PHOTOVOLTAIC SYSTEM FOR THE PUMPING STATION IN BOUAR

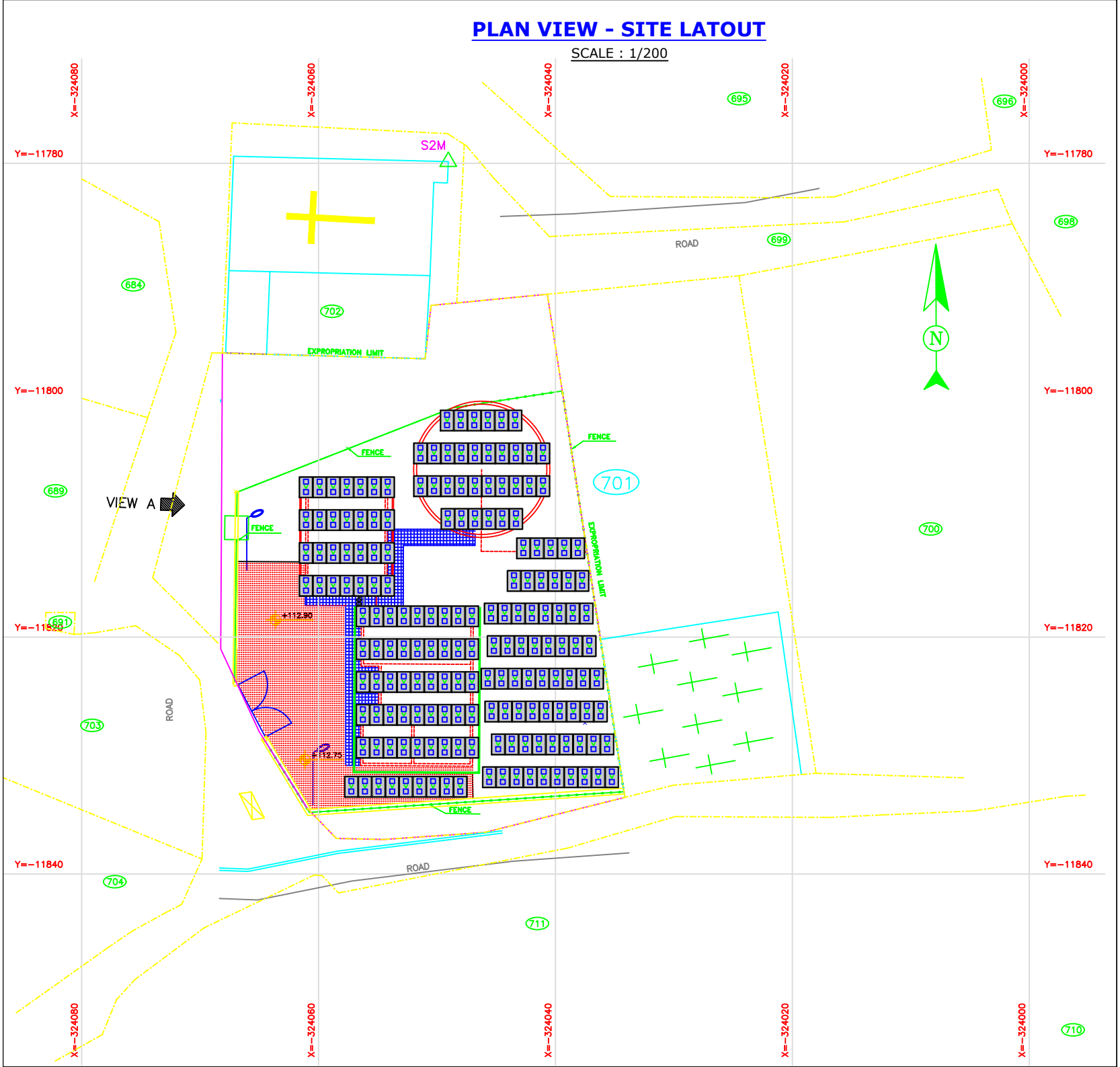
Volume 4

DRAWINGS

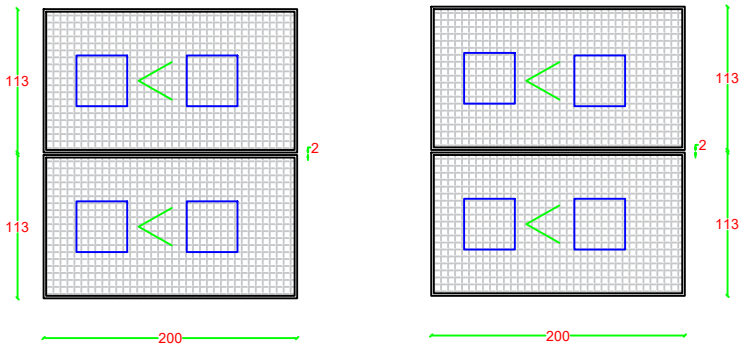
(FEBRUARY 2024)

