1 Introduction

This technical note intends to provide the information required from the planning condition number 12 related to the PV panels provision at 294-295 High Holborn, WC1V 7JG (Application ref: 2017/1827/P, dated 15th August 2018), consisting of a building ranging from basement level to the 8th floor, comprising a retail unit at ground floor level (shell only), offices at 1st and 2nd floor, and 10 No. apartments from 3rd to 8th floor.

2 Condition

Condition no. 12 states:

"Prior to relevant stage of construction, detailed plans showing the location and extent of photovoltaic cells to be installed on the building shall have been submitted to and approved by the Local Planning Authority in writing. The measures shall include the installation of a meter to monitor the energy output from the approved renewable energy systems. The cells shall be installed in full accordance with the details approved by the Local Planning Authority and permanently retained and maintained thereafter.

Reason: To ensure the development provides adequate on-site renewable energy facilities in accordance with the requirements of policies CC1 and CC2 of the Camden Local Plan 2017."

3 Response

The CO_2 targets for this development are as follows:

- Residential element 35.1%
- Non-domestic element 32.5%
- From low and zero carbon technologies 23.9%

The criteria are met by allowing for 10 No. panels to the non-domestic part of the development with an efficiency of 19.55%, and 20 No. panels to the residential units, with a peak rating of 400W/panel.

The PV panels are going to be installed on a metal frame support system above the mechanical plant at roof level, and above the main stair core, generally as shown in drawing, facing south and with an inclination of 20°. The technical sheet of the PV panel considered is also provided. The life expectancy of the system is 25 years.

The outgoing ways from the main panel board serving the PV arrays shall be fitted with a digital multi-meter. These multi-meters shall provide live readings/measurements of V, A, F, PF, kW and kVA. The meters are integral to the main panel board located within the basement LV switch room.

The PV panels are going to be installed by a MCS (Microgeneration Certification Scheme) certified installer, south facing, without any shading from surrounding buildings (of similar heights, located on the western and eastern side of the development), in accordance with the Local Authority guidelines. The PV panels and the equipment will be MCS certified as well. Enough space has been left around the arrays for maintenance purposes. Final PV detail design to be carried out by a PV specialist.

4 PV panel – Non-domestic development

ET Solar Solar Panel 320Watt Monocrystalline. Black Frame

60-Cell module, 320Wp, with positive tolerance 0-3%, linear performance warranty, high efficiency 19.55%. MCS Certified

Electrical Characteristics ET Solar 320W Photovoltaic Module

Model Type	ET-M660320WB
Peak Power (Pmax)	320W
Module Efficiency	19.55%
Maximum Power Voltage (VMP)	33.42V
Maximum Power Current (Imp)	9.58A
Open Circuit Voltage (Voc)	41.54V
Short Circuit Current (Isc)	10.00A
Power Tolerance	0 to + 5W
Operating Temperature	-40 ~ +85°C
Maximum System Voltage DC	1500V
Nominal Operating Cell Temperature	45 ± 2°C
Fire Safety	Class C
Maximum Series Fuse Rating	20A

Mechanical Characteristics

Number of Cells	pcs	60
Size of Cell	mm	156x156
Size of Module	mm	1650X992X35
Weight	kg	18.6
Connector	MC4 compatible PV1-F	

Absolute Maximum Ratings

Temperature Range (°C)	-40°C ~ +85°C
Surface Maximum Load Capacity (Pa)	5400
Allowable Hail Load	25mm ice-ball with velocity of 23m/s

5 PV panel – Domestic development

Electrical Properties (STC[2])

		LG400N2T-A5	Bifaical Gain[3]				LG390N2T - A5	Bifacial Gain[3]			
			5%	10%	20%	30%		5%	10%	20%	30%
Maximum Power (Pmax)	[W]	400	420	440	480	520	390	410	429	468	507
MPP Voltage (Vmpp)	[V]	41.5	41.5	41.5	41.6	41.6	41.4	41.4	41.4	41.5	41.5
MPP Current (Impp)	[A]	9.65	10.13	10.61	11.55	12.51	9.43	9.90	10.36	11.28	12.22
Open Circuit Voltage (Voc)	[V]	49.7	49.7	49.7	49.8	49.8	49.2	49.2	49.2	49.3	49.3
Short Circuit Current (Isc)	[A]	10.22	10.73	11.24	12.26	13.29	10.15	10.15	11.17	12.18	13.20
Module Efficiency	[%]	18.9	19.9	20.8	22.7	24.6	18.5	19.4	20.3	22.1	24.0
Operating Temperature	[°C]	-40 ~ +90									
Maximum System Voltage	[V]	1000									
Maximum Series Fuse Rating	[A]	20									
Pmax Bifaciality Coefficient[4]	[%]	76									
Power Tolerance	[%]	0 ~ +3									

