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Sports Lighting | Sustainable Energy | Electrical Services | Construction Projects

Cricket Victoria
Junction Oval Sports Lighting
Development Approval Technical Report | 2024

16 December 2024

Cricket Victoria
CitiPower Centre - Junction Oval
Lakeside Drive
St Kilda VIC 3182

Attention: Shaun Graf

RE: Cricket Victoria Junction Oval Sports Lighting

Dear Shaun

CME takes much pleasure in submitting the detailed drawings and documentation for the Sports Lighting project at Junction Oval – Cricket Victoria and as further detailed below.

We trust that our submission addresses all the required criteria. Should you have any questions or require any further information, please don't hesitate to contact me.

Yours sincerely

Chris Mattner
Chief Executive Officer
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E: cmattner@cmegroup.com.au

Contents

Specifications and Drawings

Specification: LCE-101565-T1 Electrical Specification

Drawings:

Drawing No.	Rev No.	Drawing No.	Rev No.
Electrical Infrastructure Design		**Sports Lighting Engineering**	
LCE101565-E000	C1	Signify final lighting design	8
LCE101565-E001	C1		
LCE101565-E002	C1	**Structural Engineering**	
LCE101565-E003	C1	244071-TTW-DR-ST-0001 GENERAL NOTES	P1
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LCE101565-E007	C1	**Geotechnical Engineering Report**	
LCE101565-E100	C1	24.0223.01_CV Junction Oval_GIR	v1f
LCE101565-E.TOD			

Scope of Works

Project Specific Qualifications included in our offer:

- Design and Engineering
  - Full documentation and technical support.
  - O&M Manuals and As-Installed documentation.
- Civil Works
  - As per electrical infrastructure drawing.
  - Pile Cap and Pile footings for light towers.
  - Open trench/Directional drilling and re-instatement.
- Electrical
  - Design, supply and install 1 x new Site Main Switchboard (SMSB).
  - Design, supply and install 4 x new Sports Lighting Light Tower Distribution boards (DB.LT1-DB.LT4).
  - Supply and install submains to suit each distribution board load requirements.
  - Commissioning, testing and verification of installation.
- Sports Lighting
  - Supply and install LED Sports Lighting luminaires as per designs supplied by CME.
  - Supply and install powder-coated light towers as per designs supplied by CME.
  - All LED drivers to be housed back-to-back in each light tower Distribution Board cabinets.
  - Installation of anaconda gland onto the luminaire junction box.
  - Installation of anaconda mechanical protection over the new luminaire wiring from headframe. exit point into the anaconda gland on the luminaire junction box.
  - Lightning protection earthing system at the base of each light tower.
  - Aiming and angling of each luminaire as per sports lighting engineering.
  - Commissioning, testing, and verifying performance auditing of the Sports Lighting system.

    * A night performance audit can be scheduled with a broadcaster or a verification report can be issued to the broadcaster.
- Lighting Control System
  - Maximum control of each luminaire.
  - Cabling, installation, certification and testing of system.
  - Connection into new fibre network.
- Fibre Network
  - Design and installation of professional sports field fibre network.
  - 12core fibre connection from new fibre network section in each Light Tower Distribution Board (DB.LT1-DB.LT4) to existing main communication cabinet.
  - Integration with Lighting Control System.
  - Cabling, installation, certification and testing of system.

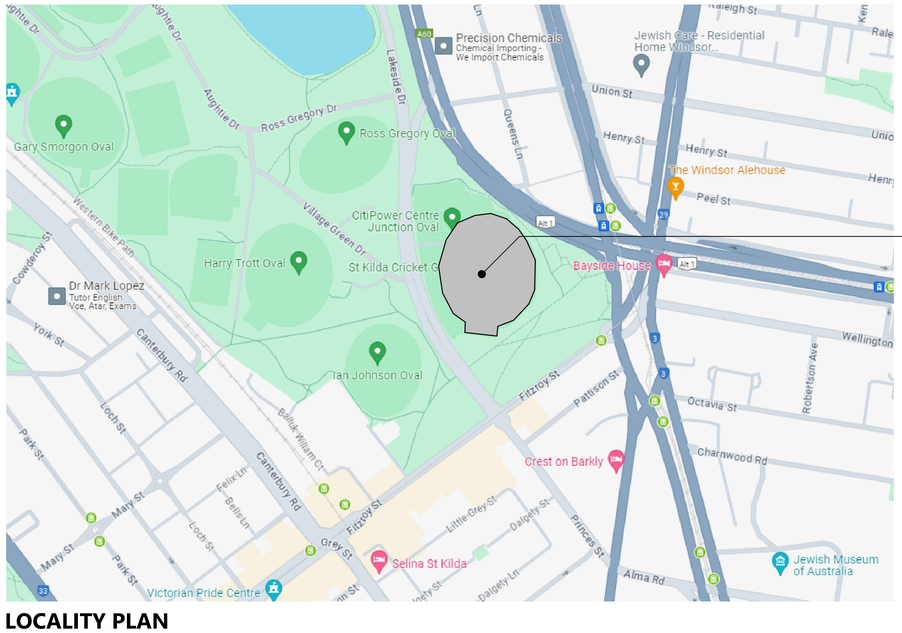
Electrical Infrastructure Design

JUNCTION OVAL SPORTSLIGHTING ECI

LAKESIDE DRIVE, ST KILDA VIC 3182

ELECTRICAL SERVICES

DRAWING INDEX



AREA OF WORKS.

LOCALITY PLAN

NOT TO SCALE
FOR INFORMATION ONLY

REV'N	DESCRIPTION	DATE	CHK'D
C1	ISSUED FOR CONSTRUCTION	31.01.25	PC

FOR CONSTRUCTION

TO BE PRINTED IN COLOUR

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ELECTRICAL CONSULTANT

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PROJECT
JUNCTION OVAL SPORTSLIGHTING ECI
LAKESIDE DRIVE, ST KILDA VIC 3182
ELECTRICAL SERVICES

DRAWING
COVER SHEET, DRAWING INDEX AND LOCALITY PLAN

DRAWING IS INTENDED TO CAPTURE THE SCOPE ONLY AND IS NOT TO REPLACE WORKSHOP DRAWINGS. WORKSHOP DRAWINGS SHALL BE PRODUCED BY THE TRADE FROM WHICH FINAL COORDINATION AND CONSTRUCTION ACTIVITIES SHALL OCCUR. VERIFY DIMENSIONS AND LEVELS ON SITE BEFORE SETTING OUT. DO NOT SCALE FROM DRAWING. REFER TO FIGURED DIMENSIONS - IN mm UNLESS OTHERWISE STATED.

Scale	Drawn: RS	Date
NTS	Design: BJ	JAN 2025
	Review: PC	

Orig. Size	Drawing no.	Revision
A1	LCE101565-E000	C1

LEGEND OF SYMBOLS

LUMINAIRES

LTx — LIGHT TOWER 1, 2, 3 AND 4.

POWER

KIOSK SUB-STATION

ELECTRICAL CABLE PIT.

SB — SWITCHBOARD.

MSB — MAIN SWITCHBOARD.

COMMUNICATIONS

COMMUNICATIONS CABLE PIT.

VARIOUS LINETYPES

E — E — UNDERGROUND ELECTRICAL CONDUIT.

C — C — UNDERGROUND COMMUNICATIONS CONDUIT.

/ // /// — SINGLE PHASE, TWO PHASE, OR THREE PHASE.

EXISTING SERVICES LINE TYPE.

SCHEMATICS

CIRCUIT BREAKER.

SWITCH.

AIR CIRCUIT BREAKER (WITHDRAWABLE).

BUSBAR LINK (NORMALLY OPEN OR CLOSED AS SHOWN).

FUSE CARTRIDGE.

60kA / N — SURGE PROTECTION WITHOUT MEN LINK.

KIOSK SUB-STATION.

CURRENT TRANSFORMER.

PMU / kWh — POWER MONITORING UNIT.

ELECTRICITY kWh METER (ELECTRICITY RETAILER).

N — NEUTRAL & EARTH.

E — EARTH.

BUSBAR.

JOIN.

CABLE.

SWITCHGEAR ENCLOSURE.

MISCELLANEOUS

200A / 400A — DEVICE RATED AT 400A, SET AT 200A

CONDUIT SIZING AND TYPE

1 E 50 (E)

- (E) DENOTES EXISTING, (N) DENOTES NEW
- DIAMETER OF CONDUIT
- SERVICES TYPE
- E - DENOTES ELECTRICAL SERVICES
- C - DENOTES COMMUNICATION SERVICES
- No. OF

CABLE SIZING AND TYPE

2 x 4 x 1C 25mm² Cu/X-90/PVC + ECC

TVd = 5.3% PHASE TO PHASE

- NO. OF GROUPS
- NO. OF CORES
- NO. CORES PER CABLE
- CONDUCTOR SIZE
- CONDUCTOR MATERIAL
- INSULATION CODE/TYPE (AS PER AS/NZS 3008
- SHEATH TYPE
- EARTH CONDUCTOR
- TOTAL VOLTAGE DROP

ELECTRICAL SCOPE OF WORKS

1. NOT USED.
2. NOT USED.
3. SUB-MAINS TO LIGHT TOWER SWITCHBOARDS.
4. FOUR (4) LIGHT TOWER SWITCHBOARDS COMPLETE WITH CONCRETE PLINTH. COLOUR TO BE CUSTOM, TO BE ADVISED. AN MEN AND EARTH STAKE IS TO BE FITTED TO THESE SWITCHBOARDS. PROTECT THE EXPOSED EARTH CONDUCTOR AND STAKE WITH 2MM 'TOP HAT'. FAN FORCED VENTILATION IS REQUIRED FOR THE COMPARTMENT HOUSING THE CONTROL GEAR.
5. NETWORKED LIGHTING CONTROL SYSTEM WILL BE DESIGNED BY ANOTHER DESIGNER BUT THE ELECTRICAL WORKS ARE TO INCLUDE ALL PIT AND PIPE TO SUIT.
6. LIGHTING FINAL SUB-CIRCUITS (2C+E 4.0MM2). INCLUDE FOR "ANACONDA FLEXIBLE METALLIC CONDUIT" WHEN CABLES ARE EXPOSED ON THE LIGHT POLE HEADFRAME.
7. AS WELL, ALL FOUR (4) LIGHT TOWER SWITCHBOARDS SHALL EACH BE FITTED WITH A 2-POLE SWITCH THAT ISOLATES THE DALI-2 BUS AND ALLOWS THE SPORTSLIGHTING CONTROL GEAR TO REVERT TO 100% ON WHEN 240V IS SUPPLIED TO THE CONTROL GEAR. THIS SWITCH SHALL BE MOUNTED TO THE ESCUTCHEON.
8. EARTHING SYSTEMS IN ACCORDANCE WITH AS/NZS 3000
9. ITP'S & CRITICAL WORKS PLANS FOR ALL OPERATING SYSTEMS.
10. PROVISION OF ALL HOISTING AND ACCESS EQUIPMENT REQUIRED TO INSTALL ALL SYSTEMS.
11. PROVISION OF TRAINING OF MAINTENANCE STAFF FOR ALL SYSTEMS.
12. TESTING AND COMMISSIONING OF THE ABOVE SYSTEMS.
13. MAINTENANCE AND SERVICING, DEFECTS LIABILITY AND WARRANTY FOR 12 MONTHS FROM THE DATE OF PRACTICAL COMPLETION.
14. INSTALLATION AND OPERATING MANUALS, AND AS-CONSTRUCTED DRAWINGS.

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PROJECT

JUNCTION OVAL SPORTSLIGHTING ECI
LAKESIDE DRIVE, ST KILDA VIC 3182
ELECTRICAL SERVICES

DRAWING

LEGEND OF SYMBOLS

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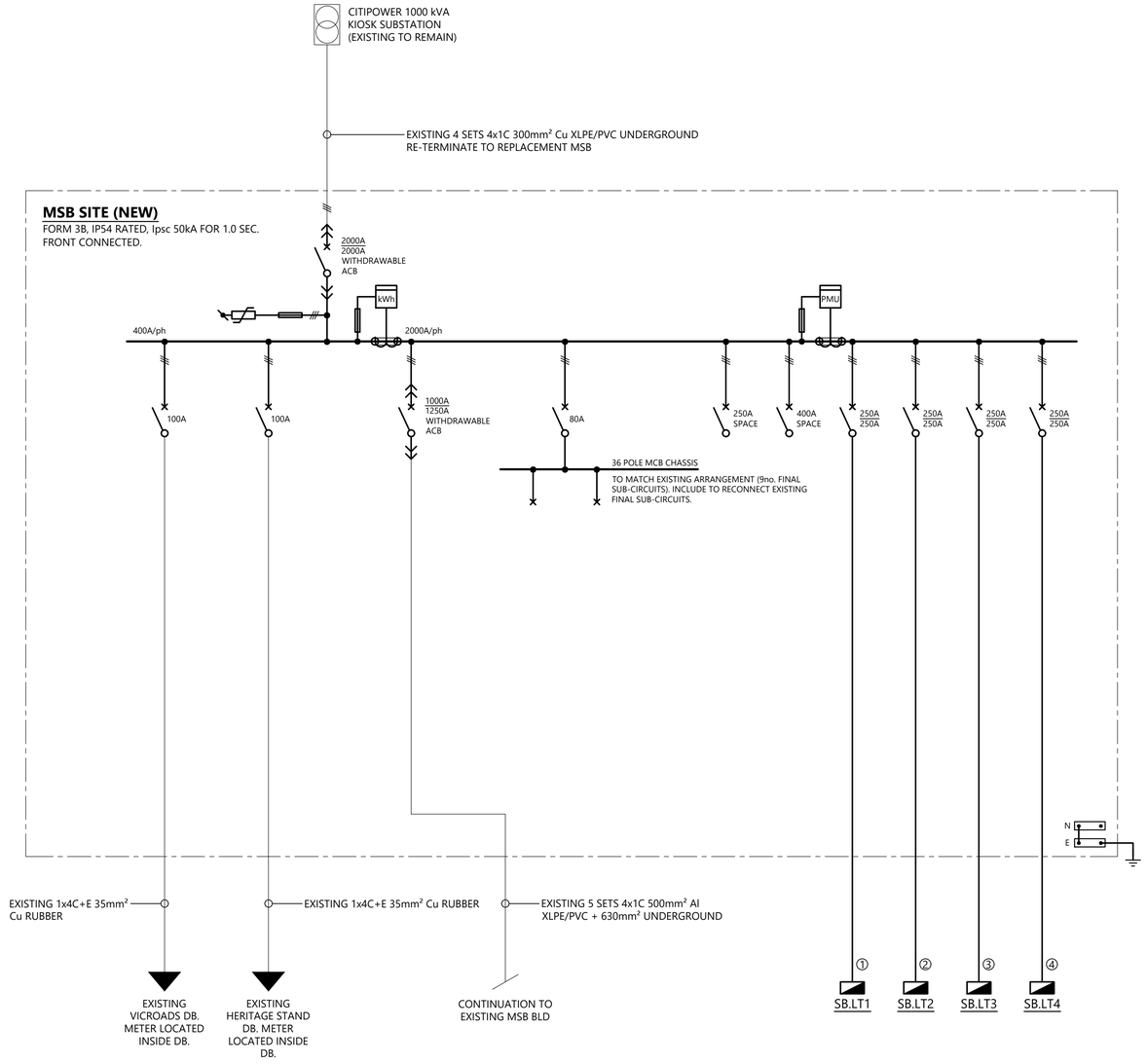
A1	LCE101565-E001	C1



MAIN SWITCHBOARD SINGLE LINE DIAGRAM

NEW MSB REPLACES EXISTING
NOT TO SCALE

NOTES:

1. ALL CIRCUIT BREAKERS 80A<250A ARE MCCB WITH ADJUSTABLE MAGNETIC TRIP SETTING.
2. ALL CIRCUIT BREAKERS 250A<1000A ARE MCCB WITH ELECTRONIC TRIP UNITS.
3. ALL CIRCUIT BREAKERS > 1000A ARE WITHDRAWABLE AIR CIRCUIT BREAKERS WITH 5.0 MICROTRIP PROTECTION FEATURES.

CABLE SCHEDULE

Reference	From	To	Design Load (amps / ph)	Approximate Cable Length (m)	Cable Size using Copper	Conduit size using Copper	Cable Size using Aluminium	Conduit Size using Aluminium	Notes
1	MSB SITE	SB. LT1	190	207	4x1c 185mm² Cu XLPE/PVC	1E100	4x1c 300mm² Al XLPE/PVC	1E125	-
2	MSB SITE	SB. LT2	190	204	4x1c 185mm² Cu XLPE/PVC	1E100	4x1c 300mm² Al XLPE/PVC	1E125	-
3	MSB SITE	SB. LT3	190	125	4x1c 120mm² Cu XLPE/PVC	1E100	4x1c 185mm² Al XLPE/PVC	1E100	-
4	MSB SITE	SB. LT4	190	119	4x1c 120mm² Cu XLPE/PVC	1E100	4x1c 185mm² Al XLPE/PVC	1E100	-

NOTES

1. CABLE SIZES ARE BASED ON A DESIGN LOAD OF 190A/ph AT EACH LIGHT TOWER SWITCHBOARD.

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ELECTRICAL SERVICES

DRAWING
SINGLE LINE DIAGRAM

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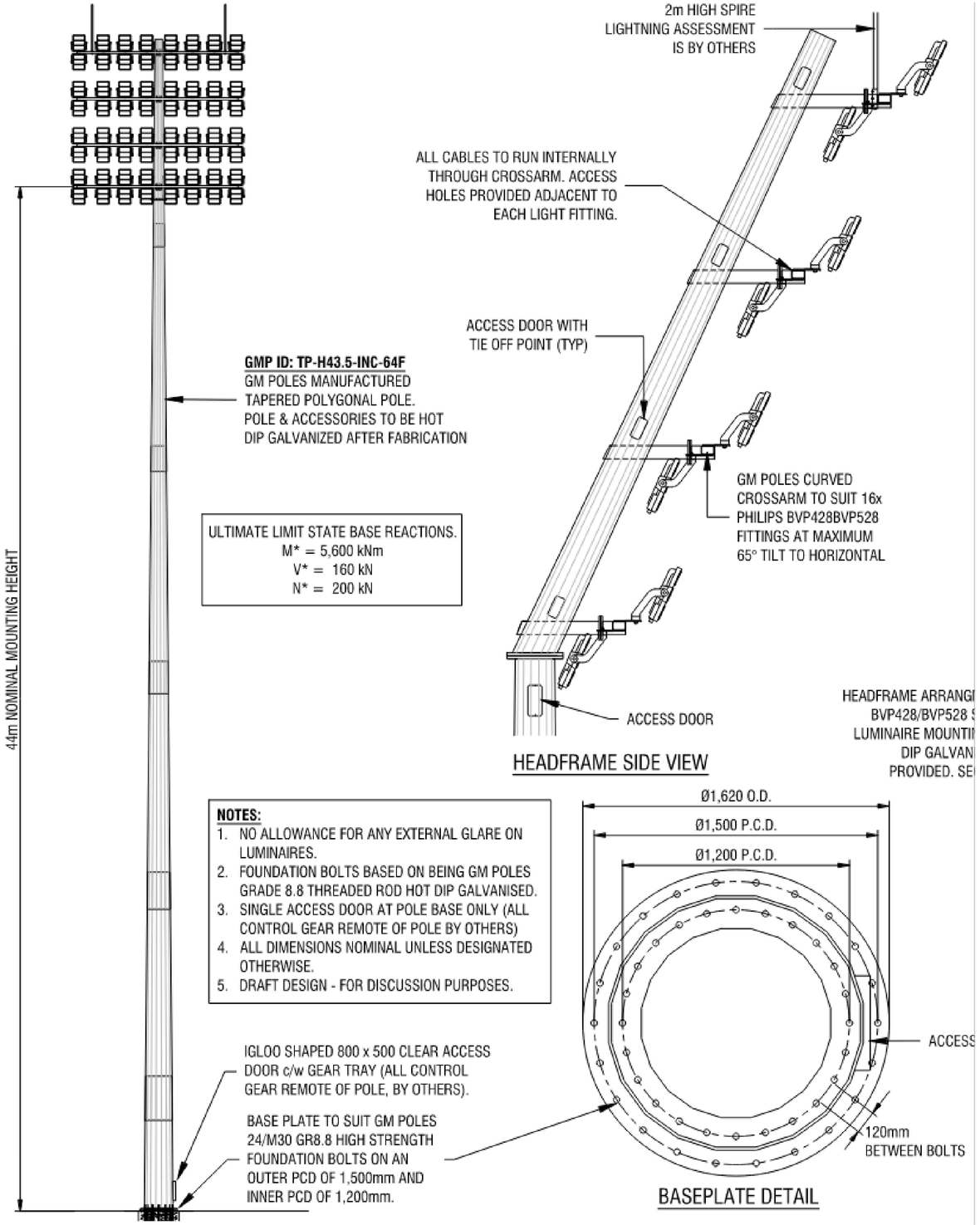

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DRAWING

LIGHT TOWER DETAILS

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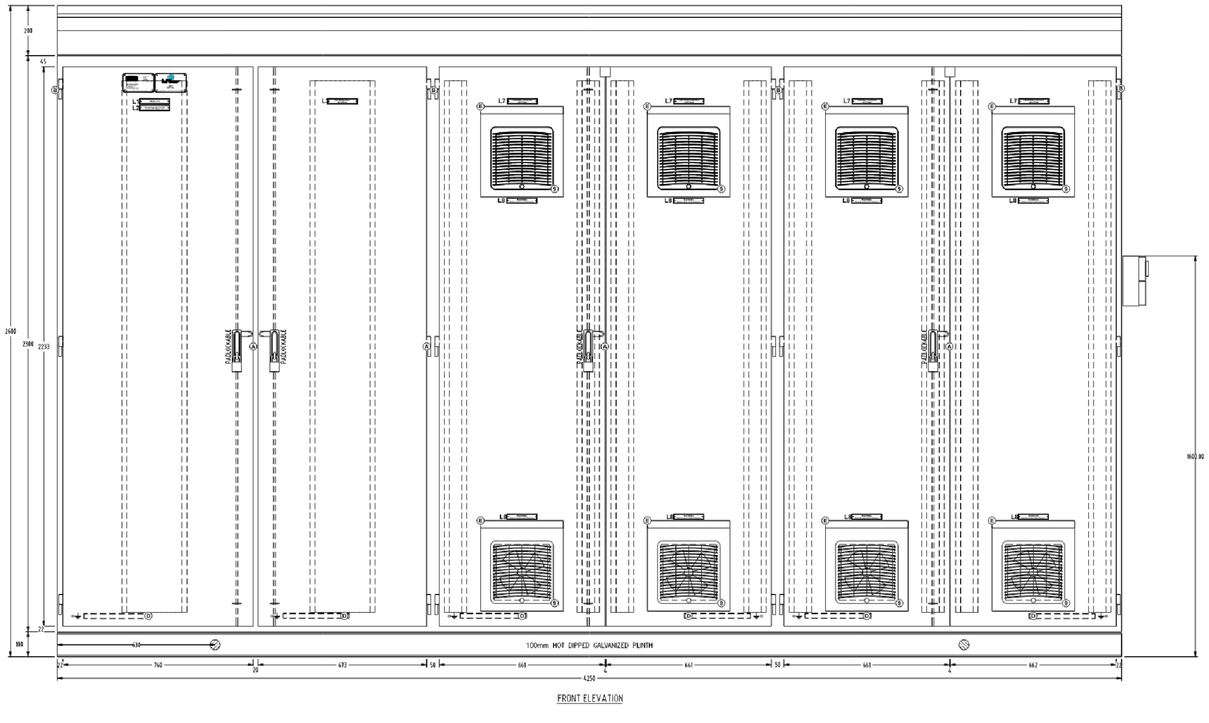
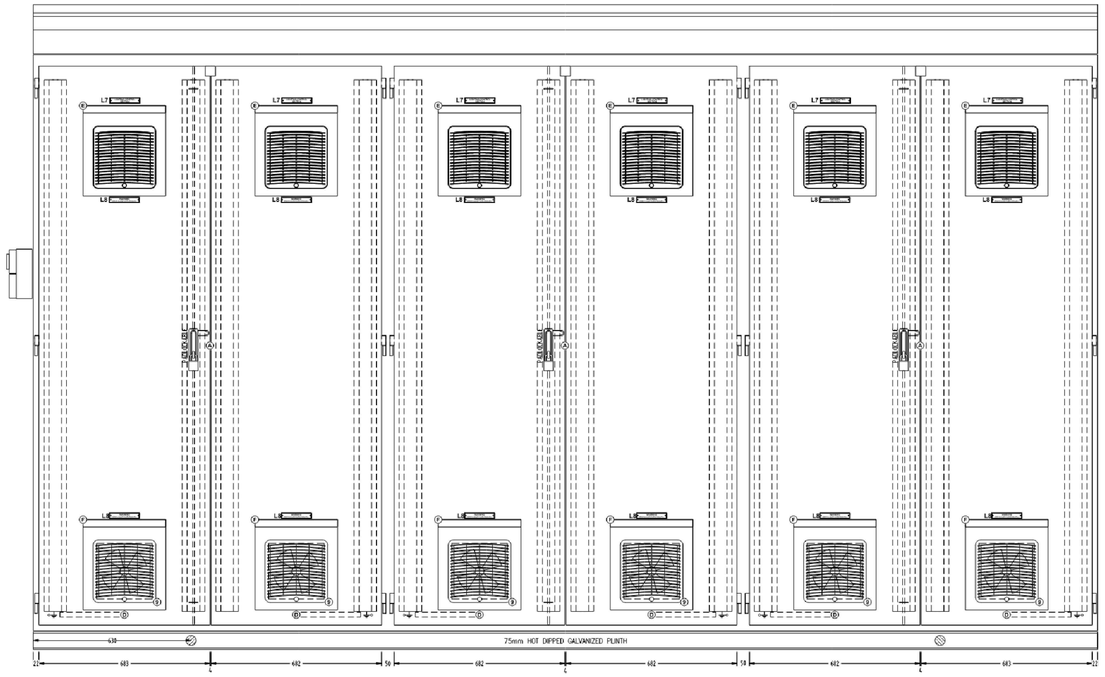


FRONT ELEVATION



REAR ELEVATION

CONSTRUCTION NOTES				
CONSTRUCTION	MACHINE FORMED AND WELDED			
CABLE ENTRY	MAINS IN: BOTTOM SUBMAINS OUT: BOTTOM			
MATERIAL	CABINET	1.6mm ZINC ANNEAL MILD STEEL		
	DOORS	1.6mm ZINC ANNEAL MILD STEEL		
	ESCUTCHEONS	1.6mm ZINC ANNEAL MILD STEEL		
	EQUIPMENT PANELS	1.6mm ZINC ANNEAL MILD STEEL		
	PLINTH	100x50mm GR300 HOT ROLLED PARALLEL FLANGE CHANNEL		
DEGREE OF PROTECTION	INGRESS	IP56		
	SEGREGATION	FORM 3Bb (AS/NZ 61439.1:2016)		
	DOOR SEAL	TESA 4773 25x6mm PVC/NITRILE CLOSED-CELL FOAM (SUITABLE -28°C TO 79°C)		
	GLAND PLATE SEAL	TESA 66283 12x3mm MEDIUM-HARD PVC CLOSED-CELL FOAM (SUITABLE -35°C TO 90°C)		
BUS RATING	CURRENT	400A		
	FAULT	25kA FOR 1 SECOND		
WIRING	POWER COLOURS	400/230V AC	PHASE: RED, WHITE, BLUE	NEUTRAL: BLACK
	CONTROL COLOURS	230V AC	ACTIVE: WHITE	NEUTRAL: BLACK
		110V AC	ACTIVE: GREY	NEUTRAL: BLACK
		<32V AC	ACTIVE: ORANGE	NEUTRAL: BLACK
		48V DC	POSITIVE: PINK	NEGATIVE: GREY
		<32V DC	POSITIVE: BROWN	NEGATIVE: GREY
		VOLT FREE	ORANGE	
		INSTRUMENT	PINK	
FINISH	CABINET & DOORS	ROUGH SURFACES FILED, CLEAN, DEGREASE, GRIND SMOOTH. PRIME ALL CUT EDGES AND GROUND SURFACES WITH DULUX ZINC RICH IP PRIMER. OVEN BAKED POWDER COATED		
	PANELS	ROUGH SURFACES FILED, CLEAN, DEGREASE, GRIND SMOOTH. OVEN BAKED POWDER COATED		
	PLINTH	HOT DIP GALVANISED		
COLOUR	CABINET	<<TBA>>		
	DOORS	<<TBA>>		
	ESCUTCHEONS	"NEW BRIGHT WHITE" RIPPLE		
	EQUIPMENT PANELS	"NEW BRIGHT WHITE" RIPPLE		
	RAILS / TOP HATS	NATURAL GALVANISE		
	PLINTH	NATURAL GALVANISE		
LABELS	MATERIAL	ROWMARK LASERMAX 2 PLY ACRYLIC		
	FIXING	EXTERNAL: STAINLESS STEEL SCREWS INTERNAL: DOUBLE SIDED TAPE		
	COLOURING	WHITE WITH BLACK ENGRAVING (W B W) FOR STANDARD LABELS RED WITH WHITE ENGRAVING (R W R) FOR WARNING, DANGER AND MAIN SWITCH LABELS		

