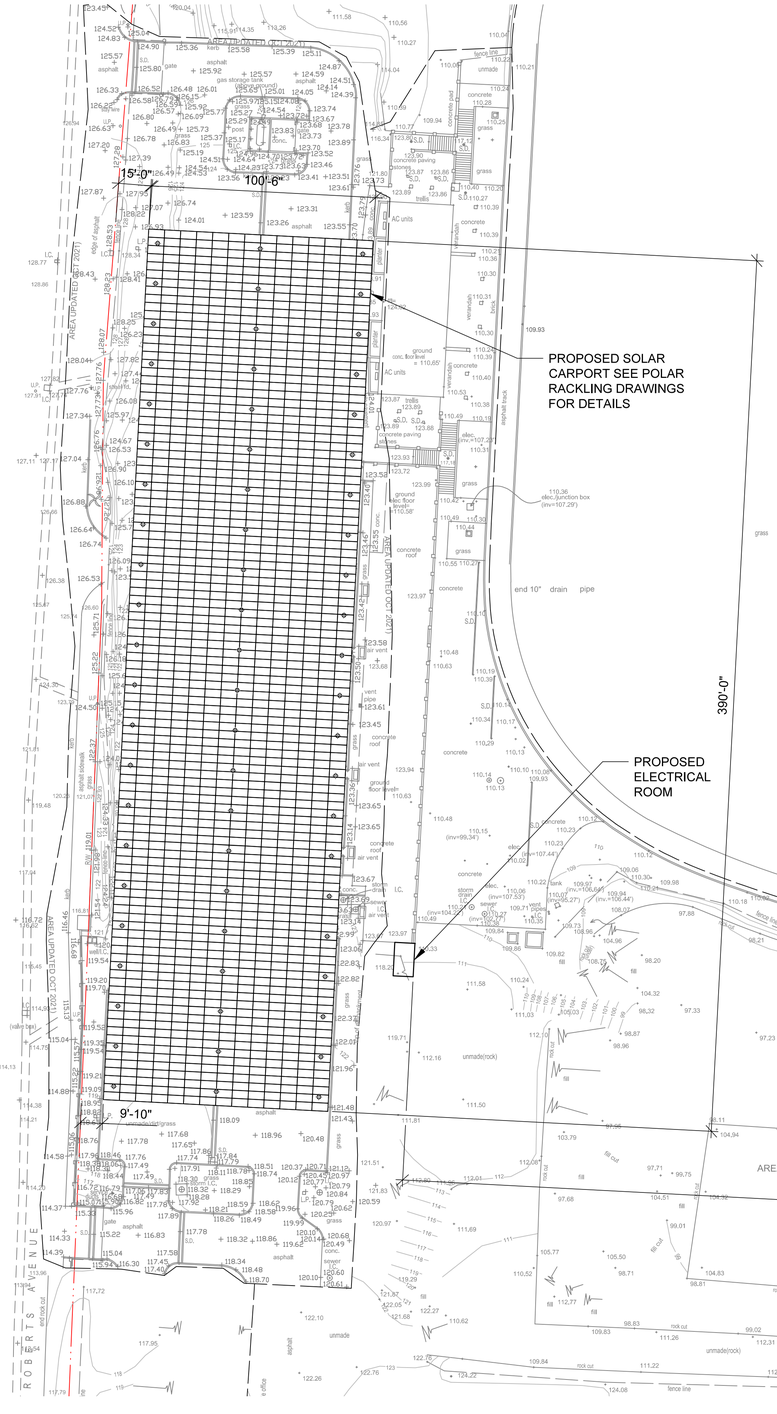
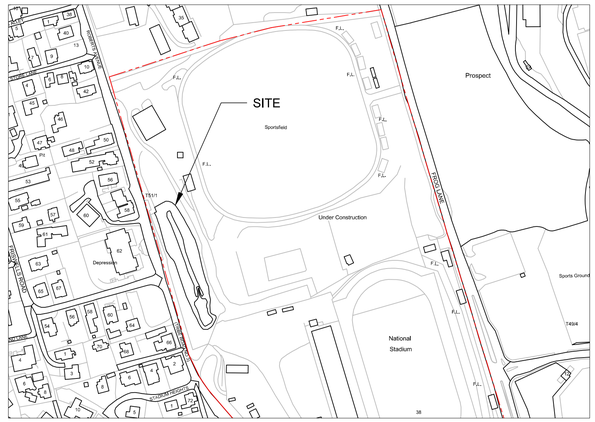


SITE PLAN

Scale: 1/32" = 1'-0"



LOCATION PLAN

Scale: 1:2500

APPROVED
13 Jun 2022
BUILDING CONTROL
ALL BUILDING WORKS AND SATISFIABLE WALL CONFORM TO THE REQUIREMENTS OF THE BUILDING ACT 1998, THE BERMUDA BUILDING CODE, 2018, AND ALL OTHER CODES AND STANDARDS IN FORCE. ALL WORKS SHALL BE INSPECTED AND APPROVED PRIOR TO CONCEALMENT.

APPROVED DRAWINGS
SUBJECT TO PERMIT CONDITIONS
ONE SET OF DRAWINGS SHALL REMAIN ON SITE
PERMIT NO. BC0041-22

MASON
AND ASSOCIATES LTD

13 Par-La-Ville Road, Hamilton HM 11
Phone: (441) 292-1327
Email: info@mason.bm
www.mason.bm

CLIENT

REGISTERED PROFESSIONAL ENGINEER
No. 119
CIVIL
KELLY J. HARRIS
9 May 2022
BERMUDA

ISSUED FOR CONSTRUCTION

IMPORTANT NOTES

This seal indicates that Mason and Associates Ltd.(MAL) has had direct or indirect input into specific design elements of the works. As such our company must be afforded the opportunity to inspect the work as it progresses to ensure conformity to the related design details, specifications and notes. If we are not accorded the privilege of inspecting the work on site before it is covered up or otherwise hidden or if variations to the original details are made without written approval by the engineer of record, Mason and Associates Ltd. will assume no responsibility for the works. Client is still required to contact Building Control for inspections.

DATE	MAL ENGINEER	COMMENTS INSPECTION

REVISIONS

No.	DATE	BY	REVISION

PROJECT DETAILS

PROPOSED MICROGRID SOLAR PROJECT
NATIONAL SPORTS CENTRE
38 FROG LANE
DEVONSHIRE

TITLE

SITE AND LOCATION PLANS

DRAWN BY: KJH / CKL

CHECKED BY: KJH

JOB No: 14951

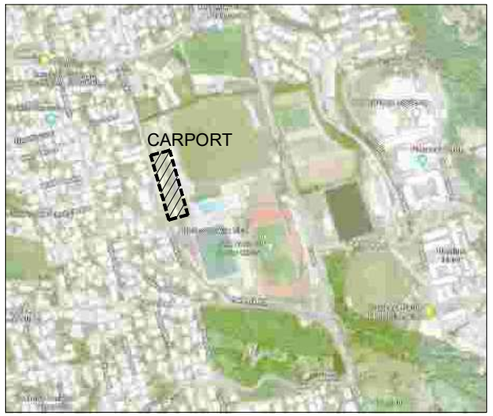
DATE: 31 DEC 2021

REVISION:

SHEET No: S1

Atlantic Energy Solutions Group - Bermuda NSC Carport
756.49 kW DC Solar Photovoltaic (PV) Grid-Tie System
65 Roberts Avenue, Devonshire, DV01 Bermuda

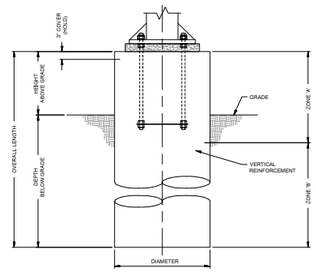
POLAR RACKING
6889 Rexwood Road, Unit 5, Mississauga, ON L4V 1R2
TEL: 416-860-6722 FAX: 416-860-6719
www.polarracking.com



LOCATION PLAN
SCALE: N.T.S.