[2] STC (Standard Test Condition): Irradiance 1,000 W/m², Module Temperature 25 °C, AM 1.5. The nameplate power output is measured and determined by LG Electronics at its sole and absolute discretion.
[3] Depending on mounting height and albedo of the underground.
[4] Pmax Bifaciality Coefficient 25 years guarantee, based on front output guarantee. Tolerance ± 7%.

Mechanical Properties

Cells	6 x 12
Cell Type	Monocrystalline / N-type
Cell Dimensions	161.7 x 161.7 mm
# of Busbar	12 (Multi Wire Busbar)
Dimensions (L x W x H)	2,064 x 1,024 x 40 mm
Front Load	5,400 Pa
Rear Load	4,300 Pa
Weight	22.0 kg
Connector Type	MC4
Junction Box	IP68 with 3 Bypass Diodes
Cables	2 x 1200 mm
Glass	High Transmission Tempered Glass
Frame	Anodized Aluminium

Certifications and Warranty

Certifications	IEC 61215, IEC 61730-1/-2
	IEC 61701 (Salt mist corrosion test)
	IEC 62716 (Ammonia corrosion test)
	ISO 9001
Fire Resistance Class	Class C, Fire Class 1 (Italy)
Product Warranty	25 Years
Output Warranty of Pmax	Linear Warranty[1]

[1] 1) 1st year min. 98%, 2) After 1st year max. 0.5% annual degradation, 3) Min. 86% for 25 years

Temperature Characteristics

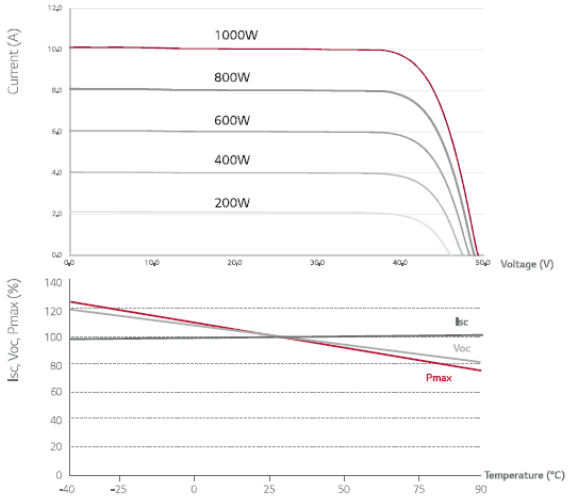
NOCT	[°C]	45 ± 3
Pmax	[%/°C]	-0.36
Voc	[%/°C]	-0.27
Isc	[%/°C]	0.03

Electrical Properties (NOCT[5])

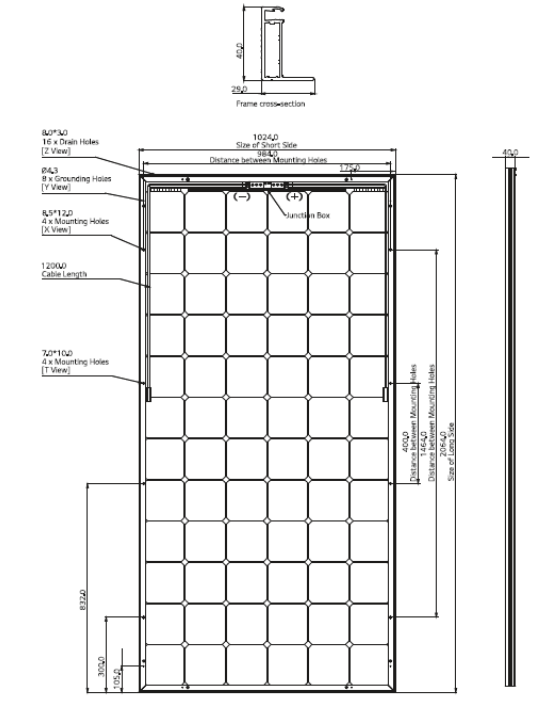
Model		LG400N2T-A5	LG390N2T-A5
Maximum Power (Pmax)	[W]	296	289
MPP Voltage (Vmpp)	[V]	38.4	38.3
MPP Current (Impp)	[A]	7.71	7.54
Open Circuit Voltage (Voc)	[V]	46.5	45.9
Short Circuit Current (Isc)	[A]	8.21	8.17

