LDP Ltd
Independent Electrical & Illumination Engineers

30 September 2020

Tattico Limited

Level 10

West Plaza Tower

1-3 Albert Street

Auckland 1010

Attention: Ross Cooper

Dear Ross,

RE: RUAKAKA TRAVELLER'S CENTRE

LIGHTING ASSESSMENT OF ENVIRONMENTAL EFFECTS

As requested, we have produced an outdoor lighting design for Ruakaka Traveller's Centre, State Highway 1, Ruakaka, and assessed in terms of potential environmental effects.

The following is an explanatory report with our findings and observations against the local authority's planning rules.

1 SITE DESCRIPTION

The Ruakaka Traveller's Centre will be located on the northeastern corner of the roundabout linking State Highway 1 and State Highway 15A, and is zoned as "Rural Production Zone" in the Whangarei District Plan (operative 07 May 2007).

The site is bounded by NZTA highway designation to the west and south and rural farmland to the east and north. On the western side of the roundabout is a GAS fuel station and light commercial and industrial properties with adjacent carparking.

The adjoining properties and their zoning are as follows:

Boundary	• **Adjacent Zone**
North	• Rural Production Zone
East	• State Highway 15A
South & West	• State Highway 1

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2 LIGHTING CONCEPT DESIGN

General

Lighting calculations were undertaken for the outdoor vehicle circulation areas. Calculations exclude any existing light contribution from the highway, which borders the site on two sides.

Lighting specification for the exterior building façades and outdoor self-illuminated signage will be undertaken by others. Signage will be designed by the operator to comply with the District Plan.

Carpark & Vehicle Circulation Areas

The lighting calculations cover all outdoor vehicle circulation areas of the site, including access roads, internal circulation routes, fuel kiosk and station forecourt, carparks, and pedestrian crossing points.

The proposed lighting design complies with the requirements of AS/NZS 1158.3.1:2020 "Lighting for roads and public spaces" – category PC1, achieving maintained average illuminance levels of 14 lux throughout the car parking and circulation areas of the site.

To achieve this it is proposed to install a total of 64x area lights mounted on 47x 8m columns located throughout the site and 4x 10m columns on the access road. Exact quantities will be subject to future detailed design. All area lights proposed will be asymmetric with a distribution to deliver lighting into the site without spilling into the surrounds, installed with no tilt above the horizontal. The total overall height above ground including outreach & lights will be no more than 10m, which itself is no higher than the state highway roundabout lighting.

This type of light is appropriate for the illumination of areas such as carparks due to their asymmetric optic, providing totally downward light onto the space in order to reduce spill light and glare, whist providing good uniformity of lighting over the task area.

The column height and quantities stated are required to achieve the required illuminance level and lighting uniformity for the coverage areas with the minimum number of columns.

The columns and luminaires will generally be light coloured (plain galvanised or painted) to present a recessive appearance when viewed against the sky during the day

Pedestrian Crossing

Each pedestrian crossing location will be highlighted by a nearby luminaire.

Disabled Parking Bays

Disabled parking bays in a carpark are lit to a higher level than surrounding carpark and circulation elements, being lit to AS/NZS1158.3.1 – category PCD, or a minimum maintained illuminance of 14 lux. Dark coloured columns and lights mounted at 8m will retain consistency of appearance with the wider lighting scheme.

Fuel Pump Canopy

The area under the fuel pump canopy is lit to a higher level than the surrounding forecourt, carpark and circulation elements, being lit to an average of approximately 300 lux in accordance with the recommendations in AS/NZS 1680. All light is directed downwards onto the forecourt.

Summary

Final lighting design will be provided at a later stage for engineering approval, however this design proves feasibility to achieve compliance with the governing national standard for roads and public spaces, AS/NZS1158 and the applicable rules of the Whangarei District Plan.

3 WHANGAREI DISTRICT PLAN (operative May 2007)

The proposed lighting design had been assessed against the Whangarei District Plan (operative 03 May 2007) as follows:

RPE.2 Rural Production Environment - Landuse

Item RPE.2.3 Discretionary Activities – "Any building: a. That exceeds a maximum height of 10m."