LEGEND

- PURLIN
- PANEL
- COLUMN LOCATION

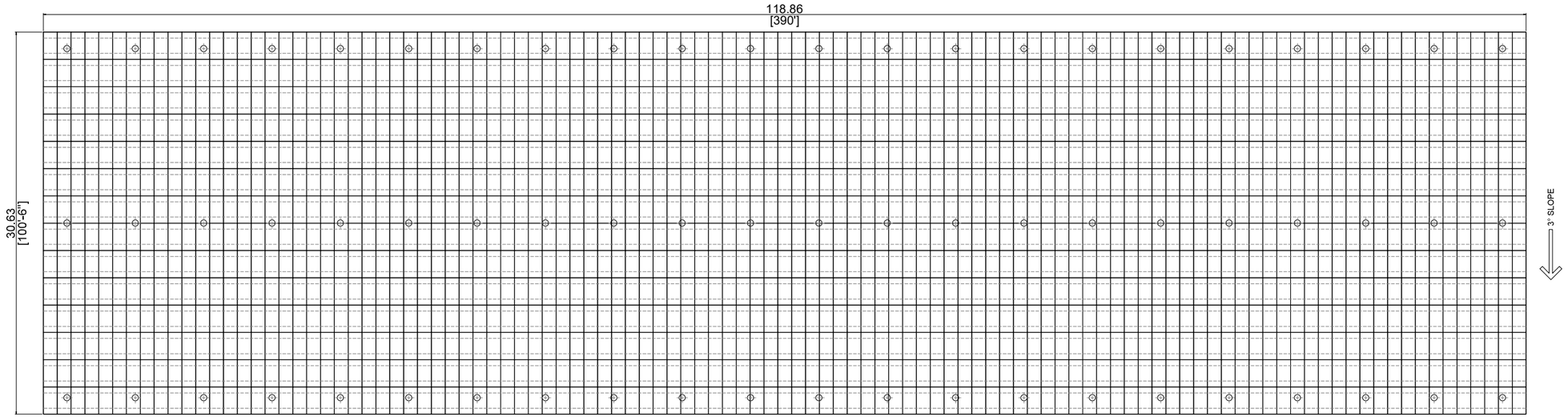


TYPICAL FOUNDATION VIEW

APPROVED
13 Jun 2022
BUILDING CONTROL
ALL BUILDING WORKS AND MATERIALS SHALL CONFORM TO THE REQUIREMENTS OF THE BUILDING ACT 1988, THE BERMUDA BUILDING CODE 2014 AND ALL OTHER CODES AND STANDARDS IN FORCE. ALL WORKS SHALL BE INSPECTED AND APPROVED PRIOR TO CONCEALMENT.

REGISTERED PROFESSIONAL ENGINEER
No. 119
CIVIL
KELLY J. HARRIS
5 May 2022
BERMUDA

SECTION 1
S-01 / 1498 MODULES



1 S-01 ROOF PLAN - FLATTENED VIEW
SCALE 1:175

PRR ARRAY INFORMATION

ARRAY SIZE	756.49 kW DC
AZIMUTH	T.B.C.
MODULE TYPE	TSM-DE18M(II) / 505W
MODULE DIMS.	2176 ×1098× 35 mm
MODULE QTY.	1498

REV NO.	ISSUANCE	DATE
3	ISSUED FOR APPROVAL	25OCT21
2	ISSUED FOR APPROVAL	10AUG21
1	ISSUED FOR CLIENT APPROVAL	18JUN21

PROJECT NAME:
Bermuda NSC
Longspan Solar Carport

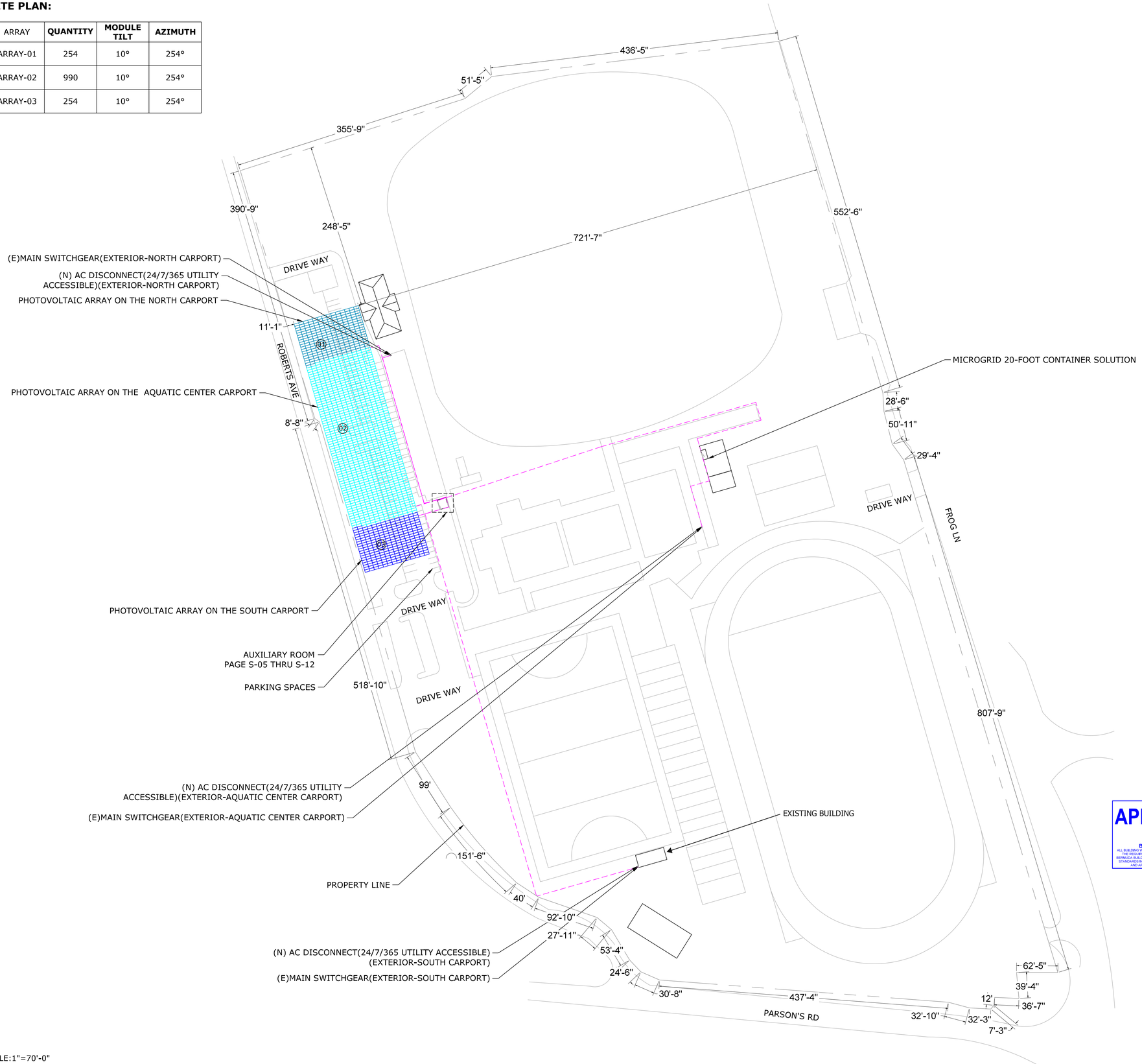
DRAWING NAME:
KEY PLAN, DETAILS AND LAYOUT

PROJ. NO.:	DWG. BY:	CHKD. BY:	SCALE:
004781	AV	SA	AS SHOWN

DRAWING NUMBER:
S-001

SITE PLAN:

ARRAY	QUANTITY	MODULE TILT	AZIMUTH
ARRAY-01	254	10°	254°
ARRAY-02	990	10°	254°
ARRAY-03	254	10°	254°



APPROVED
13 Jun 2022
BUILDING CONTROL
ALL BUILDING WORKS AND MATERIALS SHALL CONFORM TO THE REQUIREMENTS OF THE BUILDING ACT 1988, THE BERMUDA BUILDING CODE,2018 AND ALL OTHER CODES AND STANDARDS IN FORCE. ALL WORKS SHALL BE INSPECTED AND APPROVED PRIOR TO CONCEALMENT.

SCALE:1"=70'-0"

Optimal Tech

SYSTEM INFORMATION

DC SYSTEM SIZE: 756.49KW
AC SYSTEM SIZE: 900.00KW
NORTH CARPORT:
DC SYSTEM SIZE: 128.27KW
AC SYSTEM SIZE: 180.00KW
MODULES:
(254)TRINA SOLAR
TSM-DE18M(II) 505W
INVERTERS:
(3)FIMER
PVS-60-TL-US(3PH,277/480V)
CENTER CARPORT:
DC SYSTEM SIZE: 499.95KW
AC SYSTEM SIZE: 540.00KW
MODULES:
(990)TRINA SOLAR
TSM-DE18M(II) 505W
INVERTERS:
(9)FIMER
PVS-60-TL-US(3PH,277/480V)
SOUTH CARPORT:
DC SYSTEM SIZE: 128.27KW
AC SYSTEM SIZE: 180.00KW
MODULES:
(254)TRINA SOLAR
TSM-DE18M(II) 505W
INVERTERS:
(3)FIMER
PVS-60-TL-US(3PH,277/480V)
WIND SPEED: 150MPH
SNOW LOAD: 0PSF
MINIMUM
TEMPERATURE: 20°C
MAXIMUM
TEMPERATURE: 40°C

REGISTERED PROFESSIONAL ENGINEER No. 135 BERMUDA

SOLAR PV PROJECT
FOR
BERMUDA NSC
65 ROBERTS AVENUE, DEVONSHIRE, BM

REVISION

DATE	DESCRIPTION	REV
03/21/22	PERMIT PLANS	A

PROJECT INFORMATION

NAME:BERMUDA NSC

ADDRESS:65 ROBERTS AVENUE, DEVONSHIRE, BM

32.301639, -64.771827
APN:21936

AHJ:BM-CITY OF DEVONSHIRE

PRN NUMBER:GTO-CU-2021-302

ILLUMINE i
Because quality matters

SITE PLAN

DRAFTED BY/QC'ED BY:
V.PRIYA/VANITHA

SCALE:AS NOTED	REV:A
DATE:3/21/22	E-01

GOVERNMENT OF BERMUDA

Department of Planning

Dame Lois Browne-Evans Building, 58 Court Street, Hamilton HM 12, Bermuda
Phone: (441) 295-5151 Fax: (441) 295-4100

Our Reference: **BC0041-22** **June 13, 2022**
Your Reference:

Ellsworth K Wainwright
12 West Avenue
Southampton, BM SN03

Dear Sir/Madam,

Application Number: BC0041-22
Applicant: Damon Wade
Site(s): 38 Frog Lane Devonshire DV01

756.49kW (DC) Photovoltaic PV System; 1498 panels @ 505W/panel; 39,000 sq ft

I refer to the Building Permit Applications in respect of the above. I wish to advise you that the approved documents are now ready for download from https://planningenergov.gov.bm/EnerGov_Prod/SelfService. **Please ensure that this complete permit package is passed on to your client(s).**

You are reminded that you must not begin work until an approved permit has been issued. The building permit number must be on display at the entrance to the site. This number should not be removed from the site until such time as the Certificate of Occupancy has been issued. A copy of the "approved" construction drawings must be available at the site. Contravention of the above is liable to fines of up to $25,000.