HARDWARE LIST				
REF	ITEM DESCRIPTION	MANUFACTURER	QTY	ITEM No
(A)	CHROME PLATED PADLOCKABLE SWING HANDLE 3 POINT CAM LOCKING ROD WITH EYE - 1100mmL	SELECTLOK SELECTLOK SELECTLOK	7 7 14	1107SCD04 1000-1500 R001100E
(B)	CHROME PLATED BRASS BLOCK HINGE	SELECTLOK	36	HB650NS-E
(C)	STAINLESS STEEL A4 LEGEND CARD HOLDER	LAI	1	LAI-A4-LEGEND
(D)	AUTO DOOR STAY - STANDARD	LAI	12	LAI-DS-AUTO-STD
(E)	IP56 FAN/FILTER COVER 200-250MM	LAI	20	COVER56-250

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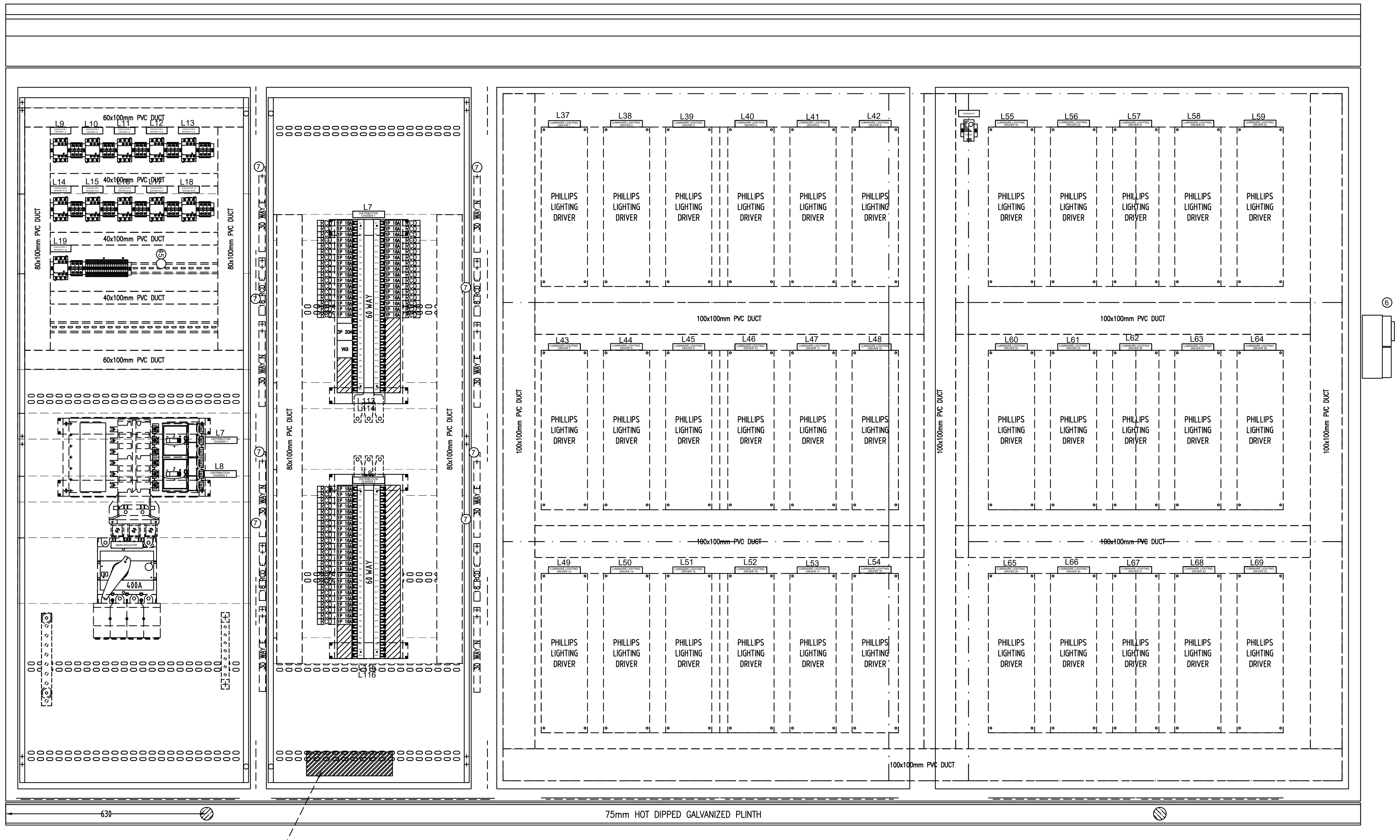
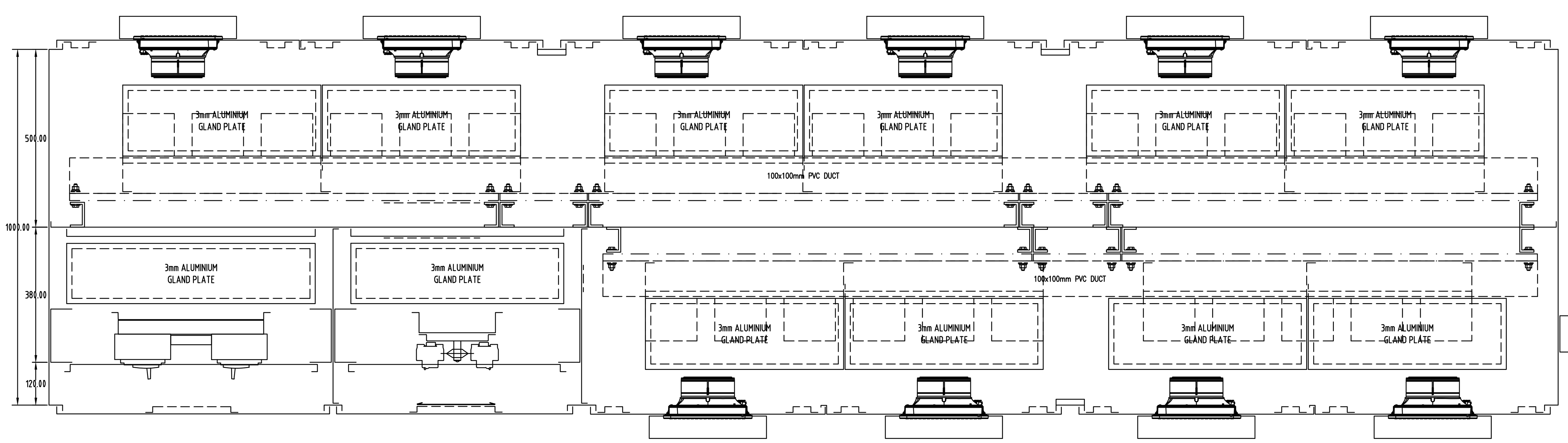
ELECTRICAL SERVICES

DRAWING
LIGHT TOWER SWITCHBOARD DETAILS
SHEET 1 OF 4

Scale	Drawn: RS	Date
NTS	Design: BJ	JAN 2025
	Review: PC	
Orig. Size	Drawing no.	Revision
A1	LCE101565-E004	C1



FRONT ELEVATION



SECTION VIEW A-A

L1 DB.SL.LT2
L2 INCOMER SECTION
L3 DISTRIBUTION SECTION
L4 LIGHTING CONTROL SECTION x5
L5 WARNING REMOVE & CLEAN FILTERS REGULARLY x20
L6 MAIN ISOLATOR
L7 DISTRIBUTION CHASSIS 1 x2
L8 DISTRIBUTION CHASSIS 2 x2
L9 CONTACTOR 1 DRIVERS 1-3
L10 CONTACTOR 2 DRIVERS 4-6
L11 CONTACTOR 3 DRIVERS 7-9
L12 CONTACTOR 4 DRIVERS 10-12
L13 CONTACTOR 5 DRIVERS 13-15
L14 CONTACTOR 6 DRIVERS 16-18
L15 CONTACTOR 7 DRIVERS 19-21
L16 CONTACTOR 8 DRIVERS 22-24
L17 CONTACTOR 9 DRIVERS 25-27
L18 CONTACTOR 10 DRIVERS 28-30
L19 CONTACTOR 11 DRIVERS 31-33
L20 CONTACTOR 12 DRIVER 34-36
L21 CONTACTOR 13 DRIVERS 37-39
L22 CONTACTOR 14 DRIVERS 40-42
L23 CONTACTOR 15 DRIVERS 43-45
L24 CONTACTOR 16 DRIVERS 46-48
L25 CONTACTOR 17 DRIVERS 49-51
L26 CONTACTOR 18 DRIVERS 52-54
L37 LUMINAIRE LIGHTING DRIVER 1
L38 LUMINAIRE LIGHTING DRIVER 2
L39 LUMINAIRE LIGHTING DRIVER 3
L40 LUMINAIRE LIGHTING DRIVER 4
L41 LUMINAIRE LIGHTING DRIVER 5
L42 LUMINAIRE LIGHTING DRIVER 6
L43 LUMINAIRE LIGHTING DRIVER 7
L44 LUMINAIRE LIGHTING DRIVER 8
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L85 LUMINAIRE LIGHTING DRIVER 49
L86 LUMINAIRE LIGHTING DRIVER 50
L87 LUMINAIRE LIGHTING DRIVER 51
L88 LUMINAIRE LIGHTING DRIVER 52
L89 LUMINAIRE LIGHTING DRIVER 53
L90 LUMINAIRE LIGHTING DRIVER 54
L91 20A GPO FED FROM RWB7

L113 R11 O W11 B11 R12 W12 B12 R13 W13 B13 R14 W14 B14 R15 W15 B15 R16 W16 B16 R17 W17 B17 R18 W18 B18 R19 W19 B19 R20 W20 O B20
L114 R1 O W1 B1 R2 W2 B2 R3 W3 B3 R4 W4 B4 R5 W5 B5 R6 W6 B6 R7 W7 B7 R8 W8 B8 R9 W9 B9 R10 W10 O B10
L115 R31 O W31 B31 R32 W32 B32 R33 W33 B33 R34 W34 B34 R35 W35 B35 R36 W36 B36 R37 W37 B37 R38 W38 B38 R39 W39 B39 R40 W40 O B40
L116 R21 O W21 B21 R22 W22 B22 R23 W23 B23 R24 W24 B24 R25 W25 B25 R26 W26 B26 R27 W27 B27 R28 W28 B28 R29 W29 B29 R30 W30 O B30

EQUIPMENT LIST

REF.	ITEM DESCRIPTION	MANUFACTURER	QTY.	ITEM No.
1	3P 400A LOAD BREAK SWITCH INS400	SCHNEIDER	1	31110
	INS320-630 SHORT TERMINAL SHROUD	SCHNEIDER	1	LV432592
	INS320-630 LONG TERMINAL SHROUD	SCHNEIDER	1	LV432594
	630A 3P SPREADER KIT 52.5mm (ONE SET)	LAI	1	LAI-SPDR-630A-3P-52.5
2	630A 12 WAY TOP/BOTTOM FED CB CHASSIS	SCHNEIDER	1	CNSXA12DS
	3P 250A 25kA NSX250B TM250D CB	SCHNEIDER	2	LV431110 / C25B3TM250
	NSX100-250 3P SHORT TERMINAL SHROUD	SCHNEIDER	2	LV429515
	NSX100-250 3P LONG TERMINAL SHROUD	SCHNEIDER	2	LV429517
3	250A 60 WAY C60 CIRCUIT BREAKER CHASSIS	SCHNEIDER	2	SAU25060183
	1P 16A 6kA iC60N RCD CB	SCHNEIDER	54	A9D61816
	3P 20A 6kA iC60N CB	SCHNEIDER	1	A9F44320
45	9kW 18A 3P CONTACTOR 240VAC COIL	SCHNEIDER	18	LC1D18U7
	16mm2 UT16 SCREW TERMINALS GREY	PHOENIX	54	3044199
	END COVER D-UT16 FOR 16mm2 UT16	PHOENIX	19	3047206
	4mm2 PT4 PUSH IN TERMINALS GREY	PHOENIX	36	3211757
	END COVER D-ST4 FOR 4mm2 PT4	PHOENIX	2	3030420
	END CLAMP	PHOENIX	76	3022218
6	56 SERIES 20A OUTLET WAITING ON DETAILS	SCHNEIDER	1	TBA
7	18 WAY BRASS BAR	SELECTLOK	4	B12018IX
	30 WAY BRASS BAR	SELECTLOK	8	B12030IX
	INSULATED FEET FOR BRASS BAR	SELECTLOK	16	BISEL
60	THERMOSTAT 1xN/O COOLING "BLUE"	SPC	3	KTS 011
	IP54 250mm GRILL AND FILTER	PHOENIX	10	PV2000BPB
	IP54 250mm 230m/h FAN AND FILTER 230VAC	PHOENIX	10	PV2500BPB

REV'N	DESCRIPTION	DATE	CHK'D
C1	ISSUED FOR CONSTRUCTION	31.01.25	PC

FOR CONSTRUCTION

TO BE PRINTED IN COLOUR

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ELECTRICAL CONTRACTOR

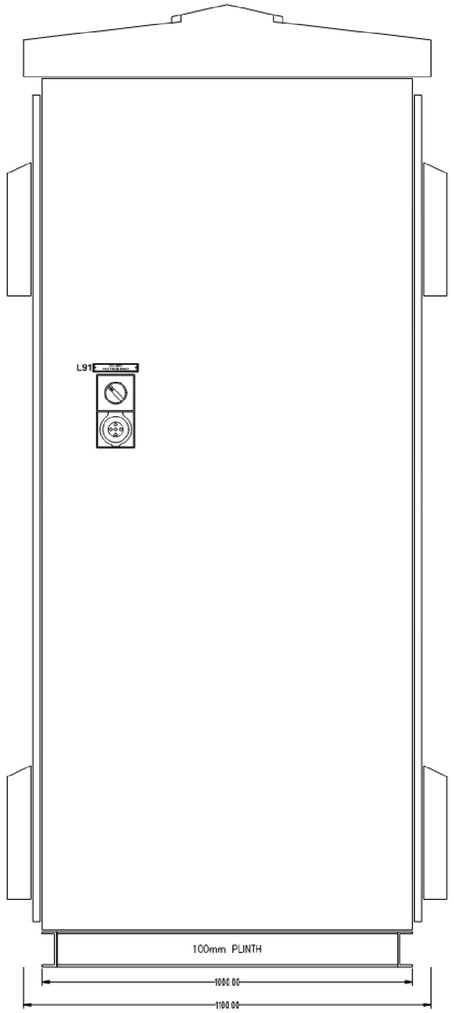
CME Powered by Excellence

ELECTRICAL CONSULTANT
LUCID CONSULTING AUSTRALIA
Level 12, 150 Lonsdale St,
Melbourne VIC 3000
Phone: (03) 9867 8770
Email: melbourne@lucidconsulting.com.au

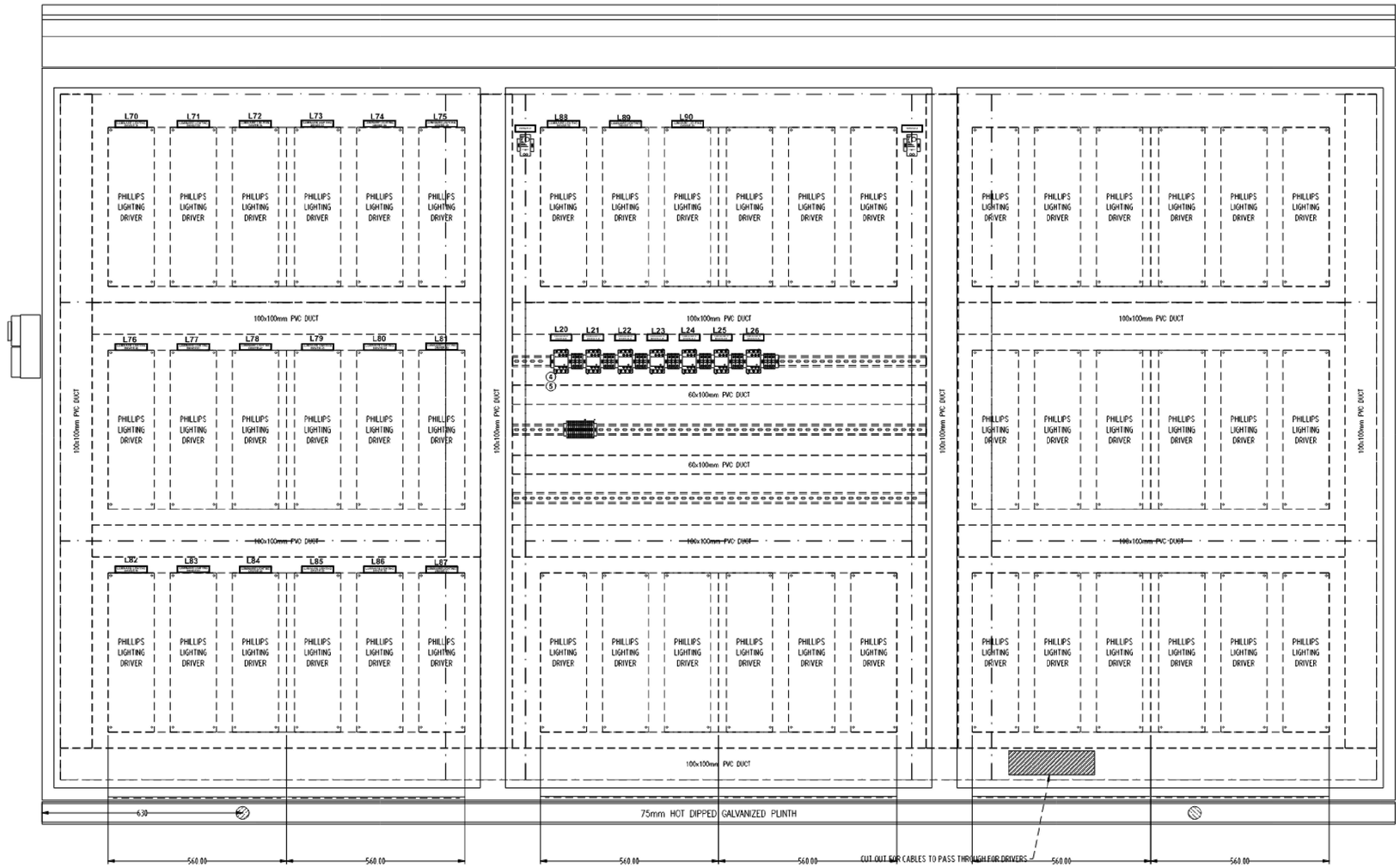
PROJECT
JUNCTION OVAL SPORTSLIGHTING ECI
LAKESIDE DRIVE, ST KILDA VIC 3182
ELECTRICAL SERVICES

DRAWING
LIGHT TOWER SWITCHBOARD DETAILS
SHEET 2 OF 4

Scale: NTS
Drawn: RS
Design: BJ
Review: PC
Date: JAN 2025
Orig. Size: A1
Drawing no.: LCE101565-E005
Revision: C1



SIDE ELEVATION



FRONT ELEVATION

REV'N	DESCRIPTION	DATE	CHK'D
C1	ISSUED FOR CONSTRUCTION	31.01.25	PC

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PROJECT

JUNCTION OVAL SPORTSLIGHTING ECI
LAKESIDE DRIVE, ST KILDA VIC 3182
ELECTRICAL SERVICES

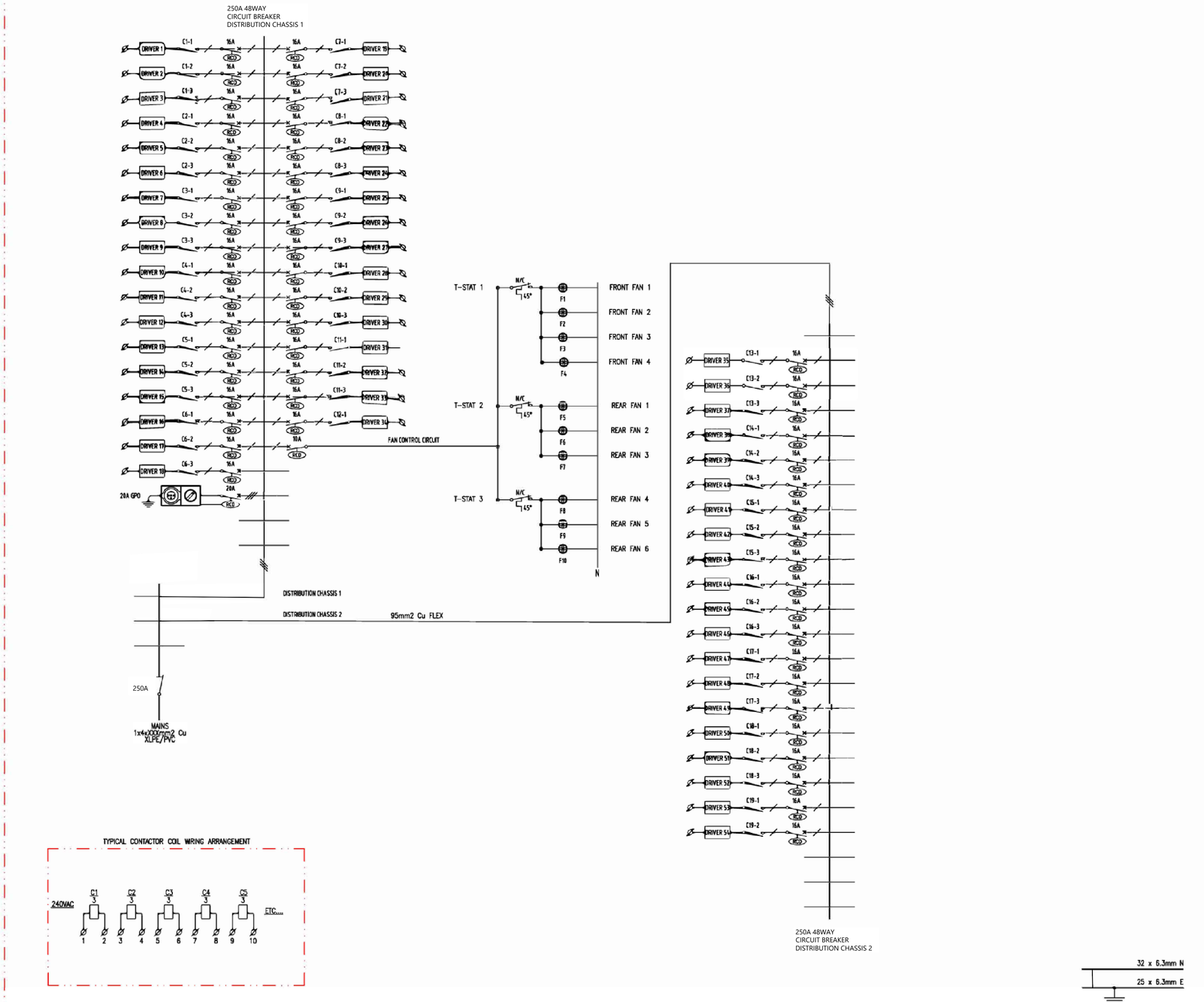
DRAWING

LIGHT TOWER SWITCHBOARD DETAILS
SHEET 3 OF 4

DRAWING IS INTENDED TO CAPTURE THE SCOPE ONLY AND IS NOT TO REPLACE WORKSHOP DRAWINGS. WORKSHOP DRAWINGS SHALL BE PRODUCED BY THE TRADE FROM WHICH FINAL COORDINATION AND CONSTRUCTION ACTIVITIES SHALL OCCUR. VERIFY DIMENSIONS AND LEVELS ON SITE BEFORE SETTING OUT. DO NOT SCALE FROM DRAWING. REFER TO FIGURED DIMENSIONS - IN mm UNLESS OTHERWISE STATED.

Scale	Drawn: RS	Date
NTS	Design: BJ	JAN 2025
	Review: PC	
Orig. Size	Drawing no.	Revision
A1	LCE101565-E006	C1

WIRING SCHEMATIC



REV'N	DESCRIPTION	DATE	CHK'D
C1	ISSUED FOR CONSTRUCTION	31.01.25	PC

FOR CONSTRUCTION

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PROJECT

JUNCTION OVAL SPORTSLIGHTING ECI
LAKESIDE DRIVE, ST KILDA VIC 3182
ELECTRICAL SERVICES

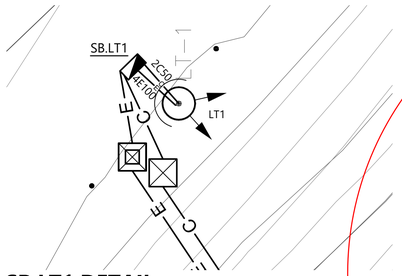
DRAWING

LIGHT TOWER SWITCHBOARD DETAILS
SHEET 4 OF 4

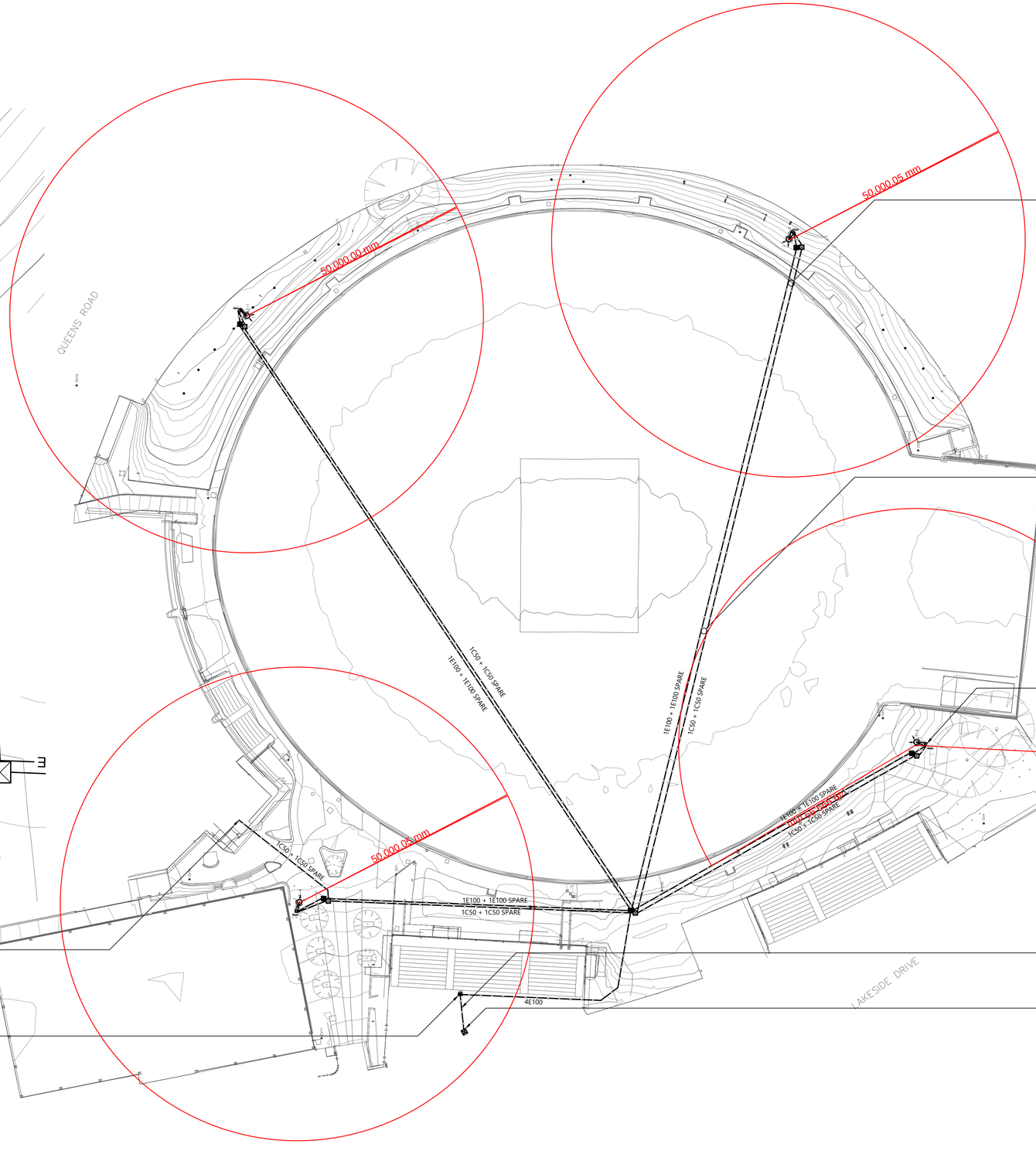
Scale	Drawn: RS	Date
NTS	Design: BJ	JAN 2025
	Review: PC	
Orig. Size	Drawing no.	Revision
A1	LCE101565-E007	C1

NOTES:

1. RETAINING WALLS AROUND BASE OF LIGHT TOWERS LT1-LT3 NOT SHOWN.
2. CONDUIT SIZES SHOWN ARE FOR COPPER CONDUCTORS. REFER TO CABLE SCHEDULE ON DRAWING E002 FOR CONDUIT SIZES FOR ALUMINIUM CONDUCTORS.



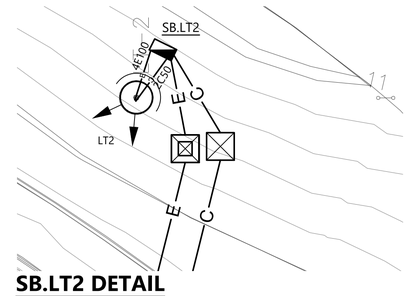
SB.LT1 DETAIL
1:100 SCALE



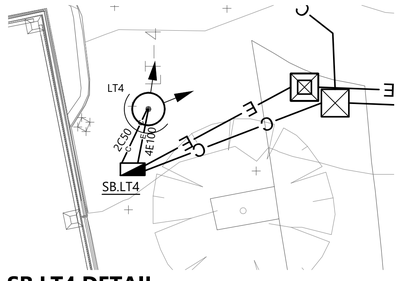
6x100mmDIA CONDUIT (NOMINAL - TBC).

