.30	0.23	93%

*Actual production yield may vary between -4 and +10% of initial delivered lumens.

** For more information on the IES BUG (Backlight-Uplight-Glare) Rating visit www.iesna.org/PDF/Erratas/TM-15-11BugRatingsAddendum.pdf.

*** For recommended lumen maintenance factor data see TD-13. Calculated L₇₀ based on 6,000 hours LM-80-08 testing; > 150,000 hours.



CoreLine Waterproof

WT120C LED18S/840 PSU L600

Coreline Waterproof - LED Module, system flux 1800 lm - 840 neutral white - Power supply unit

Whether for a new building or renovation of an existing space, customers want lighting solutions that provide quality of light and substantial energy and maintenance savings. The new CoreLine Waterproof range of LED products can be used to replace traditional waterproof luminaires with fluorescent lamps. The process of selecting, installing and maintaining is so easy – it's a simple switch.

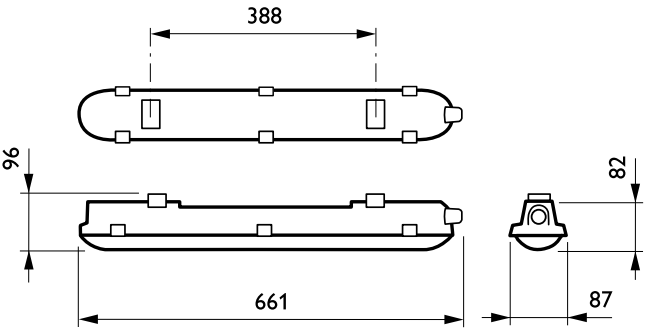
Product data

General Information		Flammability mark	
Number of light sources	1 pc	CE mark	For mounting on normally flammable surfaces
Lamp family code	LED18S [LED Module, system flux 1800 lm]	ENEC mark	CE mark
Light source color	840 neutral white	UL mark	ENEC mark
Light source replaceable	No	Warranty period	-
Number of gear units	1 unit	Constant light output	3 years + 2 years upon registration
Driver/power unit/transformer	Power supply unit	Number of products on MCB of 16 A type B	No
Driver included	Yes	RoHS mark	24
Optic type	-	Product family code	RoHS mark
Optical cover/lens type	Polycarbonate bowl/cover		WT120C [Coreline Waterproof]
Luminaire light beam spread	110°	Operating and Electrical	
Emergency lighting	-	Input Voltage	220 to 240 V
Control interface	-	Input Frequency	50 to 60 Hz
Connection	Push-in connector 3-pole	Inrush current	8 A
Cable	-	Inrush time	0.060 ms
Protection class IEC	Safety class I	Power Factor (Min)	0.9
Glow-wire test	Temperature 850 °C, duration 30 s		

CoreLine Waterproof

Controls and Dimming	
Dimmable	No
Mechanical and Housing	
Housing Material	Polycarbonate
Reflector material	Steel
Optic material	-
Optical cover/lens material	Polycarbonate
Fixation material	Stainless steel
Optical cover/lens finish	Textured
Overall length	661 mm
Overall width	87 mm
Overall height	96 mm
Approval and Application	
Ingress protection code	IP65 [Dust penetration-protected, jet-proof]
Mech. impact protection code	IK08 [5 J vandal-protected]
Initial Performance (IEC Compliant)	
Initial luminous flux (system flux)	2000 lm
Luminous flux tolerance	+/-10%
Initial LED luminaire efficacy	111 lm/W
Init. Corr. Color Temperature	4000 K
Init. Color Rendering Index	≥80
Initial chromaticy	(0.38, 0.38) SDCM <3.5
Initial input power	18 W
Power consumption tolerance	+/-10%

Dimensional drawing

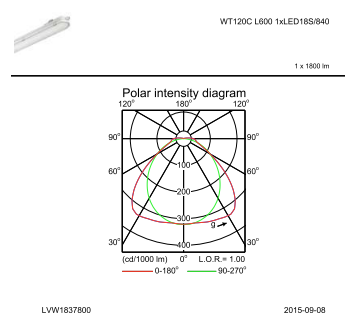
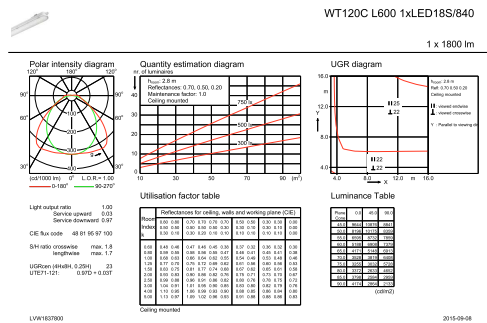