Please be advised that the owner of this development bears ultimate responsibility for completion of the project in accordance with all relevant codes and documents.

Your cooperation in this matter would be greatly appreciated.

Yours faithfully

for Building Control Officer

Cc. Damon Wade

GOVERNMENT OF BERMUDA

Department of Planning

Dame Lois Browne-Evans Building, 58 Court Street, Hamilton HM 12, Bermuda
Phone: (441) 295-5151 Fax: (441) 295-4100

Number: **BC0041-22**

Permit Date:

Type: **Building - Commercial**

Site Location: **38 Frog Lane Devonshire DV01**

Applicant: **Damon Wade**
2 Cherry Hill Lane
Paget, PG03

Agent: **Ellsworth K Wainwright**

Scope of Work: **756.49kW (DC) Photovoltaic PV System; 1498 panels @ 505W/panel; 39,000 sq ft**

Conditions: All of the permit conditions on the last page plus the following:

1. Certificate of Completion and Occupancy – Refer to Section 106, Clauses 106.1 to 106.6. The Bermuda Building Code 2014 (which states that requests for Certificates of Completion and Occupancy, whether partial or final, must be made in writing following the completion (with pass) of ALL final inspections. PLEASE NOTE THAT A REQUEST FOR PARTIAL SIGN OFF WILL INCUR A FEE OF $50.00 (in accordance with Government Fees Amendment Regulations 2018, effective 1 April 2018).

Planning Conditions: All of the planning conditions from Plan Case P0623-21 must also be met:

1. The development hereby permitted shall begin before the expiration of 2 (two) years from the date of this permission.

2. For the avoidance of doubt the consent hereby granted is for planning permission only. Prior to the commencement of building operations a separate application for a building permit must be made and approved.

3. For the avoidance of doubt, the solar panel development at this scale is considered a form of controlled plant. A construction permit for the controlled plant must be obtained from the Department of Environment and Natural Resources and submitted with the building permit application. A license to operate the controlled plant must be obtained from the Department of Environment and Natural Resources and submitted prior to the issuance of a Certificate of Completion and Occupancy.

4. Evidence that a complete Bulk Generation Licence application has been submitted, or written confirmation from the Regulatory Authority that a bulk generation licence is not required, shall be submitted to the Department of Planning prior to the issuance of a Certificate of Completion and Occupancy.

WORK SHALL NOT PROCEED UNTIL THE INSPECTORS HAVE APPROVED THE VARIOUS STAGES OF CONSTRUCTION.

By downloading this report, applicant agrees to terms and conditions of this building permit.

Building Official or Responsible Person

ISSUED PURSUANT TO THE BUILDING ACT OF 1988 AND BERMUDA BUILDING CODE 2014

GENERAL PERMIT CONDITIONS

In addition to the specific conditions listed on the other side, this permit is conditioned upon full compliance with the Building Act 1988 which provides for inspections of the work as it progresses.

The permit holder shall notify the Building Official at least one working day prior to proceeding or concealing work which requires inspection that inspection is needed. Work which requires inspection includes:

1) Setting out of the project prior to any excavation of any building works. Property survey stakes and location markers in place.
2) Excavations completed for foundation, reinforcing placed prior to pouring footing concrete.
3) Foundations poured, backfilled, waterproofed, prior to vertical construction.
4) Structural reinforcing in all structural concrete members prior to pouring concrete. All structural members prior to concealing the member.
5) All RI electrical work prior to concealing.
6) Roof framing, battens and sheathing prior to installation of roof slates, shingles, sheet roofing or roof membrane.
7) Re-commencement of work after project has been suspended in excess of three months.
8) Final completion of the work prior to occupancy.

Requests for inspection can be downloaded from the EnerGov Customer Self Service Portal at: https://www.gov.bm/department/planning .

The enclosed field card is required to be posted at the job site and a copy of this permit with a copy of the approved permit documents are required to be kept at the job site.

The building Act 1988 also requires compliance with all other laws not addressed by the Building Regulations. This includes full compliance with:

1. The Planning Act and planning approval conditions.
2. Regulations administered by the Fire Service.
3. Regulations administered by the Health Department.
4. Requirements of the Health and Safety at Work Act.
5. All other applicable regulations or laws.

When appropriate a copy of this permit is forwarded to other agencies such as those listed above to advise them of your project.

Violations of the Building Act 1988 can carry fines of up to $25,000.00.

This Permit is void if any required Planning Approvals are not in force or deviation is made from any Planning Approval.

Deviation from the Permit Conditions or deviation from the Approval Plans is not lawful.

This Permit is not transferable.

This Permit may be cancelled in accordance with the Building Act 1988.

THIS PERMIT DOES NOT AUTHORISE USE OR OCCUPANCY OF A BUILDING.

GOVERNMENT OF BERMUDA

Department of Planning

Dame Lois Browne-Evans Building, 58 Court Street, Hamilton HM 12, Bermuda
Phone: (441) 295-5151 Fax: (441) 295-4100

Our Reference: P0623-21 **16 March 2022**

Mason and Associates Ltd.
P.O. Box HM 1477
City of Hamilton, BM HM FX

Dear Sir/Madam,

Application Number:	P0623-21
Description:	Proposed Construction of New Carport Solar Array over Existing Parking Area, Installation of 1,498 Solar Panels, 39,000 sq. ft., Total Capacity 756kW and Construction of a 15 ft. x 9 ft. Electrical Room to House Auxiliary Equipment.
Applicant:	Bermuda National Sports Centre
Location(s):	38 Frog Lane Devonshire DV01

The above application for Final Approval, received on 19 January 2022, was considered by the Director of Planning.

On 16 March 2022, the Director resolved to approve the application.

The grant of planning permission is subject to the following condition(s):

1. The development hereby permitted shall begin before the expiration of 2 (two) years from the date of this permission.
2. For the avoidance of doubt the consent hereby granted is for planning permission only. Prior to the commencement of building operations a separate application for a building permit must be made and approved.
3. For the avoidance of doubt, the solar panel development at this scale is considered a form of controlled plant. A construction permit for the controlled plant must be obtained from the Department of Environment and Natural Resources and submitted with the building permit application. A license to operate the controlled plant must be obtained from the Department of Environment and Natural Resources and submitted prior to the issuance of a Certificate of Completion and Occupancy.
4. For the avoidance of doubt the proposed solar panel development requires a formal license from the Regulatory Authority. As such, a formal license must be obtained from the Regulatory Authority and submitted with the Building Permit application.

Document and Plans

All planning documents, including stamped plans, are available online from the Department of Planning Customer Self Service portal at https://planning.gov.bm. Search by the reference number provided above and look in the Attachments section.

Important Information Regarding this Approval

Renewal of Planning and Subdivision Approvals

Applications for the **Renewal of Planning Permission** (final or in principle), must be filed within three (3) months of the date that planning approval will expire. If planning approval expires, the filing of a new planning application is required. Final planning approval will remain valid beyond the 2 years, without need for renewal of planning permission, only if a building permit has been obtained and building works have formally commenced (excludes site clearing and excavation work).

Final Plans of Subdivision are normally registered by the Department of Planning 21 days after the Board approval date.