NOMINAL ROUTE OF UNDERGROUND ELECTRICAL AND COMMUNICATIONS CONDUITS WITHIN BOREHOLE. (TYPICAL).

LIGHT TOWER, SWITCHBOARD AND PIT ARRANGEMENT. (TYPICAL).



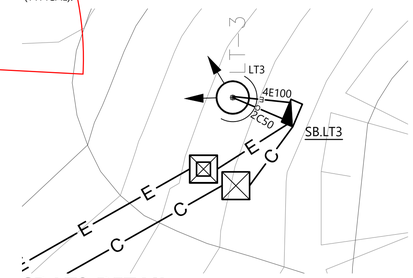
SB.LT2 DETAIL
1:100 SCALE



SB.LT4 DETAIL
1:100 SCALE

COMMUNICATIONS CONDUITS EXTEND INSIDE ADMIN BUILDING AND CONNECT TO LIGHTING CONTROL SYSTEM.

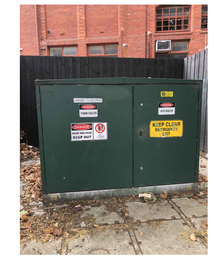
MAIN SWITCHBOARD (MSB-SITE)
REPLACE EXISTING WITH NEW.



SB.LT3 DETAIL
1:100 SCALE

4x EXISTING ELECTRICAL CONDUITS (SIZE UNKNOWN). WHEN EXISTING MSB IS REPLACED WITH NEW BRING EXISTING CONDUITS INTO BOTTOM OF NEW MSB.

CITIPOWER 1MVA KIOSK SUBSTATION
EXISTING TO REMAIN.



REV'N	DESCRIPTION	DATE	CHK'D
C1	ISSUED FOR CONSTRUCTION	31.01.25	PC

FOR CONSTRUCTION

5 2.5 0 2.5 5 10 15 20 25 m
SCALE 1:500

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PROJECT
JUNCTION OVAL SPORTSLIGHTING ECI
LAKESIDE DRIVE, ST KILDA VIC 3182
ELECTRICAL SERVICES

DRAWING
PROPOSED SITE PLAN ARRANGEMENT

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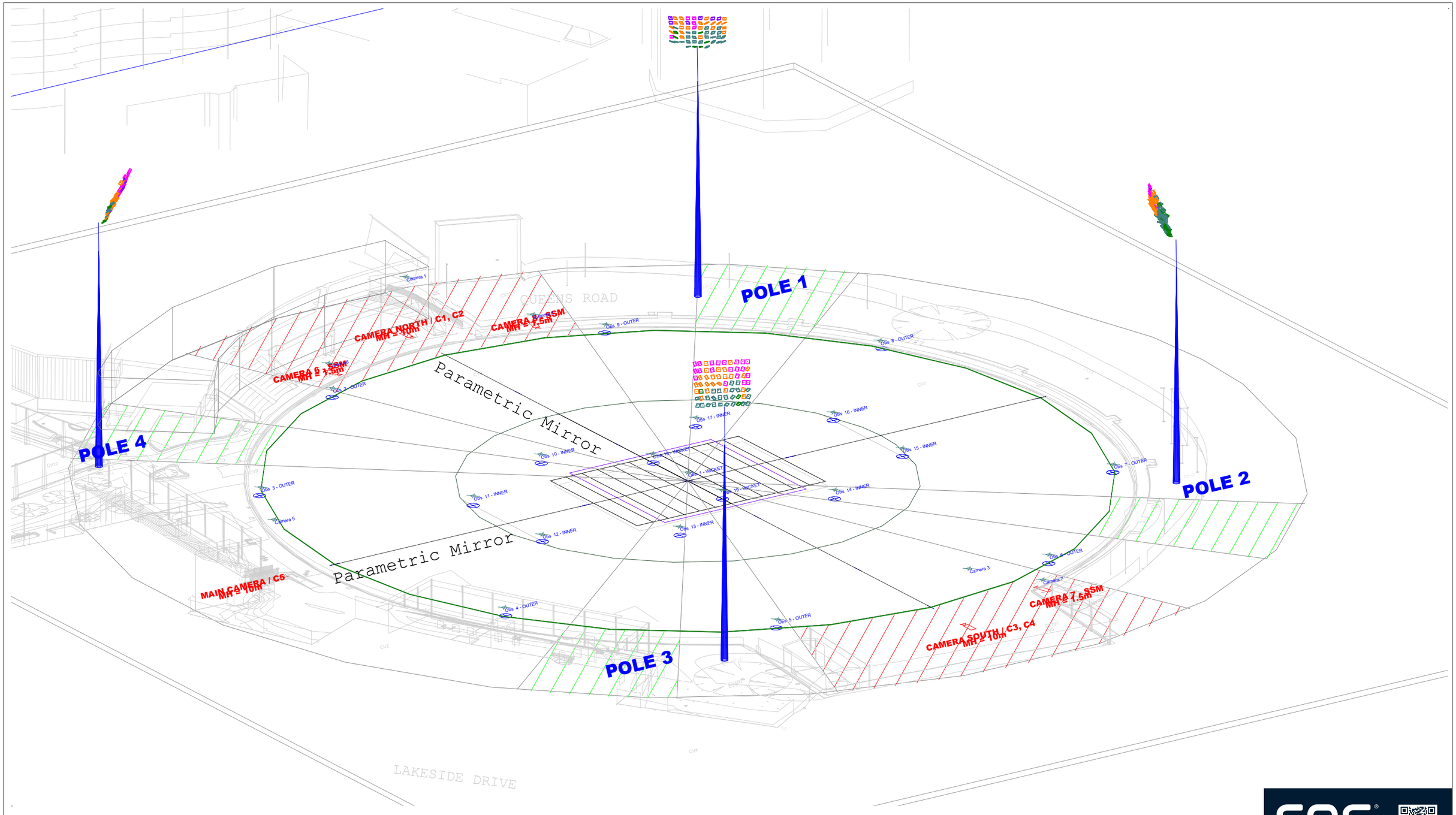
Scale	Drawn: RS	Date
1:500	Design: BJ	JAN 2025
	Review: PC	
Orig. Size	Drawing no.	Revision
A1	LCE101565-E100	C1

Sports Lighting Engineering



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PROJECT NAME:	Junction Oval ICC Broadcast Lighting
LAYOUT VIEW:	Luminaire Layout & Technical Information
CUSTOMER NAME:	Cricket Victoria, CitiPower Centre
LIGHTING DESIGNER:	
PRINT SIZE: A3	PRINTED DATE: 13/02/2025

Calculation Summary								
Project: CALCS								
Scenario: T1								
Label	Obs Label	CalcType	Avg	Max	Min	Min/Avg	Min/Max	UG
Eh Horizontal INNER - 2750u8u7	N.A.	Illuminance	3153	3595	2625	0.83	0.73	1.14
Eh Horizontal OUTTER - 1000u7u5	N.A.	Illuminance	1891	2996	1467	0.78	0.49	1.28
Eh Horizontal WICKET - 3750u8u7	N.A.	Illuminance	3752	4045	3340	0.90	0.83	1.07
Ev C1,C2 Camera North INNER - 1800u7u6	N.A.	Illuminance	2288	2933	1709	0.75	0.58	1.17
Ev C1,C2 Camera North WICKET - 2500u8u7	N.A.	Illuminance	2877	3175	2552	0.89	0.80	1.08
Ev C3,C4 Camera South INNER - 1800u7u6	N.A.	Illuminance	2189	2687	1572	0.72	0.59	1.17
Ev C3,C4 Camera South WICKET - 2500u8u7	N.A.	Illuminance	2610	2876	2278	0.87	0.79	1.13
Ev C5 INFIELD - 1800u7u6	N.A.	Illuminance	2073	2635	1621	0.78	0.62	1.19
Ev C5 OUTFIELD - 1200u7u5	N.A.	Illuminance	1201	1923	688	0.57	0.36	1.27
Ev C5 WICKET -2500u8u7	N.A.	Illuminance	2510	2757	2098	0.84	0.76	1.12
Ev C6 INFIELD - 1800u7u6	N.A.	Illuminance	2164	2762	1583	0.73	0.57	1.20
Ev C6 WICKET - 2500u8u7	N.A.	Illuminance	2734	2975	2392	0.87	0.80	1.08
Ev C7 INFIELD - 1800u7u6	N.A.	Illuminance	2122	2584	1591	0.75	0.62	1.17
Ev C7 WICKET - 2500u8u7	N.A.	Illuminance	2567	2826	2285	0.89	0.81	1.11
Ev C8 INFIELD - 1800u7u6	N.A.	Illuminance	2086	2760	1606	0.77	0.58	1.16
Ev C8 WICKET - 2500u8u7	N.A.	Illuminance	2634	2923	2148	0.82	0.73	1.10

Calculation Summary		
Project: GLARE		
Scenario: T1		
Obs Label	CalcType	Max
N.A.	Illuminance	4122
Camera 1	Glare Rating	12.1
Camera 3	Glare Rating	15.4
Camera 6	Glare Rating	24.6
Camera 8	Glare Rating	22.1
Camera 7	Glare Rating	25.7
Camera 5	Glare Rating	17.8
Obs 1 - WICKET	Glare Rating	40.4
Obs 18 - WICKET	Glare Rating	39.8
Obs 19 - WICKET	Glare Rating	39.7
Obs 10 - INNER	Glare Rating	37.0
Obs 11 - INNER	Glare Rating	37.0
Obs 12 - INNER	Glare Rating	36.6
Obs 13 - INNER	Glare Rating	41.4
Obs 14 - INNER	Glare Rating	38.5
Obs 15 - INNER	Glare Rating	37.4
Obs 16 - INNER	Glare Rating	36.8
Obs 17 - INNER	Glare Rating	38.9
Obs 2 - OUTER	Glare Rating	27.0
Obs 3 - OUTER	Glare Rating	32.6
Obs 4 - OUTER	Glare Rating	32.8
Obs 5 - OUTER	Glare Rating	28.6
Obs 6 - OUTER	Glare Rating	26.2
Obs 7 - OUTER	Glare Rating	31.0
Obs 8 - OUTER	Glare Rating	27.4
Obs 9 - OUTER	Glare Rating	27.5

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PROJECT NAME:
Junction Oval
ICC Broadcast Lighting

LAYOUT VIEW:
Luminaire Layout & Technical Information

CUSTOMER NAME:
Cricket Victoria, CitiPower Centre

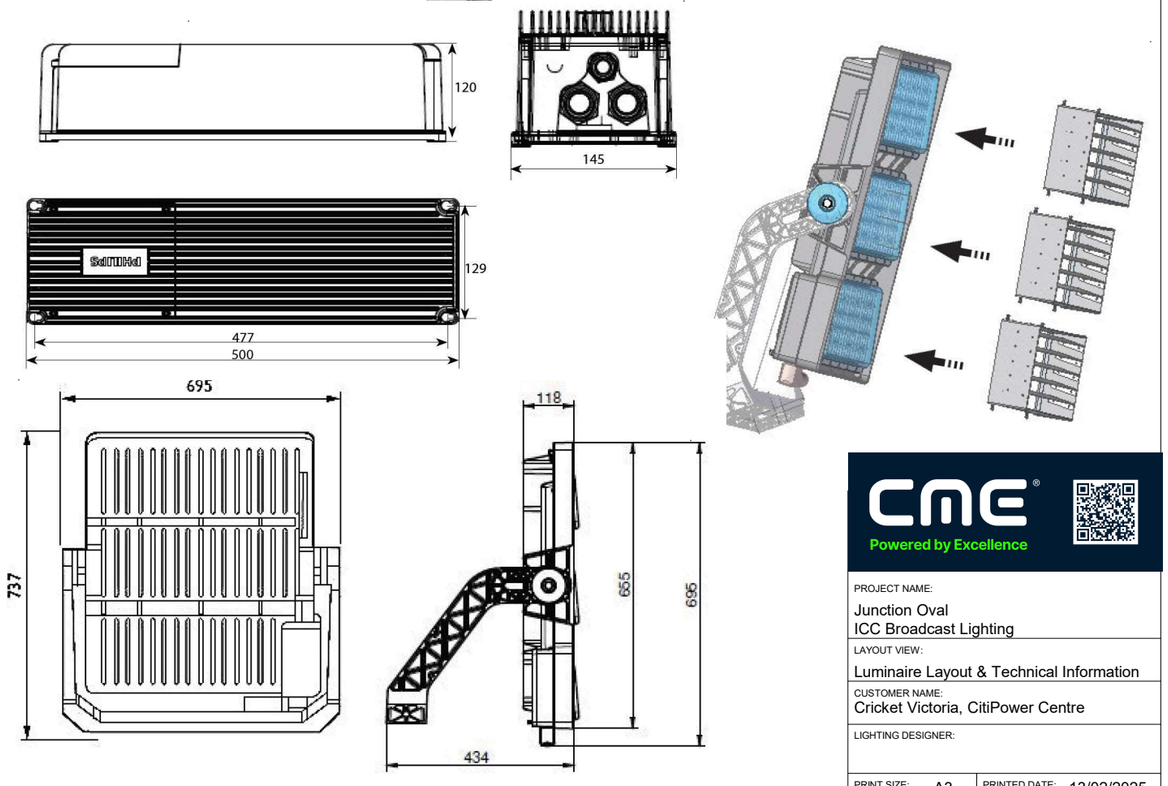
LIGHTING DESIGNER:

PRINT SIZE: A3 | PRINTED DATE: 13/02/2025

Fitting Notes:
- ArenaVison Gen 3.6 (BVP428)
- DMX dimming
- Fitting Weight 26.5 kg
- Cool White 5700K
- CRI 85min Typical 90+
- Television Lighting Consistency Index (TLC) 85
- Operating Temperature Range -40° to +45°
- Average Max Operating Temperature +30°
- Luminaire IP Rating - IP66
- Lumen Package - 191,000lm
- Beam distributions, 7x Symmetrical optics with/without Louvers:
    - S2 - Extra Narrow
    - S3 - Very Narrow
    - S4 - Narrow Spot
    - S5 - Medium
    - S6 - Flood
    - S7 - Wide Flood
    - S8 - Extra Wide Flood

Driver Notes:
- Remote Driver Box (BV)
- Input Voltage 200-415V
- Total Driver Input Power 1500W
- Driver Weight 6.3 kg
- Driver IP Rating - IP66

Luminaire Schedule					
Scenario: T1					
Label	Symbol	Description	Qty	LLF	Lum. Lumens
S3		ArenaVision LED gen3_5 2022	11	0.900	192045
S4		ArenaVision LED gen3_5 2022	49	0.900	192048
S5		ArenaVision LED gen3_5 2022	97	0.900	190919
S6		ArenaVision LED gen3_5 2022	84	0.900	191703
S7		ArenaVision LED gen3_5 2022	26	0.900	191905



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PROJECT NAME:
Junction Oval
ICC Broadcast Lighting

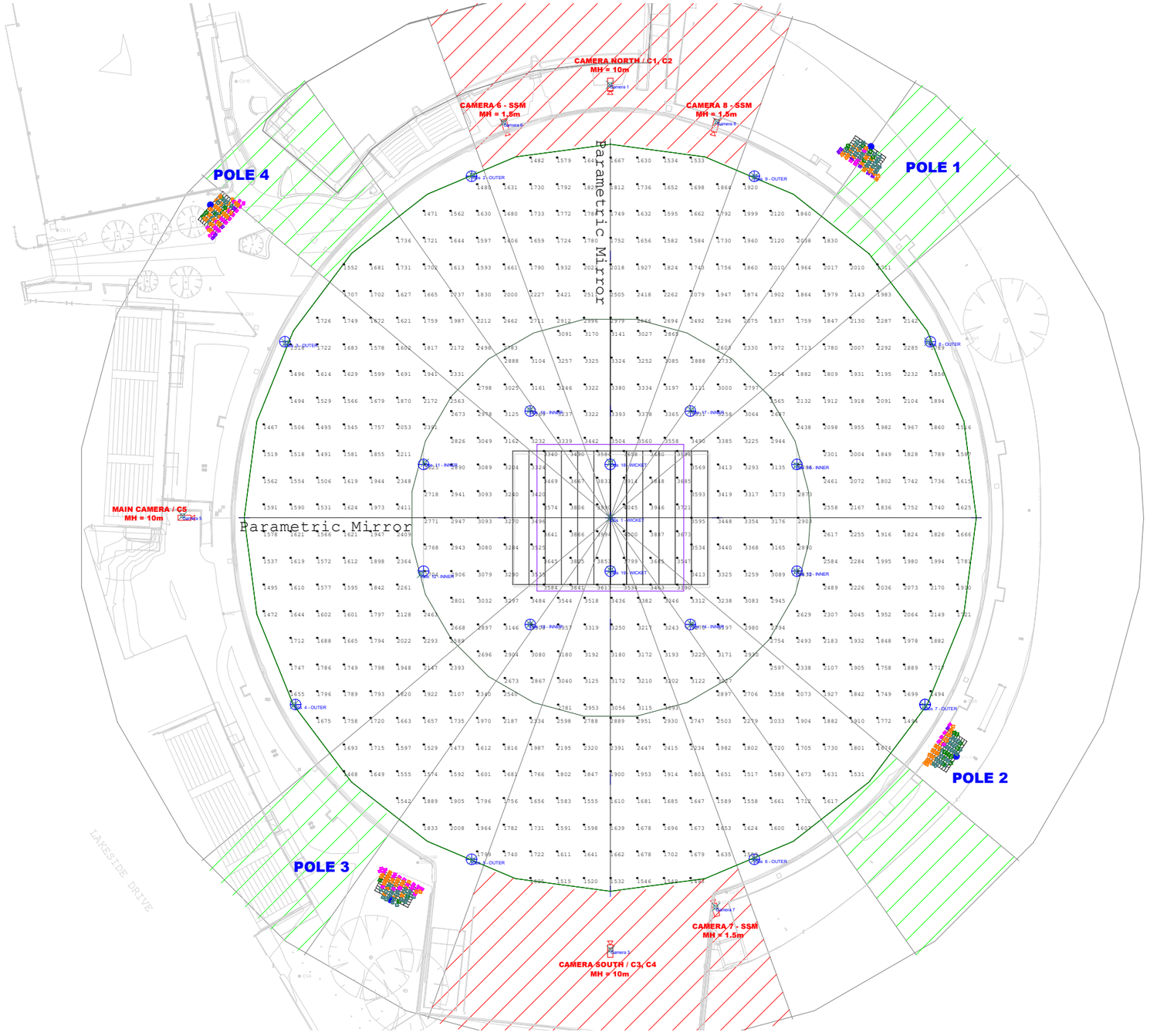
LAYOUT VIEW:
Luminaire Layout & Technical Information

CUSTOMER NAME:
Cricket Victoria, CitiPower Centre

LIGHTING DESIGNER:

PRINT SIZE: A3

PRINTED DATE: 13/02/2025



Eh Horizontal - OUTER
Not to Scale

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PROJECT NAME:	Junction Oval ICC Broadcast Lighting
LAYOUT VIEW:	Luminaire Layout & Technical Information
CUSTOMER NAME:	Cricket Victoria, CitiPower Centre
LIGHTING DESIGNER:	
PRINT SIZE: A3	PRINTED DATE: 13/02/2025

Eh Horizontal - INNER
Not to Scale

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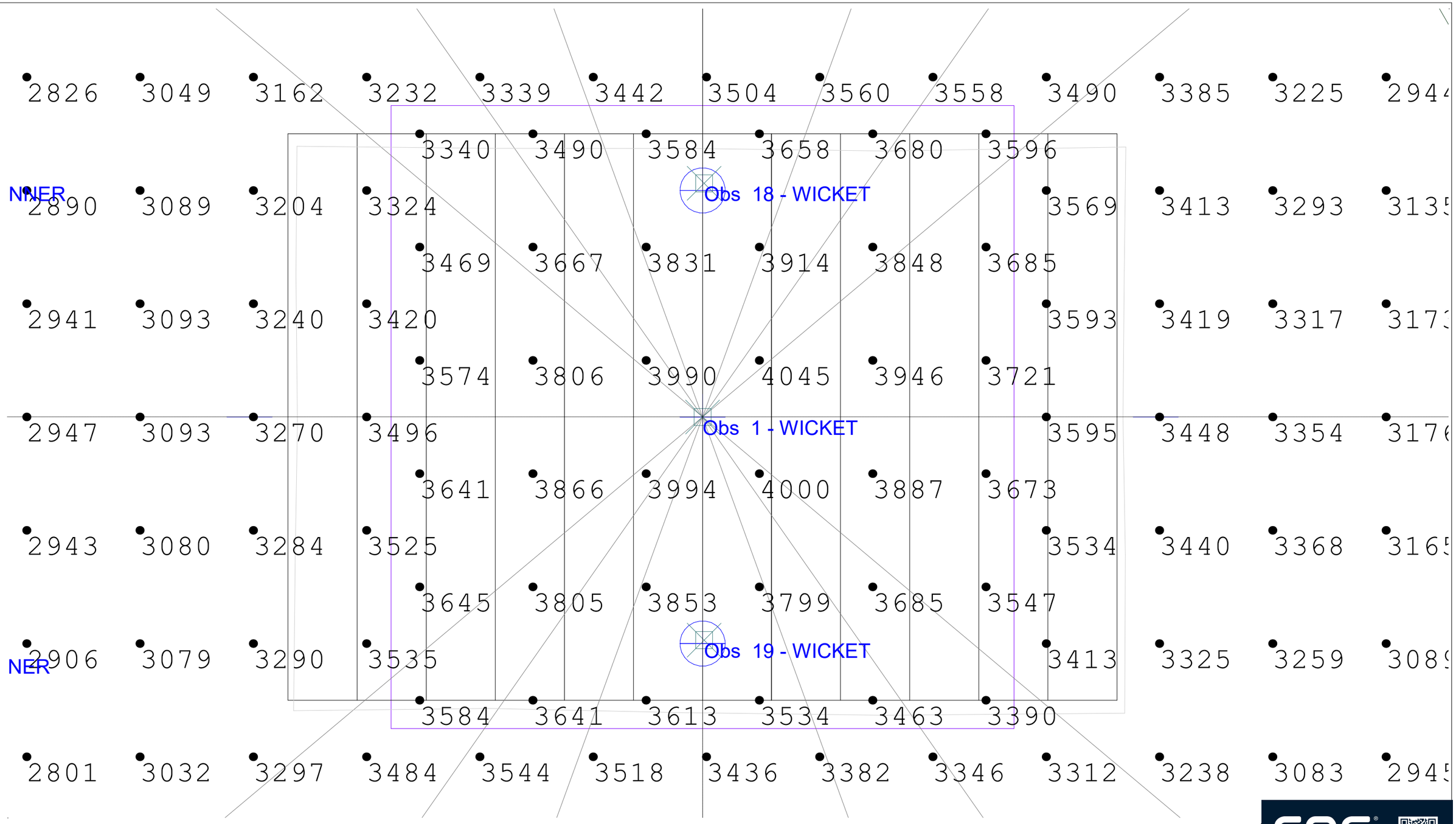

Eh Horizontal - WICKET
Not to Scale

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CUSTOMER NAME:	Cricket Victoria, CitiPower Centre
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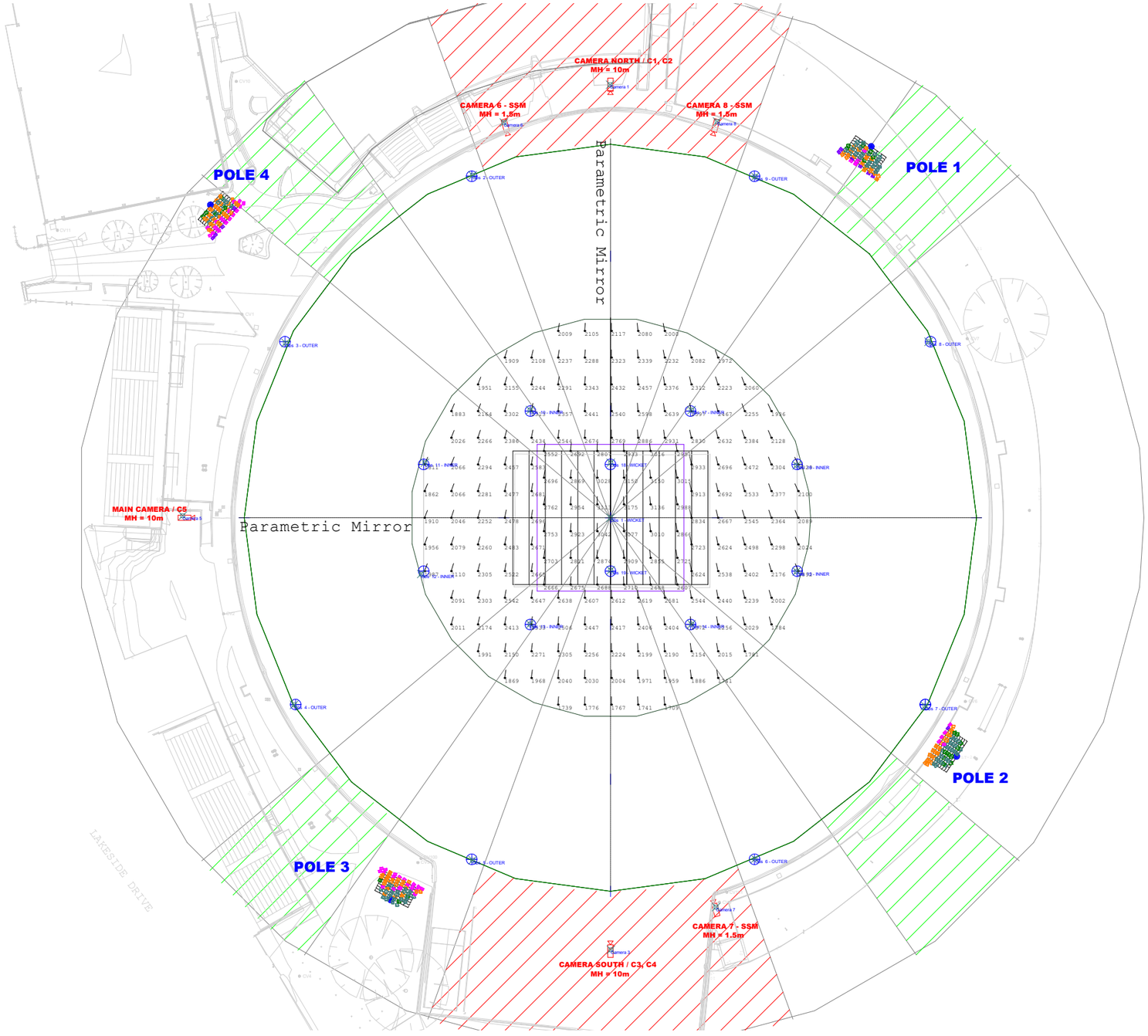


Ev C1,C2 Camera North - OUTER
Not to Scale

Powered by Excellence

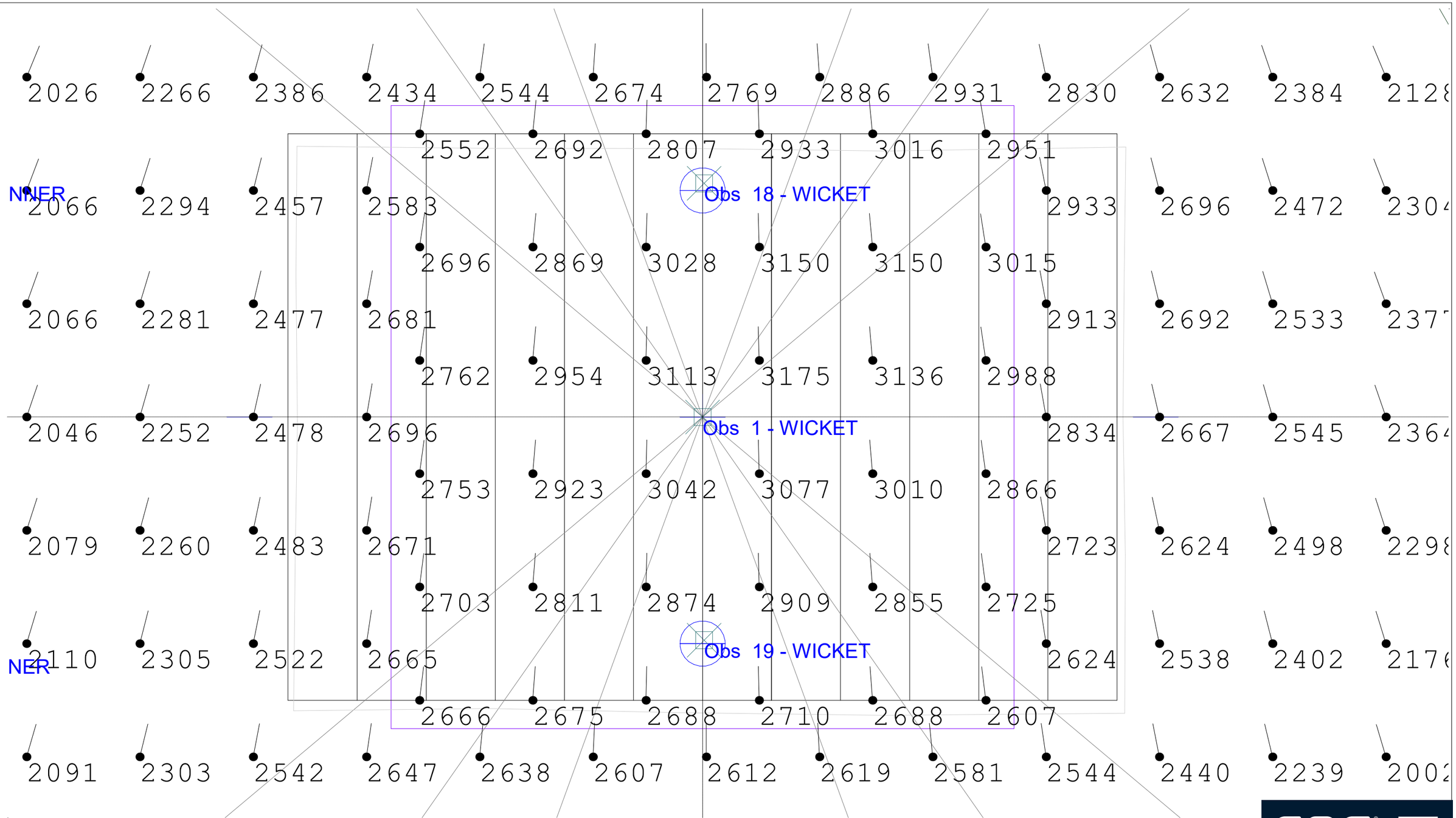
PROJECT NAME: Junction Oval ICC Broadcast Lighting	
LAYOUT VIEW: Luminaire Layout & Technical Information	
CUSTOMER NAME: Cricket Victoria, CitiPower Centre	
LIGHTING DESIGNER:	
PRINT SIZE: A3	PRINTED DATE: 13/02/2025