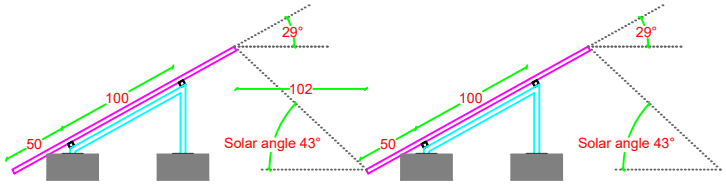
PLAN VIEW - SITE LATOUT

SCALE : 1/200

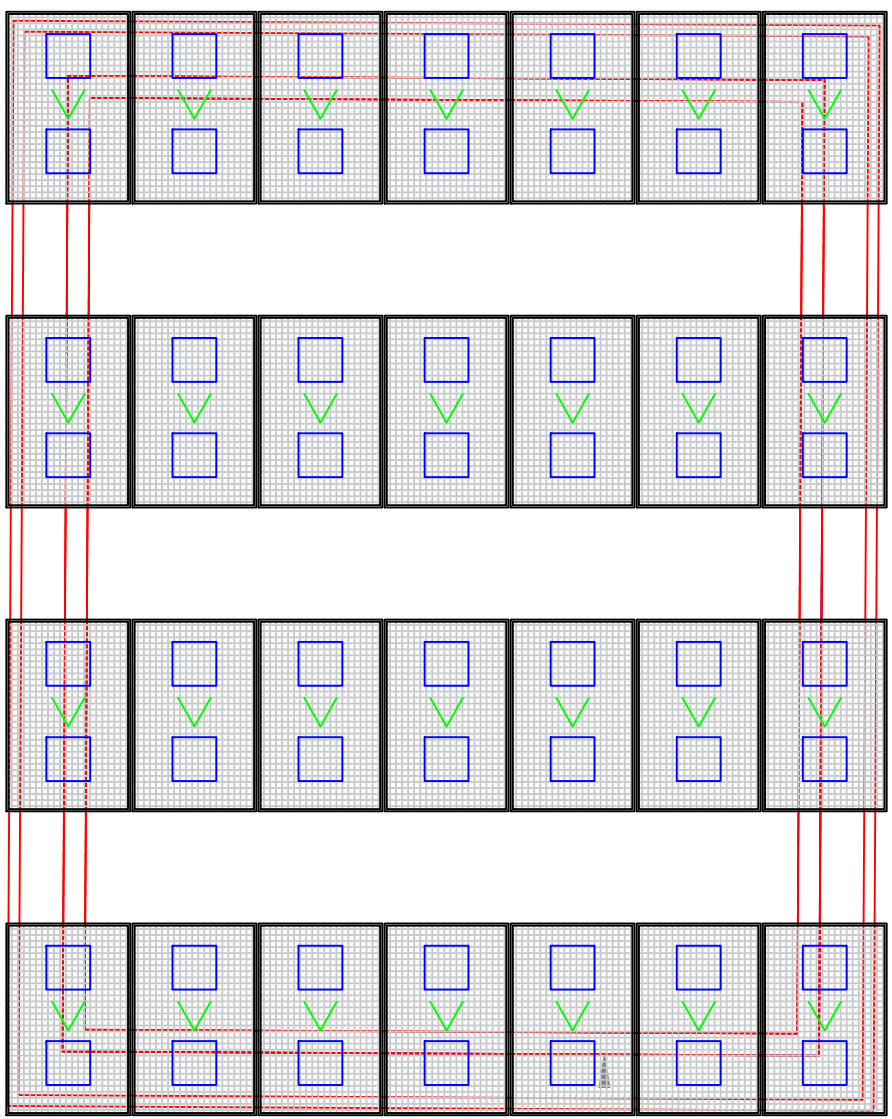