Appeals

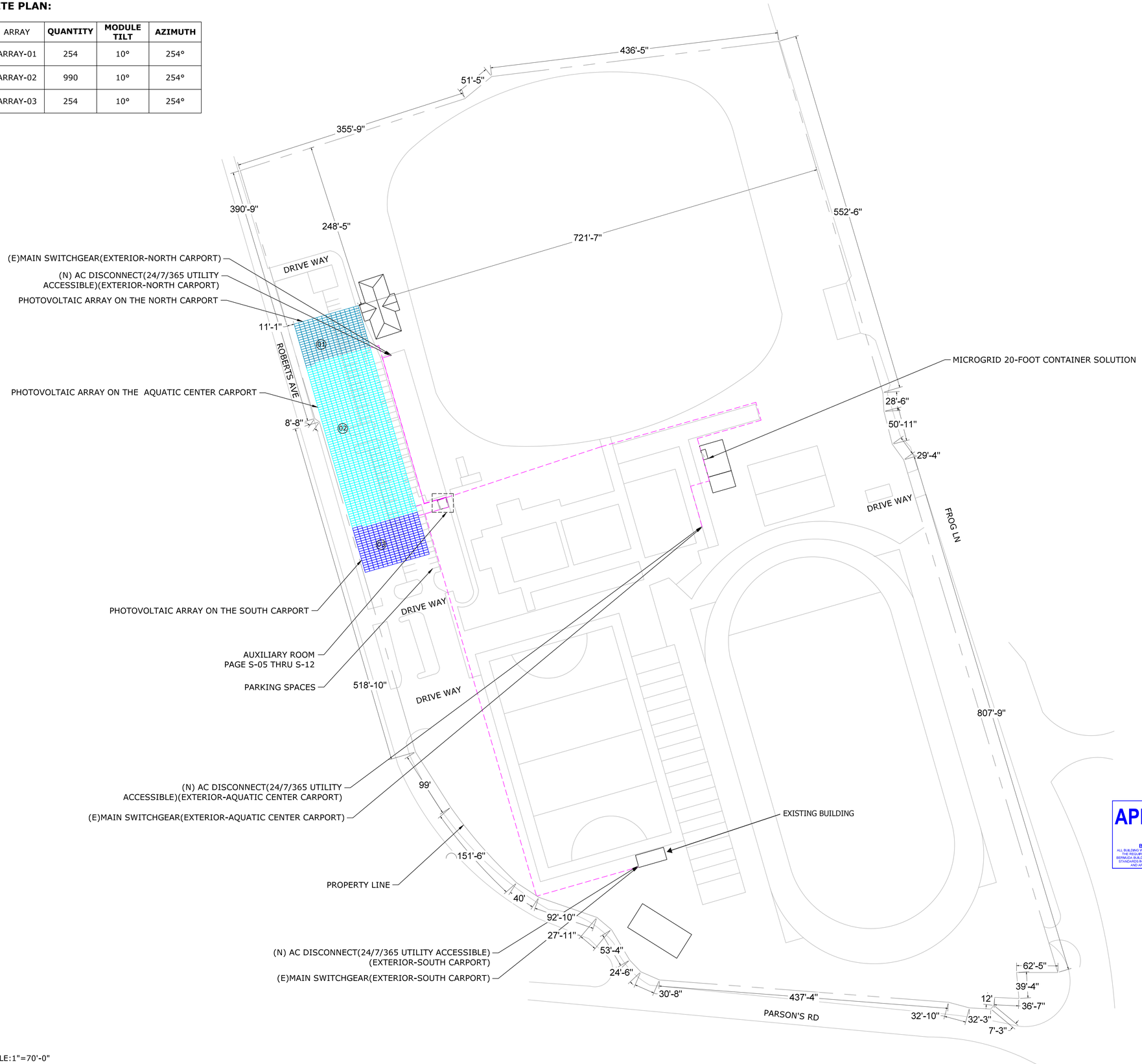
The Director's decision, and/or any condition herein, may be appealed to the Development Applications Board. The time frame for filing an appeal is within 28 days of being notified of the decision. If this planning/subdivision approval, or any condition or approval is appealed, the approval is suspended until the Board determines the appeal.

Yours faithfully,

Victoria Pereira
Director of Planning

SITE PLAN:

ARRAY	QUANTITY	MODULE TILT	AZIMUTH
ARRAY-01	254	10°	254°
ARRAY-02	990	10°	254°
ARRAY-03	254	10°	254°



APPROVED
13 Jun 2022
BUILDING CONTROL
ALL BUILDING WORKS AND MATERIALS SHALL CONFORM TO THE REQUIREMENTS OF THE BUILDING ACT 1988, THE BERMUDA BUILDING CODE,2018 AND ALL OTHER CODES AND STANDARDS IN FORCE. ALL WORKS SHALL BE INSPECTED AND APPROVED PRIOR TO CONCEALMENT.

SCALE:1"=70'-0"

Optimal Tech

SYSTEM INFORMATION

DC SYSTEM SIZE: 756.49KW
AC SYSTEM SIZE: 900.00KW
NORTH CARPORT:
DC SYSTEM SIZE: 128.27KW
AC SYSTEM SIZE: 180.00KW
MODULES:
(254)TRINA SOLAR
TSM-DE18M(II) 505W
INVERTERS:
(3)FIMER
PVS-60-TL-US(3PH,277/480V)
CENTER CARPORT:
DC SYSTEM SIZE: 499.95KW
AC SYSTEM SIZE: 540.00KW
MODULES:
(990)TRINA SOLAR
TSM-DE18M(II) 505W
INVERTERS:
(9)FIMER
PVS-60-TL-US(3PH,277/480V)
SOUTH CARPORT:
DC SYSTEM SIZE: 128.27KW
AC SYSTEM SIZE: 180.00KW
MODULES:
(254)TRINA SOLAR
TSM-DE18M(II) 505W
INVERTERS:
(3)FIMER
PVS-60-TL-US(3PH,277/480V)
WIND SPEED: 150MPH
SNOW LOAD: 0PSF
MINIMUM
TEMPERATURE: 20°C
MAXIMUM
TEMPERATURE: 40°C

REGISTERED PROFESSIONAL ENGINEER No. 135 BERMUDA

SOLAR PV PROJECT
FOR
BERMUDA NSC
65 ROBERTS AVENUE, DEVONSHIRE, BM

REVISION

DATE	DESCRIPTION	REV
03/21/22	PERMIT PLANS	A

PROJECT INFORMATION

NAME:BERMUDA NSC

ADDRESS:65 ROBERTS AVENUE, DEVONSHIRE, BM

32.301639, -64.771827
APN:21936

AHJ:BM-CITY OF DEVONSHIRE

PRN NUMBER:GTO-CU-2021-302

ILLUMINE i
Because quality matters

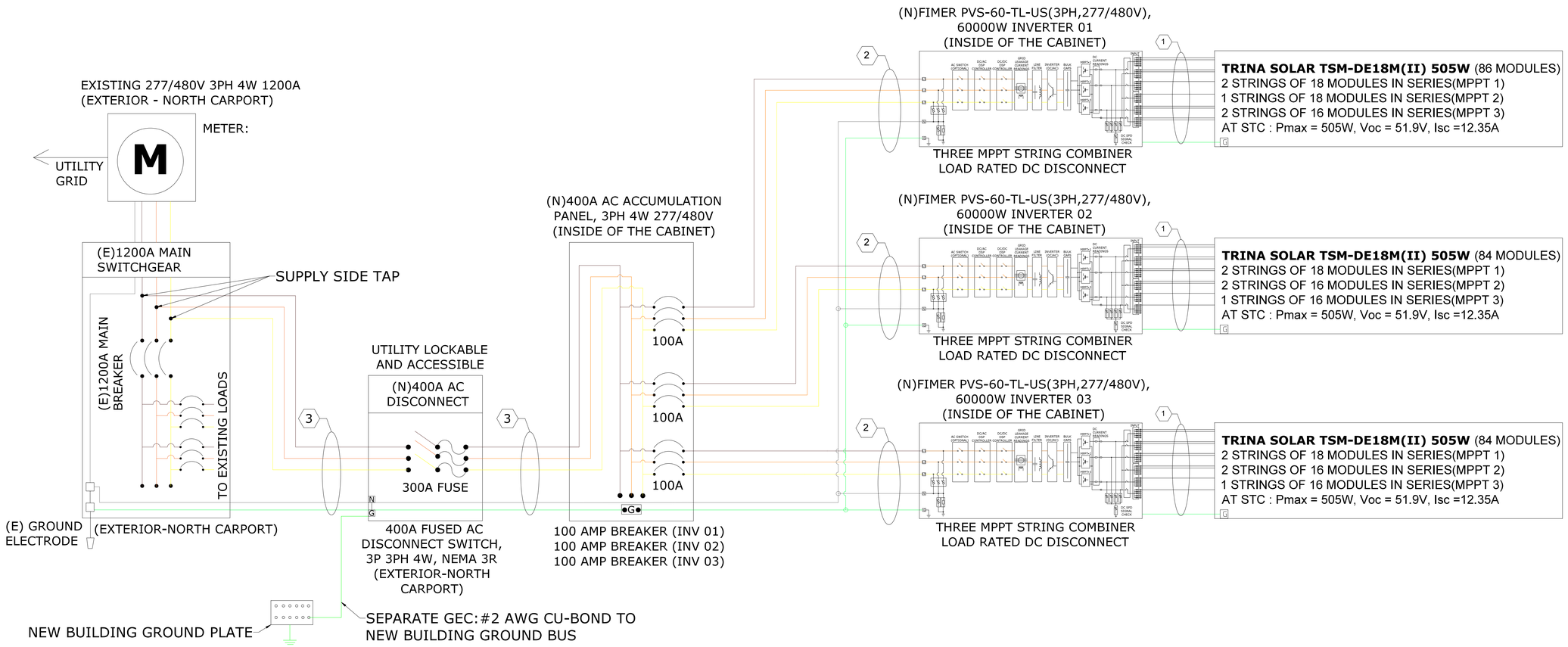
SITE PLAN

DRAFTED BY/QC'ED BY:
V.PRIYA/VANITHA

SCALE:AS NOTED | REV:A

DATE:3/21/22 | E-01

ELECTRICAL DIAGRAM 128.27 kW DC SYSTEM SIZE 180.00 kW AC SYSTEM SIZE



OCPD CALCULATIONS
MAIN PANEL RATING:1200A, MAIN BREAKER RATING:1200A
LINE SIDE TAP INTERCONNECTION ALLOWABLE BACKFEED IS =1200A
OCPD CALCULATIONS: INVERTER OVERCURRENT PROTECTION
=INVERTER O/P I X CONTINUOUS LOAD(1.25) =((77AX3)x1.25=288.75A=>PV BREAKER/FUSE = 300A
TOTAL REQUIRED PV BREAKER/FUSE SIZE =>300A PV BREAKER/FUSE
THE DESIGNED INTERCONNECTION MEETS THE 705.12(A)(2) REQUIREMENTS.