Parametric Mirror

Ev C1,C2 Camera North - INNER
Not to Scale

CME
Powered by Excellence

PROJECT NAME:	Junction Oval ICC Broadcast Lighting
LAYOUT VIEW:	Luminaire Layout & Technical Information
CUSTOMER NAME:	Cricket Victoria, CitiPower Centre
LIGHTING DESIGNER:	
PRINT SIZE: A3	PRINTED DATE: 13/02/2025



Ev C1,C2 Camera North - WICKET
Not to Scale

CME
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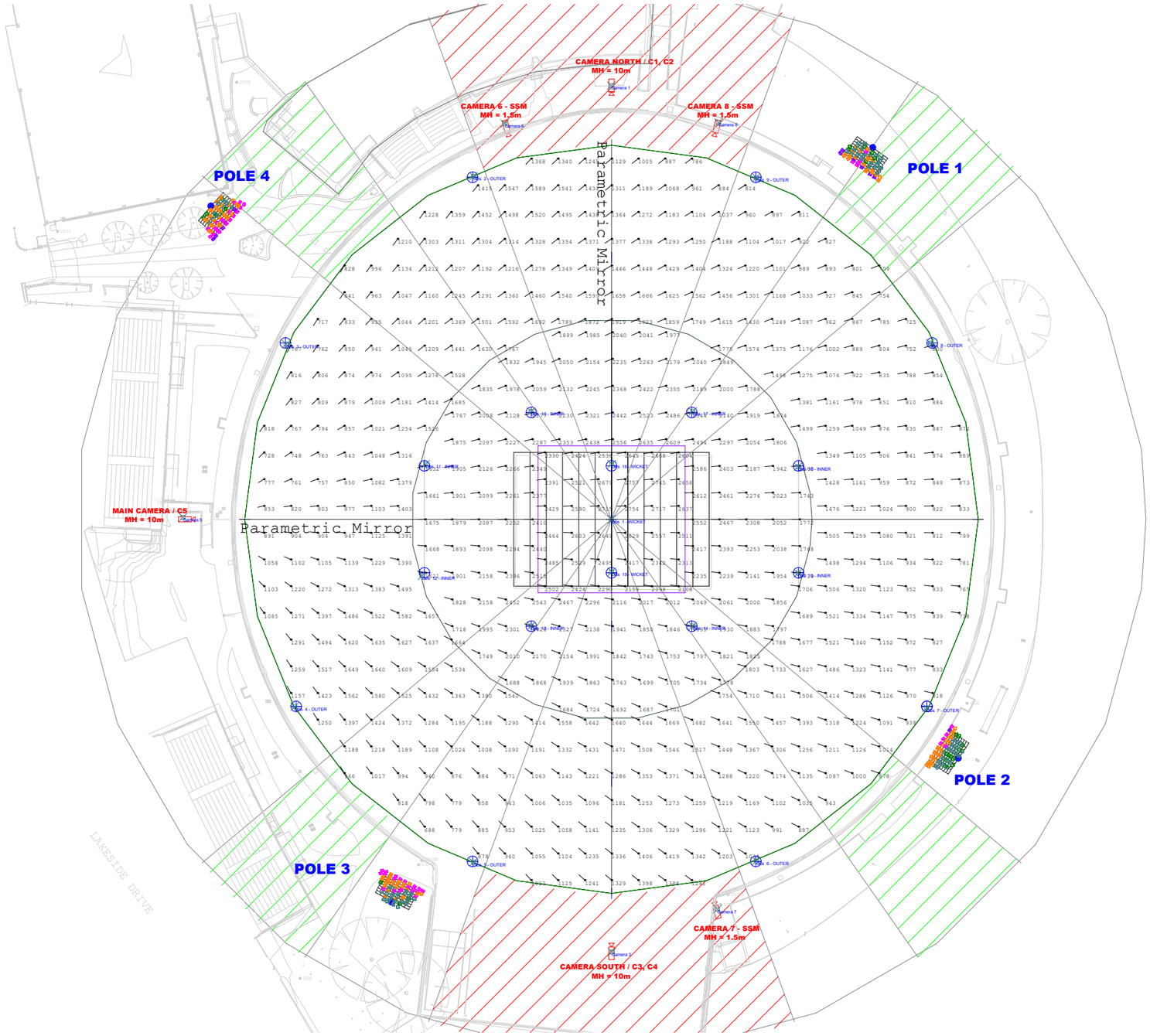
PROJECT NAME:	Junction Oval ICC Broadcast Lighting
LAYOUT VIEW:	Luminaire Layout & Technical Information
CUSTOMER NAME:	Cricket Victoria, CitiPower Centre
LIGHTING DESIGNER:	
PRINT SIZE: A3	PRINTED DATE: 13/02/2025



Ev C5 Camera West - OUTTER
Not to Scale

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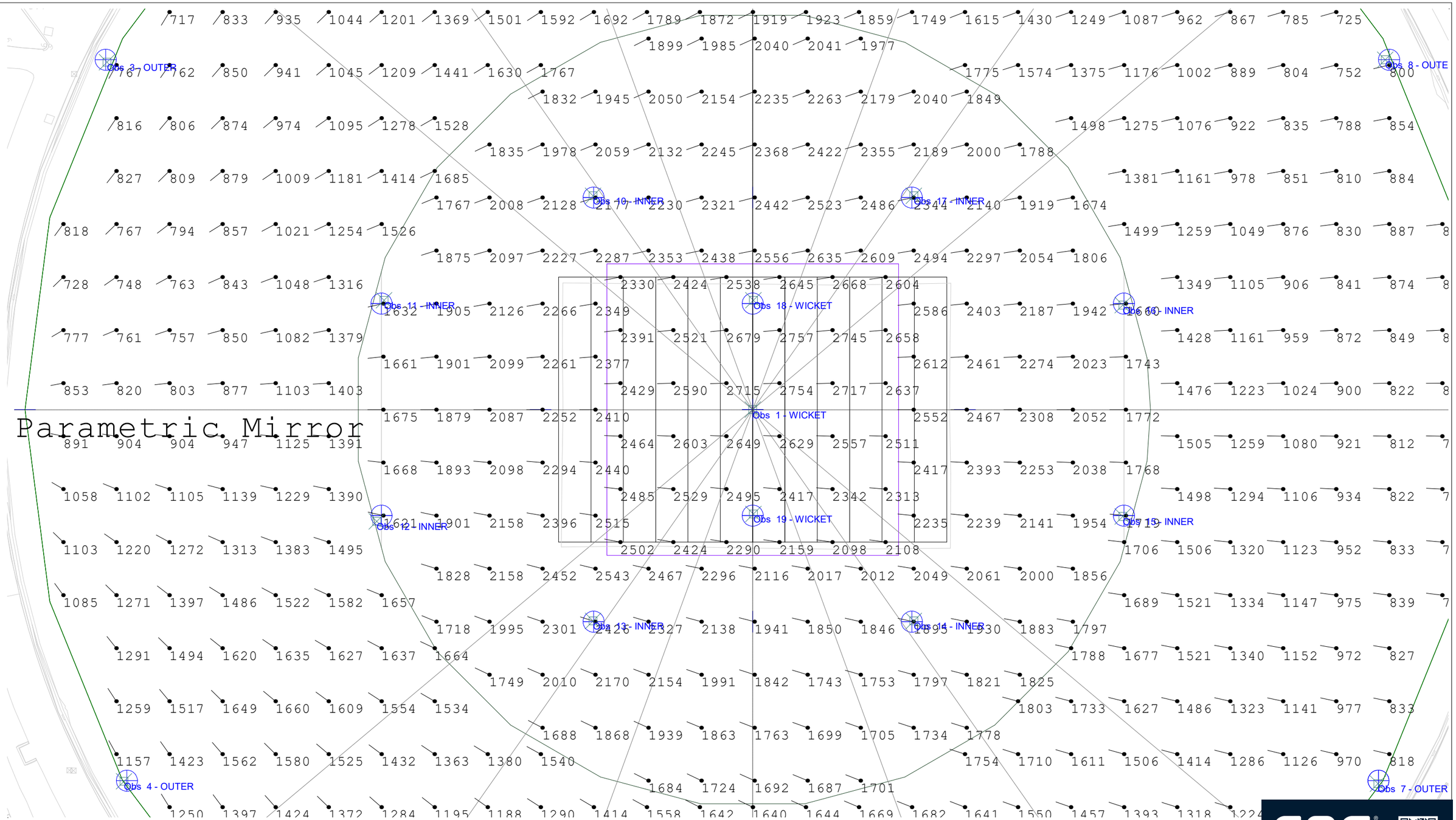
PROJECT NAME: Junction Oval ICC Broadcast Lighting	
LAYOUT VIEW: Luminaire Layout & Technical Information	
CUSTOMER NAME: Cricket Victoria, CitiPower Centre	
LIGHTING DESIGNER:	
PRINT SIZE: A3	PRINTED DATE: 13/02/2025



Ev C5 Camera West - INNER
Not to Scale

Powered by Excellence

PROJECT NAME:
Junction Oval
ICC Broadcast Lighting

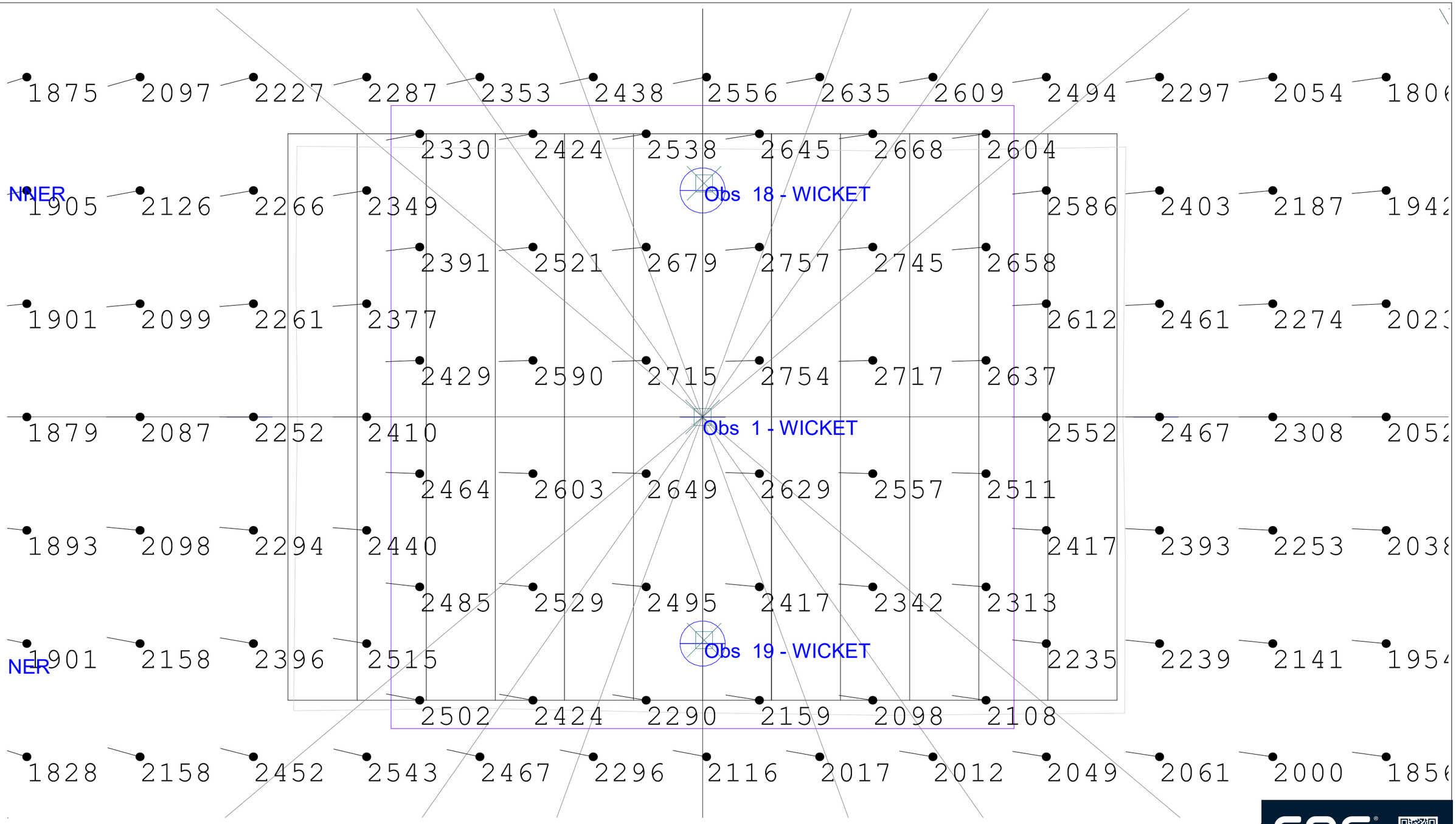
LAYOUT VIEW:
Luminaire Layout & Technical Information

CUSTOMER NAME:
Cricket Victoria, CitiPower Centre

LIGHTING DESIGNER:

PRINT SIZE: A3

PRINTED DATE: 13/02/2025



Ev C5 Camera West - WICKET
Not to Scale

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PROJECT NAME:
Junction Oval
ICC Broadcast Lighting

LAYOUT VIEW:
Luminaire Layout & Technical Information

CUSTOMER NAME:
Cricket Victoria, CitiPower Centre

LIGHTING DESIGNER:

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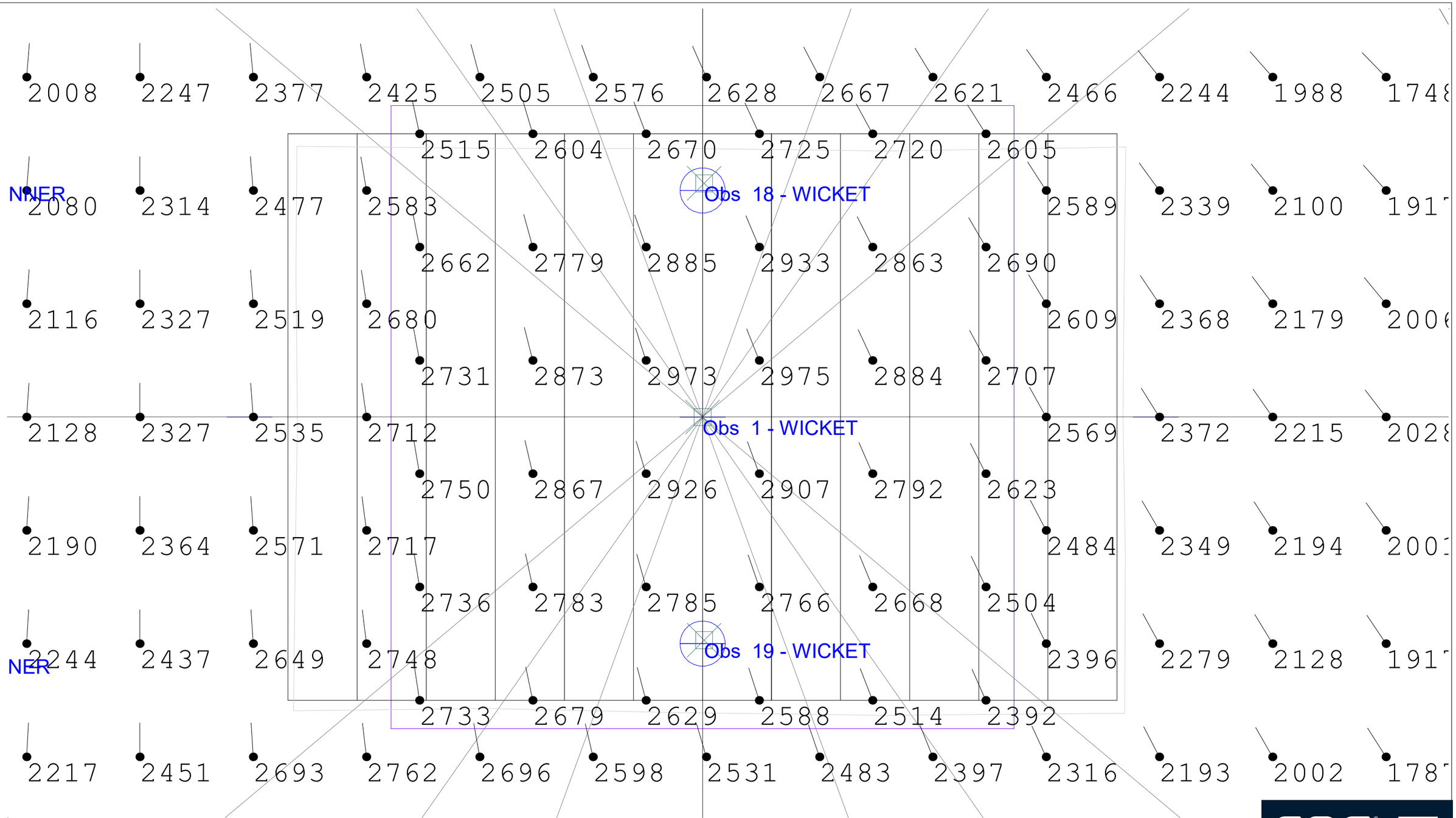

SSM - SUPER SLOW MOTION
Not to Scale

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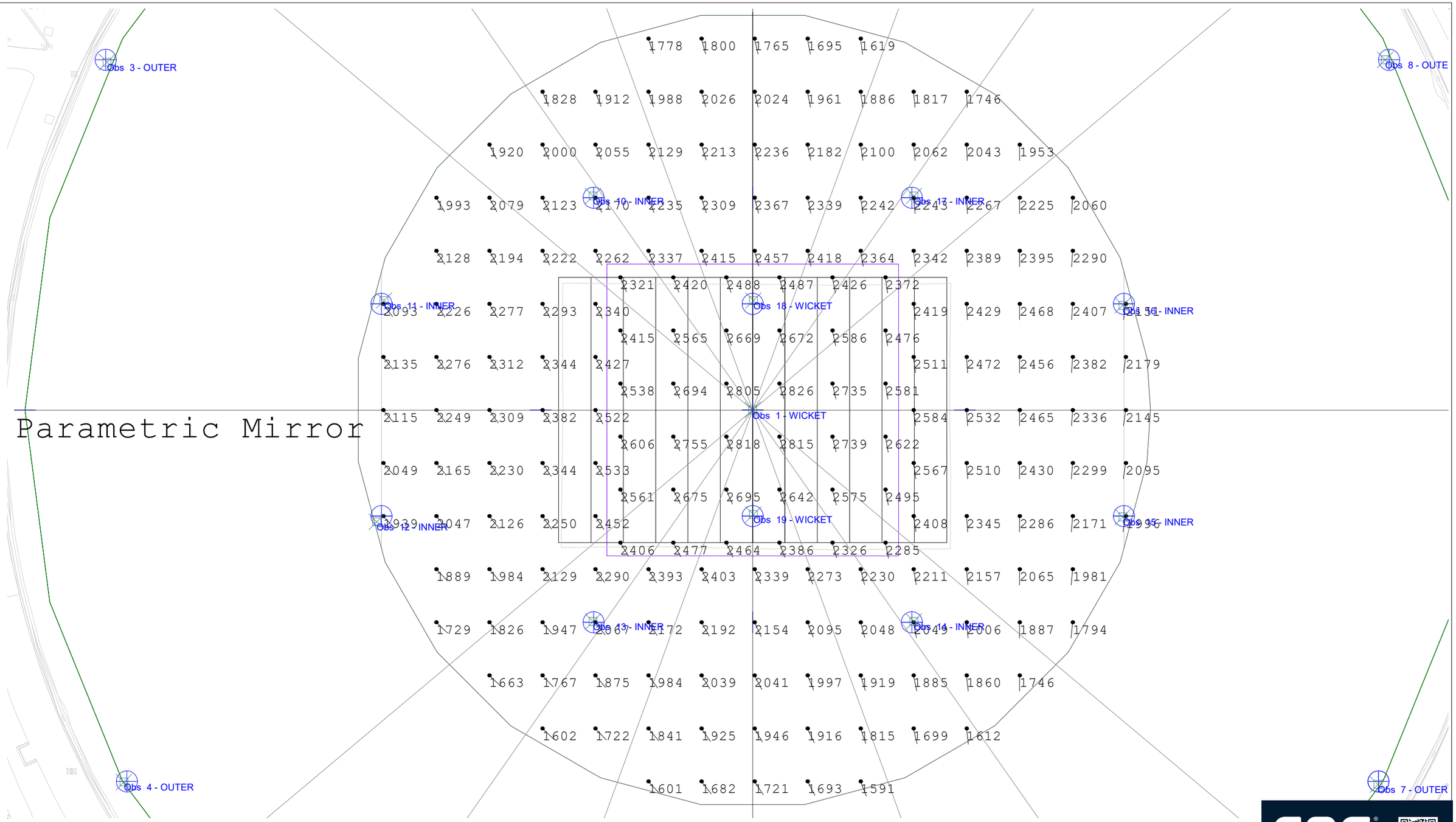
PROJECT NAME:	Junction Oval ICC Broadcast Lighting
LAYOUT VIEW:	Luminaire Layout & Technical Information
CUSTOMER NAME:	Cricket Victoria, CitiPower Centre
LIGHTING DESIGNER:	
PRINT SIZE: A3	PRINTED DATE: 13/02/2025

Parametric Mirror



SSM - SUPER SLOW MOTION
Not to Scale

CME
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PROJECT NAME:	Junction Oval ICC Broadcast Lighting
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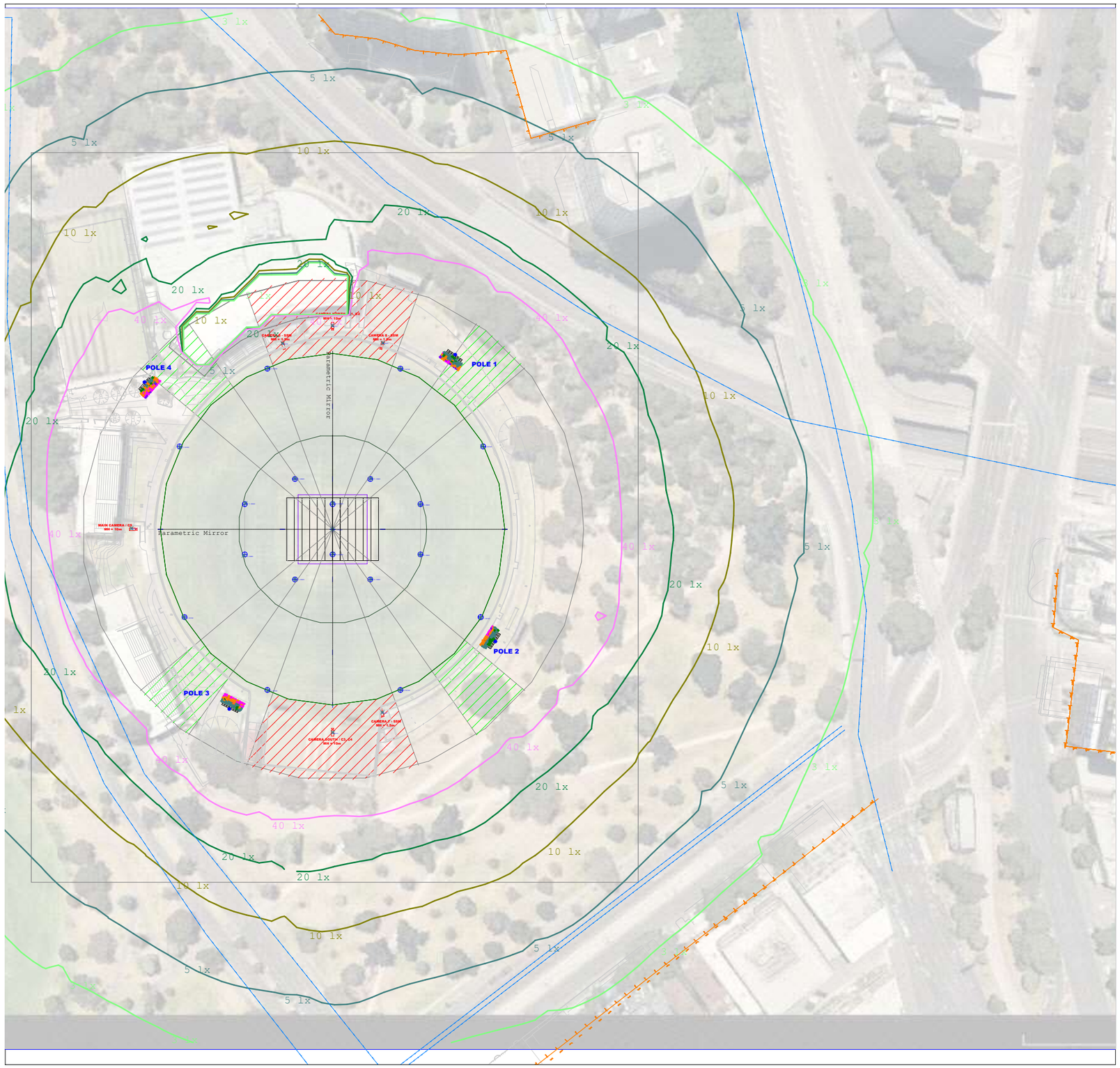
CUSTOMER NAME:	Cricket Victoria, CitiPower Centre
LIGHTING DESIGNER:	
PRINT SIZE: A3	PRINTED DATE: 13/02/2025



OBTRUSIVE LIGHT
Not to Scale

Calculation Summary	
Project: Obtrusive	
Scenario: T1	
Label	**Max**
ObtrusiveLight_Fitzroy St_Cd_Seg1	23459
ObtrusiveLight_Fitzroy St_Ill_Seg1	16.4
ObtrusiveLight_Kings Way_Cd_Seg1	57836
ObtrusiveLight_Kings Way_Cd_Seg2	61247
ObtrusiveLight_Kings Way_Cd_Seg3	47428
ObtrusiveLight_Kings Way_Cd_Seg4	34736
ObtrusiveLight_Kings Way_Cd_Seg5	34726
ObtrusiveLight_Kings Way_Cd_Seg6	32025
ObtrusiveLight_Kings Way_Cd_Seg7	28477
ObtrusiveLight_Kings Way_Cd_Seg8	25222
ObtrusiveLight_Kings Way_Ill_Seg1	11.8
ObtrusiveLight_Kings Way_Ill_Seg2	18.5
ObtrusiveLight_Kings Way_Ill_Seg3	18.1
ObtrusiveLight_Kings Way_Ill_Seg4	18.1
ObtrusiveLight_Kings Way_Ill_Seg5	16.7
ObtrusiveLight_Kings Way_Ill_Seg6	16.2
ObtrusiveLight_Kings Way_Ill_Seg7	16.3
ObtrusiveLight_Kings Way_Ill_Seg8	17.0
ObtrusiveLight_St Kilda Rd 2_Cd_Seg1	26066
ObtrusiveLight_St Kilda Rd 2_Cd_Seg2	20928
ObtrusiveLight_St Kilda Rd 2_Cd_Seg3	13925
ObtrusiveLight_St Kilda Rd 2_Cd_Seg4	11187
ObtrusiveLight_St Kilda Rd 2_Ill_Seg1	8.5
ObtrusiveLight_St Kilda Rd 2_Ill_Seg2	2.7
ObtrusiveLight_St Kilda Rd 2_Ill_Seg3	7.9
ObtrusiveLight_St Kilda Rd 2_Ill_Seg4	0.3
ObtrusiveLight_TI_Fitzroy St	0
ObtrusiveLight_TI_Kings Way	7
ObtrusiveLight_TI_Lakeside Drive	2
ObtrusiveLight_TI_Punt Rd	0

Obtrusive Light - Compliance Report

AS/NZS 4282:2023, TV - High District Brightness (near stadium), Non-Curfew L1
Filename: Junction Oval - Buckford Tender Submission REV7 - 2025 FTS
13/02/2025 14:39:25

Illuminance

Maximum Allowable Value: 100 Lux

Calculations Tested (13):

Calculation Label	Test Results	Max. Illum.
ObtrusiveLight_St Kilda Rd 2_Ill_Seg1	PASS	8.5
ObtrusiveLight_St Kilda Rd 2_Ill_Seg2	PASS	2.7
ObtrusiveLight_St Kilda Rd 2_Ill_Seg3	PASS	7.9
ObtrusiveLight_St Kilda Rd 2_Ill_Seg4	PASS	0.3
ObtrusiveLight_Fitzroy St_Ill_Seg1	PASS	16.4
ObtrusiveLight_Kings Way_Ill_Seg1	PASS	11.8
ObtrusiveLight_Kings Way_Ill_Seg2	PASS	18.5
ObtrusiveLight_Kings Way_Ill_Seg3	PASS	18.1
ObtrusiveLight_Kings Way_Ill_Seg4	PASS	18.1
ObtrusiveLight_Kings Way_Ill_Seg5	PASS	16.7
ObtrusiveLight_Kings Way_Ill_Seg6	PASS	16.2
ObtrusiveLight_Kings Way_Ill_Seg7	PASS	16.3
ObtrusiveLight_Kings Way_Ill_Seg8	PASS	17.0

Luminous Intensity (Cd) Per Luminaire

Maximum Allowable Value: 100000 Cd
Control Angle: 83 Degrees

Luminaire Locations Tested (267)
Test Results: PASS

Threshold Increment (TI)

Maximum Allowable Value: 20 %

Calculations Tested (4):

Calculation Label	Adaptation Luminance	Test Results
ObtrusiveLight_TI_Fitzroy St	10	PASS
ObtrusiveLight_TI_Kings Way	10	PASS
ObtrusiveLight_TI_Punt Rd	10	PASS
ObtrusiveLight_TI_Lakeside Drive	10	PASS

Upward Waste Light Ratio (UWLR)

Maximum Allowable Value: 8.0 %

Calculated UWLR: 1.9 %
Test Results: PASS

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PROJECT NAME:
Junction Oval
ICC Broadcast Lighting

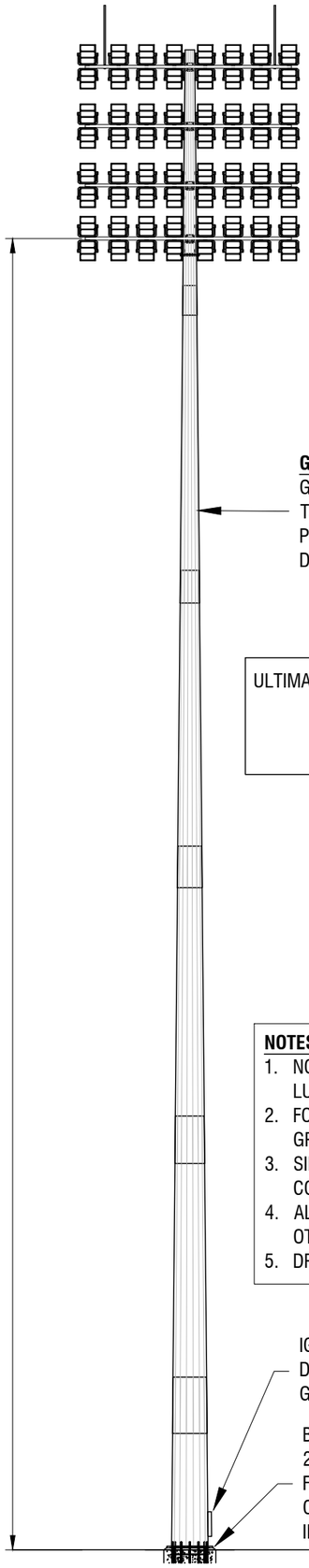
LAYOUT VIEW:
Obtrusive lighting

CUSTOMER NAME:
Cricket Victoria, CitiPower Centre

LIGHTING DESIGNER:

PRINT SIZE: A3

PRINTED DATE: 13/02/2025



GMP ID: TP-H43.5-INC-64F
GM POLES MANUFACTURED TAPERED POLYGONAL POLE. POLE & ACCESSORIES TO BE HOT DIP GALVANIZED AFTER FABRICATION

ULTIMATE LIMIT STATE BASE REACTIONS.
M* = 5,600 kNm
V* = 160 kN
N* = 200 kN

IGLOO SHAPED 800 x 500 CLEAR ACCESS DOOR c/w GEAR TRAY (ALL CONTROL GEAR REMOTE OF POLE, BY OTHERS).