CoreLine Waterproof WT120C

Over Time Performance (IEC Compliant)	
Driver failure rate at 5000 h	1 %
Median useful life L70B50	50000 h
Median useful life L80B50	30000 h
Median useful life L90B50	15000 h
Application Conditions	
Ambient temperature range	-20 to +35 °C
Average ambient temperature	25 °C
Maximum dim level	Not applicable
Suitable for random switching	Yes (relates to presence/ movement detection and daylight harvesting)
Product Data	
Full product code	871829184045900
Order product name	WT120C LED18S/840 PSU L600
EAN/UPC - Product	8718291840459
Order code	910500453335
Numerator - Quantity Per Pack	1
Numerator - Packs per outer box	1
Material Nr. (12NC)	910500453335
Net Weight (Piece)	0.930 kg



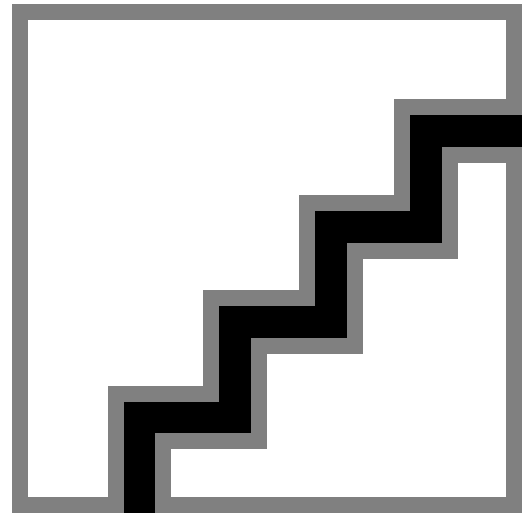
Photometric data



IFGU1_WT120C L600 1xLED18S840.EPS

IFPC1_WT120C L600 1xLED18S840.EPS





Tango G2 LED

BVP281 LED44/NW 40W 220-240V AMB

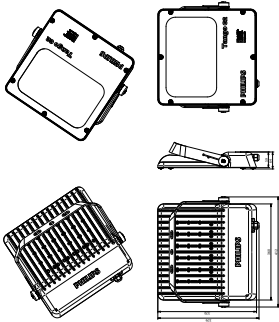
Tango G2 LED is a general purpose LED flood lighting luminaire for various lighting applications, such as area lighting, bill-board, façade, industry area, recreational sports and other general applications. The Tango G2 LED flood light incorporates LED light source, optical system, heat sink and driver into one compact housing. Its specially designed heat sink incorporates aesthetics and functionality to ensure reliability and long lifetime. Tango G2 LED takes advantage of LED technology which provides energy savings and a longer lifetime, bringing area lighting into a new era.

Product data

General Information		Initial Performance (IEC Compliant)	
Driver included	Yes	Colour Rendering Index	80
Protection class IEC	Safety class I (I)	Over Time Performance (IEC Compliant)	
CE mark	CE mark	Median useful life L70B50	50000 h
Spare parts available	Yes	Application Conditions	
Operating and Electrical		Ambient temperature range	-40 to +50 °C
Input voltage	220-240 V	Average ambient temperature	35 °C
Input frequency	50 to 60 Hz	Product Data	
Mechanical and Housing		Full product code	911401634302
Housing material	Aluminum extruded	Order product name	BVP281 LED44/NW 40W 220-240V AMB
Optic material	Polycarbonate	Order code	911401634302
Optical cover/lens material	Polycarbonate	Numerator – quantity per pack	1
Approval and Application		Numerator – packs per outer box	1
Ingress protection code	IP65 [Dust penetration-protected, jet-proof]	Material no. (12NC)	911401634302
Mech. impact protection code	IK07 [2 J reinforced]	Net weight (piece)	6.000 kg