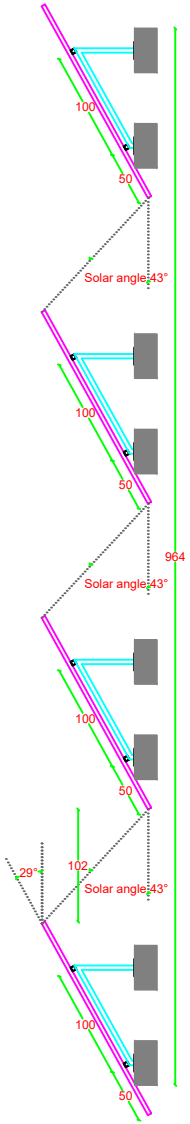
PANEL STANDARD DETAILS



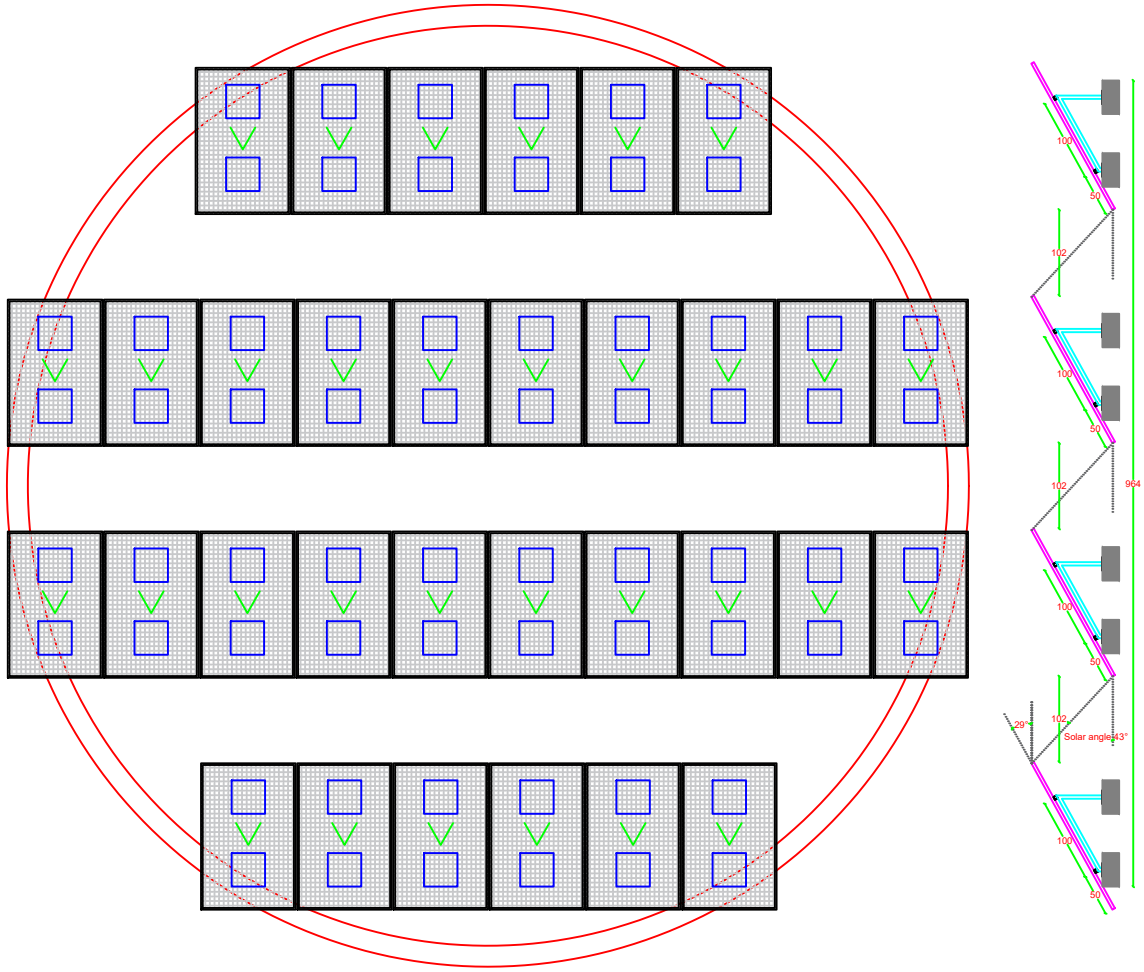


ROOF 1 - 28 PANELS