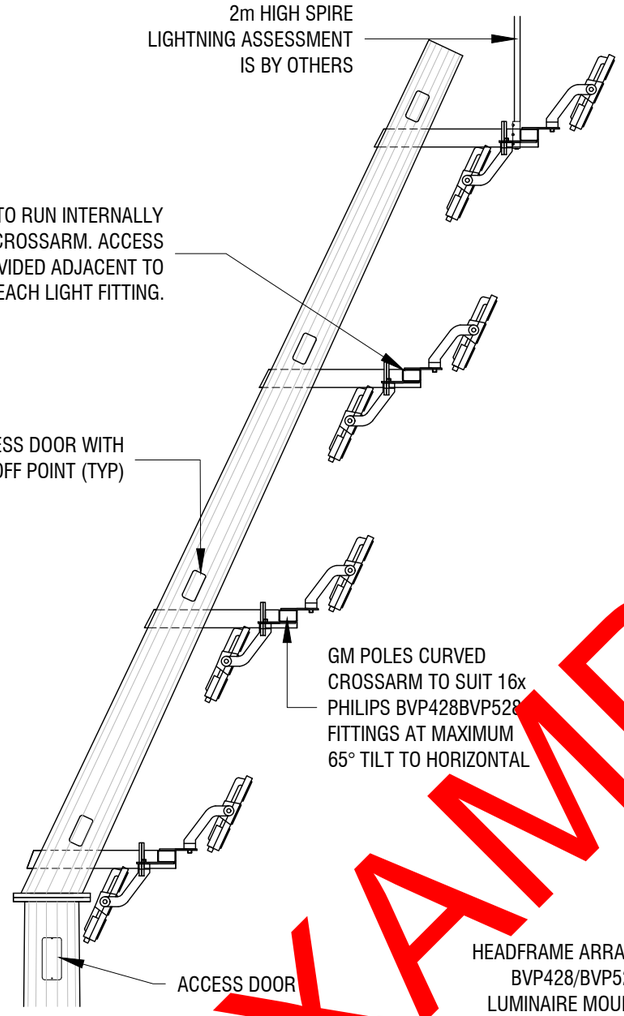
BASE PLATE TO SUIT GM POLES 24/M30 GR8.8 HIGH STRENGTH FOUNDATION BOLTS ON AN OUTER PCD OF 1,500mm AND INNER PCD OF 1,200mm.

2m HIGH SPIRE LIGHTNING ASSESSMENT IS BY OTHERS

ALL CABLES TO RUN INTERNALLY THROUGH CROSSARM. ACCESS HOLES PROVIDED ADJACENT TO EACH LIGHT FITTING.

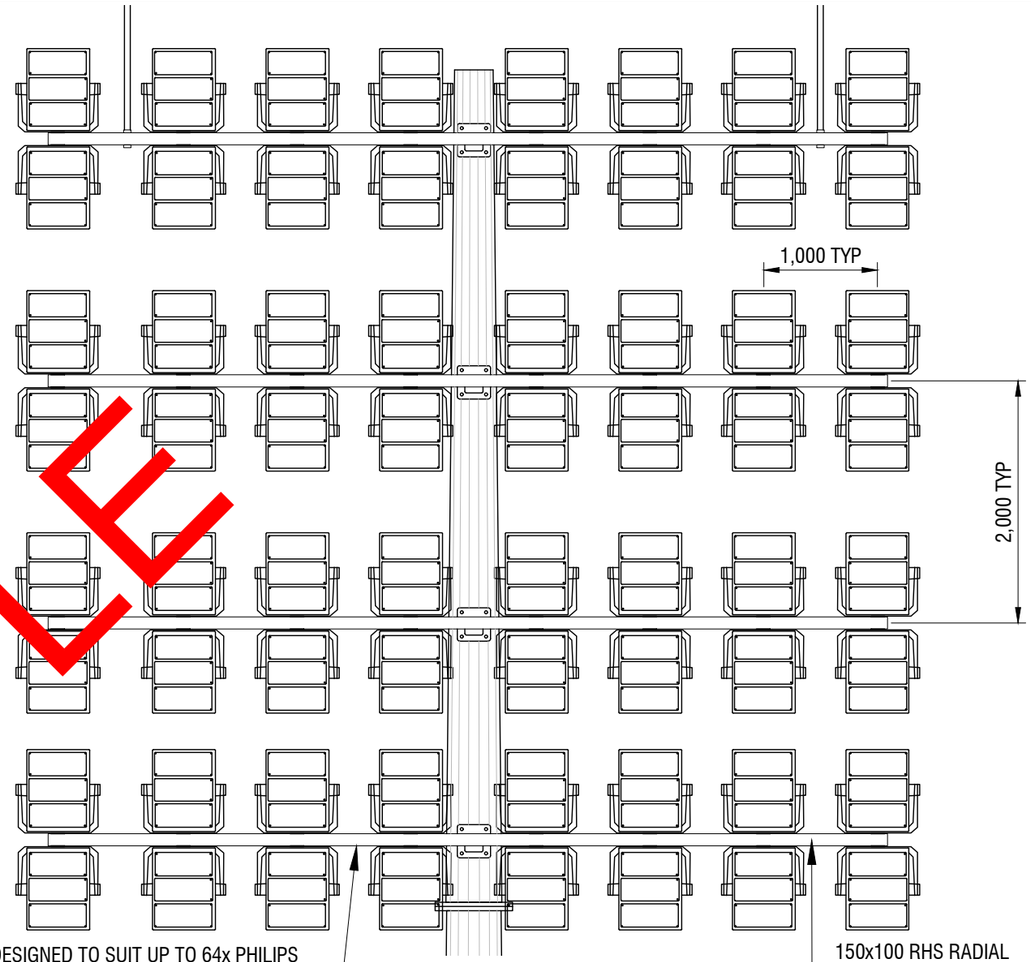
ACCESS DOOR WITH TIE OFF POINT (TYP)

GM POLES CURVED CROSSARM TO SUIT 16x PHILIPS BVP428BVP528 FITTINGS AT MAXIMUM 65° TILT TO HORIZONTAL



ACCESS DOOR

HEADFRAME SIDE VIEW

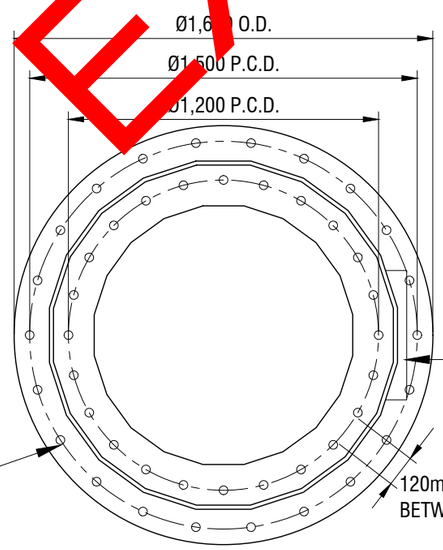


HEADFRAME ARRANGMENT DESIGNED TO SUIT UP TO 64x PHILIPS BVP428/BVP528 SYMMETRIC LUMINAIRES OR SIMILAR. EACH LUMINAIRE MOUNTING POSITION SUPPLIED WITH M20 (8.8) HOT DIP GALVANISED FIXING BOLT. FIX POINT ON CROSSARM PROVIDED. SECONDARY TETHER BY OTHERS IF REQUIRED.

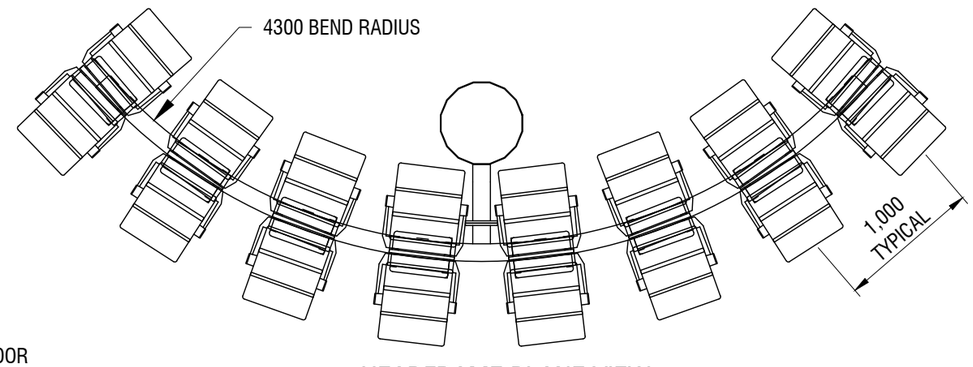
150x100 RHS RADIAL CROSSARM c/w MOUNTING BOLTS AND CABLE EXITS

HEADFRAME FRONT VIEW

NOTES:
1. NO ALLOWANCE FOR ANY EXTERNAL GLARE ON LUMINAIRES.
2. FOUNDATION BOLTS BASED ON BEING GM POLES GRADE 8.8 THREADED ROD HOT DIP GALVANISED.
3. SINGLE ACCESS DOOR AT POLE BASE ONLY (ALL CONTROL GEAR REMOTE OF POLE BY OTHERS)
4. ALL DIMENSIONS NOMINAL UNLESS DESIGNATED OTHERWISE.
5. DRAFT DESIGN - FOR DISCUSSION PURPOSES.



BASEPLATE DETAIL



HEADFRAME PLANE VIEW

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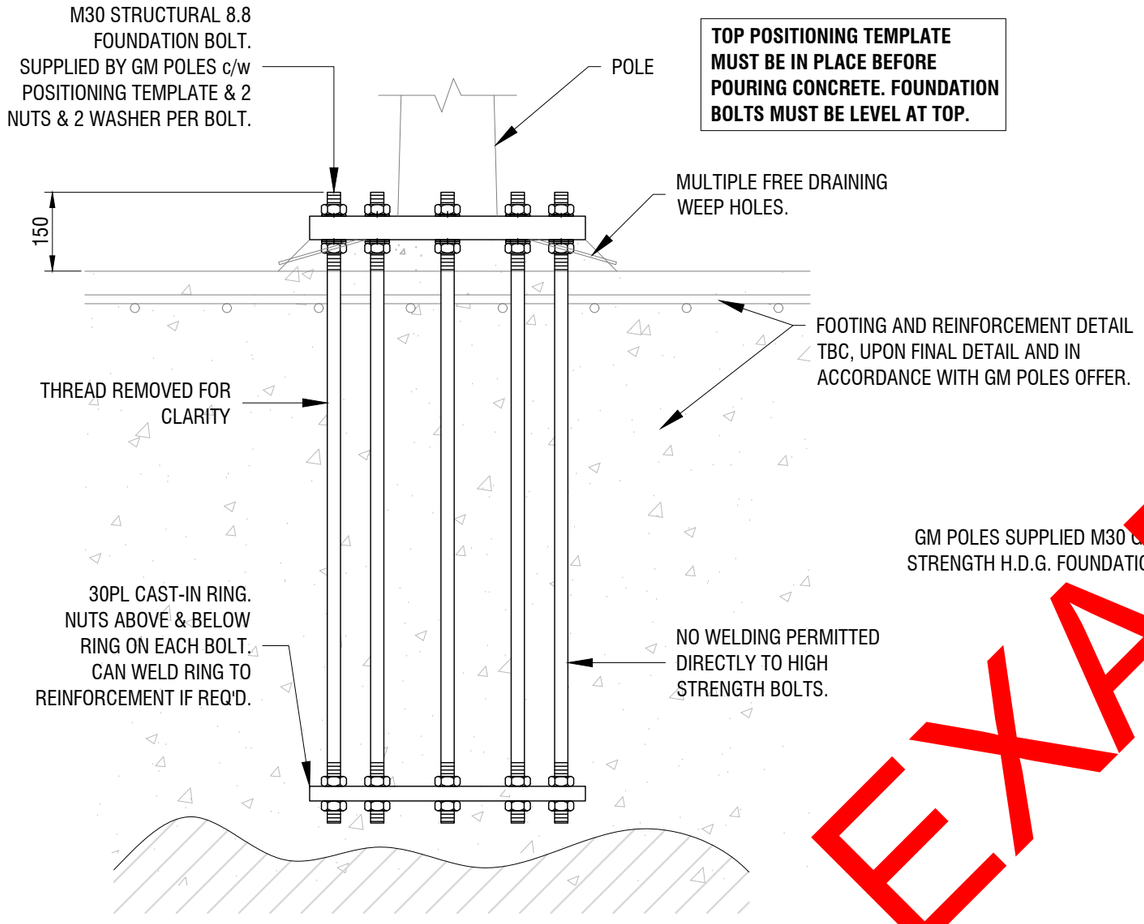
GM POLES

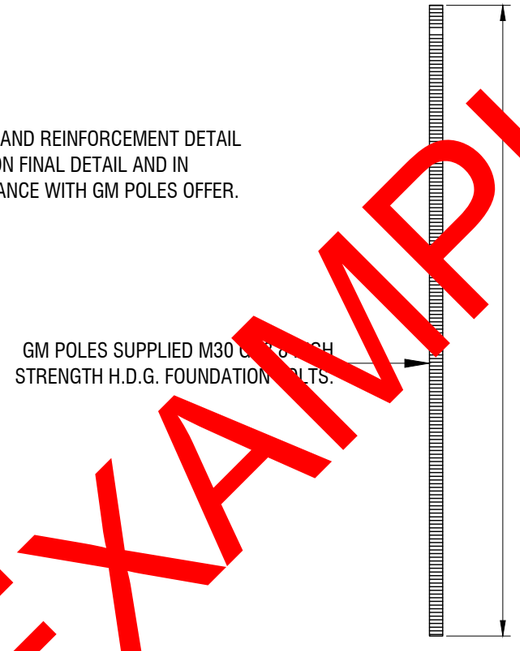
490 Freeman Rd.
RICHLANDS,
QLD 4077
Ph: (07) 3718 4900

EXAMPLE - LIGHT TOWER GENERAL ARRANGEMENT

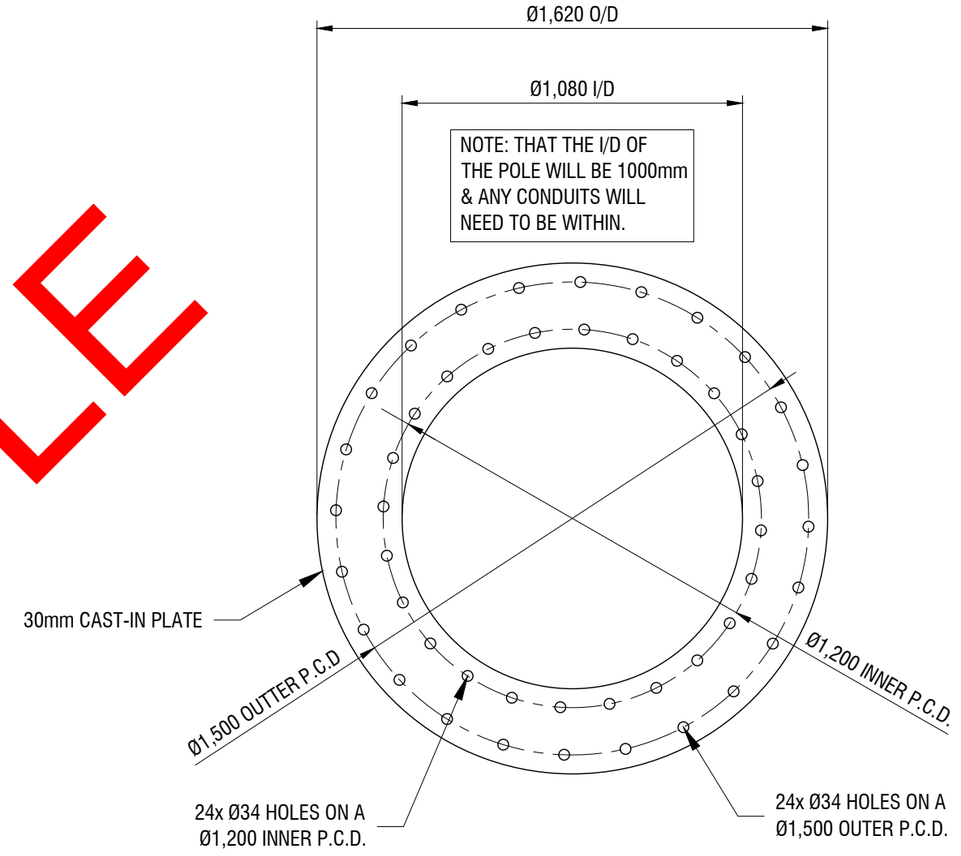
Dm	Date	Scale	Drawing No	Page
D. Creed	22/09/2023	N.T.S.	CD0013852B	1 of 1



TOP POSITIONING TEMPLATE MUST BE IN PLACE BEFORE POURING CONCRETE. FOUNDATION BOLTS MUST BE LEVEL AT TOP.



FOUNDATION BOLT DETAIL



CAST-IN RING PLATE

TOP BOLT POSITIONING TEMPLATE
SAME DIMENSION BUT WITH 16mm THICK.

BOLT ASSEMBLY PLACEMENT

FOUNDATION BOLT ARRANGEMENT

48x BOLTS TOTAL OVER 2x ROWS.
OUTER ROW: 24-M30/1500mm P.C.D.
INNER ROW: 24-M30/1200mm P.C.D.

ULTIMATE LIMIT STATE BASE REACTIONS:

M* = 5,600 kNm
V* = 160 kN
N* = 200 kN

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GM POLES
490 Freeman Rd.
RICHLANDS,
QLD 4077
Ph: (07) 3718 4900

EXAMPLE - FOUNDATION BOLT ASSEMBLY DRAWING

Drn	Date	Scale	Drawing No	Page
R.Ramachandran	26/10/2023	N.T.S.	CD0013852C	1 of 1

Structural Engineering

GENERAL NOTES

1. These drawings are for structural purposes only and are to be read in conjunction with the specification, architectural drawings, other contract documentation and the requirements of the relevant authorities.
2. Verify all setting out dimensions with the Architect.
3. Do not obtain dimensions by scaling the structural elements.
4. Should any ambiguity, error, omission, discrepancy, inconsistency or other fault exist or seem to exist in the contract documents, immediately notify in writing to the Superintendent.
5. Maintain the structure in a stable condition during construction. Temporary bracing/shoring shall be provided by the contractor to keep the structure and excavations stable at all times, ensuring that no part of the documented structure becomes overstressed. For all temporary batters obtain geotechnical engineer's recommendations.
6. All workmanship and materials shall be in accordance with the requirements of current Standards Australia codes and the bylaws, ordinances or other requirements of the relevant building authorities.
7. All proprietary items are to be installed and fixed in accordance with the manufacturers specifications and instructions.
8. All work is to be carried out in accordance with all Workcover requirements and occupational health and safety act regulations
9. Construction using these drawings shall not commence until a Construction Certificate is issued by the Principal Certifying Authority.

DESIGN LOADS:

Refer to drawing S2000 for applicable Design Loads

SAFETY IN DESIGN

TTW operates under Safe Work Australia's Code of Conduct for the Safe Design of Structures.
These drawings shall be read in conjunction with the TTW Transfer of Information Letter and Structural Risk and Solutions Register.
Under the Code of Conduct it is the Client's responsibility to provide a copy of the Structural Risk and Solutions Register to the Principal Contractor.
It is the Principal Contractor's responsibility to review the hazards and risks identified during the design process to ensure a safe workplace is maintained for the construction, maintenance and eventual demolition of the structure.

PILING NOTES

1. Piles are to be designed in accordance with AS2159 by the contractor for the axial loads and moments listed in the piling schedule and all requirements of the specification.
2. The pile design and installation shall follow the recommendations outlined in the geotechnical report No. 24.0223.01_CV Junction Oval_GIR_v1f prepared by ADE Consulting Group. Any additional geotechnical investigat ion work deemed necessary shall be at the contractor's expense.
3. Pile spacing and pile cap design is based on 1050 diameter bored piles. Alternative pile systems may be used subject to approval. Any necessary re-design of pile caps to suit alternative systems shall be at the expense of the contractor. For single piles under columns the minimum pile diameter shall be 1050.
4. All piles or pile groups are to be centred under columns and walls UNO
5. Prior to commencing on site, the contractor must submit for approval:
   (a) pile type proposed
   (b) pile size(s), reinforcement details, founding depths and design certificate. The design certificate is to certify the pile design is in accordance with AS2159 for the loads listed in the piling schedule and be signed by a NER registered engineer experienced in the type of piling proposed.
   (c) a shop drawing setting out all pile locations from grid
6. The contractor is to coordinate the location of all underground services and to be responsible for ensuring that these are either avoided or relocated as appropriate.
7. The contractor shall provide a NER registered engineer to supervise the pile installation.
8. At the satisfactory completion of the work the contractor shall provide an inspection certificate signed by a NER registered engineer.

FOOTING NOTES

1. Foundations have been designed for:
   Allowable Bearing Pressure 5000kPa (Piles founded on Dense Sand
   Allowable Side Shear - 25 kPa (Piles within Medium Dense Sand)
   - 55 kPa (Piles within Dense Sand)
   - 80 kPa (Piles within Very Dense Sand)
2. Foundation material is to be inspected and approved by the geotechnical engineer before casting footings.
3. Refer to geotechnical report No. 24.0223.01_CV Junction Oval_GIR_v1f dated 28 May 2024 by ADE Consulting Group.
4. Locate all pipes, retaining walls and excavation outside a 1:2 (vertical:horizontal) zone of influence from the bottom edge of the footing.
5. Where side shear is required to be developed, clean and roughen the sides of the excavation to the satisfaction of the geotechnical engineer.
6. Footings shall be located centrally under walls and columns unless noted otherwise.
7. Footings to be constructed and backfilled as soon as possible following excavation to avoid softening or drying out by exposure.
8. Contractor is to allow for cost of geotechnical inspections and any required certification.

CONCRETE NOTES

EXPOSURE CLASSIFICATION : External - B1
Internal - A2

CONCRETE
Place concrete of the following characteristic compressive strength f'_c as defined in AS 1379.

Location	f'_c MPa at 28 days
Piles	S40
Pile Caps, Footing Beams, Pad Footings	S40
Slabs on Ground	S32

1. Use Type 'GP' cement, unless otherwise specified.
2. All concrete shall be subject to project assessment and testing to AS 1379.
3. Consolidate by mechanical vibration. Cure all concrete surfaces as directed in the Specification.
4. For all falls in slab, drip grooves, reglets, chamfers etc. refer to the architect's drawings and specifications.
5. Unless shown on the drawings, the location of all construction joints shall be submitted to engineer for review.
6. No holes or chases shall be made in the slab without the approval of the Engineer.
7. Conduits and pipes are to be fixed to the underside of the top reinforcement layer.
8. Slurry used to lubricate concrete pump lines is not to be used in any structural members.
9. All slabs cast on ground require sand blinding with a Concrete Underlay
10. (175) Indicates slab or band thickness

FORMWORK

1. The design, certification, construction and performance of the formwork, falsework and backpropping is the responsibility of the contractor.
2. The proposed method of installation and removal of formwork is to be submitted to the Superintendent for comment prior to work being carried out.

REINFORCEMENT NOTES

1. Fix reinforcement as shown on drawings. The type and grade is indicated by a symbol as shown below. On the drawings this is followed by a numeral which indicates the size in millimetres of the reinforcement.

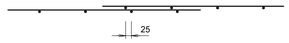
N	Hot rolled ribbed bar	grade D500N
R	Plain round bar	grade R250N
SL	Square mesh	grade 500L
RL	Rectangular mesh	grade 500L

2. Provide bar supports or spacers to give the following concrete cover to all reinforcement unless otherwise noted on drawings.

Footings	-	75 top, 75 bottom, 75 sides.
Slabs	-	30 top, 30 bottom, 30 sides.
	-	30 when exposed to weather or ground.
Beams	-	30 bottom, 30 sides, 30 top to ties.
	-	30 when exposed to weather or ground.
Columns	-	30 to ties and spirals.
	-	30 when exposed to weather or ground.
Walls	-	30 generally.
	-	30 when cast in forms but later exposed to weather or ground.
	-	30 when cast directly in contact with ground.

3. Cover to reinforcement ends to be 50 mm UNO.
4. Provide N12-450 support bars to top reinforcement as required. Tension Lap UNO
5. Maintain cover to all pipes, conduits, reglets, drip grooves etc.
6. All cogs to be standard cogs unless noted otherwise.
7. Fabric end and side laps are to be placed strictly in accordance with the manufacturers requirements to achieve a full tensile lap. Fabric shall be laid so that there is a maximum of 3 layers at any location.