SYSTEM INFO:
128.27 kW DC SYSTEM SIZE
(254) TRINA SOLAR TSM-DE18M(II) 505W MODULES
(3) FIMER PVS-60-TL-US(3PH,277/480V)

SYSTEM CHARACTERISTICS-INV-01 TO INV-03:
OPERATING VOLTAGE = (MODULE VMP) X (# MODULES / STRING) =43.0V X 18=774V
MAX OPEN CIRCUIT VOLTAGE = {[((TEMP COEF VOC) X (VOC)) / 100] X [LOW TEMP - STC TEMP] + VOC} X (# MODULES / STRING) = {[(-0.26 %/°C X51.9V) / 100] X [20 °C - 25 °C] +51.9V} X 18=946.34V
OPERATING CURRENT = (MODULE IMP) * (# STRINGS) =11.75 A X 5=58.75A
SHORT CIRCUIT CURRENT = 1.25 X (MODULE ISC) X (# STRINGS) = 1.25 X 12.35 A X 5= 77.18A
DC WIRE SIZING
MAX CIRCUIT CURRENT = (MODULE ISC) X (CONTINUOUS LOAD)[690.53] = 12.35A X 1.25 X 1.25 =19.29A
ADJUSTED CONDUCTOR AMPACITY = (HIGH TEMP) [PER TABLE 310.15(B)(2)(a)]] X (CONDUIT FILL) [PER TABLE 310.15(B)(3)(a)X (CONDUCTOR AMPACITY) [PER TABLE 310.15(B)(16)] = 0.71X 0.8 X 40A =22.72A
TERMINAL RATING, [PER NEC 110.14(C)] - 10 AWG, 75°C RATED =35A
35A > 19.29A, SO THE TERMINAL RATING GOVERNS THE CONDUCTOR SIZING
ALSO, 22.72A > 15.43A, AND **10 AWG** IS SUFFICIENT.
AC WIRE SIZING-INV-01 TO INV-03:
MAX AC OUTPUT CURRENT = (MAX INVERTER OUTPUT) X (CONTINUOUS LOAD) [PER NEC 690.52] =77A X 1.25 = 96.25A
ADJUSTED CONDUCTOR AMPACITY = (HIGH TEMP) [PER TABLE 310.15(B)(2)(a)] X (CONDUIT FILL) [PER TABLE 310.15(B)(3)(a)] X (CONDUCTOR AMPACITY) [PER TABLE 310.15(B)(16)] =0.91 X 1 X 115A =104.65A
TERMINAL RATING, [PER NEC 110.14(C)] - 3 AWG, 75°C RATED = 100A
100A >96.25A, SO THE ADJUSTED CONDUCTOR AMPACITY GOVERNS THE CONDUCTOR SIZING
ALSO,104.65A >77A **3 AWG** IS SUFFICIENT
INVERTER OVERCURRENT PROTECTION
(INVERTER MAX CURRENT) X (CONTINOUS LOAD) =77A X 1.25 = 96.25A --> 100A OVERCURRENT PROTECTION
AC ACCUMULATION PANEL TO POI:
MAX AC OUTPUT CURRENT = (MAX INVERTER OUTPUT) X (CONTINUOUS LOAD) [PER NEC 690.52]
= 77AX 3 X 1.25 =288.75A
ADJUSTED CONDUCTOR AMPACITY = (HIGH TEMP) [PER TABLE 310.15(B)(2)(a)] X (CONDUIT FILL) [PER TABLE 310.15(B)(3)(a)] X (CONDUCTOR AMPACITY) [PER TABLE 310.15(B)(16)] =0.91 X1 X 350A =318.5A
TERMINAL RATING, [PER NEC 110.14(C)] - 350 kcmil, 75°C RATED =310A
310A >288.75A, SO THE ADJUSTED CONDUCTOR AMPACITY GOVERNS THE CONDUCTOR SIZING
ALSO,318.5A >231A, AND **350 kcmil** IS SUFFICIENT
INVERTER OVERCURRENT PROTECTION
(INVERTER MAX CURRENT) X (CONTINOUS LOAD) = 77AX 3X 1.25 = 288.75A --> 300A OVERCURRENT PROTECTION

CONDUIT SCHEDULE

TAG ID	CONDUIT SIZE	CONDUCTOR	NEUTRAL	GROUND
1	1-1/4" EMT 1-1/4" EMT	(6) 10 AWG PV WIRE 2K (4) 10 AWG PV WIRE 2K	NONE	(1) 6 AWG BARE COPPER
2	1-1/4" EMT	(3) 3 AWG THHN/THWN-2	(1) 8 AWG THHN/THWN-2	(1) 8 AWG THHN/THWN-2
3	2-1/2" EMT/ 3" PVC	(3) 350 kcmil THHN/THWN-2	(1) 4 AWG THHN/THWN-2	(1) 4 AWG THHN/THWN-2

MODULE SPECIFICATION	
MODEL	TRINA SOLAR TSM-DE18M(II) 505W
MODULE POWER @ STC	505W
OPEN CIRCUIT VOLTAGE:**Voc**	51.9V
MAX POWER VOLTAGE:**Vmp**	43.0V
SHORT CIRCUIT VOLTAGE:**Isc**	12.35A
MAX POWER CURRENT:**Imp**	11.75A

INVERTER SPECIFICATIONS	
MODEL	FIMER PVS-60-TL-US(3PH,277/480V)
POWER RATING	60000W
RATED DC INPUT POWER	61800W
MAX OUTPUT CURRENT	77A
CEC WEIGHTED EFFICIENCY	98.00%
MAX INPUT CURRENT(PER MPPT)	36A
MAX DC VOLTAGE	1000V

DC VOLTAGE DROP CALCULATION (NSC NORTH CARPORT)

SOURCE	TERMINATION	TAG	CONDUIT TYPE	CURRENT (IMP)	STRING VOLTAGE AT 2%DB (VMP)	#SET O' PARALLEL CONDUCTOR	CONDUCTOR	CONDUCTOR MATERIAL	RESISTENCE AT 75 DEG C	RESISTENCE AT 2%DB	MAX CONDUTOR LENGTH(ft)	%V.DROP
MODULES	INVERTER 01	1	PVC	11.75	774	1	C AWG 10	Cu	0.00124	0.00104775	420	1.34%
MODULES	INVERTER 02	1	PVC	11.75	774	1	C AWG 10	Cu	0.00124	0.00104775	450	1.43%
MODULES	INVERTER 03	1	PVC	11.75	774	1	C AWG 10	Cu	0.00124	0.00104775	500	1.59%
											MAX Vdrop	1.59%
											AVERAGE Vdrop	1.45%

3 PHASE AC VOLTAGE DROP CALCULATION

SOURCE	TERMINATION	TAG	CONDUIT TYPE	CURRENT	VOLTAGE	#SET O' PARALLEL CONDUCTOR	CONDUCTOR	CONDUCTOR MATERIAL	RESISTENCE AT 75 DEG C	RESISTENCE AT 2%DB	MAX CONDUTOR LENGTH(ft)	%V.DROP
INVERTER TO COLLECTION												
INVERTER 01	AC ACCUMULATION	2	PVC	77	480	1	G AWG 03	Cu	0.00025	0.00021124	10	0.06%
INVERTER 02	AC ACCUMULATION	2	PVC	77	480	1	G AWG 03	Cu	0.00025	0.00021124	20	0.12%
INVERTER 03	AC ACCUMULATION	2	PVC	77	480	1	G AWG 03	Cu	0.00025	0.00021124	30	0.18%
COLLECTION TO POI												
AC ACCUMULATION	AC DISCONNECT	3	PVC	231	480	1	P 350 KCMIL	Cu	0.000043	3.63333E-05	320	0.97%
AC DISCONNECT	POI	3	EMT	231	480	1	P 350 KCMIL	Cu	0.000043	3.63333E-05	10	0.03%
											MAX Vdrop	1.18%
											AVERAGE Vdrop	1.12%
											TOTAL SYSTEM VDROP	2.77%

NOTE:
1.THIS INSTALLATION IS TO BE CONSIDERED SUPERVISED.ALL NEW ADDITIONS AND ALTERATIONS TO ANY EQUIPMENT IDENTIFIED IN THIS DOCUMENT MUST BE MADE WITH ENGINEERING SUPERVISION AND ALL WORK MUST BE COMPLETED BY QUALIFIED PERSONNEL.
2.ALL EQUIPMENT AND TERMINALS MUST BE MINIMUM 75°C RATED.
3.ALL CONDUCTORS ARE COPPER, UNLESS OTHERWISE SPECIFIED.
4.ALL TERMINATIONS OF ALUMINUM CONDUCTORS SHALL BE PROPERLY INSTALLED WITH BEST PRACTICE PROCEDURES THAT INCLUDE BUT NOT LIMITED TO: USE OF TERMINATION EQUIPMENT RATED FOR ALUMINUM AT THE CONDUCTOR TEMPERATURE, CURRENT, AND VOLTAGE; ALLOWANCE FOR MOVEMENT DUE TO THERMAL EXPANSION/CONTRACTION; EXPOSED ALUMINUM SHALL BE PROPERLY COATED WITH ANTI-OXIDATION COMPOUND; TERMINALS ARE TORQUE AND MARKED TO REQUIRED SETTINGS WITH CALIBRATED DEVICE
5.TAP DISCONNECTS ARE WITHIN THE 10 FOOT PER TAP RULE.
6.TAPS ARE MADE USING LISTED DEVICES.

