

# PV PANELS - U0160162

ON BEHALF OF  
THE RICHMOND CHARITIES

MITRE MEWS TO THE REAR OF 20-34 ST MARY'S GROVE,  
RICHMOND

(22/2082/FUL)

NOVEMBER 2024



**CLIVE CHAPMAN**  
**ARCHITECTS**  
SUSTAINABILITY CONSULTANTS

4 EEL PIE ISLAND  
TWICKENHAM MIDDX  
TWI 3DY  
TELEPHONE 020 8891 4837  
EMAIL INFO@CCAR.CO.UK  
WEBSITE WWW.CCAR.CO.UK

## 1.0 Requirements

### 1.1 Condition

U0160162 - Notwithstanding the details shown on the approved drawings, prior to the occupation of the development hereby approved, further details of the photovoltaic panels shall be submitted to and approved in writing by the Local Planning Authority. The details shall include:

- o Siting
- o Design
- o Energy savings

The development shall only be implemented in accordance with the approved details and maintained as such unless otherwise agreed in writing by the Local Planning Authority.

REASON: In the interests of promoting sustainable forms of developments and to meet the terms of the application.

## 2.0 Development Description

The proposed Mitre Mews development is for 5 No. 1- bed single-storey dwellings (Use Class C3 (a)) with associated landscaped amenity, providing 100% affordable housing for the over 65s. All the units are designed to 'Passivhaus' standards, with four units to be M4(3) wheelchair user dwellings and one to M4(2) wheelchair accessible and adaptable standards.

## 3.0 Siting

Refer to drawing: SMGG-112 C7 Roof Plan & SMGG-115(2) Elevation – East.

### 3.1 Design

Each of the five dwellings is provided with 8 x JA Solar 410 watt panels per property, together with 1 x Givenergy Hybrid 3.6kW inverter and 5.2kW Gen I battery. That is a total of 40 panels, or a photovoltaic system of 3.28kWp.

## Harvest the Sunshine

### DEEP BLUE 3.0

**Mono**

**420W MBB Half-cell Module**  
 JAM54S31 395-420/GR/1000V Series

**Introduction**

Assembled with 11BB PERC cells and gapless ribbon connection technology, the modules can offer higher output power with improved module efficiency, the reduction of cells gaps brings outstanding module appearance. The half-cell configuration makes less shading effect, lower risk of hot spot, as well as more reliable and stable power generation.

Higher output power

Lower LCOE

Less shading and lower resistive loss

Better mechanical loading tolerance

**Superior Warranty**

- 12-year product warranty
- 25-year linear power output warranty

Year	New Linear Power Warranty (%)	Standard Module Linear Power Warranty (%)
0	97.9%	84.8%
5	97.5%	83.1%
10	97.1%	81.4%
15	96.7%	79.7%
20	96.3%	78.0%
25	81.7%	63.1%

■ New linear power warranty ■ Standard module linear power warranty

**Comprehensive Certificates**

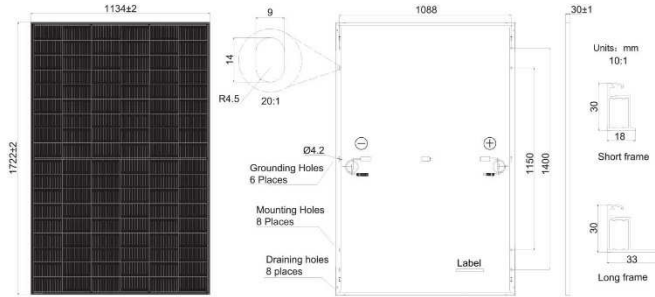
- IEC 61215, IEC 61730
- ISO 9001: 2015 Quality management systems
- ISO 14001: 2015 Environmental management systems
- ISO 45001: 2018 Occupational health and safety management systems

JA SOLAR

www.jasolar.com

Specifications subject to technical changes and tests.  
 JA Solar reserves the right of final interpretation.  
 Shanghai JA Solar Technology Co., Ltd.