Tango G2 LED

Dimensional drawing



Tango LED gen2 BVP281-BVP284



Obtrusive Light - Compliance Report

AS/NZS 4282 : 2019 A4-High District Brightness - Curfew

Filename: EL01 Gull Pokeno Lighting Rev A Curfew

01-Mar-20 8:33:34 AM

Illuminance

Maximum Allowable Value: 10 Lux

Calculations Tested (6):

Calculation Label	Test Results	Max. Illum.
ObtrusiveLight 25 Market Street_III_Seg1	PASS	7.3
ObtrusiveLight Great Sth Road_III_Seg1	PASS	5.4
ObtrusiveLight Great Sth Road_III_Seg2	PASS	8.2
ObtrusiveLight Great Sth Road_III_Seg3	PASS	8.3
ObtrusiveLight Great Sth Road_III_Seg4	PASS	2.9
ObtrusiveLight Great Sth Road_III_Seg5	PASS	0.9

Luminous Intensity (Cd) Per Luminaire

Maximum Allowable Value: 2500 Cd

Control Angle: 83 Degrees

Luminaire Locations Tested (13)

Test Results: **PASS**

All Luminaire Locations (13):

Lum.No.	Label	Cd	Tilt	Roll	Spin
1	F1	427	0	0	0
26	P	601	180	70	0
29	P	601	180	100	0
30	P	601	180	70	0
31	P	601	180	100	0
34	P	601	180	70	0
35	P	601	180	100	0
27	XSP2A	160	0	0	0
28	XSP2A	160	0	0	0
32	XSP2A	160	0	0	0
33	XSP2A	160	0	0	0
36	XSP2A	160	0	0	0
37	XSP2A	160	0	0	0

Luminous Intensity (Cd) At Vertical Planes

Maximum Allowable Value: 1000 Cd

Calculations Tested (6):

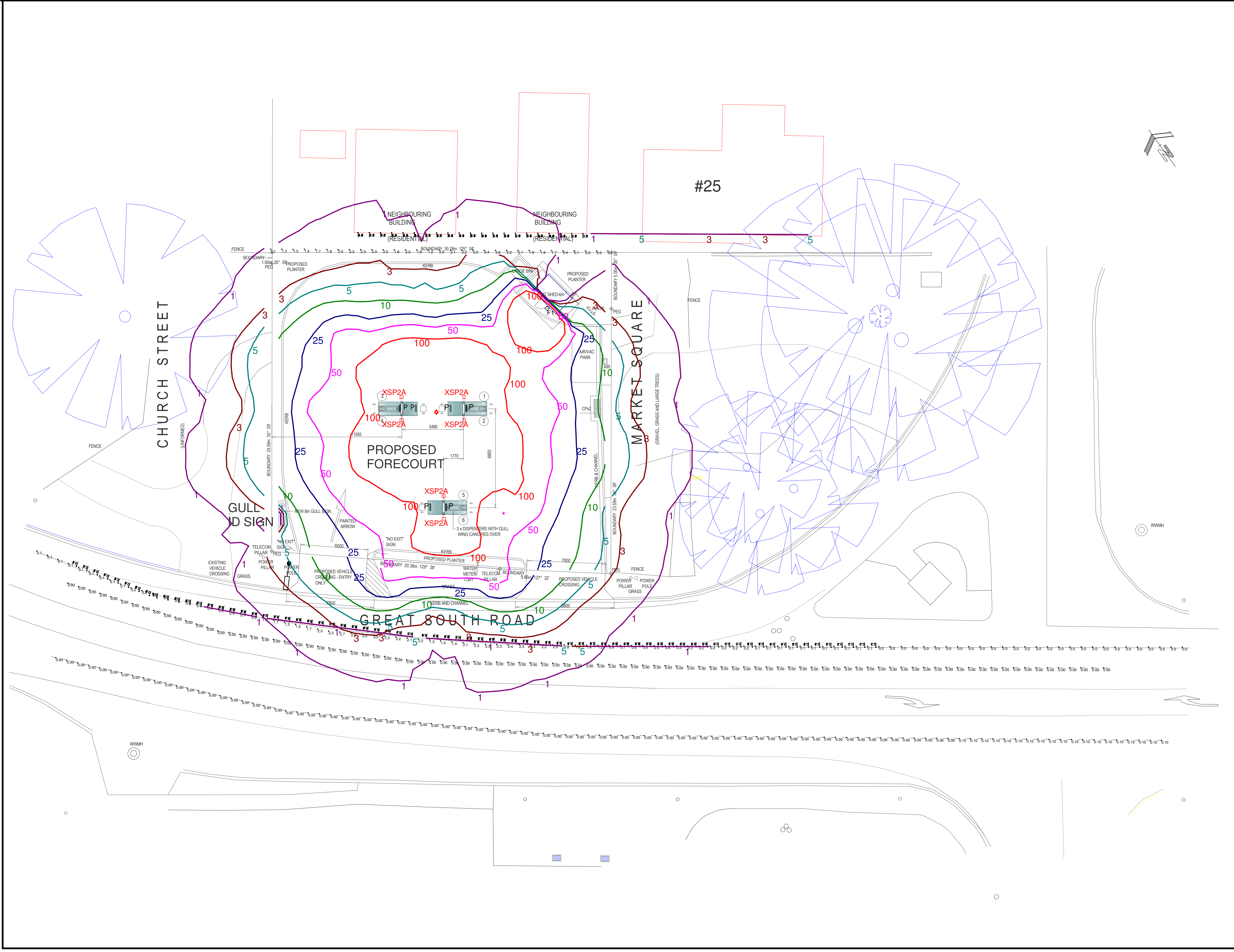
Calculation Label	Test Results
ObtrusiveLight 25 Market Street_Cd_Seg1	PASS
ObtrusiveLight Great Sth Road_Cd_Seg1	PASS
ObtrusiveLight Great Sth Road_Cd_Seg2	PASS
ObtrusiveLight Great Sth Road_Cd_Seg3	PASS
ObtrusiveLight Great Sth Road_Cd_Seg4	PASS
ObtrusiveLight Great Sth Road_Cd_Seg5	PASS