APPROVED
13 Jun 2022
BUILDING CONTROL
ALL BUILDING WORKS AND MATERIALS SHALL CONFORM TO THE REQUIREMENTS OF THE BUILDING ACT 1998, THE BERMUDA BUILDING CODES 2007 AND ANY AMENDMENTS AND STATUTORY INSTRUMENTS. ALL WORKS SHALL BE INSPECTED AND APPROVED PRIOR TO CONCEALMENT.

Optimal Tech

SYSTEM INFORMATION
DC SYSTEM SIZE: 756.49KW
AC SYSTEM SIZE: 900.00KW
NORTH CARPORT:
DC SYSTEM SIZE: 128.27KW
AC SYSTEM SIZE: 180.00KW
MODULES:
(254)TRINA SOLAR TSM-DE18M(II) 505W
INVERTERS:
(3)FIMER PVS-60-TL-US(3PH,277/480V)
CENTER CARPORT:
DC SYSTEM SIZE: 499.95KW
AC SYSTEM SIZE: 540.00KW
MODULES:
(990)TRINA SOLAR TSM-DE18M(II) 505W
INVERTERS:
(9)FIMER PVS-60-TL-US(3PH,277/480V)
SOUTH CARPORT:
DC SYSTEM SIZE: 128.27KW
AC SYSTEM SIZE: 180.00KW
MODULES:
(254)TRINA SOLAR TSM-DE18M(II) 505W
INVERTERS:
(3)FIMER PVS-60-TL-US(3PH,277/480V)
WIND SPEED: 150MPH
SNOW LOAD: 0PSF
MINIMUM TEMPERATURE: 20°C
MAXIMUM TEMPERATURE: 40°C

REGISTERED PROFESSIONAL ENGINEER No. 135 BERMUDA

SOLAR PV PROJECT FOR BERMUDA NSC
65 ROBERTS AVENUE, DEVONSHIRE, BM

REVISION

DATE	DESCRIPTION	REV
03/21/22	PERMIT PLANS	A

PROJECT INFORMATION
NAME:BERMUDA NSC
ADDRESS:65 ROBERTS AVENUE, DEVONSHIRE, BM
32.301639, -64.771827
APN:21936
AHJ:BM-CITY OF DEVONSHIRE
PRN NUMBER:GTO-CU-2021-302

ILLUMINEi Because quality matters

ELECTRICAL DIAGRAM & CALC-CARPORT NSC NORTH

DRAFTED BY/QC'ED BY:
V.PRIYA/VANITHA

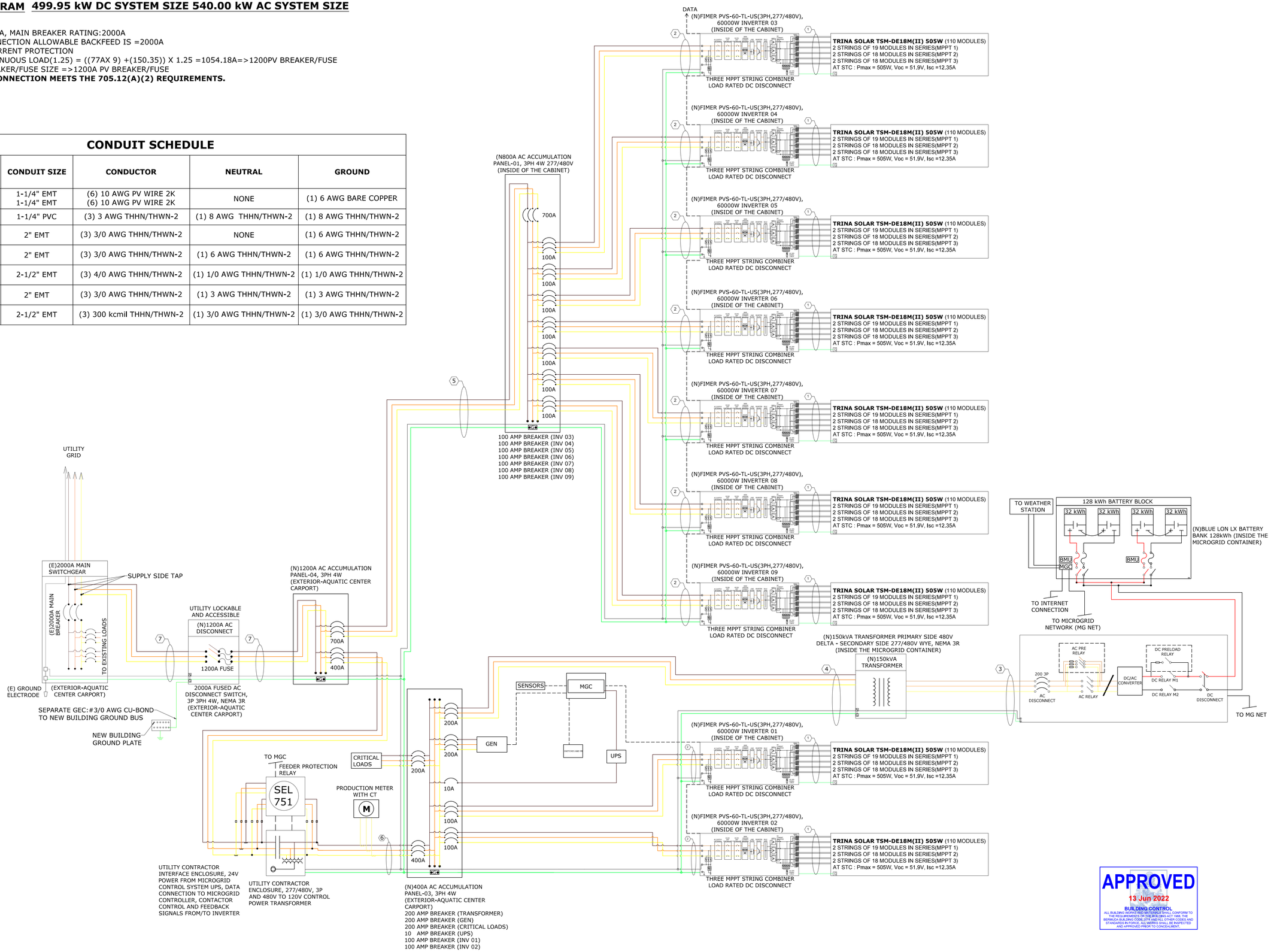
SCALE:AS NOTED	REV:A
DATE:3/21/22	E-10

ELECTRICAL DIAGRAM 499.95 kW DC SYSTEM SIZE 540.00 kW AC SYSTEM SIZE

OCPD CALCULATIONS
MAIN PANEL RATING:2000A, MAIN BREAKER RATING:2000A
LINE SIDE TAP INTERCONNECTION ALLOWABLE BACKFEED IS =2000A
OCPD:INVERTER OVERCURRENT PROTECTION
=INVERTER O/P I X CONTINUOUS LOAD(1.25) = ((77AX 9) +(150.35)) X 1.25 =1054.18A=>1200PV BREAKER/FUSE
TOTAL REQUIRED PV BREAKER/FUSE SIZE =>1200A PV BREAKER/FUSE
THE DESIGNED INTERCONNECTION MEETS THE 705.12(A)(2) REQUIREMENTS.