**MECHANICAL DIAGRAMS**



Remark: customized frame color and cable length available upon request

**SPECIFICATIONS**

Cell	Mono
Weight	19.5kg or 21.5kg
Dimensions	1722±2mm×1134±2mm×30±1mm
Cable Cross Section Size	4mm <sup>2</sup> (IEC) , 12 AWG(UL)
No. of cells	108(6x18)
Junction Box	IP68, 3 diodes
Connector	Stäubli MC4 QC Solar QC 4.10
Cable Length (Including Connector)	Portrait: 200mm(+)/300mm(-); Landscape: 1200mm(+)/1200mm(-)
Front Glass	2.8mm or 3.2mm
Country of Manufacturer	China/Vietnam

**ELECTRICAL PARAMETERS AT STC**

TYPE	JAM54S31 -395/GR/1000V	JAM54S31 -400/GR/1000V	JAM54S31 -405/GR/1000V	JAM54S31 -410/GR/1000V	JAM54S31 -415/GR/1000V	JAM54S31 -420/GR/1000V
Rated Maximum Power(Pmax) [W]	395	400	405	410	415	420
Open Circuit Voltage(Voc) [V]	36.98	37.07	37.23	37.32	37.45	37.58
Maximum Power Voltage(Vmp) [V]	30.84	31.01	31.21	31.45	31.61	31.80
Short Circuit Current(Isc) [A]	13.70	13.79	13.87	13.95	14.02	14.10
Maximum Power Current(Imp) [A]	12.81	12.90	12.98	13.04	13.13	13.21
Module Efficiency [%]	20.2	20.5	20.7	21.0	21.3	21.5
Power Tolerance	0~+5W					
Temperature Coefficient of Isc(α <sub>Isc</sub> )	+0.045%/°C					
Temperature Coefficient of Voc(β <sub>Voc</sub> )	-0.275%/°C					
Temperature Coefficient of Pmax(γ <sub>Pmp</sub> )	-0.350%/°C					

STC Irradiance 1000W/m<sup>2</sup>, cell temperature 25°C, AM1.5G

Remark: Electrical data in this catalog do not refer to a single module and they are not part of the offer. They only serve for comparison among different module types. Measurement tolerance at STC: Pmax ±3%, Voc ±3% and Isc ±4%.

**ELECTRICAL PARAMETERS AT NOCT**

TYPE	JAM54S31-395 /GR/1000V	JAM54S31-400 /GR/1000V	JAM54S31-405 /GR/1000V	JAM54S31-410 /GR/1000V	JAM54S31-415 /GR/1000V	JAM54S31-420 /GR/1000V
Rated Max Power(Pmax) [W]	298	302	306	310	314	318
Open Circuit Voltage(Voc) [V]	34.75	34.88	35.12	35.23	35.37	35.50
Max Power Voltage(Vmp) [V]	29.08	29.26	29.47	29.72	29.89	30.09
Short Circuit Current(Isc) [A]	10.96	11.03	11.10	11.16	11.22	11.29
Max Power Current(Imp) [A]	10.25	10.32	10.38	10.43	10.50	10.57

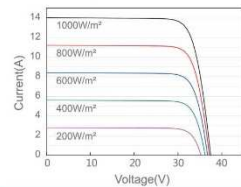
NOCT Irradiance 800W/m<sup>2</sup>, ambient temperature 20°C, wind speed 1m/s, AM1.5G

**OPERATING CONDITIONS**

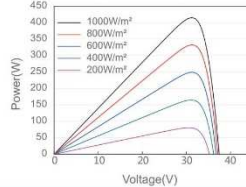
Maximum System Voltage	1000V DC
Operating Temperature	-40 C ~+85 C
Maximum Series Fuse Rating	25A
Maximum Static Load, Front	3600Pa, 1.5
Maximum Static Load, Back	1600Pa, 1.5
NOCT	45±2 C
Safety Class	Class II
Fire Safety Class	Class C

**CHARACTERISTICS**

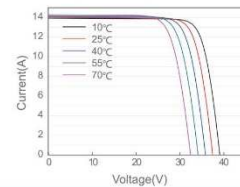
Current-Voltage Curve JAM54S31-415/GR/1000V



Power-Voltage Curve JAM54S31-415/GR/1000V



Current-Voltage Curve JAM54S31-415/GR/1000V





The 5.2kWh battery pack is our most versatile battery and can be installed in a wider range of locations due to its compact design and can either be wall mounted or floor stood.

This battery is primarily used in a modular way ensuring the system can grow with the needs of the consumer. Utilising lithium iron phosphate technology, our batteries are extremely safe and can be installed in a wide range of locations. The battery chemistry does not contain any Cobalt, making it non-flammable and the battery pack is 99% recyclable.