The proposed lighting will be mounted on columns that will not exceed 10m. Hence, the proposed lighting columns will be a **Permitted Activity**.

Urban and Services – Decision Chapter – Light

LIGHT-R1 Any Activity Not Otherwise Listed in This Chapter *Activity Status : Permitted, where:* *1. Resource consent is not required under any rule of the District Plan.* *2. The activity is not prohibited under any rule of the District Plan.*	Noted.
LIGHT-R2 Any Artificial Lighting *Activity Status: Permitted, where:* *1. The artificial lighting is shielded or a suitable luminaire optic deployed, so that light emitted by the luminaire is projected below a horizontal plane running through the lowest point on the fixture as represented in LIGHT Appendix Illustration of District Wide Lighting Standard.*	All lights to be at 0° tilt to the horizontal and emit 0% upward light. Complies
2. The light is static and is not moving or flashing.	Complies.

3. Artificial lighting located in the Sport and Active Recreation Zone or the Open Space Zone complies with the AS/NZS 1158 and AS/NZS4282 standards.	Not applicable (N/A).
4. The added illuminance onto any other site or a road reserve, measured at the boundary, does not exceed the following limits:	
a. All zones (excluding the Sport and Active Recreation Zone and the Open Space Zone):	
i. Artificial lighting measured at the receiving allotment boundary with a road reserve – 15 Lux	The maximum value calculated at any road boundary is approximately 14 lux. Less than 15 lux. Complies
ii. Artificial lighting measured at the receiving allotment boundary other than with a road reserve – 10 Lux.	The maximum value calculated at any rural boundary is approximately 3.6 lux. Less than 10 lux. Complies
b. Sport and Active Recreation Zone and Open Space Zone:	
i. Artificial lighting measured at the receiving site boundary with a road reserve – 15 Lux.	N/A.
ii. Artificial lighting measured at the receiving allotment boundary with the Residential, Natural Open Space, Rural Living, Rural Village Residential and Rural (Urban Expansion) Zones – 10 Lux.	N/A.
iii. Artificial lighting measured at the receiving site boundary with all other zones – 20 Lux.	N/A.
Note: The limits identified do not apply to internal allotment boundaries where multiple allotments are held in the same ownership.	
5. The activity complies with LIGHT--REQ-1.	Noted.

Note: Any artificial road lighting, health and safety or navigational artificial lighting, and artificial lighting for mineral extraction activities in Quarrying Resource Areas is not required to comply with LIGHT-R2.	
LIGHT-R3 Any Artificial Road Lighting	N/A.
LIGHT-R4 Any Health and Safety or Navigational Artificial Lighting	N/A.
LIGHT-R5 Any Artificial Lighting for Mineral Extraction Activities in Quarrying Resource Areas	N/A.
LIGHT-R6 Any Car Parking or Loading Spaces in the City Centre, Commercial, Light Industrial, Heavy Industrial, Waterfront, Marsden Primary Centre – Town Centre South and Industry, Rural Village Centre and Rural Village Industry Zones	N/A – Rural Production Zone
LIGHT-R7 Any Subdivision	N/A
LIGHT-REQ1 Lighting Measurement	
1. Unless specified otherwise, lighting shall be measured by calculation with a proprietary lighting design programme which details the direct, horizontal and vertical plane illuminance with a maintenance factor set at 1.0 at any point and height of an adjacent property boundary.	Noted – spill lighting has been calculated in compliance with the rule.
2. The light intensity shall be measured by calculation with a proprietary lighting design programme at a height of 1.5 metres above ground level at any point on the adjacent property boundary.	Noted – light intensity has been calculated in compliance with the rule.
3. Road lighting and lighting for parks, reserves, publicly accessible /used areas and pedestrian areas shall be calculated in accordance with the methods described in the AS/NZS 1158 series of standards as listed in REF.1 Referenced Documents at REF.1.2 b. or alternative method of compliance certified in a statement by a suitably qualified and experienced professional (e.g. Chartered Professional Engineer or Independently Qualified Person).	Noted – lighting calculations have been carried out in accordance with the standard, and thereby in compliance with the rule.