RESERVOIR ROOF - 32 PANELS



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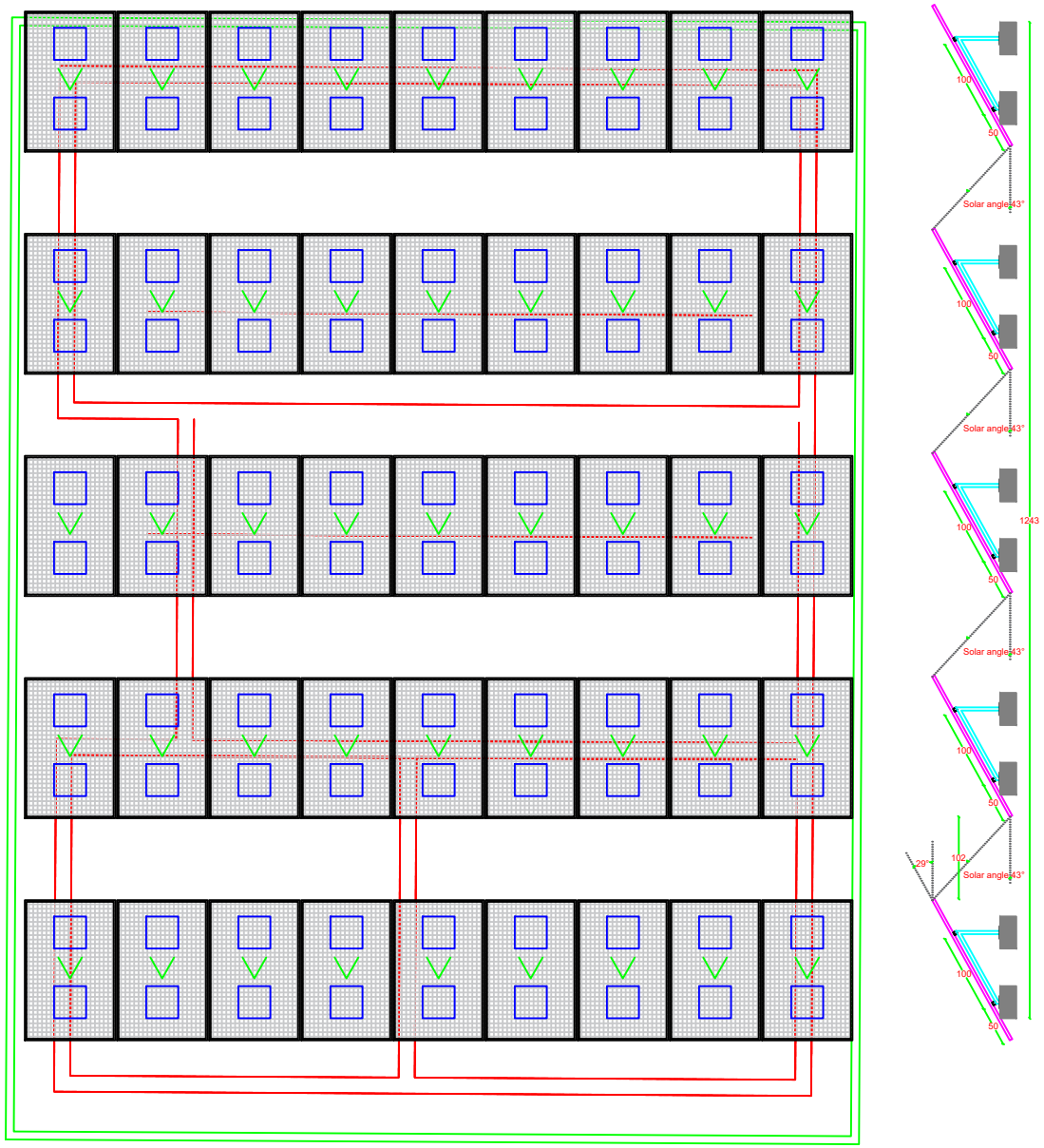