#### Remote Firmware

Control and monitor your Smart System on the move via our GivEnergy Monitoring App and Portal.



#### IP65 Rating

Our IP65 rated enclosure gives protection against water and dust. Ideal for lofts and outdoor installation.



#### Retrofit Compatible

Add the battery to an existing Solar PV System without affecting the Government Incentive.



#### 12 Year Warranty

Supplied with a full manufacturer's warranty. Our UK team are on hand to help you should any issues arise.



#### Standalone Battery System

A standalone battery can be used without the need for Solar Panels. Charge the battery off-peak when it's cleaner, greener and less costly then discharge the battery during peak times for maximum saving.

## Giv-Bat 5.2 Gen 1

### SPECIFICATIONS

Dimensions	515H X 223D x 480W (mm)
Weight	63Kg
Capacity	5.2 kWh / 102 Ah
Voltage	51.2V
Current	50A
Technology	LiFePO <sub>4</sub> Cell
IP Grade	IP65
BMS	Robust Multi Point Monitoring BMS Pre Installed
Life Cycling (Optimal: 80% DOD at 25°C)	10 Years
Charging Temperature	0°C - 55°C
Discharging Temperature	-10°C - 55°C
Storage Temperature	-30°C - 60°C
Warranty BTT	52MWh / 12 Years
Standard	UN 38.3, IEC61000

### ELECTRICAL PARAMETERS

Operating Voltage Range	45V - 58V
Maximum Charging Voltage	59V
Max. Charging / Discharging Current	50A / 50A
Networking Interface	RS485
Communication Protocols	Modbus
Advantages	Stackable, BMS Upgradeable, IP65
Depth of Discharge	80%



The third generation of the GivEnergy Hybrid Inverter is a battery and solar inverter in one unit.

It can be coupled directly with solar panels to generate usable electricity in the property as well as store any excess energy for later use in a battery. The Hybrid Inverter aims to minimise export by storing excess energy in the battery during generation hours. Additionally, it will minimise import by discharging to meet demand in the property.



**In-built WiFi and LAN**

Includes in-built WiFi and LAN for a hard-wired network connection.



**Higher Charge/Discharge Rate**

Increased efficiency, higher discharge rates of up to 3.6kW.



**Flexible Rate Tariff**

Charge the battery off-peak when it's cleaner, greener and less costly then discharge the battery during peak times for maximum saving.



**12 Year Warranty**

Supplied with a full manufacturer's warranty. Our UK team are on hand to help you should any issues arise.

## Hybrid Inverter 3.6 Gen 3

### INPUT DATA (PV)

Max. DC Input Power (per string)	7.5kWp
Start-up Voltage	150V
Max. PV Voltage	580V
MPPT Range	120V - 550V
Nominal Voltage	360V
Max. Short Circuit Current (per string)	20A
Max. Input Current (per string)	15A
MPPT Tracker / No. of Strings per MPPT Tracker	2/1

### OUTPUT DATA (AC)

Nominal AC Output Power	3600W
Max. Apparent Power Output to Utility Grid	3800VA
Max. Output Current	16A
Nominal Voltage / Range	230V (180 - 272) VAC
Frequency Range	50 / 60 Hz; ±5 Hz
Power Factor (Full Load)	>0.99
Power Factor Range	0.8 Lagging... 0.8 Leading
THDI (Nominal Power)	<3%
AC Connection	Single Phase

### BATTERY

Battery Type	LiFePO <sub>4</sub>
Battery Voltage Range	45V - 58V
Nominal Voltage	51.2VDC
Charge* / Discharge Current	65A / 81A
Max. Charge / Discharge Power	3300W / 3600W
Communication Interface	RS485

### BACKUP TERMINAL PARAMETER (AC)

Nominal AC Output Power	3600W
Nominal Voltage	230V <sub>ac</sub>
Max. Output Current	16A
Nominal Frequency	50 Hz
Automatic Switch Time	10ms
THDv ( Linear Load)	<3%

\* Charge current increased to 70A via firmware update

### PROTECTION DEVICES

DC Reverse Polarity Protection	Yes
DC Switch Rating for each MPPT	Yes
Output Overcurrent Protection	Yes
Output Overvoltage Protection Varistor	Yes
Ground Fault Monitoring	Yes
Grid Monitoring	Yes
Max. Inrush Current	30A Peak
Max. Output Fault Current	40A Peak
Max. Output Overcurrent Protection	25A RMS
Earth Leakage Current Monitoring	Yes