FABRIC LAPS



8. Laps in reinforcement shall be made only where shown on the drawings unless otherwise approved. Refer to Reinforcement Lap table below. Gap between lapped bars to be no more than 3 bar diameters as per AS3600 clause 13.2

TENSION LAPS

BAR SIZE	32 MPa CONCRETE		
	TOP BARS IN BANDS AND BEAMS	HORIZONTAL BARS IN WALLS & TOP BARS IN SLABS > 330 THICK	ALL OTHER BARS
N12	580	620	480
N16	800	920	700
N20	1130	1240	950
N24	1480	1590	1230
N28	1850	1940	1490
N32	2250	2300	1780
N36	2690	2700	2080
N40	3130	3130	2420

BAR SIZE	40 MPa CONCRETE		
	TOP BARS IN BANDS AND BEAMS	HORIZONTAL BARS IN WALLS & TOP BARS IN SLABS > 330 THICK	ALL OTHER BARS
N12	580	590	480
N16	770	870	670
N20	1050	1150	890
N24	1370	1440	1100
N28	1700	1740	1340
N32	2070	2070	1590
N36	2420	2420	1870
N40	2800	2800	2150

BAR SIZE	50 MPa CONCRETE		
	TOP BARS IN BANDS AND BEAMS	HORIZONTAL BARS IN WALLS & TOP BARS IN SLABS > 330 THICK	ALL OTHER BARS
N12	580	580	480
N16	770	780	640
N20	950	1040	800
N24	1230	1290	990
N28	1530	1550	1200
N32	1850	1850	1430
N36	2170	2170	1670
N40	2500	2500	1930

COMPRESSION LAPS

BAR SIZE	LAP
N16	640
N20	800
N24	960
N28	1120
N32	1280
N36	1440
N40	1600

Rev	Description	Eng	Draft	Date
P1	PRELIMINARY ISSUE	ADU	ADU	05.06.24

Project
CV JUNCTION OVAL
LIGHT TOWERS

Sheet Subject
GENERAL NOTES

Architect

Structural Engineer
TTW Structural Civil Traffic Façade
+61 3 9602 1433 | L13 379 Collins Street Melbourne VIC 3000

Scale : A1 AS INDICATED
Drawn ADU
Authorised

Job No 244071
Drawing No S0001
Revision P1

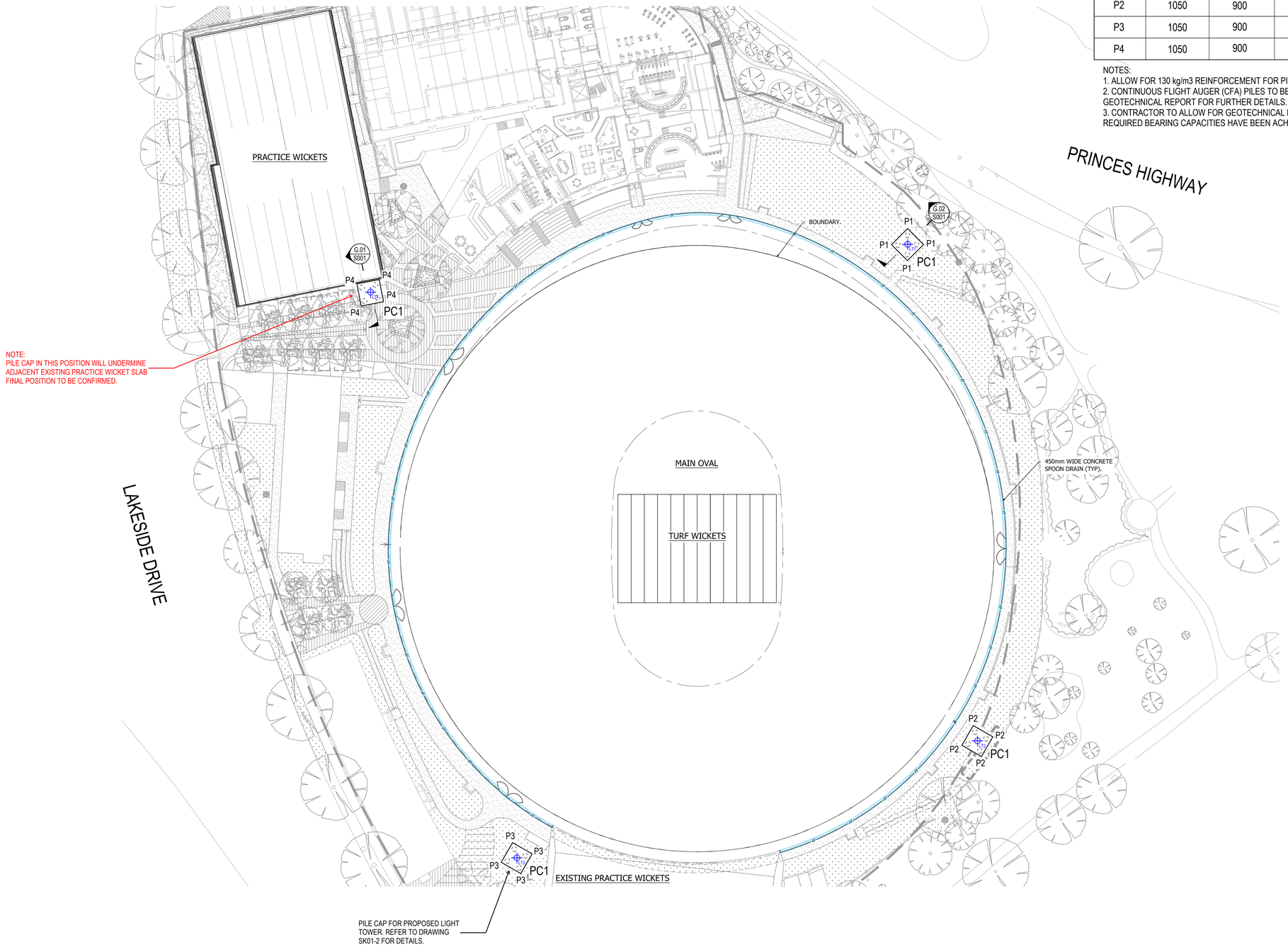
PRELIMINARY
NOT TO BE USED FOR CONSTRUCTION

A1 0 1 2 3 4 5 6 7 8 9 10

PILE SCHEDULE

MARK	PILE DIA.	PILE ULS LOADS			ESTIMATED PILE DEPTH (m BELOW N.G.L)	REMARKS
		ULTIMATE TENSION (kN)	ULTIMATE COMPRESSION (kN)	ULTIMATE SHEAR (kN)		
P1	1050	900	1320	40	10	PILE TO BE FOUNDED IN DENSE SAND WITH ULT. END BEARING OF 5000 kPa
P2	1050	900	1320	40	11	PILE TO BE FOUNDED IN DENSE SAND WITH ULT. END BEARING OF 5000 kPa
P3	1050	900	1320	40	12	PILE TO BE FOUNDED IN DENSE SAND WITH ULT. END BEARING OF 5000 kPa
P4	1050	900	1320	40	16.5	PILE TO BE FOUNDED IN DENSE SAND WITH ULT. END BEARING OF 5000 kPa

NOTES:
1. ALLOW FOR 130 kg/m3 REINFORCEMENT FOR PILES TYPICALLY U.N.O
2. CONTINUOUS FLIGHT AUGER (CFA) PILES TO BE ADOPTED TYPICALLY THROUGHOUT - REFER TO GEOTECHNICAL REPORT FOR FURTHER DETAILS.
3. CONTRACTOR TO ALLOW FOR GEOTECHNICAL ENGINEER TO INSPECT AND CERTIFY THAT THE REQUIRED BEARING CAPACITIES HAVE BEEN ACHIEVED BEFORE CASTING PILES.



DENOTES PROPOSED LIGHT POLE LOCATION - FINAL LOCATIONS TO BE CONFIRMED. REFER TO SURVEY DRAWING 2400768 BY BEVERIDGE WILLIAMS, DATED 28/03/2024 FOR FURTHER DETAILS

FOUNDATION PLAN
SCALE 1:500

Rev	Description	Eng	Draft	Date
P1	PRELIMINARY ISSUE	ADU	ADU	05.06.24

Project
CV JUNCTION OVAL LIGHT TOWERS

Sheet Subject
FOUNDATION PLAN

Architect

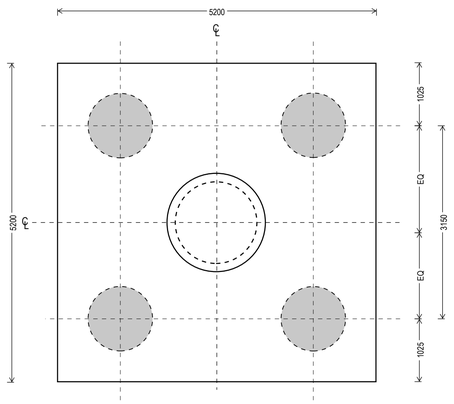
Structural Engineer
TTW Structural Civil Traffic Façade
+61 3 9602 1433 | L13 379 Collins Street Melbourne VIC 3000

Scale : A1	Drawn	Authorised
1 : 500	ADU	

Job No	Drawing No	Revision
244071	S1000	P1

PRELIMINARY
NOT TO BE USED FOR CONSTRUCTION

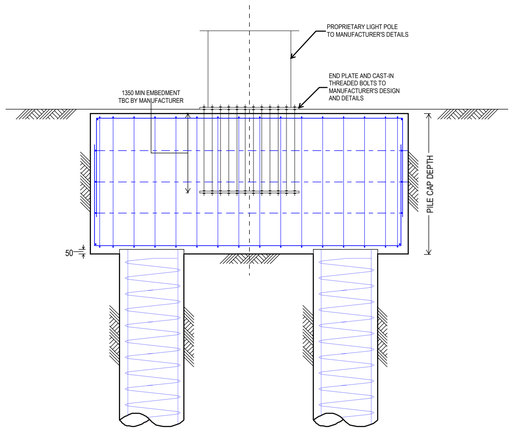
A1 0 1 2 3 4 5 6 7 8 9 10



PILE CAP - PC01	
DEPTH	2300
BTM REINFORCEMENT X BARS	TBC
BTM REINFORCEMENT Y BARS	TBC
TOP REINFORCEMENT X BARS	TBC
TOP REINFORCEMENT Y BARS	TBC
SIDE FACE REINFORCEMENT	N20-200

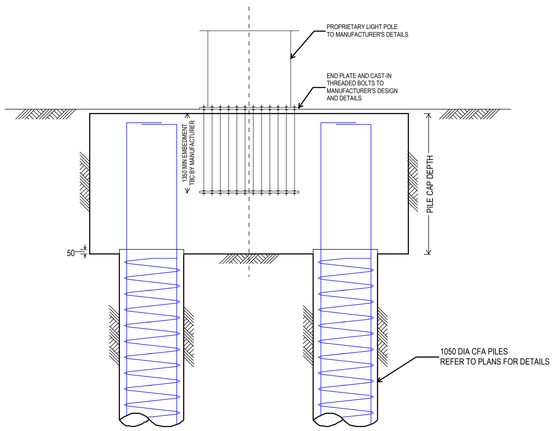
COVER: 50mm
CONCRETE GRADE: 40 MPa F'c

NOTE: ALLOW FOR 120 kg/m3 REINFORCEMENT TYPICAL.



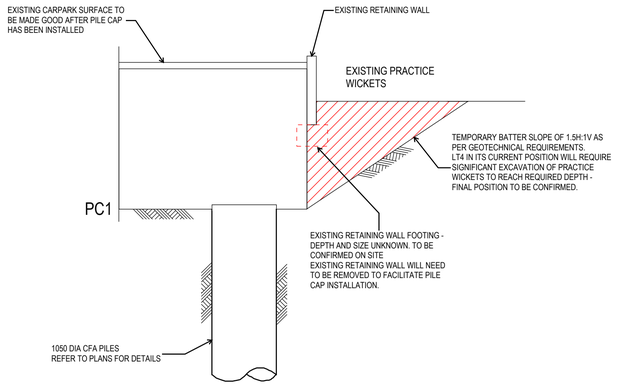
PC1 PILE CAP - SECTION VIEW

SCALE 1:50



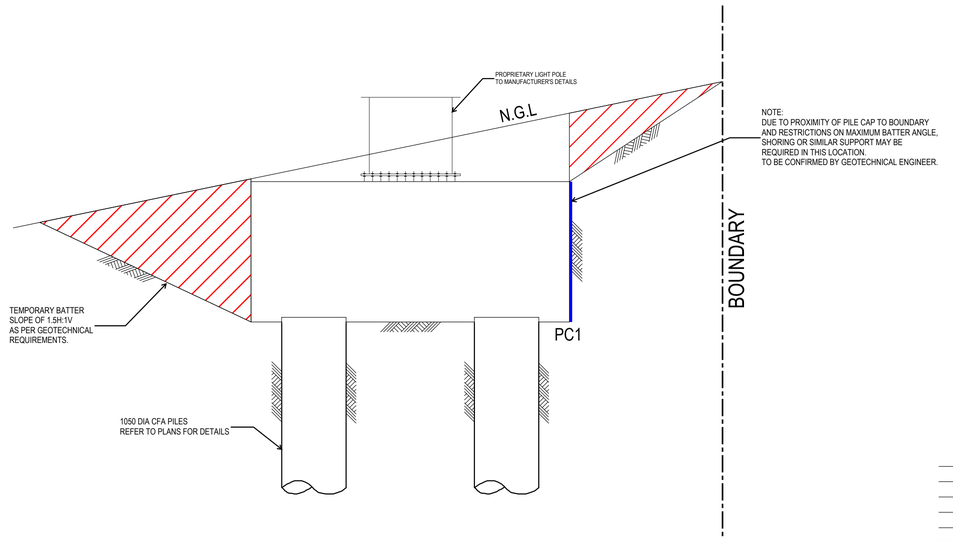
PC1 CAP - SECTION VIEW (ALTERNATE PILE REINFORCEMENT VIEW)

SCALE 1:50



SECTION G.01

SCALE 1:50



SECTION G.02

SCALE 1:50

NOTE:
THE ABOVE HAS BEEN DESIGNED FOR THE FOLLOWING ULTIMATE LIMIT STATE BASE REACTIONS, AS PER DRAWING CD0013852B BY GM POLES, DATED 22/09/2023:

ULTIMATE BASE MOMENT (M*): 5600kN.m
ULTIMATE BASE SHEAR (V*): 160 kN
ULTIMATE BASE AXIAL LOAD (N*): 200 kN

NOTES
1. ASSUMED THAT ALL LOADS ABOVE ARE APPLIED AT CENTROID OF LIGHT POLE, AND APPLIED MOMENT AND SHEAR ARE FULLY REVERSIBLE
2. PILE CAP REINFORCEMENT SHOWN IN THESE DRAWINGS ASSUMES 1050 PILE DIAMETER AND SETOUT OF PILES AS SHOWN. PILING CONTRACTOR MUST ALLOW FOR REVIEW OF RAFT DIMENSIONS AND REINFORCEMENT IN EVENT OF CHANGES TO PILE SIZE AND/OR DIAMETER.

A1 0 1 2 3 4 5 6 7 8 9 10

Rev	Description	Eng	Draft	Date
P1	PRELIMINARY ISSUE	ADU	ADU	05.06.24

Project
CV JUNCTION OVAL LIGHT TOWERS

Sheet Subject
PILE CAP SECTIONS AND DETAILS

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Scale : A1	Drawn	Authorised
1 : 50	ADU	

Job No	Drawing No	Revision
244071	S2000	P1

PRELIMINARY
NOT TO BE USED FOR CONSTRUCTION

Geotechnical Engineering Report

Geotechnical Investigation

CV Junction Oval Light Towers

Prepared for: CME Group c/o TTW Engineers

24.0223.01_CV Junction Oval_GIR_v1f | Date: 29 May 2024

ADE CONSULTING GROUP

Document Information

Report Title:	Geotechnical Investigation - CV Junction Oval Light Towers
Prepared for:	CME Group c/o TTW Engineers
Project Location:	CV Junction Oval, Lakeside Dr, St Kilda VIC 3182
File Reference:	24.0223.01
Report Reference:	24.0223.01_ CV Junction Oval_GIR_v1f

Document Control

Rev	Date	Author	Revision Description	Reviewer/Approver
v0d	28/05/2024	JSM	Draft for comments	NN
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For and on behalf of
ADE Consulting Group Pty Ltd

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Appendices

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1 Introduction

1.1 Engagement

ADE Consulting Group Pty Ltd (ADE) was commissioned by CME Group c/o TTW Engineers (TTW) to undertake a geotechnical investigation to inform the design of four light towers at Cricket Victoria (CV) Junction Oval, Lakeside Dr, St Kilda VIC 3182 (herein referred to as "the site").

The commissioned works were undertaken in general accordance with the email correspondences between 21 March 2024 and 26 March 2024 and the schedule of rates (Document Ref: 24.0223.00_ Light Towers GI_SOR_V0F, Dated 26 March 2024).

To ensure its contextual integrity, this report must be read in its entirety and should not be copied, distributed or referred to in part only.

1.2 Purpose

This report has been prepared to present the geotechnical investigation findings and engineering assessment of the basic site ground model, geotechnical design parameters for piled foundations, and a discussion of geotechnical risks and construction considerations.

1.3 Background

CME Group are the managing contractor for Cricket Victoria to design and construct four 40m tall light towers at Cricket Victoria Junction Oval in St Kilda, Victoria.

Based on the client-supplied documents, a previous geotechnical investigation was conducted by Golder Associates in 2015 and 2016 (Document Ref: 1535657-002-R-Rev0.pdf, Dated 2 September 2015, 1535657-003-R-Rev1.pdf, Dated 21 April 2016 and 1535657-011-R-Rev0 Additional investigation, dated 7 October 2016) encountered similar soil strata to this investigation.

1.4 Scope of work

The geotechnical investigation scope of work presented in this report is to inform the design solution of the four light towers at CV Junction Oval.

The agreed geotechnical scope of works is limited to:

- Enabling site works and engaging relevant subcontractors.
- Drilling of four boreholes at the proposed light tower locations to a depth of up to 20m below ground level, including Standard Penetration Tests (SPT) at 1.5m intervals.
- Provision of a factual and interpretive report including the following:
    - Brief description of the site and geology.
    - A site location plan showing the approximate test locations.
    - Summary of subsurface soil profile and groundwater conditions (if encountered).
    - Engineering borehole logs in accordance with AS 1726.
    - Estimated geotechnical design parameters for pile foundations and permanent and temporary batter slopes.
    - Commentary on on-site earthworks and excavation conditions.
    - Commentary on the construction of footing systems.

2 Site information

2.1 Description

The site is located at the CV Junction Oval on Lakeside Drive, St Kilda. The site facilitates a cricket ground, training facilities, and associated pavilions. The test location area was nominated at four locations along the boundary of the cricket ground. The surfaces at LT01, LT02 and LT03 were inclined at approximately 8-12 degrees. LT04 was generally flat within the car park area to the northwest of the site, adjacent to the café. It should be noted that access to LT01 and LT02 was via Parks Victoria (PV) land. The appropriate care and preliminaries were completed prior to entering any PV-owned areas.

2.2 Regional Geology

The Victorian Seamless Geology data set (1:250,000 Scale, State Govt of Victoria,2023) indicates that the site is underlain by Brighton Group / Red Bluff Sandstone formation (Nbr). This formation is described as having clayey sands to sandy clays with sand intervals. Figure 1 provides an extract of the site location in the context of the regional geology plan.

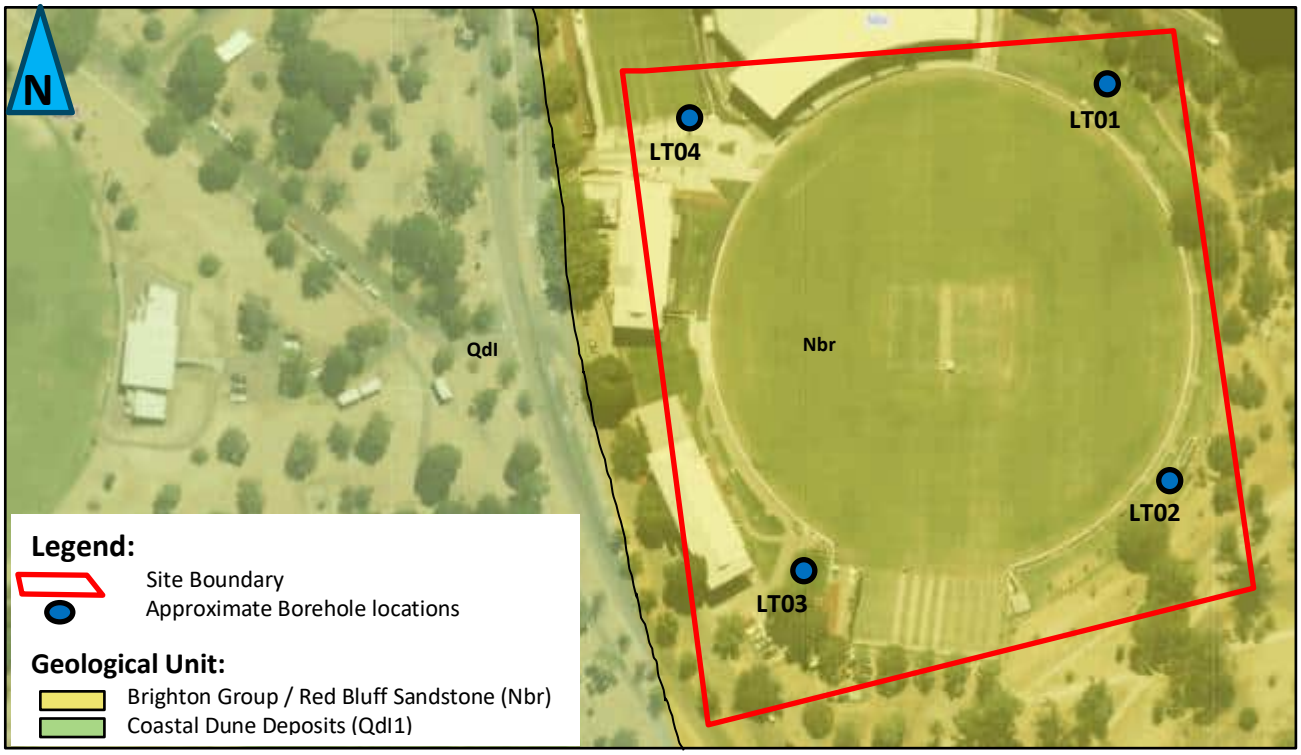

Figure 1: Site location and regional geology

3 Geotechnical investigation

3.1 General

The geotechnical site investigation was conducted from 1 to 4 May 2024. Before drilling, underground services were checked at each borehole location by a suitably qualified service locator using service scanning and ground penetration radar (GPR) methods. A summary of test location ID, GPS northing/eastings and termination depth is shown in Table 1. A site plan highlighting the approximate test locations is presented in Appendix A.

Table 1: Summary of borehole locations

Borehole ID	Approximate top of borehole RL (MGA2020) (m)	MGA-94 Zone 55		Termination Depth (m BGL)	Termination Depth RL (m)
		Easting	Northing		
LT01	11.11	0322358	5808313	19.45	- 8.34
LT02	10.36	0322375	5808201	11.95	- 1.59
LT03	9.51	0322271	5808172	19.45	- 9.94
LT04	8.51	0322237	5808303	19.45	- 10.94

RL = Reduced Level

3.2 Borehole Drilling

Boreholes were drilled using a solid auger and wash boring (mud rotary) methods using a Comacchio 702 and a tight access Hanjin D&B 8-D geotechnical drilling rig.

Three boreholes (LT01, LT03 and LT 04) were advanced to a depth of 19.45 meters below ground level (mBGL), and one borehole (LT02) was advanced to a depth of 12.50 mBGL.

The soil samples recovered during the drilling were logged by an experienced ADE geotechnical engineer in accordance with AS1726-2017.

Standard Penetration Tests (SPT) were undertaken at regular intervals from 0.5 mBGL for visual, tactile and strength assessments. At the completion of the drilling, boreholes were backfilled to the surface and reinstated to existing conditions.

All borehole logs are provided in Appendix B, along with explanatory notes providing definitions of the terms and symbols used in the logs. These should be read in conjunction with this report and the limitations presented in Section 6.

4 Results of Investigation

4.1 Site Geotechnical Conditions

The findings from the geotechnical investigation and available regional data have been utilised to create a generalised ground profile, as presented in Table 2.

Table 2: Summary of generalised ground profile

Unit	Origin	General Description	Depth (m)			
			LT01	LT02	LT03	LT04
1	Topsoil/Fill	Clayey SAND / Sandy CLAY	0.0 – 3.5	0.0 – 2.5	0.0 – 1.5	0.0 – 2.0
2a	Alluvial (Inferred Brighton Group)	Cohesive (Silty CLAY / Sandy CLAY)	3.5 – 3.8	–	1.5 – 3.5 14.70 – 19.45	2.0 – 4.5
2b	Alluvial (Inferred Brighton Group)	Granular (Clayey SAND / SAND)	3.8 – 19.45	2.5 – 11.95	3.5 – 14.70	4.5 – 19.45

In order to establish engineering parameters, the subsurface strata have been divided into three geotechnical units.

- **Unit 1 – Topsoil / Fill**

  Fill material was encountered across the investigation locations, with thicknesses ranging from approximately 3.5m below ground level (bgl) at LT01 to 1.5m bgl at LT03. The non-cohesive topsoil material consisted of silty clayey sand. It was observed that at the LT04 location, there was a concrete thickness of 200mm on top of the fill layer.

- **Unit 2a - Alluvial soil – Cohesive (inferred Brighton Group / Red Bluff Formation)**

  This Brighton Group unit was encountered beneath the Fill layer at all LT01, LT03 and LT04 borehole locations. This cohesive layer was inferred by ALLUVIAL Soil material comprising of a mixture of sand, silt, clay, and gravel. Alluvium soil is inferred from sedimentary deposits that have been eroded, transported, and deposited by flowing water, such as rivers, streams, and floods and are often found in low-lying areas such as river valleys, floodplains, and deltas.

- **Unit 2b - Alluvial soil – Granular (inferred Brighton Group / Red Bluff Formation)**

  This Brighton Group unit was encountered beneath the upper cohesive layer at LT01, LT03 and LT04 borehole locations. LT02 encountered this unit below the Fill material. This layer inferred ALLUVIAL Soil material consists of a mixture of sand, silt, clay, and gravel.

4.2 Standard Penetration Testing (SPT)

Figure 2 shows the general outcomes of the SPT results and the strength of material encountered on site according to AS1289.6.3.1.

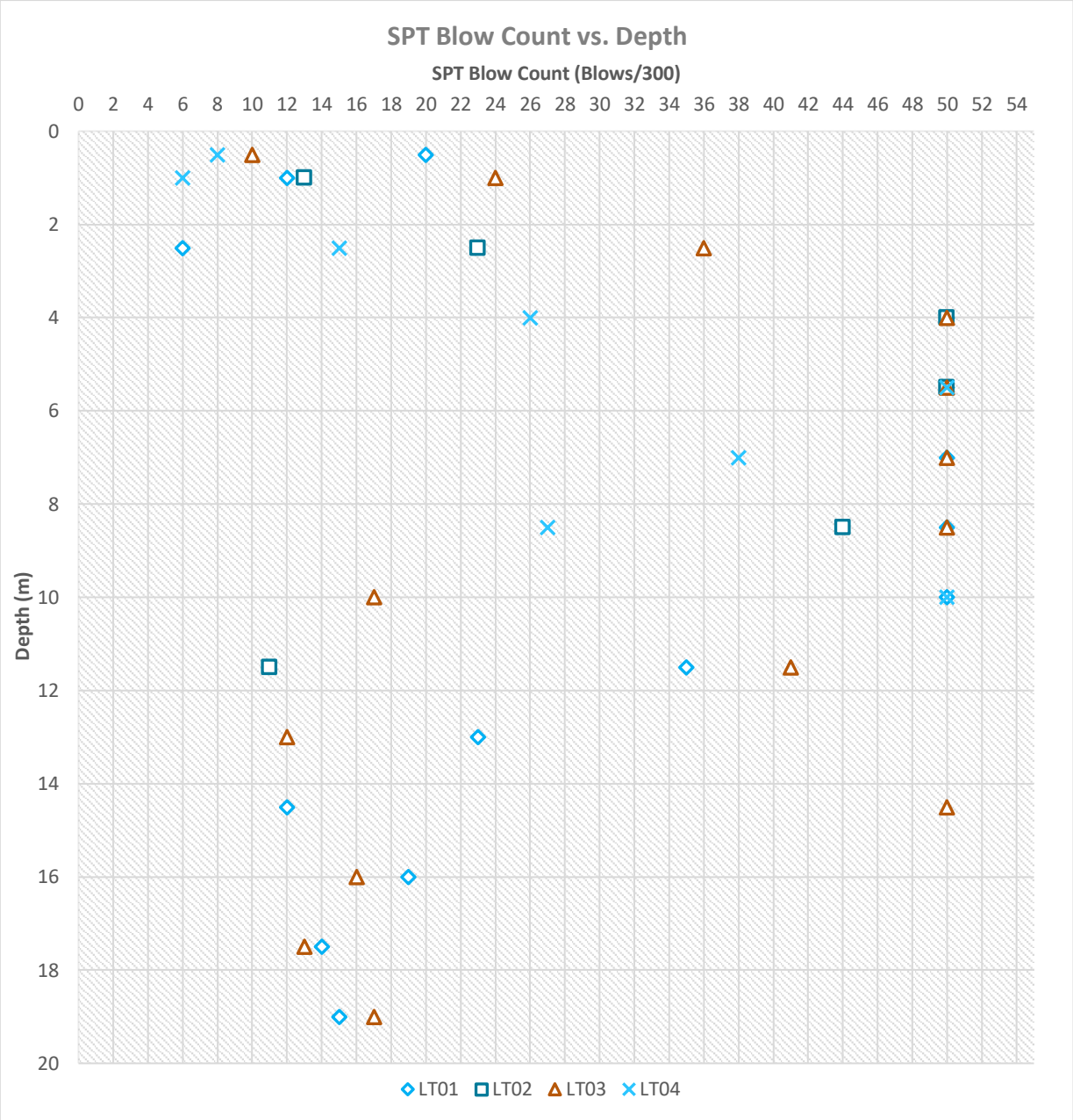

Figure 2: Summary of SPT results

4.3 Groundwater Condition

Visualising Victoria's Groundwater database indicates that the regional groundwater table is approximately within 0.0m to 5.0 m BGL. According to the data previously collected by Golder Associates report number 1535657-003-R-Rev1, section 4.3, dated 21 April 2016, the groundwater level in the vicinity of the site typically ranges from approximately 2m to 7m BGL.

An inferred groundwater level was encountered at LT02 at approximately 10.50 m BGL based on the visually saturated material observed from the auger drilling. No further groundwater was observed at the other borehole locations due to the wash-boring drilling methods. Therefore, the groundwater data obtained provides limited information into the groundwater behaviour at the site. Groundwater level variations and perched water are likely across the site and over time due to seasonal and construction effects.