Urban and Services – Notified Chapters – Signs

SI-R20 Any Illuminated Sign Visible from Beyond the Site Boundary	

Activity Status: Discretionary *Where:* *1. The sign is located within the following zones:* *a. Residential Zones* *b. Neighbourhood Centre* *c. Open Space* *d. Natural Open Space* *e. Waterfront* *f. Marsden Primary Centre-Town Centre South* *g. Airport* *h. Ruakaka Equine* *i. Rural Production* *j. Rural Living* *k. Rural Village Residential* *l. Rural (Urban Expansion)* *m. Rural Village Industry* *n. Rural Village Centre*	Noted. Signage will be developed by the operator using their standard suite of signage to ensure compliance with the with the recommendations of the district Plan and AS/NZS 4282:2019 Table 3.5 – "Maximum Average Luminance of Surfaces".

CONCLUSIONS

- In respect to spill light and glare on the surrounding environment the proposed installation complies with the rules of the Whangarei District Council (operative 07 May 2007).
- In our opinion, the added effects from the proposed lighting will be less than minor.

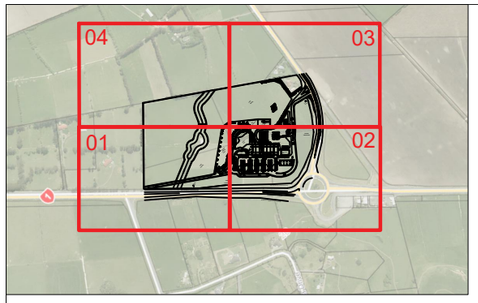
We trust that this provides you with the information that you require at this stage but please contact the writer should you need any further information or clarification.

Yours faithfully,

LDP Limited

Ben Cullen

Enclosed: Concept Lighting Drawings E01-05



LOCALITY PLAN

N

WEST BOUNDARY CALCULATION PLANE

FARM GRAZING

FARM GRAZING

ESPLANADE RESERVE

WETLAND

PICNIC + PLAY

FREEDOM CAMPING SITES

QSR 280²

swale

swale

CAMPER

GENERAL LANDSCAPING

PYLON SIGN

0.8 lx

1.5 lx

7 lx

14 lx

SOUTH BOUNDARY CALCULATION PLANE

STATE HIGHWAY 1

RESIDENCE BOUNDARY CALCULATION PLANE

LAYOUT NOTES:

DO NOT SCALE DRAWING

0 5m 10m 15m

CLIENT

REV	NOTES	DATE
A	AEE	29.09.20

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PROJECT: RUAKAKA SERVICE CENTRE - CONCEPT LIGHTING DESIGN

DRAWING: LAYOUT 01 - INITIAL LIGHTING PERFORMANCE

SCALE @ A3	DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED BY
1:1000 @ A3	LW	LW	JM	JM

PROJECT NUMBER	DRAWING NUMBER	REVISION No.
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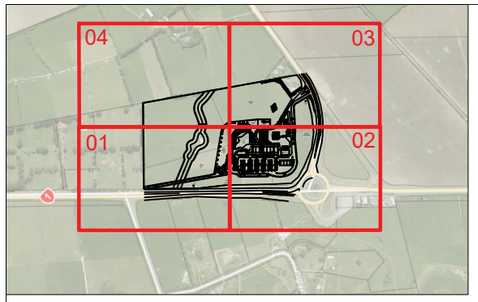

LOCALITY PLAN

DOG EXERCISE
S.S TREATMENT
WETLAND
PICNIC + PLAY
FREEDOM CAMPING SITES
QSR 280²
COACH DROP-OFF
LOADING ZONES
TRUCK ROOM
FUEL KIOSK 300M ²
CHARGE STATIONS
8 LANE FUEL CANOPY
GENERAL LANDSCAPING
PORT MARSDEN HIGHWAY
EAST BOUNDARY CALCULATION PLANE
swale
CAMPER AND TRAILER PARKING
SOUTH BOUNDARY CALCULATION PLANE
STATE HIGHWAY 1
RESIDENCE BOUNDARY CALCULATION PLANE
N
7 lx
14 lx
1.5 lx
0.8 lx