### GENERAL DATA

Dimensions	588H x 214D x 480W (mm)
Weight	32Kg
Charge / Discharge Efficiency	94% / 94%
PV Max. Efficiency	97.6%
Euro Efficiency	97%
MPPT Efficiency	99.9%
Protection Class	IP65
Noise Emission (Typical)	<30dB
Operational Temperature	-20°C - 60°C with derating at 50°C
Relative Humidity	0 ~ 100%
Altitude	4000m (derating above 2000m)
Inverter Topology	Transformerless
Self-Consumption	<5W

### FEATURES

Display LCD	LED & APP
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### INTERFACE

Communication	BMS: RS485 Meter - Meter: RS485 Portal - WiFi (USB) or LAN
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### CERTIFICATES AND APPROVALS

TÜV CE,  
TÜV IEC 62109-1&2,  
TÜV VDE 0126-1-1,  
AS4777&AS/NZS 3100,  
EN50549,  
SAA,  
G98,  
G100





## 3.2 Energy Saving

The planning design and Energy Report set out the proposed use of 350 W panels, generating 10.5 kW. The final development installed more powerful 410 W panels, generating 16.4 kW, as it is designed to Passivhaus standards. Therefore, the final development has improved energy savings from the original planning report.

The estimated output of the PV system based on the total size of the array, irradiance (sunlight) for the postcode, shading, and the orientation of the panels is:

$1,150.00 + 1,207.96 = 2,357.96$  kWp (refer to following data sheet).



## Key Performance Summary

A. Installation Data		
Installed capacity of PV system – kWp (stc)	1.64	kWp
Orientation of the PV system – degrees from South	100	°
Inclination of system – degrees from horizontal	12	°
Postcode region	1	
B. Performance Calculations		
kWh/kWp (Kk) from table	806	kWh/kWp
Shade Factor (SF)	0.87	
Estimated annual output (kWp x Kk x SF)	1,150.00	kWh
C. Installation Data		
Assumed occupancy archetype	Home All Day	
Assumed annual electricity consumption, kWh	5,300.00	kWh
Assumed annual electricity generation from solar PV system, kWh	1,150.00	kWh
Expected solar PV self-consumption / Self-sufficiency (PV Only)	805.00	kWh
Grid electricity independence / Self-sufficiency (PV Only)	15	%





# Key Performance Summary

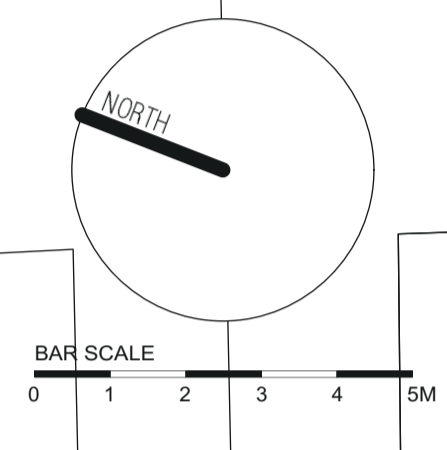
A. Installation Data		
Installed capacity of PV system – kWp (stc)	1.64	kWp
Orientation of the PV system – degrees from South	80	°
Inclination of system – degrees from horizontal	12	°
Postcode region	1	
B. Performance Calculations		
kWh/kWp (Kk) from table	837	kWh/kWp
Shade Factor (SF)	0.88	
Estimated annual output (kWp x Kk x SF)	1,207.96	kWh
C. Installation Data		
Assumed occupancy archetype	Home All Day	
Assumed annual electricity consumption, kWh	5,300.00	kWh
Assumed annual electricity generation from solar PV system, kWh	1,207.96	kWh
Expected solar PV self-consumption / Self-sufficiency (PV Only)	773.09	kWh
Grid electricity independence / Self-sufficiency (PV Only)	15	%

ACCOMMODATION SCHEDULE

SELF-CONTAINED DWELLINGS FOR THE OVER 65s  
 4 No. 1 BED / 2 PERSON WHEELCHAIR ACCESSIBLE M4(3) UNITS @ 60M<sup>2</sup>  
 1 No. 1 BED / 2 PERSON ACCESSIBLE & ADAPTABLE UNIT WITH WET ROOM M4(2) @ 50M<sup>2</sup>  
 5 No. UNITS TOTAL

PARKING:  
 1 No. BLUE BADGE DISABLED PARKING BAY (ELECTRIC CHARGING)  
 2 No. VISITOR BAYS

NOTE:  
 DRY RISER REQUIRED FOR FIRE BRIGADE ACCESS.  
 EXISTING NEIGHBOUR GATE AND GARAGE ACCESS RETAINED.  
 BOUNDARY FENCE REPLACEMENT SUBJECT TO CONSULTATION WITH NEIGHBOURS.