Due to the limited information observed from this investigation, a design groundwater level cannot be determined, and therefore, the designer will need to consider a suitable design groundwater level based on the available information. If the client wishes to accurately identify the groundwater level, this can be performed as part of an additional assessment.

5 Engineering Assessment

5.1 Proposed works

The geotechnical investigation has been undertaken with the purpose of informing the light tower design and construction. It is understood that four new light towers are to be constructed around the existing cricket ground. The specifics regarding the proposed piled structure, anticipated structural loads and ground pressures have not yet been provided. Consequently, the recommendations outlined in this report are of a general nature and may be revised once detailed structural information becomes accessible.

The geotechnical assessment presented in this section of the report relies on the descriptions outlined earlier. Should there be advancements in the design process or alterations to the scope of work, it may be necessary to review and potentially revise the assessment provided.

5.2 Seismic Design

The geotechnical investigation conducted at the site had a limited scope, reaching a maximum drilling depth of 19.50 mBGL. Although no bedrock was encountered within this depth range, the precise depth remains uncertain. However, considering available regional geological data and local experience, a soil subclass of D_e for deep soils should be adopted, along with a Hazard Factor (Z) of 0.09 as per AS 1170.4–2007.

5.3 Pile Foundations

Bored piles are generally the preferred option for a 40m high light tower, which demands substantial structural integrity and load-bearing capacity. Bored piles offer the necessary depth and diameter flexibility, ensuring a stable and robust foundation capable of supporting the height and potential wind loads on the tower.

However, if site conditions and structural requirements fall within the capabilities of Continuous Flight Auger (CFA) piles, and there are constraints related to noise, vibration, or installation speed, CFA piles could be considered. Considering potential challenges, such as the need for casing or support for open pile holes and potential groundwater inflows, CFA concrete-injected piles might be suitable if they can achieve the required structural integrity. Upon reaching the termination depth specified by the designer, concrete is pumped under pressure through the hollow stem of the CFA as the auger is withdrawn. Subsequently, the steel reinforcement is installed using a hydraulic vibrator into the concrete. CFA piles typically range in diameter from 400mm to 1200mm and are generally effective in soils and weak rock, as encountered in this investigation.

It is important to note that we currently lack detailed information on the foundation loadings and the required pile diameter. Once these details are available, the foundation design can be tailored to the ground conditions and any associated uncertainties by the designers.

The estimated geotechnical design parameters provided in Table 3 can be adopted for the design of piles.

Table 3: Estimated geotechnical parameters for pile design

Units	Soil type	Consistency / Relative Density	Undrained Shear strength, Su[1] (kPa)	Elastic Modulus (MPa)		Estimated Ultimate End Bearing Capacity, F_b (kPa)	Estimated Ultimate Shaft Skin Friction, F_s (kPa)	*Estimated Lateral Yield Pressure, P_y (MPa)**
				Vertical E'_v	Horizontal E'_h			
2a	Cohesive	Firm	25	5	3.5	N/A	15	0.125* 0.250**
		Stiff	50	10	7	500	30	0.250* 0.500**
		Very Stiff	100	20	15	900	45	0.500* 1.000**
		Hard	200	40	30	1,800	60	1.000* 2.000**
2b	Granular	Loose	-	5	3.5	N/A	15	0.100* 0.200**
		Medium Dense		10	7	1,650	25	0.250* 0.500**
		Dense	-	50	37	5,000	55	0.750* 1.500**
		Very Dense	-	80	60	7,000	80	1.250* 2.500*

[1] *The shear strength values are estimated based on SPT relationships.*

* for depth<3D

**for depth>3D

The pile design should be carried out in accordance with Australian Standard AS 2159-2009, which is based on using limit state principles. For ultimate limit state design, the designer would need to adopt an appropriate geotechnical strength reduction factor (ϕ_g). A geotechnical reduction factor of 0.4 can be adopted based on the fact that no pile testing is considered. This factor may be revised, subject to consideration of pile installation methods and load testing during construction. It should be noted that a separate design for lateral stability of the piles under applied loads is needed as the light tower is typically a lateral loaded pile. For uplift design, an additional reduction factor of 0.75 should be applied to the shaft adhesion value. Piles are to be spaced not less than three pile diameters (centre to centre) to attain the design end bearing and shaft friction capacities. Piles closer than three pile diameters may have a reduced capacity due to group effects and should be referred to a geotechnical engineer for revised capacities.

Pile foundation settlements will be dependent on the selected construction methodology, cleanliness of the pile toe, and side surface condition. For a well-designed and constructed pile, a vertical settlement of less than 25 mm under SLS loads is expected. However, lateral displacement shall be assessed via the lateral design stage, and the pile diameter may need to be increased, or the group pile may need to be considered to minimise lateral movement.

5.4 Soil Aggressivity

It was advised by TTW that laboratory assessment was not required for this investigation. Therefore, no soil aggressivity laboratory analysis was performed. It should be noted that based on the AS 2159—2009, the durability of the pile should be designed considering the environmental conditions that may affect the design life. The designer should consider suitable measures for the protection and durability of the pile

foundation. If the client wishes to accurately identify the exposure classification in accordance with AS 2159-2009, this can be performed as part of an additional assessment.

5.5 Retaining Wall Design

As requested by TTW, the estimated geotechnical parameters for retaining wall design, based on the site investigation results, are presented in Table 4.

Table 4: Estimated geotechnical parameters for retaining wall design

Units	Soil type	Consistency / Relative Density	Unit Weight, γ	Effective Cohesion, c' (kPa)	Effective Friction Angle, φ' (°)	K_o	K_a	K_p
1	Fill	-	17	0	30	N/A	N/A	N/A
2a	Cohesive	Firm	17	3	24	0.577	0.406	2.464
		Stiff	18	4	26	0.562	0.390	2.561
		Very Stiff	19	6	28	0.531	0.361	2.770
		Hard	19	8	29	0.515	0.347	2.882
2b	Granular	Loose	17	-	30	0.500	0.333	3.000
		Medium Dense	18	-	34	0.441	0.283	3.537
		Dense	19	-	36	0.412	0.260	3.852
		Very Dense	20	-	38	0.384	0.238	4.204

5.6 Temporary Batter Slopes

Temporary batters up to 1.5m in the existing fill and natural subgrade can be constructed at maximum slopes of 1.5H:1V, subject to temporary work design recommendations. If site restraints require temporary batters to be steepened beyond the recommended value above, shoring or similar support would have to be considered before proceeding with any excavation.

A detailed batter slope stability assessment should be performed on all proposed temporary batters exceeding about 1.5m in height. We recommend that the excavated batters be assessed by ADE at the time of the excavation during the construction stage.

Pile cap and trench side walls and any excavation within the fill materials encountered may exhibit unstable behaviour for short- and long-term excavations. It is recommended that adequate shielding, propping, and drainage/dewatering measures be implemented prior to entering excavations. Any temporary excavations exceeding the relevant occupational health and safety regulations should be regularly inspected and certified by a suitable, competent geotechnical engineer.

Due to nearby medium to large trees noted near the proposed light tower locations, it is likely that an open-cut excavation will increase its overall dimensions from the removal of such organic objects. This will need to be considered during the construction phase.

Inclement weather conditions can potentially affect the performance of any open excavations, and in case of wet weather, all workers and staff should be evacuated from the immediate area. A suitable, competent geotechnical engineer shall re-inspect temporary excavations prior to recommencing work in affected excavations.

Care should be taken to ensure that there is no surcharge from stockpile materials and building or vehicular loads to at least the excavation depth beyond the crest of excavations.

All excavation work should be fully supervised by a suitable, competent geotechnical engineer to confirm the conditions of the exposed material and provide additional recommendations where and if required.

5.7 Geotechnical Design Review

As the design develops, ADE considers it important that the project geotechnical engineers are given the opportunity to review the design and/or engineering drawings to ensure recommendations relating to site development are in accordance with this report and have been interpreted as intended.

Geotechnical input throughout the detailed design and construction phase is also recommended. This may include geotechnical verification during construction and construction phase monitoring, as appropriate.

6 Limitations of this report

This report has been prepared for the sole use of TTW and for the sole purpose specified in this document. TTW has commissioned the works resulting in the preparation of this report in accordance with ADE Schedule of Rates (Document Ref: 24.0223.00_ Light Towers GI_SOR_V0F, dated 26 March 2024) only, which was prepared in response to the briefing provided by TTW, which may have been provided in written or verbal form.

The advice herein relates only to this project, and all results, conclusions and recommendations made should be reviewed by a competent and experienced person with experience in environmental and geotechnical investigations before being used for any other purpose. ADE accepts no liability for use or interpretation by any person or body other than TTW, who commissioned the works. This report should not be reproduced or amended in any way without prior approval from TTW or ADE. It should not be relied upon by any other party, who should make their own independent enquiries.

This report does not provide a complete assessment of the geotechnical status of the site, and it is limited to the scope defined herein. Should information become available regarding conditions at the site (e.g., Conditions exposed at the site during earthworks varying significantly with the results within this report), ADE reserves the right to review the report in the context of the additional information.

ADE's professional opinions are based upon its professional judgement, experience, training, and results from analytical data. In some cases, further testing and analysis may be required, thus producing different results and/or opinions. ADE has limited investigation to the scope agreed upon with TTW.

This report has been written with the intent of providing TTW with information on the site subsurface for design and construction purposes. Subsurface conditions relevant to the works undertaken by TTW should be assessed by a competent contractor who can make their own interpretation of the data represented within this report.

Subsurface conditions will always vary within a worksite, and the extremes of these variations cannot be defined by exhaustive investigations, and as such, the measurements and values obtained within this result may not be representative of these extremes.

Appendix A. Test Location Plan

LEGEND

BH ID

ADE CONSULTING GROUP
SOLUTIONS THROUGH INNOVATION

ADE Consulting Group
4/95 Salmon Street
Port Melbourne VIC 3207

Website: ade.group

0 25 50 m

Client: CME Group
Project name: TTW Light Towers GI
Project number:202024.0223.01
Date created:07/05/2024
Prepared by:KA

Appendix A - Approximate Test Location Plan

Appendix B. Borehole logs

NON-CORE DRILL HOLE - GEOLOGICAL LOG

HOLE NO : LT01
FILE / JOB NO : 202024.0223.01
SHEET : 1 OF 4

CLIENT : CME Group
PROJECT : CV Junction Oval Light Towers
LOCATION : Citipower Centre Junction Oval, Lakeside Drive, St Kilda VIC 3182

POSITION : E: 322358.0, N: 5808313.0 (MGA2020-56) SURFACE ELEVATION (RL) : 11.11 (AHD) ANGLE FROM HORIZONTAL : 90°

EXCAVATION METHOD : Hanjin DB8 MOUNTING : Track CONTRACTOR : Terratest DRILLER : TO

DATE STARTED : 3/5/2024 DATE COMPLETED : 3/5/2024 DATE LOGGED : 3/5/2024 LOGGED BY : KA CHECKED BY : JSM

DRILLING						MATERIAL						
PROGRESS: DRILLING & CASING	PROGRESS: WATER	GROUND WATER LEVELS	SAMPLES & FIELD TESTS	RL (m)	DEPTH (m)	GRAPHIC LOG	GROUP SYMBOL	MATERIAL DESCRIPTION Soil Type, Colour, Plasticity or Particle Characteristic Secondary and Minor Components	MOISTURE CONDITION	CONSISTENCY RELATIVE DENSITY	PENETROMETER TEST 5 10 15 20	STRUCTURE & Other Observations
AD/V		Not Assessed	0.50m SPT 7,9,11 N=20	11.0 10.5	0.5			FILL Silty Clayey SAND: fine to coarse grained, sub-angular to sub-rounded, dark grey- brown, clay is low to medium plasticity; trace fine to medium grained gravel.	M			FILL
			0.95m 1.00m SPT 5,6,6 N=12	10.0	1.0							
			1.45m		1.5			1.50m				
			2.50m SPT 2,3,3 N=6	9.5 9.0	2.0			FILL Silty Sandy CLAY: medium to high plasticity, dark grey- brown, sand is fine to medium grained.	w>PL			
			2.95m		2.5			2.50m FILL Clayey SAND: fine to coarse grained, sub-angular to sub-rounded, dark grey- black, clay is low to medium plasticity.				
				8.5 8.0	3.0				M			
					3.5			3.50m				
				7.5			CI-CH	Silty CLAY: medium to high plasticity, grey- brown, silt is fine to medium grained; with fine to coarse grained sand.	w>PL	F		Inferred ALLUVIAL SOIL
								3.80m Clayey SAND: fine to coarse grained, sub-angular to sub-rounded, grey-brown, clay is medium to high plasticity.				
			4.00m SPT 9,30,HB N=50+(R)	7.0	4.0		SC					
			4.30m						M			
WB					4.5			4.50m Clayey SAND: fine to coarse grained, sub-rounded to sub-angular, grey-brown, clay is medium to high plasticity; trace fine to medium grained, Sub-angular to angular gravel.		VD		
				6.5			SC					

See Explanatory Notes for details of abbreviations & basis of descriptions.

ADECONSULTINGGROUP
SOLUTIONS THROUGH INNOVATION

NON-CORE DRILL HOLE - GEOLOGICAL LOG

HOLE NO : LT01
FILE / JOB NO : 202024.0223.01
SHEET : 2 OF 4

CLIENT : CME Group
PROJECT : CV Junction Oval Light Towers
LOCATION : Citipower Centre Junction Oval, Lakeside Drive, St Kilda VIC 3182

POSITION : E: 322358.0, N: 5808313.0 (MGA2020-56) SURFACE ELEVATION (RL) : 11.11 (AHD) ANGLE FROM HORIZONTAL : 90°

EXCAVATION METHOD : Hanjin DB8 MOUNTING : Track CONTRACTOR : Terratest DRILLER : TO

DATE STARTED : 3/5/2024 DATE COMPLETED : 3/5/2024 DATE LOGGED : 3/5/2024 LOGGED BY : KA CHECKED BY : JSM

DRILLING | MATERIAL

PROGRESS: DRILLING & CASING	PROGRESS: WATER	GROUND WATER LEVELS	SAMPLES & FIELD TESTS	RL (m)	DEPTH (m)	GRAPHIC LOG	GROUP SYMBOL	MATERIAL DESCRIPTION Soil Type, Colour, Plasticity or Particle Characteristic Secondary and Minor Components	MOISTURE CONDITION	CONSISTENCY RELATIVE DENSITY	PENETROMETER TEST 5 10 15 20	STRUCTURE & Other Observations
				6.0	5.5		SC	Clayey SAND: fine to coarse grained, sub-rounded to sub-angular, grey-brown, clay is medium to high plasticity; trace fine to medium grained, Sub-angular to angular gravel. *(continued)*				Inferred ALLUVIAL SOIL
			5.50m SPT 15,15(50mm HB N=50+(R) 5.70m	5.5				5.60m				
							SW	SAND: fine to coarse grained, sub-rounded to sub-angular, grey- brown, with medium to high plasticity clay; trace fine to medium grained, Sub-rounded to Sub-angular gravel.				
					6.0			6.00m				
				5.0				SAND: fine to coarse grained, sub-angular to angular, brown, trace clay.				
				4.5	6.5							
			7.00m SPT 23,15(50mm HB N=50+(R) 7.20m	4.0	7.0		SW					
WB		Not Assessed		3.5	7.5				M(*continued*)	VD		
				3.0	8.0							
			8.50m SPT 15,29,HB N=50+(R) 8.80m	2.5	8.5			8.50m : as above colour changes to grey				
				2.0	9.0		SW					
				1.5	9.5							
			10.00m					10.00m				

See Explanatory Notes for details of abbreviations & basis of descriptions.

ADECONSULTINGGROUP
SOLUTIONS THROUGH INNOVATION

NON-CORE DRILL HOLE - GEOLOGICAL LOG

HOLE NO : LT01
FILE / JOB NO : 202024.0223.01
SHEET : 3 OF 4

CLIENT : CME Group
PROJECT : CV Junction Oval Light Towers
LOCATION : Citipower Centre Junction Oval, Lakeside Drive, St Kilda VIC 3182

POSITION : E: 322358.0, N: 5808313.0 (MGA2020-56) SURFACE ELEVATION (RL) : 11.11 (AHD) ANGLE FROM HORIZONTAL : 90°

EXCAVATION METHOD : Hanjin DB8 MOUNTING : Track CONTRACTOR : Terratest DRILLER : TO

DATE STARTED : 3/5/2024 DATE COMPLETED : 3/5/2024 DATE LOGGED : 3/5/2024 LOGGED BY : KA CHECKED BY : JSM

DRILLING | MATERIAL

PROGRESS: DRILLING & CASING	PROGRESS: WATER	GROUND WATER LEVELS	SAMPLES & FIELD TESTS	RL (m)	DEPTH (m)	GRAPHIC LOG	GROUP SYMBOL	MATERIAL DESCRIPTION Soil Type, Colour, Plasticity or Particle Characteristic Secondary and Minor Components	MOISTURE CONDITION	CONSISTENCY RELATIVE DENSITY	PENETROMETER TEST 5 10 15 20	STRUCTURE & Other Observations
WB		Not Assessed	SPT 23,35(60mm HB N=50+(R)	1.0	10.21m			SAND: fine to coarse grained, sub-angular to angular, grey, with medium to high plasticity clay.				Inferred ALLUVIAL SOIL
				0.5	10.5					VD		
				0.0	11.0							
			11.50m SPT 12,16,19 N=35	-0.5	11.5		SW		M(continued)			
			11.95m	-1.0	12.0					D		
				-1.5	12.5							
			13.00m SPT 9,10,13 N=23	-2.0	13.0			13.00m SAND: fine grained, sub-rounded to rounded, brown, trace clay; trace silt.				
			13.45m	-2.5	13.5							
				-3.0	14.0		SP		W	MD		
			14.50m SPT 4,5,7 N=12	-3.5	14.5							
			14.95m									

See Explanatory Notes for details of abbreviations & basis of descriptions.

ADECONSULTINGGROUP
SOLUTIONS THROUGH INNOVATION

NON-CORE DRILL HOLE - GEOLOGICAL LOG

HOLE NO : LT01
FILE / JOB NO : 202024.0223.01
SHEET : 4 OF 4

CLIENT : CME Group
PROJECT : CV Junction Oval Light Towers
LOCATION : Citipower Centre Junction Oval, Lakeside Drive, St Kilda VIC 3182

POSITION : E: 322358.0, N: 5808313.0 (MGA2020-56) SURFACE ELEVATION (RL) : 11.11 (AHD) ANGLE FROM HORIZONTAL : 90°

EXCAVATION METHOD : Hanjin DB8 MOUNTING : Track CONTRACTOR : Terratest DRILLER : TO

DATE STARTED : 3/5/2024 DATE COMPLETED : 3/5/2024 DATE LOGGED : 3/5/2024 LOGGED BY : KA CHECKED BY : JSM

DRILLING						MATERIAL						
PROGRESS: DRILLING & CASING	PROGRESS: WATER	GROUND WATER LEVELS	SAMPLES & FIELD TESTS	RL (m)	DEPTH (m)	GRAPHIC LOG	GROUP SYMBOL	MATERIAL DESCRIPTION Soil Type, Colour, Plasticity or Particle Characteristic Secondary and Minor Components	MOISTURE CONDITION	CONSISTENCY RELATIVE DENSITY	PENETROMETER TEST 5 10 15 20	STRUCTURE & Other Observations
				-4.0	15.5			SAND: fine grained, sub-rounded to rounded, brown, trace clay; trace silt. *(continued)*				Inferred ALLUVIAL SOIL
			16.00m SPT 5,9,10 N=19	-4.5	16.0							
				-5.0			SP		W *(continued)*			
			16.45m		16.5							
WB		Not Assessed		-5.5						MD		
				-6.0	17.0							
			17.50m SPT 6,8,6 N=14	-6.5	17.5			17.50m Clayey SAND: fine to coarse grained, sub-angular to angular, brown, clay is medium to high plasticity; trace fine to medium grained gravel.				
			17.95m		18.0							
				-7.0			SC		M			
					18.5							
			19.00m	-7.5				19.00m				
SPT			SPT 4,7,8 N=15	-8.0	19.0		SC	Clayey SAND: fine to coarse grained, sub-angular to angular, grey-white, clay is medium to high plasticity.				
			19.45m		19.5			19.45m Hole Terminated at 19.45 m Target depth				

See Explanatory Notes for details of abbreviations & basis of descriptions.

ADECONSULTINGGROUP
SOLUTIONS THROUGH INNOVATION

NON-CORE DRILL HOLE - GEOLOGICAL LOG

HOLE NO : LT02
FILE / JOB NO : 202024.0223.01
SHEET : 1 OF 3

CLIENT : CME Group
PROJECT : CV Junction Oval Light Towers
LOCATION : Citipower Centre Junction Oval, Lakeside Drive, St Kilda VIC 3182

POSITION : E: 322375.0, N: 5808201.0 (MGA2020-56) SURFACE ELEVATION (RL) : 10.36 (AHD) ANGLE FROM HORIZONTAL : 90°

EXCAVATION METHOD : Hanjin DB8 MOUNTING : Track CONTRACTOR : Terratest DRILLER : TO

DATE STARTED : 4/5/2024 DATE COMPLETED : 4/5/2024 DATE LOGGED : 4/5/2024 LOGGED BY : KA CHECKED BY : JSM

DRILLING						MATERIAL						
PROGRESS: DRILLING & CASING	PROGRESS: WATER	GROUND WATER LEVELS	SAMPLES & FIELD TESTS	RL (m)	DEPTH (m)	GRAPHIC LOG	GROUP SYMBOL	MATERIAL DESCRIPTION Soil Type, Colour, Plasticity or Particle Characteristic Secondary and Minor Components	MOISTURE CONDITION	CONSISTENCY RELATIVE DENSITY	PENETROMETER TEST 5 10 15 20	STRUCTURE & Other Observations
AD/V			1.00m SPT 5,7,6 N=13 1.45m	10.0 9.5 9.0	0.5 1.0 1.5			FILL Silty Clayey SAND: fine to coarse grained, sub-angular to sub-rounded, dark grey- brown, clay is low to medium plasticity; trace fine to medium grained gravel.	M			FILL
			2.50m SPT 7,11,12 N=23 2.95m	8.5 8.0 7.5	2.0 2.5 3.0		SC	2.50m Clayey SAND: fine to coarse grained, sub-angular to sub-rounded, grey-brown, clay is medium to high plasticity.	M	MD		Inferred ALLUVIAL SOIL
			4.00m SPT 11,27,HB N=50+(R) 4.35m	7.0 6.5 6.0	3.5 4.0 4.5		SW	4.00m SAND: fine to coarse grained, sub-angular to sub-rounded, grey, with low to medium plasticity clay.	M	VD		
				5.5								

See Explanatory Notes for details of abbreviations & basis of descriptions.

ADECONSULTINGGROUP
SOLUTIONS THROUGH INNOVATION

NON-CORE DRILL HOLE - GEOLOGICAL LOG

HOLE NO : LT02
FILE / JOB NO : 202024.0223.01
SHEET : 2 OF 3

CLIENT : CME Group
PROJECT : CV Junction Oval Light Towers
LOCATION : Citipower Centre Junction Oval, Lakeside Drive, St Kilda VIC 3182

POSITION : E: 322375.0, N: 5808201.0 (MGA2020-56) SURFACE ELEVATION (RL) : 10.36 (AHD) ANGLE FROM HORIZONTAL : 90°

EXCAVATION METHOD : Hanjin DB8 MOUNTING : Track CONTRACTOR : Terratest DRILLER : TO

DATE STARTED : 4/5/2024 DATE COMPLETED : 4/5/2024 DATE LOGGED : 4/5/2024 LOGGED BY : KA CHECKED BY : JSM

DRILLING						MATERIAL						
PROGRESS: DRILLING & CASING	PROGRESS: WATER	GROUND WATER LEVELS	SAMPLES & FIELD TESTS	RL (m)	DEPTH (m)	GRAPHIC LOG	GROUP SYMBOL	MATERIAL DESCRIPTION Soil Type, Colour, Plasticity or Particle Characteristic Secondary and Minor Components	MOISTURE CONDITION	CONSISTENCY RELATIVE DENSITY	PENETROMETER TEST 5 10 15 20	STRUCTURE & Other Observations
AD/V				5.0	5.5		SW	SAND: fine to coarse grained, sub-angular to sub-rounded, grey, with low to medium plasticity clay. *(continued)*	M*(continued)*			Inferred ALLUVIAL SOIL
			5.50m SPT 11,25,HB N=50+(R) 5.82m	4.5	6.0		SW	5.50m SAND: fine to coarse grained, sub-angular to sub-rounded, grey- brown, trace clay.	M	VD		
				4.0	6.5							
				3.5	7.0		SW	7.00m SAND: fine to coarse grained, sub-angular to sub-rounded, brown, with medium to high plasticity clay.	M			
			8.50m SPT 12,21,23 N=44	3.0	7.5							
				2.5	8.0							
				2.0	8.5							
			8.95m	1.5	8.75m		SW	: as above colour changes to grey- brown	M			
					8.85m			: as above colour changes to brown		D		
				1.0	9.0		SW		M			
				0.5	9.5		SC	9.50m Clayey SAND: fine to coarse grained, sub-angular to sub-rounded, brown, clay is medium to high plasticity.	M			

See Explanatory Notes for details of abbreviations & basis of descriptions.

ADECONSULTINGGROUP
SOLUTIONS THROUGH INNOVATION

NON-CORE DRILL HOLE - GEOLOGICAL LOG

HOLE NO : LT02
FILE / JOB NO : 202024.0223.01
SHEET : 3 OF 3

CLIENT : CME Group
PROJECT : CV Junction Oval Light Towers
LOCATION : Citipower Centre Junction Oval, Lakeside Drive, St Kilda VIC 3182

POSITION : E: 322375.0, N: 5808201.0 (MGA2020-56) SURFACE ELEVATION (RL) : 10.36 (AHD) ANGLE FROM HORIZONTAL : 90°

EXCAVATION METHOD : Hanjin DB8 MOUNTING : Track CONTRACTOR : Terratest DRILLER : TO

DATE STARTED : 4/5/2024 DATE COMPLETED : 4/5/2024 DATE LOGGED : 4/5/2024 LOGGED BY : KA CHECKED BY : JSM

DRILLING						MATERIAL						
PROGRESS: DRILLING & CASING	PROGRESS: WATER	GROUND WATER LEVELS	SAMPLES & FIELD TESTS	RL (m)	DEPTH (m)	GRAPHIC LOG	GROUP SYMBOL	MATERIAL DESCRIPTION Soil Type, Colour, Plasticity or Particle Characteristic Secondary and Minor Components	MOISTURE CONDITION	CONSISTENCY RELATIVE DENSITY	PENETROMETER TEST 5 10 15 20	STRUCTURE & Other Observations
AD/V		Inferred		0.0	10.5		SC	Clayey SAND: fine to coarse grained, sub-angular to sub-rounded, brown, clay is medium to high plasticity. *(continued)*	M*(continued)*			Inferred ALLUVIAL SOIL
				-0.5	11.0		SW	SAND: fine to coarse grained, sub-angular to sub-rounded, brown, trace clay; trace silt.	W	D		Inferred Groundwater Level
SPT			11.50m SPT 3,5,6 N=11 11.95m	-1.0 -1.5	11.5		SP	SAND: fine to medium grained, sub-angular to sub-rounded, brown, trace clay; trace silt.	W	MD		
					12.0			Hole Terminated at 11.95 m Target depth				
					12.5							
					13.0							
					13.5							
					14.0							
					14.5							

See Explanatory Notes for details of abbreviations & basis of descriptions.

ADECONSULTINGGROUP
SOLUTIONS THROUGH INNOVATION

NON-CORE DRILL HOLE - GEOLOGICAL LOG

HOLE NO : LT03
FILE / JOB NO : 202024.0223.01
SHEET : 1 OF 4

CLIENT : CME Group
PROJECT : CV Junction Oval Light Towers
LOCATION : Citipower Centre Junction Oval, Lakeside Drive, St Kilda VIC 3182

POSITION : E: 322271.0, N: 5808172.0 (MGA2020-56) SURFACE ELEVATION (RL) : 9.51 (AHD) ANGLE FROM HORIZONTAL : 90°

EXCAVATION METHOD : Comacchio MC450P.1 MOUNTING : Track CONTRACTOR : Terratest DRILLER : TO

DATE STARTED : 30/4/2024 DATE COMPLETED : 1/5/2024 DATE LOGGED : 1/5/2024 LOGGED BY : KA CHECKED BY : JSM

DRILLING						MATERIAL						
PROGRESS: DRILLING & CASING	PROGRESS: WATER	GROUND WATER LEVELS	SAMPLES & FIELD TESTS	RL (m)	DEPTH (m)	GRAPHIC LOG	GROUP SYMBOL	MATERIAL DESCRIPTION Soil Type, Colour, Plasticity or Particle Characteristic Secondary and Minor Components	MOISTURE CONDITION	CONSISTENCY RELATIVE DENSITY	PENETROMETER TEST 5 10 15 20	STRUCTURE & Other Observations
AD/V		Not Assessed	0.50m SPT 6,5,5 N=10	9.0	0.5			FILL Silty SAND: fine to coarse grained, sub-angular to sub-rounded, brown, trace fine grained gravel.	M			FILL
								0.60m				
			0.95m 1.00m SPT 4,10,14 N=24	8.5	1.0			FILL Silty CLAY: medium to high plasticity, brown, with fine to medium grained,sub-angular gravel; trace fine to coarse grained, sub-rounded sand.	w>PL			
			1.45m									
				8.0	1.5							
							SC	Clayey SAND: fine to coarse grained, sub-angular to sub-rounded, brown, clay is medium to high plasticity; with fine to coarse grained, sub-angular to angular gravel.	M	MD		Inferred ALLUVIAL SOIL
				7.5	2.0							
								2.20m				
								Silty CLAY: medium to high plasticity, brown, with fine to coarse grained, sub-rounded to sub-angular sand.				
			2.50m SPT 13,15,21 N=36	7.0	2.5							
			2.95m				CI-CH		w>PL	VSt		
				6.5	3.0							
				6.0	3.5							
								3.50m				
								Clayey SAND: fine to coarse grained, sub-angular to sub-rounded, brown, clay is medium to high plasticity; with fine grained, sub-angular to sub-rounded gravel.				
							SC			D		
			4.00m SPT 13,35+/110mm HB N=50+(R)	5.5	4.0							
			4.26m					4.00m				
								Clayey SAND: fine to medium grained, sub-rounded to rounded, brown, clay is medium to high plasticity; with fine grained, sub-angular to sub-rounded gravel.	M			
				5.0	4.5		SC			VD		
WB												

See Explanatory Notes for details of abbreviations & basis of descriptions.