Threshold Increment (TI)

Maximum Allowable Value: 20 %

Calculations Tested (2):

Calculation Label	Adaptation Luminance	Test Results
Threshold Inc Travelling West	10	PASS
Threshold Inc Travelling East	10	PASS



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GENERAL NOTES

DESIGN BASED ON THE FOLLOWING;

FORCOURT TO GULL WING CANOPY HEIGHT VARIES
XSP2 MOUNTING HEIGHT = 4.5m

LIGHTING CALCULATIONS ARE SUBJECT TO THE ACCURACIES AND TOLERANCES IN ACCORDANCE WITH AS/NZS 3827.1 AND AS/NZS 3827.2.

THESE ACCURACIES & TOLERANCES INCLUDE VARIANCES IN ROOM DIMENSIONS AND OBSTRUCTIONS, SURFACE FINISHES, LUMINAIRE POSITIONING AND AIMING, AMBIENT TEMPERATURE, ATMOSPHERIC CONDITIONS, LUMINAIRE PHOTOMETRY, LAMP OUTPUT, LIGHTING DESIGN SOFTWARE, ELECTRICAL SUPPLY AND INSTRUMENT CALIBRATION.

ISOLINES SHOWN ARE IN GRADUATIONS OF 1, 3, 5, 10, 25, 50 & 100 LUX.

A	CONSENT ISSUE	RK	02/03/20
Rev	Amendment	Name	Date



kernConsultants

PO Box 97,
Red Beach 0945, Auckland
Mobile Phone: (+64) 021 302 336

R KERN	28/02/2020
Calculated	Date

Job Title

**GULL STATION
POKENO
CANOPY & SIGNAGE**

Sheet Title

**EXTERIOR LIGHTING
CALCULATION**

Project	3332	Calculation	EL01
File	Project\3332\3332-Calc		
Scale	1:150 @ A1	Amendment	A