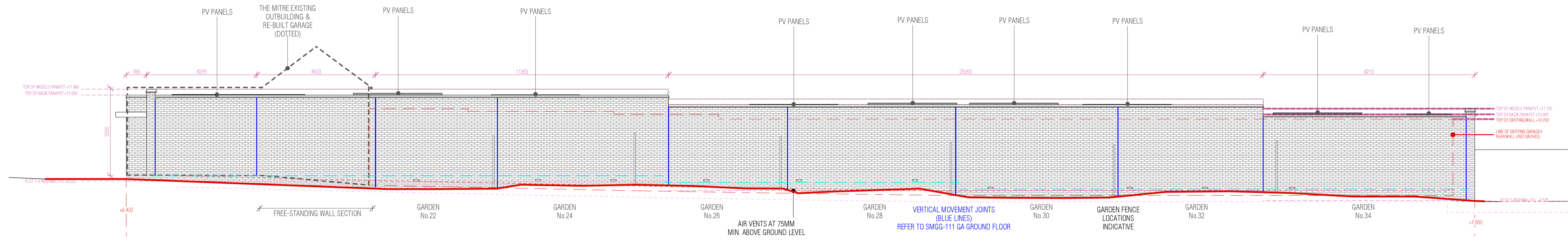
**KEY - ROOF PLAN**

- +8.000 PROPOSED PARAPET LEVELS
- COLOUR CODES DENOTE VARIED PARAPET HEIGHTS
- SVP SOIL VENT PIPE
- RWP RAINWATER PIPE
- AIR EXHAUST/INTAKE DUCTWORK
- MVHR UNIT
- AC/DC/TV CABLES THROUGH ALWITRA
- WATER SPOUT 75MM HIGH x 215MM WIDE
- TV AERIAL DISH
- ECO BAT BOX / STARLING BOX / SPARROW TERRACE / BUG HOTEL