LAYOUT NOTES:

DO NOT SCALE DRAWING

0 5m 10m 15m

CLIENT

REV	NOTES	DATE
A	AEE	29.09.20

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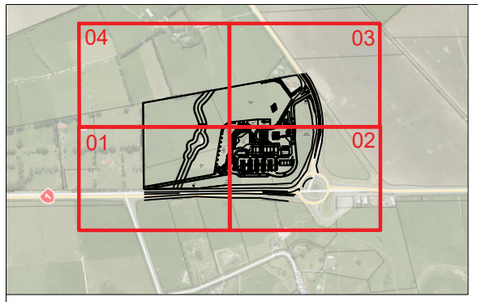
PROJECT: RUAKAKA SERVICE CENTRE - CONCEPT LIGHTING DESIGN

DRAWING: LAYOUT 02 - INITIAL LIGHTING PERFORMANCE

SCALE @ A3	DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED BY
1:1000 @ A3	LW	LW	JM	JM

PROJECT NUMBER	DRAWING NUMBER	REVISION No.
20-0123-001A	E102	A



LOCALITY PLAN

NORTH BOUNDARY CALCULATION PLANE

EAST BOUNDARY CALCULATION PLANE

PORT MARSDEN HIGHWAY

FARM GRAZING

DOG EXERCISE

S.S TREATMENT

WETLAND

PICNIC + PLAY

COACH DROP-OFF

LOADING ZONES

PYLON SIGN

GENERAL LANDSCAPING

0.8 lx

1.5 lx

7 lx

14 lx

N

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LAYOUT NOTES:

DO NOT SCALE DRAWING

0 5m 10m 15m

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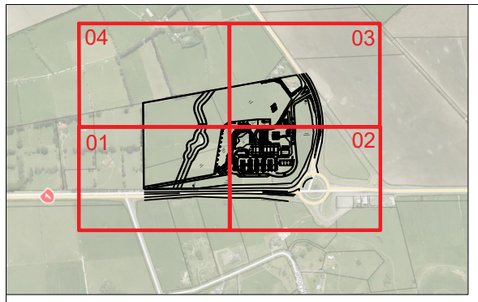
PROJECT: RUAKAKA SERVICE CENTRE - CONCEPT LIGHTING DESIGN

DRAWING: LAYOUT 03 - INITIAL LIGHTING PERFORMANCE

SCALE @ A3	DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED BY
1:1000 @ A3	LW	LW	JM	JM

PROJECT NUMBER	DRAWING NUMBER	REVISION No.
20-0123-001A	E103	A



LOCALITY PLAN

N

NORTH BOUNDARY CALCULATION PLANE

WEST BOUNDARY CALCULATION PLANE

FARM
GRAZING

FREEDOM

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LAYOUT NOTES:

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0 5m 10m 15m

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PROJECT: RUAKAKA SERVICE CENTRE - CONCEPT LIGHTING DESIGN

DRAWING: LAYOUT 04 - INITIAL LIGHTING PERFORMANCE

SCALE @ A3	DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED BY
1:1000 @ A3	LW	LW	JM	JM