CONDUIT SCHEDULE

TAG ID	PARALLEL FEEDERS	CONDUIT SIZE	CONDUCTOR	NEUTRAL	GROUND
1	1	1-1/4" EMT 1-1/4" EMT	(6) 10 AWG PV WIRE 2K (6) 10 AWG PV WIRE 2K	NONE	(1) 6 AWG BARE COPPER
2	1	1-1/4" PVC	(3) 3 AWG THHN/THWN-2	(1) 8 AWG THHN/THWN-2	(1) 8 AWG THHN/THWN-2
3	1	2" EMT	(3) 3/0 AWG THHN/THWN-2	NONE	(1) 6 AWG THHN/THWN-2
4	1	2" EMT	(3) 3/0 AWG THHN/THWN-2	(1) 6 AWG THHN/THWN-2	(1) 6 AWG THHN/THWN-2
5	3	2-1/2" EMT	(3) 4/0 AWG THHN/THWN-2	(1) 1/0 AWG THHN/THWN-2	(1) 1/0 AWG THHN/THWN-2
6	2	2" EMT	(3) 3/0 AWG THHN/THWN-2	(1) 3 AWG THHN/THWN-2	(1) 3 AWG THHN/THWN-2
7	4	2-1/2" EMT	(3) 300 kcmil THHN/THWN-2	(1) 3/0 AWG THHN/THWN-2	(1) 3/0 AWG THHN/THWN-2



APPROVED
13 Jun 2022
BUILDING CONTROL
ALL BUILDING WORKS SHALL CONFORM TO THE REQUIREMENTS OF THE BUILDING ACT 1988, THE BERMUDA BUILDING CODE,2018 AND ALL OTHER CODES AND STANDARDS IN FORCE. ALL WORKS SHALL BE INSPECTED AND APPROVED PRIOR TO CONCEALMENT.

Optimal Tech

SYSTEM INFORMATION

DC SYSTEM SIZE: 756.49KW
AC SYSTEM SIZE: 900.00KW
NORTH CARPORT:
DC SYSTEM SIZE: 128.27KW
AC SYSTEM SIZE: 180.00KW
MODULES:
(254)TRINA SOLAR TSM-DE18M(II) 505W
INVERTERS:
(3)FIMER PVS-60-TL-US(3PH,277/480V)
CENTER CARPORT:
DC SYSTEM SIZE: 499.95KW
AC SYSTEM SIZE: 540.00KW
MODULES:
(990)TRINA SOLAR TSM-DE18M(II) 505W
INVERTERS:
(9)FIMER PVS-60-TL-US(3PH,277/480V)
SOUTH CARPORT:
DC SYSTEM SIZE: 128.27KW
AC SYSTEM SIZE: 180.00KW
MODULES:
(254)TRINA SOLAR TSM-DE18M(II) 505W
INVERTERS:
(3)FIMER PVS-60-TL-US(3PH,277/480V)
WIND SPEED: 150MPH
SNOW LOAD: 0PSF
MINIMUM TEMPERATURE: 20°C
MAXIMUM TEMPERATURE: 40°C

REGISTERED PROFESSIONAL ENGINEER No. 135 BERMUDA

SOLAR PV PROJECT FOR BERMUDA NSC
65 ROBERTS AVENUE, DEVONSHIRE, BM

REVISION

DATE	DESCRIPTION	REV
03/21/22	PERMIT PLANS	A

PROJECT INFORMATION

NAME:BERMUDA NSC

ADDRESS:65 ROBERTS AVENUE, DEVONSHIRE, BM

32.301639, -64.771827
APN:21936

AHJ:BM-CITY OF DEVONSHIRE

PRN NUMBER:GTO-CU-2021-302

ILLUMINE i
Because quality matters

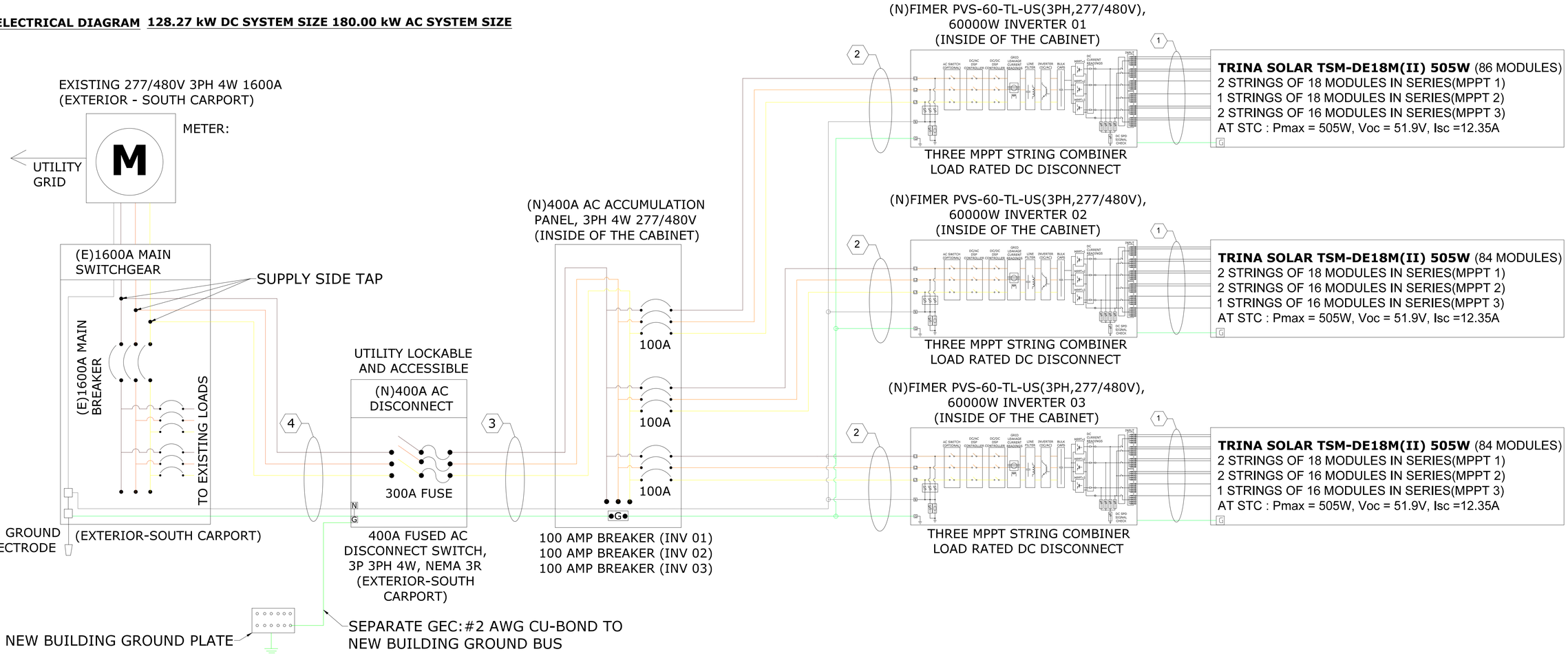
ELECTRICAL DIAGRAM - CARPORT AQUATIC CENTER

DRAFTED BY/QC'ED BY:
V.PRIYA/VANITHA

SCALE:AS NOTED | REV:A

DATE:3/21/22 | E-11

ELECTRICAL DIAGRAM **128.27 kW DC SYSTEM SIZE 180.00 kW AC SYSTEM SIZE**



OCPD CALCULATIONS
MAIN PANEL RATING:1600A, MAIN BREAKER RATING:1600A
LINE SIDE TAP INTERCONNECTION ALLOWABLE BACKFEED IS =1600A
OCPD CALCULATIONS: INVERTER OVERCURRENT PROTECTION
=INVERTER O/P I X CONTINUOUS LOAD(1.25) =((77AX3)x1.25=288.75A=>PV BREAKER/FUSE = 300A
TOTAL REQUIRED PV BREAKER/FUSE SIZE =>300A PV BREAKER/FUSE
THE DESIGNED INTERCONNECTION MEETS THE 705.12(A)(2) REQUIREMENTS.

SYSTEM INFO:
128.27 kW DC SYSTEM SIZE
(254) TRINA SOLAR TSM-DE18M(II) 505W MODULES
(3) FIMER PVS-60-TL-US(3PH,277/480V)

SYSTEM CHARACTERISTICS-INV-01 TO INV-03:
OPERATING VOLTAGE = (MODULE VMP) X (# MODULES / STRING) =43.0V X 18=774V
MAX OPEN CIRCUIT VOLTAGE = {[((TEMP COEF VOC) X (VOC)) / 100] X [LOW TEMP - STC TEMP] + VOC} X (# MODULES / STRING) = {[(-0.26 %/°C X51.9V) / 100] X [20 °C - 25 °C] +51.9V} X 18=946.34V
OPERATING CURRENT = (MODULE IMP) * (# STRINGS) =11.75 A X 5=58.75A
SHORT CIRCUIT CURRENT = 1.25 X (MODULE ISC) X (# STRINGS) = 1.25 X 12.35 A X 5= 77.18A

DC WIRE SIZING
MAX CIRCUIT CURRENT = (MODULE ISC) X (CONTINUOUS LOAD)[690.53] = 12.35A X 1.25 X 1.25 =19.29A
ADJUSTED CONDUCTOR AMPACITY = (HIGH TEMP) [PER TABLE 310.15(B)(2)(a)]] X (CONDUIT FILL) [PER TABLE 310.15(B)(3)(a)X (CONDUCTOR AMPACITY) [PER TABLE 310.15(B)(16)] = 0.71X 0.8 X 40A =22.72A
TERMINAL RATING, [PER NEC 110.14(C)] - 10 AWG, 75°C RATED =35A
35A > 19.29A, SO THE TERMINAL RATING GOVERNS THE CONDUCTOR SIZING
ALSO, 22.72A > 15.43A, AND **10 AWG** IS SUFFICIENT.