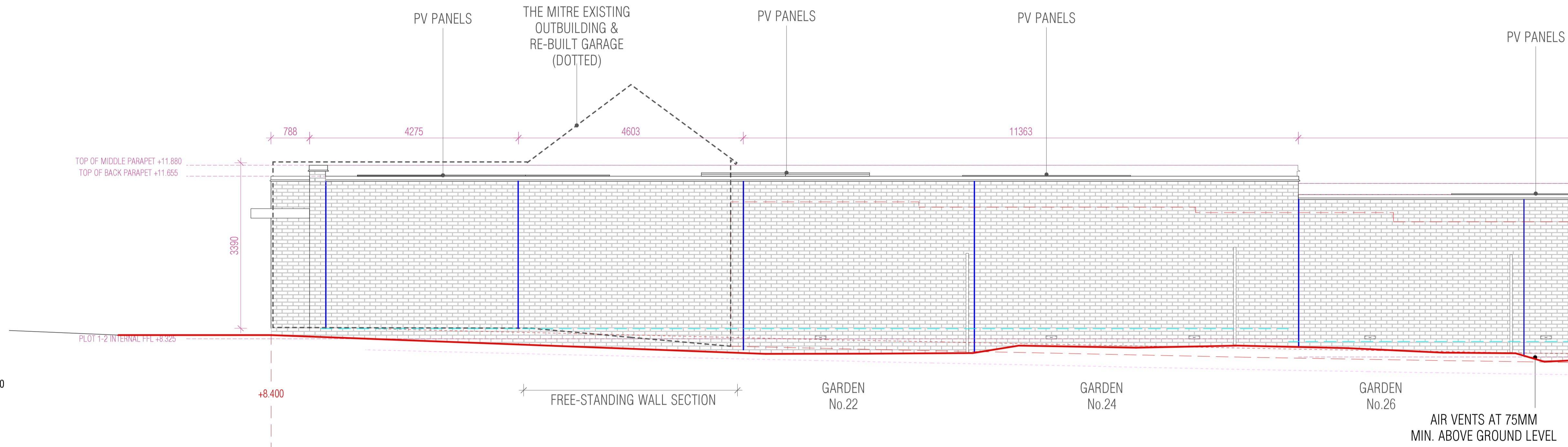


**CONSTRUCTION**

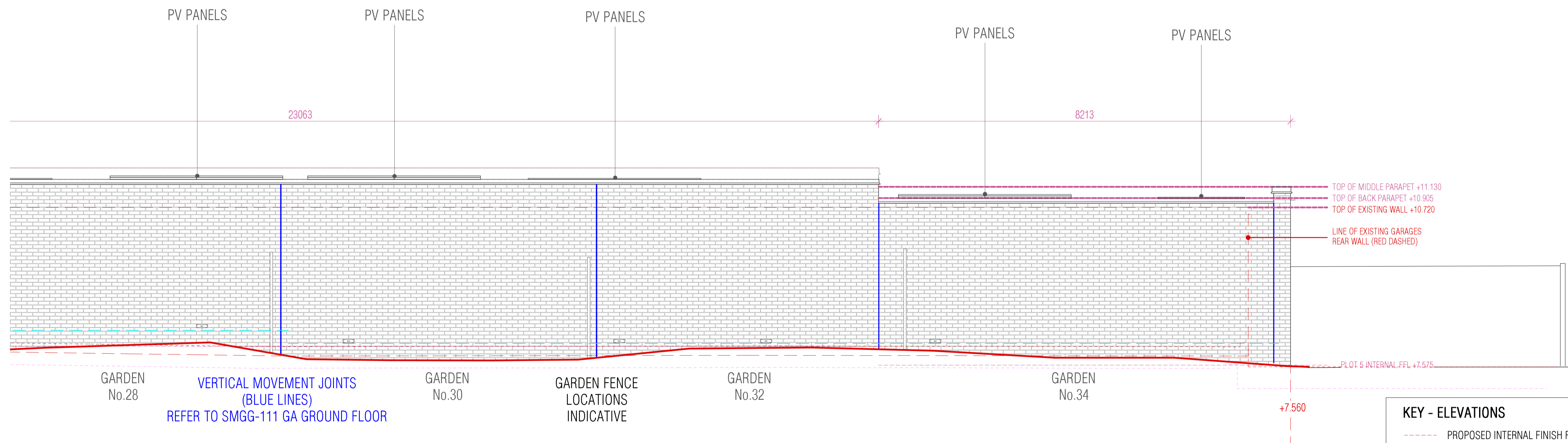
1 CONTEXTUAL ELEVATION @ 1:100  
REAR ELEVATION FACING EAST



2 CONTEXTUAL ELEVATION PART 1 @ 1:50  
REAR ELEVATION FACING EAST



3 CONTEXTUAL ELEVATION PART 2 @ 1:50  
COURTYARD ELEVATION FACING EAST



KEY - ELEVATIONS	
	PROPOSED INTERNAL FINISH FLOOR LEVEL
	PROPOSED SOLE PLATE LEVEL
	VERTICAL EXTERNAL BRICK MOVEMENT JOINT (10MM)
	AIR BRICKS



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Notes:  
Levels on this drawing are adjusted to OS GPS and Ordnance Datum; refer to Twickenham Survey's drawing 23119Lx, dated OCT 2023 & MAY 2012.  
Please refer to other drawings for arbitrary datum levels; refer to Twickenham Survey's drawing 1272L5a, dated MAY 2012.  
External FFL levels are noted to be the levels adjacent to the finished wall.

**CONSTRUCTION**

Project	ST MARY'S GROVE GARAGES, RICHMOND, TW9		
Drawing	GA - ELEVATION - EAST		
Drawing No.	Scale	Date	
SMGG - 115(2)	1:100, 1:50 @ A1	15.11.2023	

CLIVE CHAPMAN  
ARCHITECTS  
SUSTAINABILITY CONSULTANTS  
4 EEL PIE ISLAND  
TWICKENHAM MIDDY  
TW1 3DY  
TELEPHONE 020 8891 4837  
EMAIL INFO@CCAR.CO.UK  
WEBSITE WWW.CCAR.CO.UK