TYPICAL GULL WING CANOPY
DAY TIME VIEW

Calculation Summary						
Label	CalcType	Units	Avg	Max	Min	Min/Avg
Great South Road Kerb	Illuminance	Lux	0.71	3.0	0.0	0.00
ObtrusiveLight 25 Market Stree	Obtrusive - Cd	N.A.	156.26	649	0	0.00
ObtrusiveLight 25 Market Stree	Obtrusive - Ill	Lux	1.11	7.3	0.0	0.00
ObtrusiveLight Great Sth Road_	Obtrusive - Cd	N.A.	480.80	554	322	0.67
ObtrusiveLight Great Sth Road_	Obtrusive - Cd	N.A.	212.02	684	5	0.02
ObtrusiveLight Great Sth Road_	Obtrusive - Cd	N.A.	192.37	695	5	0.03
ObtrusiveLight Great Sth Road_	Obtrusive - Cd	N.A.	208.90	441	1	0.00
ObtrusiveLight Great Sth Road_	Obtrusive - Cd	N.A.	467.35	519	416	0.89
ObtrusiveLight Great Sth Road_	Obtrusive - Ill	Lux	0.73	5.4	0.2	0.27
ObtrusiveLight Great Sth Road_	Obtrusive - Ill	Lux	1.78	8.2	0.0	0.00
ObtrusiveLight Great Sth Road_	Obtrusive - Ill	Lux	1.35	8.3	0.0	0.00
ObtrusiveLight Great Sth Road_	Obtrusive - Ill	Lux	0.46	2.9	0.0	0.00
ObtrusiveLight Great Sth Road_	Obtrusive - Ill	Lux	0.46	0.9	0.3	0.65
Site Lighting	Illuminance	Lux	73.01	307.6	0.0	0.00
Spill Lighting	Illuminance	Lux	0.93	85.4	0.0	0.00
Spill Lighting Nth Boundary	Illuminance	Lux	1.74	3.6	0.0	0.00
Threshold Inc Travelling East	Obtrusive - TI	%	0.00	0.00	0.00	N.A.
Threshold Inc Travelling West	Obtrusive - TI	%	0.02	0.10	0.00	0.00



TYPICAL GULL WING CANOPY
NIGHT TIME VIEW

Luminaire Schedule						
Symbol	Qty	Label	Arrangement	Total Lamp Lumens	LLF	Description
☐ +	6	P	SINGLE	1800	1.000	Philips CoreLine Waterproof WT120C EL Under Gull Wing Canopy
☐ -	6	XSP2A	SINGLE	N.A.	1.000	ADLT Cree 'XSP2A IP66' #BXSPA2FPA-UW 102W 5700K LED Pole Mounted Luminaire - Del
☐ *	1	F1	SINGLE	5500	1.000	Philips BVP381 LED55 WW 50W AMB GM



TYPICAL GULL MID SIGN

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GENERAL NOTES

DESIGN BASED ON THE FOLLOWING;

FORCOURT TO GULL WING CANOPY
HEIGHT VARIES
XSP2 MOUNTING HEIGHT = 4.5m

LIGHTING CALCULATIONS ARE
SUBJECT TO THE ACCURACIES AND
TOLERANCES IN ACCORDANCE WITH
AS/NZS 3827.1 AND AS/NZS 3827.2.

THESE ACCURACIES & TOLERANCES
INCLUDE VARIANCES IN ROOM
DIMENSIONS AND OBSTRUCTIONS,
SURFACE FINISHES, LUMINAIRE
POSITIONING AND AIMING, AMBIENT
TEMPERATURE, ATMOSPHERIC
CONDITIONS, LUMINAIRE PHOTOMETRY,
LAMP OUTPUT, LIGHTING DESIGN
SOTWARE, ELECTRICAL SUPPLY AND
INSTRUMENT CALIBRATION.

ISOLINES SHOWN ARE IN
GRADUATIONS OF
1, 3, 5, 10, 25, 50 & 100 LUX.

A	CONSENT ISSUE	RK	02/03/20
Rev	Amendment	Name	Date



kernConsultants

PO Box 97,
Red Beach 0945, Auckland
Mobile Phone: (+64) 021 302 336

R KERN	28/02/2020
Calculated	Date

Job Title
**GULL STATION
POKENO
CANOPY & SIGNAGE**

Sheet Title
**EXTERIOR LIGHTING
CALCULATION RESULTS**

Project	3332	Calculation	EL02
File	Projects\2020\3332\Calc		
Scale	N / A	Amendment	A