AC WIRE SIZING-INV-01 TO INV-03:
MAX AC OUTPUT CURRENT = (MAX INVERTER OUTPUT) X (CONTINUOUS LOAD) [PER NEC 690.52] =77A X 1.25 = 96.25A
ADJUSTED CONDUCTOR AMPACITY = (HIGH TEMP) [PER TABLE 310.15(B)(2)(a)] X (CONDUIT FILL) [PER TABLE 310.15(B)(3)(a)] X (CONDUCTOR AMPACITY) [PER TABLE 310.15(B)(16)] =0.91 X 1 X 115A =104.65A
TERMINAL RATING, [PER NEC 110.14(C)] - 3 AWG, 75°C RATED = 100A
100A >96.25A, SO THE ADJUSTED CONDUCTOR AMPACITY GOVERNS THE CONDUCTOR SIZING
ALSO,104.65A >77A **3 AWG** IS SUFFICIENT
INVERTER OVERCURRENT PROTECTION
(INVERTER MAX CURRENT) X (CONTINOUS LOAD) =77A X 1.25 = 96.25A --> 100A OVERCURRENT PROTECTION

AC WIRE SIZING(TAG 03):
MAX AC OUTPUT CURRENT = (MAX INVERTER OUTPUT) X (CONTINUOUS LOAD) [PER NEC 690.52]
= 77AX 3 X 1.25 =288.75A
ADJUSTED CONDUCTOR AMPACITY = (HIGH TEMP) [PER TABLE 310.15(B)(2)(a)] X (CONDUIT FILL) [PER TABLE 310.15(B)(3)(a)] X (CONDUCTOR AMPACITY) [PER TABLE 310.15(B)(16)] =0.91 X1 X 430A =391.3A
TERMINAL RATING, [PER NEC 110.14(C)] - 500 kcmil, 75°C RATED =380A
380A >288.75A, SO THE ADJUSTED CONDUCTOR AMPACITY GOVERNS THE CONDUCTOR SIZING
ALSO,391.3A >231A, AND **500 kcmil** IS SUFFICIENT
INVERTER OVERCURRENT PROTECTION
(INVERTER MAX CURRENT) X (CONTINOUS LOAD) = 77AX 3X 1.25 = 288.75A --> 300A OVERCURRENT PROTECTION

CONDUIT SCHEDULE

TAG ID	CONDUIT SIZE	CONDUCTOR	NEUTRAL	GROUND
1	1-1/4" EMT 1-1/4" EMT	(6) 10 AWG PV WIRE 2K (4) 10 AWG PV WIRE 2K	NONE	(1) 6 AWG BARE COPPER
2	1-1/4" EMT	(3) 3 AWG THHN/THWN-2	(1) 8 AWG THHN/THWN-2	(1) 8 AWG THHN/THWN-2
3	3" PVC	(3) 500 kcmil THHN/THWN-2	(1) 4 AWG THHN/THWN-2	(1) 4 AWG THHN/THWN-2
4	2-1/2" EMT	(3) 350 kcmil THHN/THWN-2	(1) 4 AWG THHN/THWN-2	(1) 4 AWG THHN/THWN-2

INVERTER SPECIFICATIONS

MODEL	FIMER PVS-60-TL-US(3PH,277/480V)
POWER RATING	60000W
RATED DC INPUT POWER	61800W
MAX OUTPUT CURRENT	77A
CEC WEIGHTED EFFICIENCY	98.00%
MAX INPUT CURRENT(PER MPPT)	36A
MAX DC VOLTAGE	1000V

MODULE SPECIFICATION

MODEL	TRINA SOLAR TSM-DE18M(II) 505W
MODULE POWER @ STC	505W
OPEN CIRCUIT VOLTAGE:**Voc**	51.9V
MAX POWER VOLTAGE:**Vmp**	43.0V
SHORT CIRCUIT VOLTAGE:**Isc**	12.35A
MAX POWER CURRENT:**Imp**	11.75A

NOTE:
1.THIS INSTALLATION IS TO BE CONSIDERED SUPERVISED.ALL NEW ADDITIONS AND ALTERATIONS TO ANY EQUIPMENT IDENTIFIED IN THIS DOCUMENT MUST BE MADE WITH ENGINEERING SUPERVISION AND ALL WORK MUST BE COMPLETED BY QUALIFIED PERSONNEL.
2.ALL EQUIPMENT AND TERMINALS MUST BE MINIMUM 75°C RATED.
3.ALL CONDUCTORS ARE COPPER, UNLESS OTHERWISE SPECIFIED.
4.ALL TERMINATIONS OF ALUMINUM CONDUCTORS SHALL BE PROPERLY INSTALLED WITH BEST PRACTICE PROCEDURES THAT INCLUDE BUT NOT LIMITED TO: USE OF TERMINATION EQUIPMENT RATED FOR ALUMINUM AT THE CONDUCTOR TEMPERATURE, CURRENT, AND VOLTAGE; ALLOWANCE FOR MOVEMENT DUE TO THERMAL EXPANSION/CONTRACTION; EXPOSED ALUMINUM SHALL BE PROPERLY COATED WITH ANTI-OXIDATION COMPOUND; TERMINALS ARE TORQUE AND MARKED TO REQUIRED SETTINGS WITH CALIBRATED DEVICE
5.TAP DISCONNECTS ARE WITHIN THE 10 FOOT PER TAP RULE.
6.TAPS ARE MADE USING LISTED DEVICES.

AC WIRE SIZING(TAG 04):
MAX AC OUTPUT CURRENT = (MAX INVERTER OUTPUT) X (CONTINUOUS LOAD) [PER NEC 690.52] = 77AX 3 X 1.25 =288.75A
ADJUSTED CONDUCTOR AMPACITY = (HIGH TEMP) [PER TABLE 310.15(B)(2)(a)] X (CONDUIT FILL) [PER TABLE 310.15(B)(3)(a)] X (CONDUCTOR AMPACITY) [PER TABLE 310.15(B)(16)] =0.91 X1 X 350A =318.5A
TERMINAL RATING, [PER NEC 110.14(C)] - 350 kcmil, 75°C RATED =310A
310A >288.75A, SO THE ADJUSTED CONDUCTOR AMPACITY GOVERNS THE CONDUCTOR SIZING
ALSO,318.5A >231A, AND 350 kcmil IS SUFFICIENT
INVERTER OVERCURRENT PROTECTION
(INVERTER MAX CURRENT) X (CONTINOUS LOAD) = 77AX 3X 1.25 = 288.75A --> 300A OVERCURRENT PROTECTION

APPROVED
13 Jun 2022
BUILDING CONTROL
ALL BUILDING WORK AND MATERIALS SHALL CONFORM TO THE REQUIREMENTS OF THE BUILDING ACT 1988, THE BERMUDA BUILDING CODE 2018 AND ALL OTHER CODES AND STANDARDS IN FORCE. ALL WORKS SHALL BE INSPECTED AND APPROVED PRIOR TO CONCEALMENT.

Optimal Tech

SYSTEM INFORMATION
DC SYSTEM SIZE: 756.49KW
AC SYSTEM SIZE: 900.00KW
NORTH CARPORT:
DC SYSTEM SIZE: 128.27KW
AC SYSTEM SIZE: 180.00KW
MODULES:
(254)TRINA SOLAR TSM-DE18M(II) 505W
INVERTERS:
(3)FIMER PVS-60-TL-US(3PH,277/480V)
CENTER CARPORT:
DC SYSTEM SIZE: 499.95KW
AC SYSTEM SIZE: 540.00KW
MODULES:
(990)TRINA SOLAR TSM-DE18M(II) 505W
INVERTERS:
(9)FIMER PVS-60-TL-US(3PH,277/480V)
SOUTH CARPORT:
DC SYSTEM SIZE: 128.27KW
AC SYSTEM SIZE: 180.00KW
MODULES:
(254)TRINA SOLAR TSM-DE18M(II) 505W
INVERTERS:
(3)FIMER PVS-60-TL-US(3PH,277/480V)
WIND SPEED: 150MPH
SNOW LOAD: 0PSF
MINIMUM TEMPERATURE: 20°C
MAXIMUM TEMPERATURE: 40°C

REGISTERED PROFESSIONAL ENGINEER No. 135 E. K. W. Engineers & Architects Limited 11/11/22 BERMUDA

SOLAR PV PROJECT
FOR
BERMUDA NSC
65 ROBERTS AVENUE, DEVONSHIRE, BM

REVISION

DATE	DESCRIPTION	REV
03/21/22	PERMIT PLANS	A

PROJECT INFORMATION
NAME:BERMUDA NSC
ADDRESS:65 ROBERTS AVENUE, DEVONSHIRE, BM
32.301639, -64.771827
APN:21936
AHJ:BM-CITY OF DEVONSHIRE
PRN NUMBER:GTO-CU-2021-302

ILLUMINEI Because quality matters

ELECTRICAL DIAGRAM & CALC-CARPORT NSC SOUTH

DRAFTED BY/QC'ED BY:
V.PRIYA/VANITHA

SCALE:AS NOTED | REV:A
DATE:3/21/22 | E-13