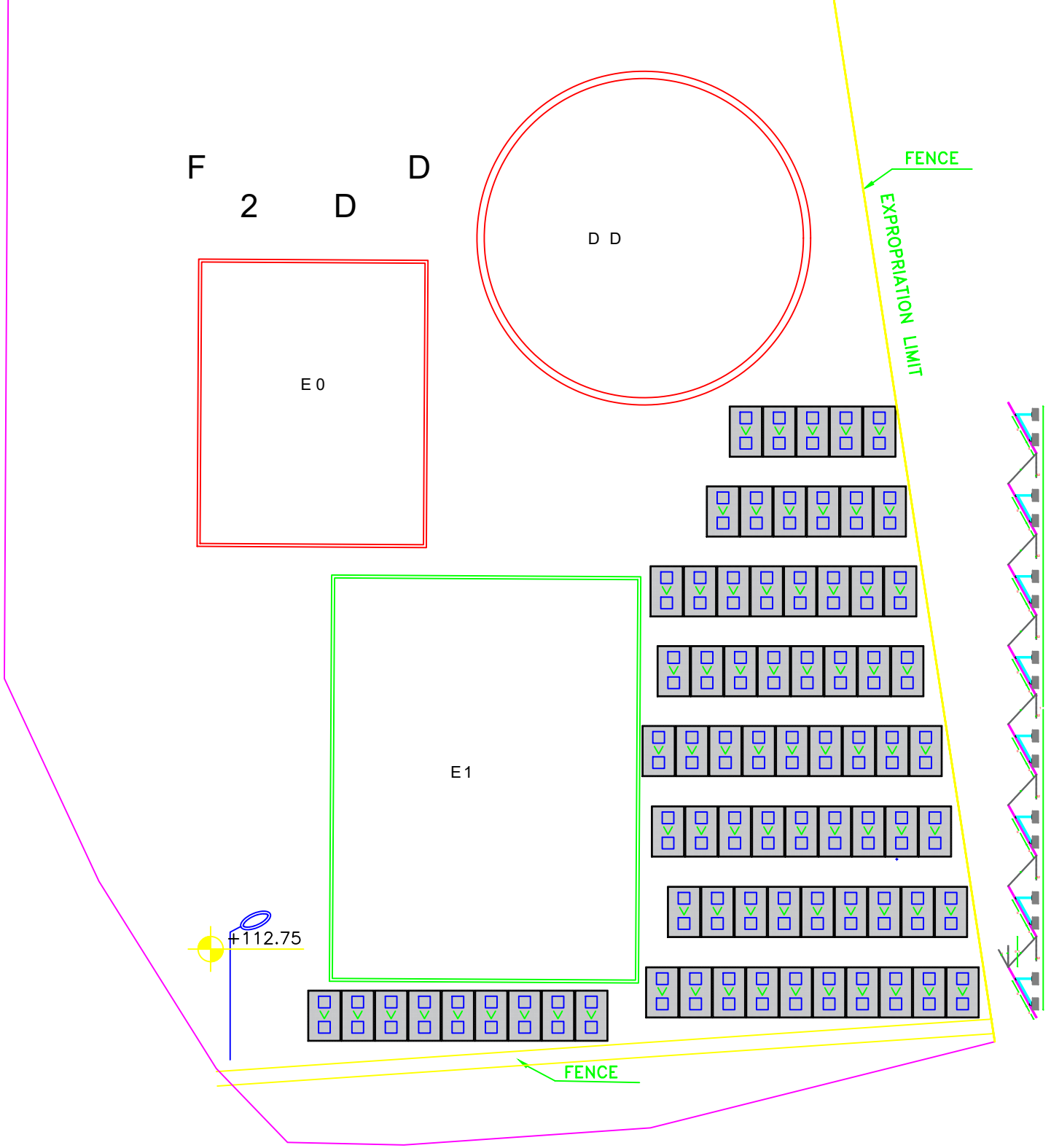
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