ADECONSULTINGGROUP
SOLUTIONS THROUGH INNOVATION

NON-CORE DRILL HOLE - GEOLOGICAL LOG

HOLE NO : LT03
FILE / JOB NO : 202024.0223.01
SHEET : 2 OF 4

CLIENT : CME Group
PROJECT : CV Junction Oval Light Towers
LOCATION : Citipower Centre Junction Oval, Lakeside Drive, St Kilda VIC 3182

POSITION : E: 322271.0, N: 5808172.0 (MGA2020-56) SURFACE ELEVATION (RL) : 9.51 (AHD) ANGLE FROM HORIZONTAL : 90°

EXCAVATION METHOD : Comacchio MC450P.1 MOUNTING : Track CONTRACTOR : Terratest DRILLER : TO

DATE STARTED : 30/4/2024 DATE COMPLETED : 1/5/2024 DATE LOGGED : 1/5/2024 LOGGED BY : KA CHECKED BY : JSM

DRILLING						MATERIAL						
PROGRESS: DRILLING & CASING	PROGRESS: WATER	GROUND WATER LEVELS	SAMPLES & FIELD TESTS	RL (m)	DEPTH (m)	GRAPHIC LOG	GROUP SYMBOL	MATERIAL DESCRIPTION Soil Type, Colour, Plasticity or Particle Characteristic Secondary and Minor Components	MOISTURE CONDITION	CONSISTENCY RELATIVE DENSITY	PENETROMETER TEST 5 10 15 20	STRUCTURE & Other Observations
WB		Not Assessed	5.50m SPT 23,35+/50mm HB N=50+(R) 5.70m	4.0	5.5		SC	Clayey SAND: fine to medium grained, sub-rounded to rounded, brown, clay is medium to high plasticity; with fine grained, sub-angular to sub-rounded gravel. *(continued)*				Inferred ALLUVIAL SOIL
								5.50m SAND: fine to medium grained, sub-angular to sub-rounded, grey.				
				3.5	6.0							
				3.0	6.5		SP					
			7.00m SPT 18,33/120mm HB N=50+(R) 7.27m	2.5	7.0				M			
								(continued)				
								7.40m				
				2.0	7.5			Clayey SAND: fine to medium grained, sub-angular to sub-rounded, grey-brown, clay is medium to high plasticity.		VD		
				1.5	8.0		SC					
			8.50m SPT 13,30,26 N=56	1.0	8.5			8.50m SAND: fine to medium grained, sub-angular to sub-rounded, grey, trace clay.				
			8.95m	0.5	9.0		SP					
				0.0	9.5			9.50m SAND: fine grained, sub-rounded to rounded, brown, trace silt; trace clay.	W			
			10.00m				SP					

See Explanatory Notes for details of abbreviations & basis of descriptions.

ADECONSULTINGGROUP
SOLUTIONS THROUGH INNOVATION

NON-CORE DRILL HOLE - GEOLOGICAL LOG

HOLE NO : LT03
FILE / JOB NO : 202024.0223.01
SHEET : 3 OF 4

CLIENT : CME Group
PROJECT : CV Junction Oval Light Towers
LOCATION : Citipower Centre Junction Oval, Lakeside Drive, St Kilda VIC 3182

POSITION : E: 322271.0, N: 5808172.0 (MGA2020-56) SURFACE ELEVATION (RL) : 9.51 (AHD) ANGLE FROM HORIZONTAL : 90°

EXCAVATION METHOD : Comacchio MC450P.1 MOUNTING : Track CONTRACTOR : Terratest DRILLER : TO

DATE STARTED : 30/4/2024 DATE COMPLETED : 1/5/2024 DATE LOGGED : 1/5/2024 LOGGED BY : KA CHECKED BY : JSM

DRILLING						MATERIAL						
PROGRESS: DRILLING & CASING	PROGRESS: WATER	GROUND WATER LEVELS	SAMPLES & FIELD TESTS	RL (m)	DEPTH (m)	GRAPHIC LOG	GROUP SYMBOL	MATERIAL DESCRIPTION Soil Type, Colour, Plasticity or Particle Characteristic Secondary and Minor Components	MOISTURE CONDITION	CONSISTENCY RELATIVE DENSITY	PENETROMETER TEST 5 10 15 20	STRUCTURE & Other Observations
			SPT 6,6,11 N=17					SAND: fine grained, sub-rounded to rounded, brown, trace silt; trace clay. *(continued)*				Inferred ALLUVIAL SOIL
			10.45m	-1.0	10.5					MD		
							SP		W *(continued)*			
				-1.5	11.0							
			11.50m									
			SPT 6,23,18 N=41	-2.0	11.5							
								11.75m				
			11.95m					SAND: fine to coarse grained, sub-angular to sub-rounded, brown, with fine to coarse grained,sub-angular to angular gravel; trace clay.				
				-2.5	12.0					D		
WB		Not Assessed					SW					
				-3.0	12.5							
			13.00m					13.00m				
			SPT 2,4,8 N=12	-3.5	13.0		SC	Clayey SAND: fine grained, sub-angular to sub-rounded, grey-brown, clay is medium to high plasticity.	M			
								13.30m				
			13.45m					: as above colour changes to brown				
				-4.0	13.5					MD		
							SC					
				-4.5	14.0							
			14.50m					14.50m				
			SPT 23,30/50mm HB N=50+(R) 14.70m	-5.0	14.5		SC	Clayey SAND: fine to coarse grained, sub-angular to sub-rounded, brown, clay is medium to high plasticity.		VD		
								14.70m				
							CI-CH	Sandy CLAY: medium to high plasticity, brown, sand is fine to coarse grained, sub- angular to sub-rounded; with fine to medium grained,sub-angular gravel; trace fine to coarse grained, sub-rounded sand.	w>PL	H		

See Explanatory Notes for details of abbreviations & basis of descriptions.

ADECONSULTINGGROUP
SOLUTIONS THROUGH INNOVATION

NON-CORE DRILL HOLE - GEOLOGICAL LOG

HOLE NO : LT03
FILE / JOB NO : 202024.0223.01
SHEET : 4 OF 4

CLIENT : CME Group
PROJECT : CV Junction Oval Light Towers
LOCATION : Citipower Centre Junction Oval, Lakeside Drive, St Kilda VIC 3182

POSITION : E: 322271.0, N: 5808172.0 (MGA2020-56) SURFACE ELEVATION (RL) : 9.51 (AHD) ANGLE FROM HORIZONTAL : 90°

EXCAVATION METHOD : Comacchio MC450P.1 MOUNTING : Track CONTRACTOR : Terratest DRILLER : TO

DATE STARTED : 30/4/2024 DATE COMPLETED : 1/5/2024 DATE LOGGED : 1/5/2024 LOGGED BY : KA CHECKED BY : JSM

DRILLING						MATERIAL						
PROGRESS: DRILLING & CASING	PROGRESS: WATER	GROUND WATER LEVELS	SAMPLES & FIELD TESTS	RL (m)	DEPTH (m)	GRAPHIC LOG	GROUP SYMBOL	MATERIAL DESCRIPTION Soil Type, Colour, Plasticity or Particle Characteristic Secondary and Minor Components	MOISTURE CONDITION	CONSISTENCY RELATIVE DENSITY	PENETROMETER TEST 5 10 15 20	STRUCTURE & Other Observations
				-6.0	15.5		CI-CH	Sandy CLAY: medium to high plasticity, brown, sand is fine to coarse grained, sub- angular to sub-rounded; with fine to medium grained,sub-angular gravel; trace fine to coarse grained, sub-rounded sand. *(continued)*				Inferred ALLUVIAL SOIL
								15.50m				
								: as above colour changes to grey		H		
			16.00m SPT 3,6,10 N=16	-6.5	16.0							
			16.45m	-7.0	16.5							
WB		Not Assessed		-7.5	17.0				w>P	*(continued)*		
			17.50m SPT 2,5,8 N=13	-8.0	17.5		CI-CH			St		
			17.95m	-8.5	18.0							
				-9.0	18.5							
SPT			19.00m SPT 3,6,9 N=15	-9.5	19.0							
			19.45m					19.45m				
					19.5			Hole Terminated at 19.45 m Target depth				

See Explanatory Notes for details of abbreviations & basis of descriptions.

ADECONSULTINGGROUP
SOLUTIONS THROUGH INNOVATION

NON-CORE DRILL HOLE - GEOLOGICAL LOG

HOLE NO : LT04
FILE / JOB NO : 202024.0223.01
SHEET : 1 OF 4

CLIENT : CME Group
PROJECT : CV Junction Oval Light Towers
LOCATION : Citipower Centre Junction Oval, Lakeside Drive, St Kilda VIC 3182

POSITION : E: 322237.0, N: 5808303.0 (MGA2020-56) SURFACE ELEVATION (RL) : 8.51 (AHD) ANGLE FROM HORIZONTAL : 90°

EXCAVATION METHOD : Comacchio MC450P.1 MOUNTING : Track CONTRACTOR : Terratest DRILLER : TO

DATE STARTED : 2/5/2024 DATE COMPLETED : 2/5/2024 DATE LOGGED : 2/5/2024 LOGGED BY : KA CHECKED BY : JSM

DRILLING						MATERIAL						
PROGRESS: DRILLING & CASING	PROGRESS: WATER	GROUND WATER LEVELS	SAMPLES & FIELD TESTS	RL (m)	DEPTH (m)	GRAPHIC LOG	GROUP SYMBOL	MATERIAL DESCRIPTION Soil Type, Colour, Plasticity or Particle Characteristic Secondary and Minor Components	MOISTURE CONDITION	CONSISTENCY RELATIVE DENSITY	PENETROMETER TEST 5 10 15 20	STRUCTURE & Other Observations
AD/V		Not Assessed	0.50m SPT 4,4,4 N=8	8.0	0.5			FILL CONCRETE. 0.20m FILL Gravelly Sandy CLAY: medium to high plasticity, grey- brown, sand is fine to coarse grained, sub-angular to angular; gravel is fine to coarse grained, sub-angular to angular. 0.50m FILL Sandy CLAY: medium to high plasticity, grey- brown, sand is fine to coarse grained, sub-angular to sub-rounded.	w>PL			FILL
			0.95m 1.00m SPT 5,3,3 N=6	7.5	1.0				w>PL			
			1.45m	7.0	1.5			1.30m FILL Clayey SAND: fine to coarse grained, sub-angular to sub-rounded, dark grey, clay is low to medium plasticity; trace fine grained gravel.	M			
				6.5	2.0			2.00m Silty CLAY: medium to high plasticity, brown, trace sand; trace organics.		F		Inferred ALLUVIAL SOIL
			2.50m SPT 4,6,9 N=15	6.0	2.5		CI-CH		w>PL	St		
			2.95m	5.5	3.0							
				5.0	3.5			3.50m Sandy CLAY: medium to high plasticity, grey- brown, sand is fine to coarse grained, sub-angular to sun-rounded.				
			4.00m SPT 7,12,14 N=26	4.5	4.0		CI-CH		w>PL	St to VSt		
			4.45m	4.0	4.5			4.50m Clayey SAND: fine to coarse grained, sub-angular to sub-rounded, brown, clay is medium to high plasticity.	M	MD		
WB							SC					

See Explanatory Notes for details of abbreviations & basis of descriptions.

ADECONSULTINGGROUP
SOLUTIONS THROUGH INNOVATION

NON-CORE DRILL HOLE - GEOLOGICAL LOG

HOLE NO : LT04
FILE / JOB NO : 202024.0223.01
SHEET : 2 OF 4

CLIENT : CME Group
PROJECT : CV Junction Oval Light Towers
LOCATION : Citipower Centre Junction Oval, Lakeside Drive, St Kilda VIC 3182

POSITION : E: 322237.0, N: 5808303.0 (MGA2020-56) SURFACE ELEVATION (RL) : 8.51 (AHD) ANGLE FROM HORIZONTAL : 90°

EXCAVATION METHOD : Comacchio MC450P.1 MOUNTING : Track CONTRACTOR : Terratest DRILLER : TO

DATE STARTED : 2/5/2024 DATE COMPLETED : 2/5/2024 DATE LOGGED : 2/5/2024 LOGGED BY : KA CHECKED BY : JSM

DRILLING | MATERIAL

PROGRESS: DRILLING & CASING	PROGRESS: WATER	GROUND WATER LEVELS	SAMPLES & FIELD TESTS	RL (m)	DEPTH (m)	GRAPHIC LOG	GROUP SYMBOL	MATERIAL DESCRIPTION Soil Type, Colour, Plasticity or Particle Characteristic Secondary and Minor Components	MOISTURE CONDITION	CONSISTENCY RELATIVE DENSITY	PENETROMETER TEST 5 10 15 20	STRUCTURE & Other Observations
								Clayey SAND: fine to coarse grained, sub-angular to sub-rounded, brown, clay is medium to high plasticity. *(continued)*				Inferred ALLUVIAL SOIL
										MD		
			5.50m SPT 23,28,30/70mm HB N=50+(R)	3.0	5.5		SC					
			5.87m						M*(continued)*			
				2.5	6.0					VD		
				2.0	6.5			6.50m : as above colour changes to grey-brown				
			7.00m SPT 11,16,22 N=38	1.5	7.0		SC					
WB		Not Assessed	7.45m	1.0	7.5			7.20m SAND: fine to medium grained, sub-angular to sub-rounded, grey, trace clay.				
							SP		W	MD		
			8.50m SPT 13,14,13 N=27	0.0	8.5			8.60m SAND: fine to coarse grained, sub-angular to sub-rounded, grey-brown, with fine to medium grained, sub angular to angular gravel.				
			8.95m				SW					
				-0.5	9.0			9.00m Gravelly SAND: fine to coarse grained, sub-angular to sub-rounded, brown, gravel is fine to medium grained, sub angular to angular.				
									M			
				-1.0	9.5		SW			D to VD		
			10.00m									

See Explanatory Notes for details of abbreviations & basis of descriptions.

ADECONSULTINGGROUP
SOLUTIONS THROUGH INNOVATION

NON-CORE DRILL HOLE - GEOLOGICAL LOG

HOLE NO : LT04
FILE / JOB NO : 202024.0223.01
SHEET : 3 OF 4

CLIENT : CME Group
PROJECT : CV Junction Oval Light Towers
LOCATION : Citipower Centre Junction Oval, Lakeside Drive, St Kilda VIC 3182

POSITION : E: 322237.0, N: 5808303.0 (MGA2020-56) SURFACE ELEVATION (RL) : 8.51 (AHD) ANGLE FROM HORIZONTAL : 90°

EXCAVATION METHOD : Comacchio MC450P.1 MOUNTING : Track CONTRACTOR : Terratest DRILLER : TO

DATE STARTED : 2/5/2024 DATE COMPLETED : 2/5/2024 DATE LOGGED : 2/5/2024 LOGGED BY : KA CHECKED BY : JSM

DRILLING						MATERIAL						
PROGRESS: DRILLING & CASING	PROGRESS: WATER	GROUND WATER LEVELS	SAMPLES & FIELD TESTS	RL (m)	DEPTH (m)	GRAPHIC LOG	GROUP SYMBOL	MATERIAL DESCRIPTION Soil Type, Colour, Plasticity or Particle Characteristic Secondary and Minor Components	MOISTURE CONDITION	CONSISTENCY RELATIVE DENSITY	PENETROMETER TEST 5 10 15 20	STRUCTURE & Other Observations
WB		Not Assessed	SPT 30/20mmHB N=R 10.02m	-2.0	10.5		SW	Gravelly SAND: fine to coarse grained, sub-angular to sub-rounded, brown, gravel is fine to medium grained, sub angular to angular. *(continued)*				Inferred ALLUVIAL SOIL
								10.50m				
				-2.0	10.5			SAND: fine to medium grained, sub-angular to sub-rounded, brown, trace clay; trace silt.		D to VD		
				-2.5	11.0							
			11.50m									
			SPT 9,11,13 N=24	-3.0	11.5		SP					
			11.95m									
				-3.5	12.0							
				-4.0	12.5			12.50m	M	*(continued)*		
								: as above colour changes to grey-brown				
			13.00m									
			SPT 5,6,8 N=14	-4.5	13.0		SP			MD		
			13.45m									
				-5.0	13.5							
				-5.5	14.0			14.00m				
								: as above colour changes to brown				
			14.50m									
			SPT 5,8,10 N=18	-6.0	14.5		SP					
			14.95m									
								15.00m				

See Explanatory Notes for details of abbreviations & basis of descriptions.

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NON-CORE DRILL HOLE - GEOLOGICAL LOG

HOLE NO : LT04
FILE / JOB NO : 202024.0223.01
SHEET : 4 OF 4

CLIENT : CME Group
PROJECT : CV Junction Oval Light Towers
LOCATION : Citipower Centre Junction Oval, Lakeside Drive, St Kilda VIC 3182

POSITION : E: 322237.0, N: 5808303.0 (MGA2020-56) SURFACE ELEVATION (RL) : 8.51 (AHD) ANGLE FROM HORIZONTAL : 90°

EXCAVATION METHOD : Comacchio MC450P.1 MOUNTING : Track CONTRACTOR : Terratest DRILLER : TO

DATE STARTED : 2/5/2024 DATE COMPLETED : 2/5/2024 DATE LOGGED : 2/5/2024 LOGGED BY : KA CHECKED BY : JSM

DRILLING						MATERIAL						
PROGRESS: DRILLING & CASING	PROGRESS: WATER	GROUND WATER LEVELS	SAMPLES & FIELD TESTS	RL (m)	DEPTH (m)	GRAPHIC LOG	GROUP SYMBOL	MATERIAL DESCRIPTION Soil Type, Colour, Plasticity or Particle Characteristic Secondary and Minor Components	MOISTURE CONDITION	CONSISTENCY RELATIVE DENSITY	PENETROMETER TEST 5 10 15 20	STRUCTURE & Other Observations
				-7.0	15.5		SP	SAND: fine to medium grained, sub-angular to sub-rounded, brown, with fine to medium grained, sub angular to angular gravel.		MD		Inferred ALLUVIAL SOIL
			16.00m SPT 14,17,26 N=43	-7.5	16.0			16.00m SAND: fine grained, sub-angular to sub-rounded, grey-brown.				
			16.45m	-8.0	16.5		SP			D		
WB		Not Assessed		-8.5	17.0				M(continued)			
			17.50m SPT 3,6,8 N=14	-9.0	17.5			17.50m SAND: fine to medium grained, sub-rounded to rounded, grey-brown, trace fine to medium grained gravel; trace pebbles, rounded.				
			17.95m	-9.5	18.0		SP			MD		
				-10.0	18.5			18.50m SAND: fine to medium grained, sub-rounded to rounded, grey, trace clay.				
SPT			19.00m SPT 2,2,4 N=6	-10.5	19.0		SP			L		
			19.45m					19.45m				
					19.5			Hole Terminated at 19.45 m Target depth				

See Explanatory Notes for details of abbreviations & basis of descriptions.

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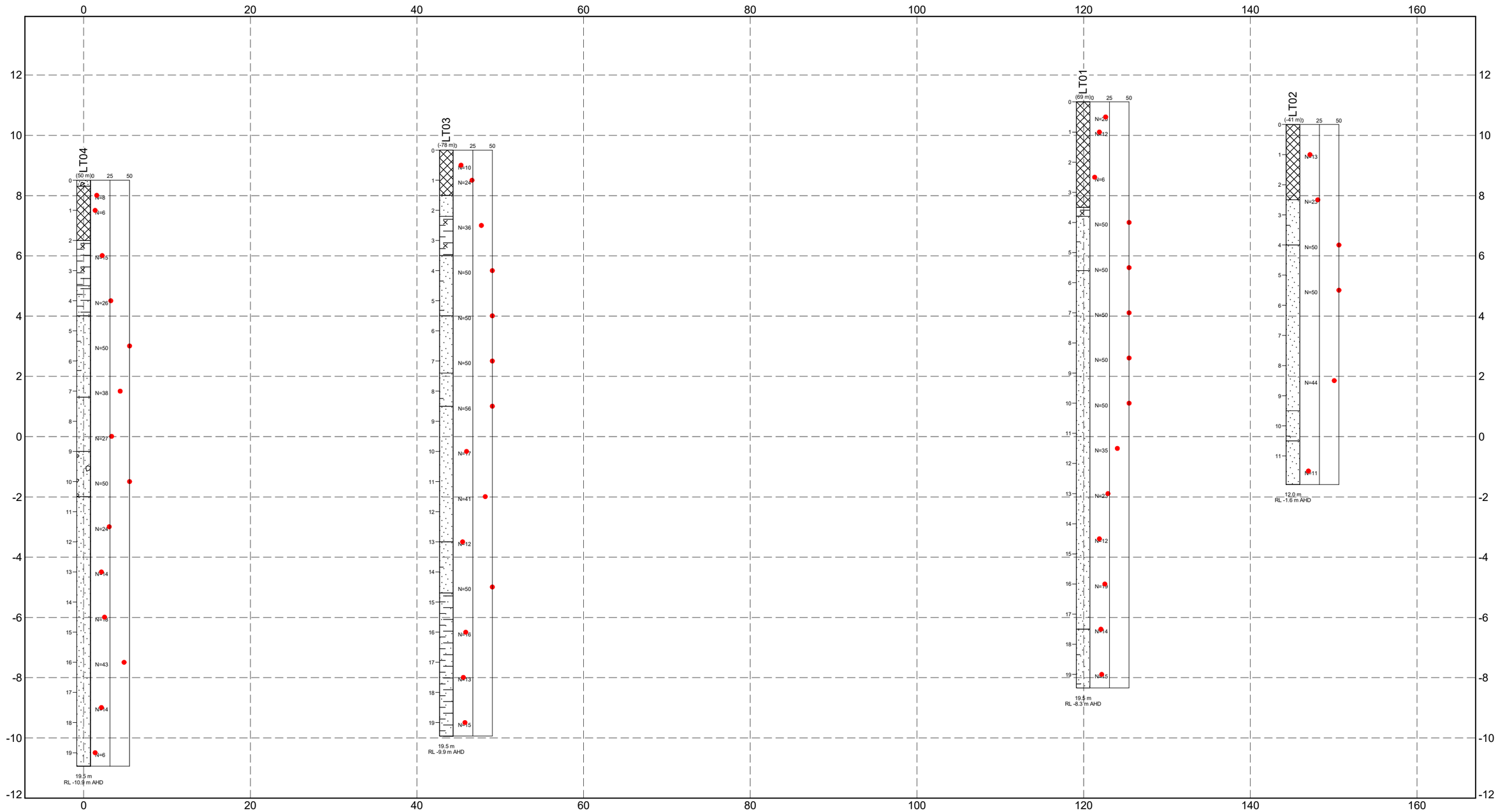
Appendix C. Longitudinal Cross Section



MATERIAL GRAPHIC

- CONCRETE
- FILL
- Silty CLAY
- Sandy CLAY
- SAND
- Clayey SAND
- Gravelly SAND

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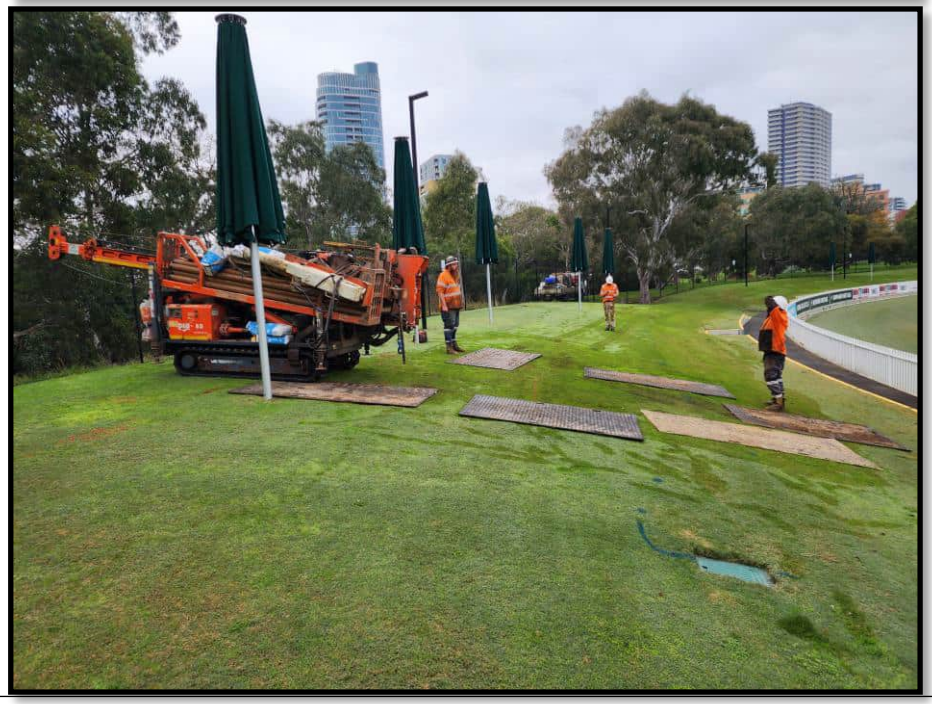
TITLE	CME Group Citipower Centre Junction Oval, Lakeside Drive, St Kilda VIC 3182 CV Junction Oval Light Towers Subsurface Section
DRAWN	KA
DATE	22/05/2024
CHECKED	JSM
DATE	22/05/2024
SCALE	H 1:469 V 1:130
	A3
PROJECT No	202024.0223.01
FIGURE No	1

Appendix D. Site Photographs



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Client:	CME Group
Project:	TTW Light Towers GI
Date created:	07/05/2024
Created by:	KA

Test Location: LT1
Address: CV Junction Oval, Lakeside Drive, St Kilda, VIC 3182

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SOLUTIONS THROUGH INNOVATION

Client:	CME Group
Project:	TTW Light Towers GI
Date created:	07/05/2024
Created by:	KA

Test Location: LT2
Address: CV Junction Oval, Lakeside Drive, St Kilda, VIC 3182

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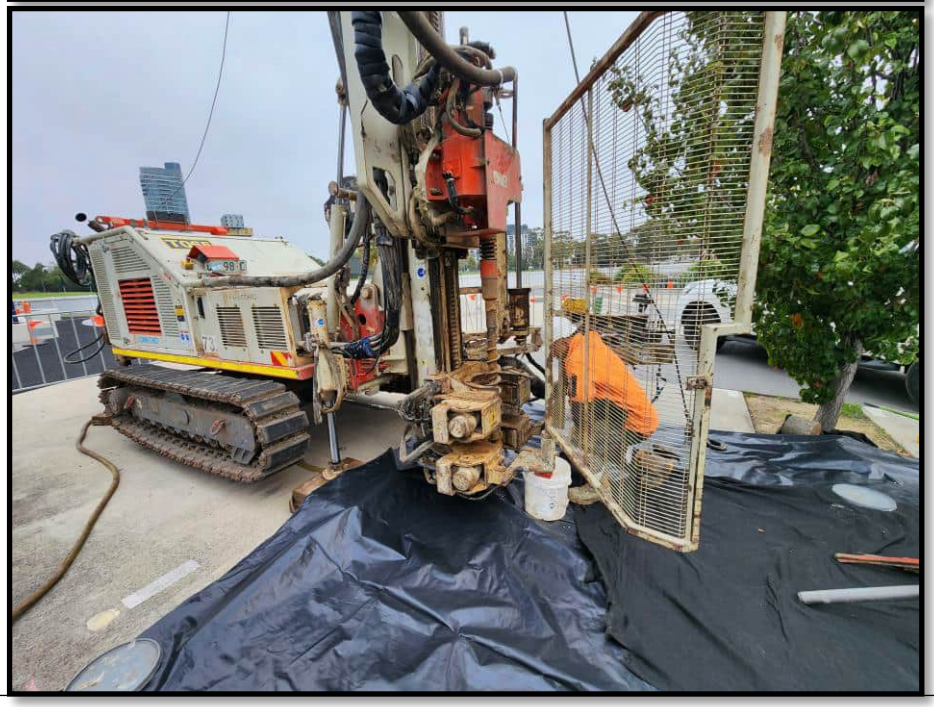
SOLUTIONS THROUGH INNOVATION

Client:	CME Group
Project:	TTW Light Towers GI
Date created:	07/05/2024
Created by:	KA

Test Location: LT3
Address: CV Junction Oval, Lakeside Drive, St Kilda, VIC 3182



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Client:	CME Group
Project:	TTW Light Towers GI
Date created:	07/05/2024
Created by:	KA

Test Location: LT4
Address: CV Junction Oval, Lakeside Drive, St Kilda, VIC 3182

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