PROJECT NUMBER	DRAWING NUMBER	REVISION No.
20-0123-001A	E104	A

Calculation Summary							
Scene: All							
Label	CalcType	Units	Avg	Max	Min	Min/Avg	Min/Max
Accessible Parks 1	Illuminance	Lux	26.56	34.4	20.9	0.79	0.61
Accessible Parks 2	Illuminance	Lux	27.06	32.8	24.3	0.90	0.74
Accessible Parks 3	Illuminance	Lux	22.65	24.7	20.2	0.89	0.82
Accessible Parks 4	Illuminance	Lux	18.85	24.9	16.0	0.85	0.64
Accessible Parks 5	Illuminance	Lux	18.55	28.9	13.6	0.73	0.47
Back Access Road	Illuminance	Lux	14.72	43.8	0.7	0.05	0.02
Carpark	Illuminance	Lux	16.34	67.4	3.0	0.18	0.04
Crossing 1	Illuminance	Lux	32.48	42.1	23.4	0.72	0.56
Crossing 2	Illuminance	Lux	13.23	15.9	10.9	0.82	0.69
Crossing 3	Illuminance	Lux	30.08	36.7	26.0	0.86	0.71
Crossing 4	Illuminance	Lux	29.67	36.8	24.8	0.84	0.67
Crossing 5	Illuminance	Lux	50.84	65.6	44.0	0.87	0.67
Crossing 6	Illuminance	Lux	36.86	43.2	34.3	0.93	0.79
Crossing 7	Illuminance	Lux	28.51	44.3	16.2	0.57	0.37
ObtrusiveLight_Boundary (East) C	Obtrusive - Cd	N.A.	49.69	142	2	0.04	0.01
ObtrusiveLight_Boundary (East)_C	Obtrusive - Cd	N.A.	22.70	77	1	0.04	0.01
ObtrusiveLight_Boundary (East)_C	Obtrusive - Cd	N.A.	19.55	53	1	0.05	0.02
ObtrusiveLight_Boundary (East)_C	Obtrusive - Cd	N.A.	18.25	43	1	0.05	0.02
ObtrusiveLight_Boundary (East)_C	Obtrusive - Cd	N.A.	48.33	345	1	0.02	0.00
ObtrusiveLight_Boundary (East)_C	Obtrusive - Cd	N.A.	560.00	4127	2	0.00	0.00
ObtrusiveLight_Boundary (East)_C	Obtrusive - Cd	N.A.	55.33	128	1	0.02	0.01
ObtrusiveLight_Boundary (East)_C	Obtrusive - Cd	N.A.	37.00	80	1	0.03	0.01
ObtrusiveLight_Boundary (East)_C	Obtrusive - Cd	N.A.	26.50	55	1	0.04	0.02
ObtrusiveLight_Boundary (East)_I	Obtrusive - Ill	Lux	1.30	1.67	0.87	0.67	0.52
ObtrusiveLight_Boundary (East)_I	Obtrusive - Ill	Lux	0.60	1.21	0.26	0.43	0.21
ObtrusiveLight_Boundary (East)_I	Obtrusive - Ill	Lux	0.28	0.44	0.17	0.61	0.39
ObtrusiveLight_Boundary (East)_I	Obtrusive - Ill	Lux	0.18	0.24	0.13	0.72	0.54
ObtrusiveLight_Boundary (East)_I	Obtrusive - Ill	Lux	0.28	1.20	0.13	0.46	0.11
ObtrusiveLight_Boundary (East)_I	Obtrusive - Ill	Lux	2.20	13.76	0.24	0.11	0.02
ObtrusiveLight_Boundary (East)_I	Obtrusive - Ill	Lux	0.08	0.12	0.05	0.63	0.42
ObtrusiveLight_Boundary (East)_I	Obtrusive - Ill	Lux	0.06	0.07	0.05	0.83	0.71
ObtrusiveLight_Boundary (East)_I	Obtrusive - Ill	Lux	0.07	0.09	0.05	0.71	0.56
ObtrusiveLight_Boundary (North)_	Obtrusive - Cd	N.A.	0.00	0	0	N.A.	N.A.
ObtrusiveLight_Boundary (North)	Obtrusive - Ill	Lux	0.00	0.00	0.00	N.A.	N.A.
ObtrusiveLight_Boundary (SH1)_Cd	Obtrusive - Cd	N.A.	N.A.	289	32	N.A.	N.A.
ObtrusiveLight_Boundary (SH1)_Cd	Obtrusive - Cd	N.A.	N.A.	205	23	N.A.	N.A.
ObtrusiveLight_Boundary (SH1)_Cd	Obtrusive - Cd	N.A.	N.A.	166	13	N.A.	N.A.