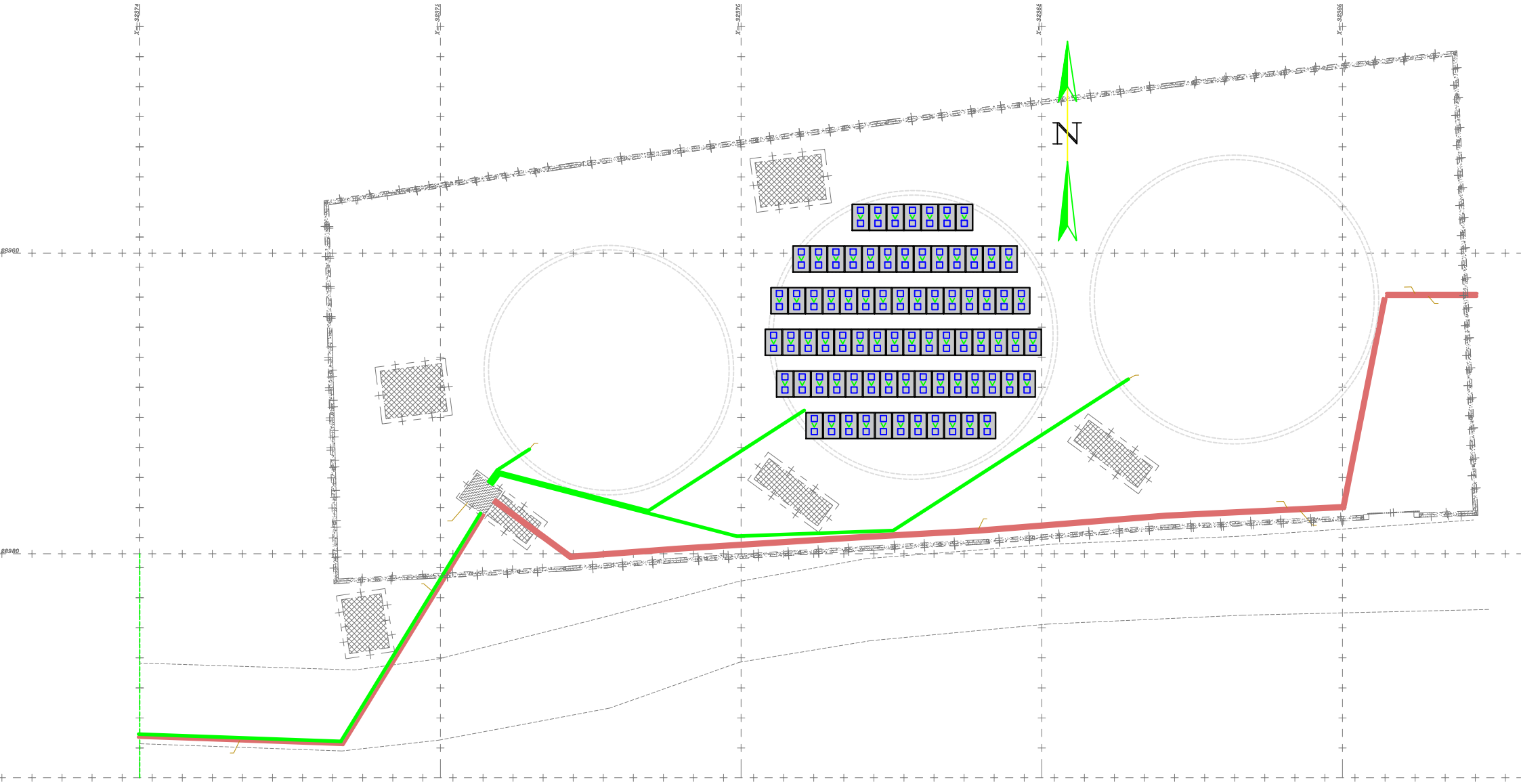
Contractor’s Name, Seal and Signature