[5] NOCT (Nominal Operating Cell Temperature): Irradiance 800 W/m², ambient temperature 20 °C, wind speed 1 m/s

Characteristic Curves



Dimensions (mm)



* The distance between the center of the mounting/grounding holes.

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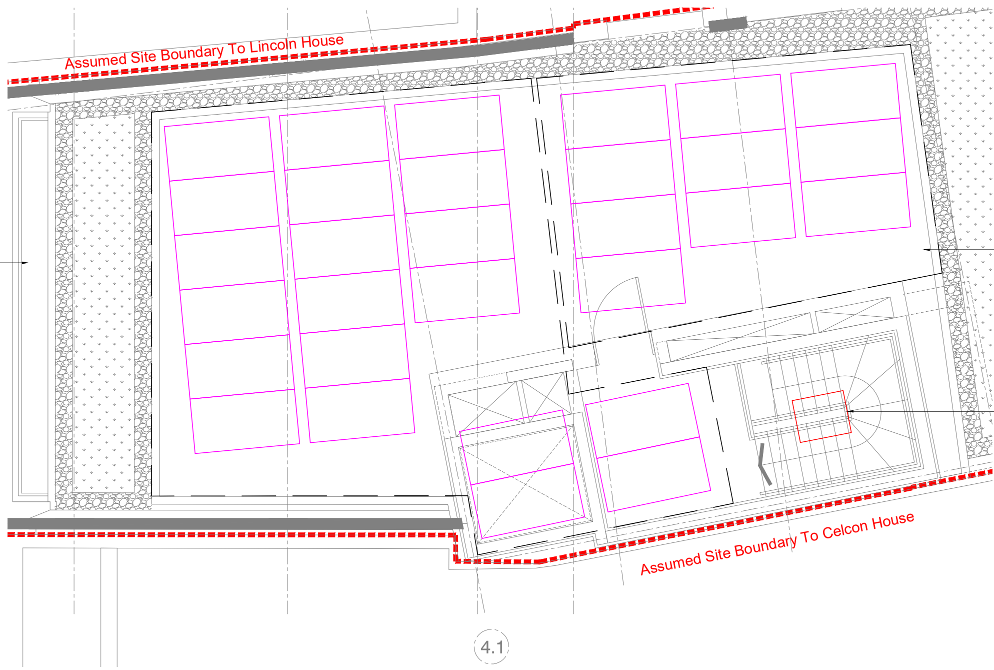
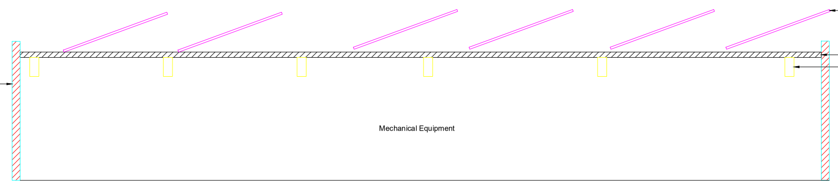
Notes

1. This drawing is not to be scaled. Work to figured dimensions only.
2. This drawing is to be read in conjunction with all relevant services, architectural and structural drawings.
3. This drawing shall not be used for detail or measurement of architectural or structural works.
4. All dimensions in millimeters unless stated otherwise.
5. All datum levels in meters unless stated otherwise.
6. For equipment details refer to technical specifications.





Section A-A @ 1:50

Rev	Date	Description	Cad	Chk

Architect

msmr

Client

CHH London LTD

Project

295 High Holborn

Drawing Title

MEP Services
PV Panels
Layout
Roof Level

ScotchPartners

Building Services Engineering | Sustainability | Acoustics

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Issue	Stage 4		
Date	Aug 20	Scale @ A1	1:50
Drawn By	KS	Checked By	RP
Drawing No.	5150-SP-00-10-DR-Z-600	Rev	P0

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