ObtrusiveLight_Boundary (SH1)_Cd	Obtrusive - Cd	N.A.	N.A.	119	5	N.A.	N.A.
ObtrusiveLight_Boundary (SH1)_Cd	Obtrusive - Cd	N.A.	N.A.	81	2	N.A.	N.A.
ObtrusiveLight_Boundary (SH1)_Cd	Obtrusive - Cd	N.A.	N.A.	58	1	N.A.	N.A.
ObtrusiveLight_Boundary (SH1)_Il	Obtrusive - Ill	Lux	N.A.	0.20	0.07	N.A.	N.A.
ObtrusiveLight_Boundary (SH1)_Il	Obtrusive - Ill	Lux	N.A.	0.15	0.06	N.A.	N.A.
ObtrusiveLight_Boundary (SH1)_Il	Obtrusive - Ill	Lux	N.A.	0.12	0.07	N.A.	N.A.
ObtrusiveLight_Boundary (SH1)_Il	Obtrusive - Ill	Lux	N.A.	0.15	0.09	N.A.	N.A.
ObtrusiveLight_Boundary (SH1)_Il	Obtrusive - Ill	Lux	N.A.	0.28	0.10	N.A.	N.A.
ObtrusiveLight_Boundary (SH1)_Il	Obtrusive - Ill	Lux	N.A.	0.30	0.12	N.A.	N.A.
ObtrusiveLight_Boundary (South)	Obtrusive - Cd	N.A.	1619	9473	99	0.06	0.01
ObtrusiveLight_Boundary (South)_	Obtrusive - Cd	N.A.	173.72	320	46	0.26	0.14
ObtrusiveLight_Boundary (South)_	Obtrusive - Cd	N.A.	60.76	182	3	0.05	0.02
ObtrusiveLight_Boundary (South)_	Obtrusive - Cd	N.A.	60.10	188	2	0.03	0.01
ObtrusiveLight_Boundary (South)_	Obtrusive - Cd	N.A.	39.80	87	2	0.05	0.02
ObtrusiveLight_Boundary (South)_	Obtrusive - Ill	Lux	3.09	33.25	0.19	0.06	0.01
ObtrusiveLight_Boundary (South)_	Obtrusive - Ill	Lux	0.26	0.38	0.19	0.73	0.50
ObtrusiveLight_Boundary (South)_	Obtrusive - Ill	Lux	0.53	0.87	0.23	0.43	0.26
ObtrusiveLight_Boundary (South)_	Obtrusive - Ill	Lux	0.86	1.02	0.65	0.76	0.64
ObtrusiveLight_Boundary (South)_	Obtrusive - Ill	Lux	0.93	1.27	0.62	0.67	0.49
ObtrusiveLight_Boundary (West)_	Obtrusive - Cd	N.A.	49.47	1208	0	0.00	0.00
ObtrusiveLight_Boundary (West)_	Obtrusive - Ill	Lux	0.13	3.56	0.00	0.00	0.00
ObtrusiveLight_TI_East SH1	Obtrusive - TI	%	N.A.	10	0	N.A.	N.A.
ObtrusiveLight_TI_North SH15	Obtrusive - TI	%	N.A.	1	0	N.A.	N.A.
ObtrusiveLight_TI_South SH15	Obtrusive - TI	%	N.A.	0	0	N.A.	N.A.
ObtrusiveLight_TI_West SH1	Obtrusive - TI	%	N.A.	1	0	N.A.	N.A.
Overall	Illuminance	Lux	N.A.	549.0	0.0	N.A.	N.A.
Service Station	Illuminance	Lux	343.69	551.3	0.4	0.00	0.00
Service Station Vertical	Illuminance	Lux	164.78	184.3	143.0	0.87	0.78
Service Station Vertical_1	Illuminance	Lux	80.00	117.2	54.4	0.68	0.46
Truck Ped Crossing	Illuminance	Lux	28.99	57.5	16.3	0.56	0.28

LAYOUT NOTES:

DO NOT SCALE DRAWING

0 5m 10m 15m

CLIENT

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A	AEE	29.09.20

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PROJECT: RUAKAKA SERVICE CENTRE - CONCEPT LIGHTING DESIGN

DRAWING: CALCULATIONS RESULTS - INITIAL LIGHTING PERFORMANCE

SCALE @ A3	DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED BY
1:1000 @ A3	LW	LW	JM	JM

PROJECT NUMBER	DRAWING NUMBER	REVISION No.
20-0123-001A	E105	A