PHOTOVOLTAIC SYSTEM FOR PUMPING STATION IN MAR CHAAYA

Volume 4

DRAWINGS

(FEBRUARY 2024)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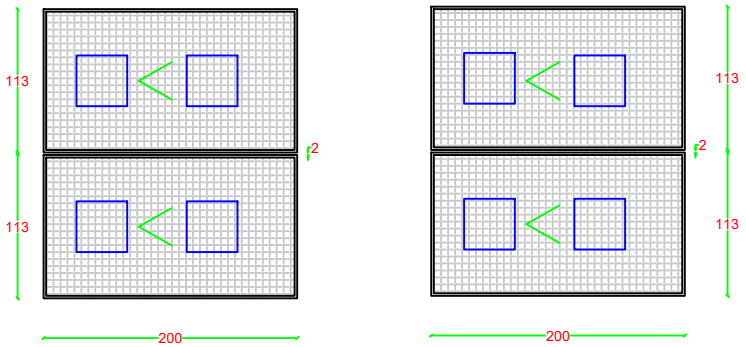
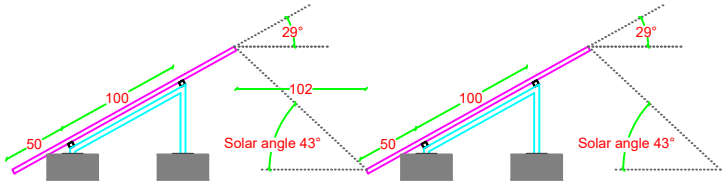
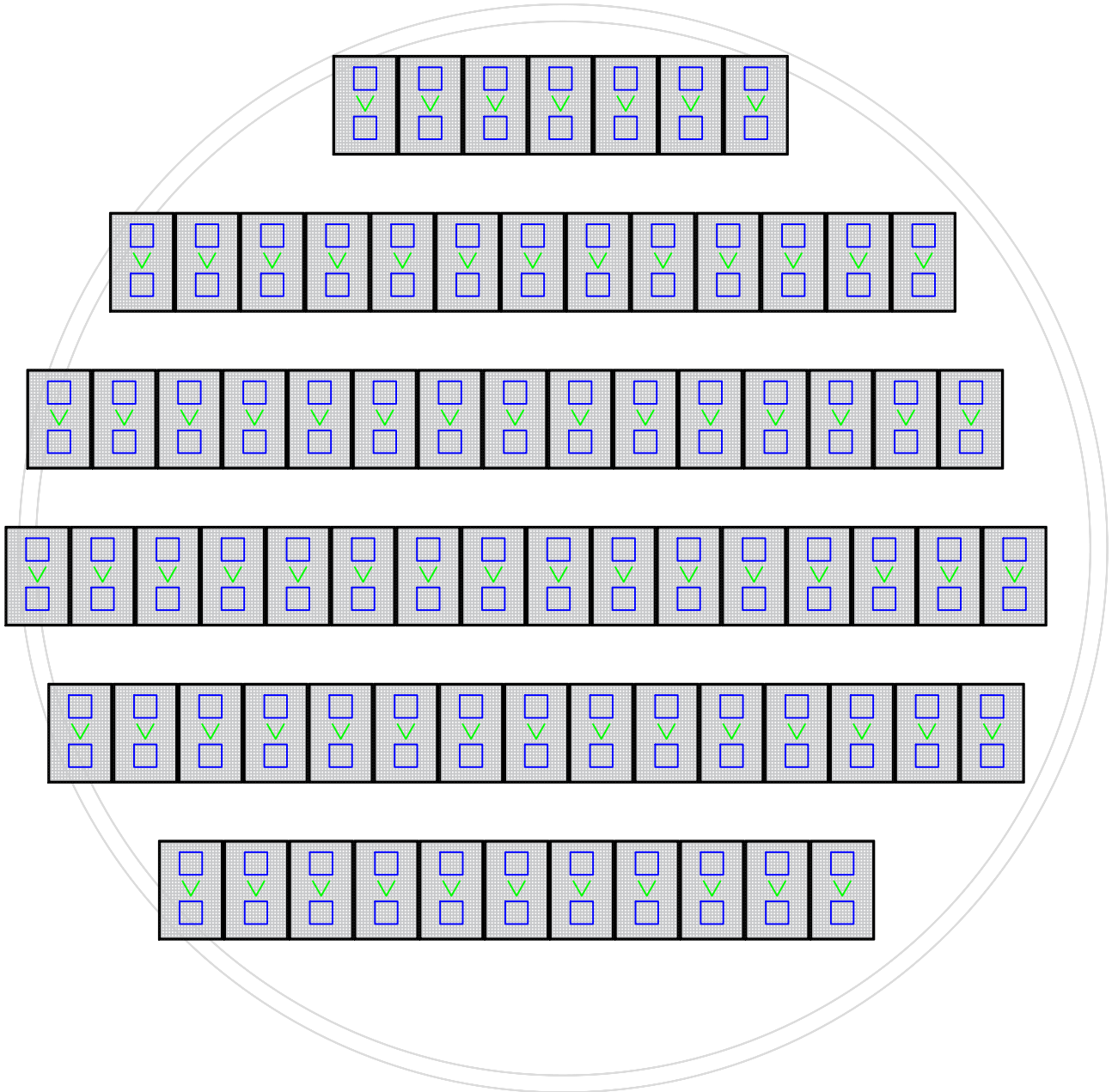
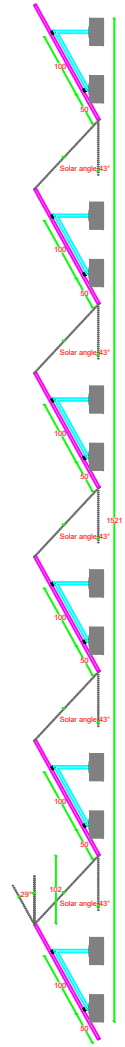
PANEL STANDARD DETAILS





RESERVOIR ROOF - 77 PANELS





Contractor’s Name, Seal and Signature

PHOTOVOLTAIC SYSTEM FOR PUMPING STATION IN OUKAIBE

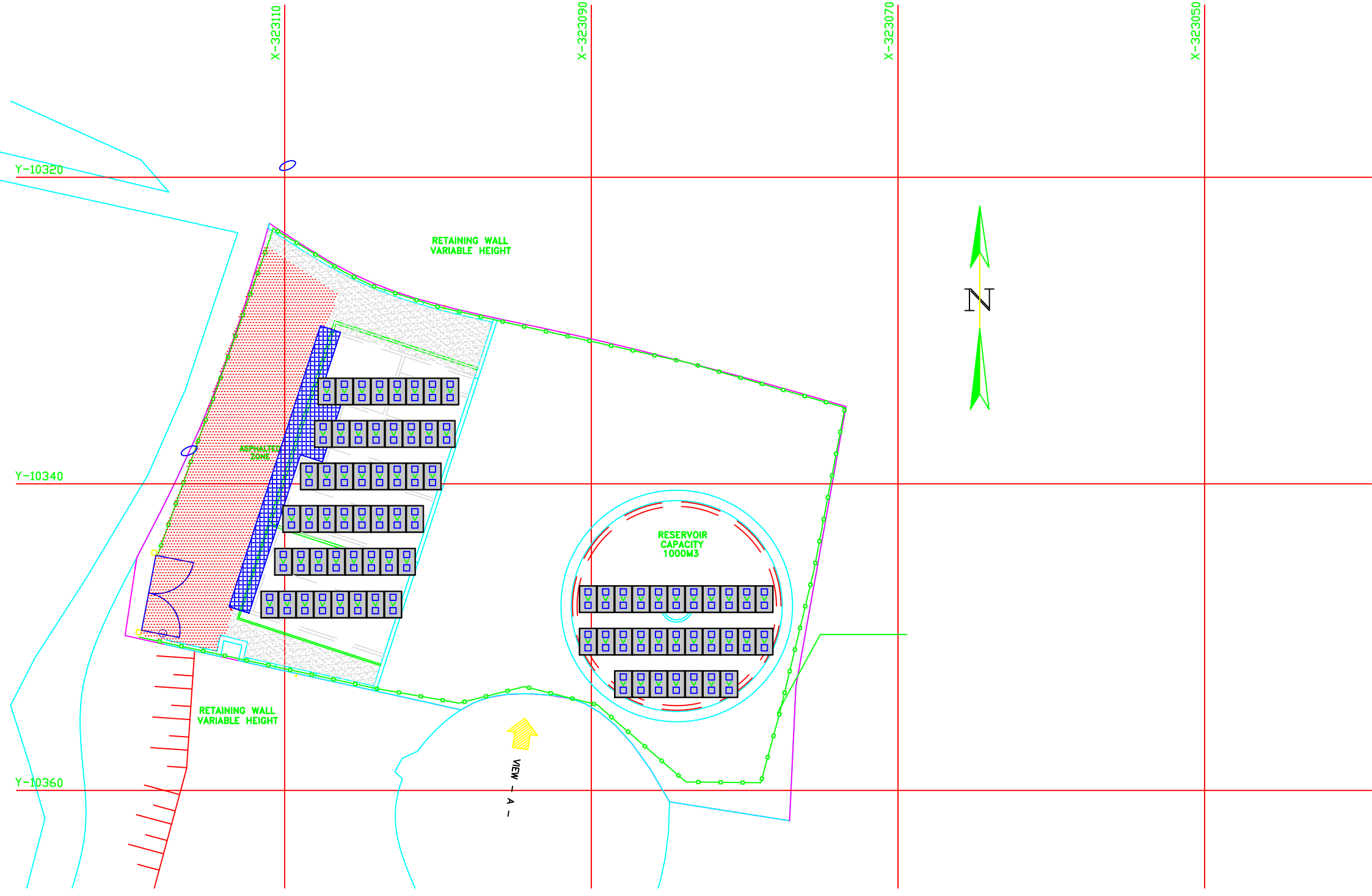
Volume 4

DRAWINGS

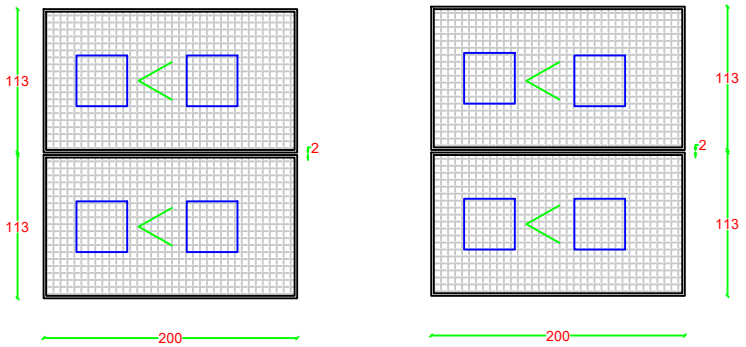
(FEBRUARY 2024)

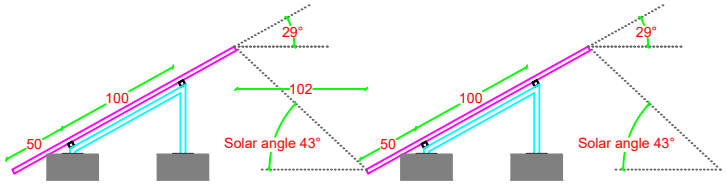
PLAN VIEW - SITE LATOUT

SCALE : 1/200

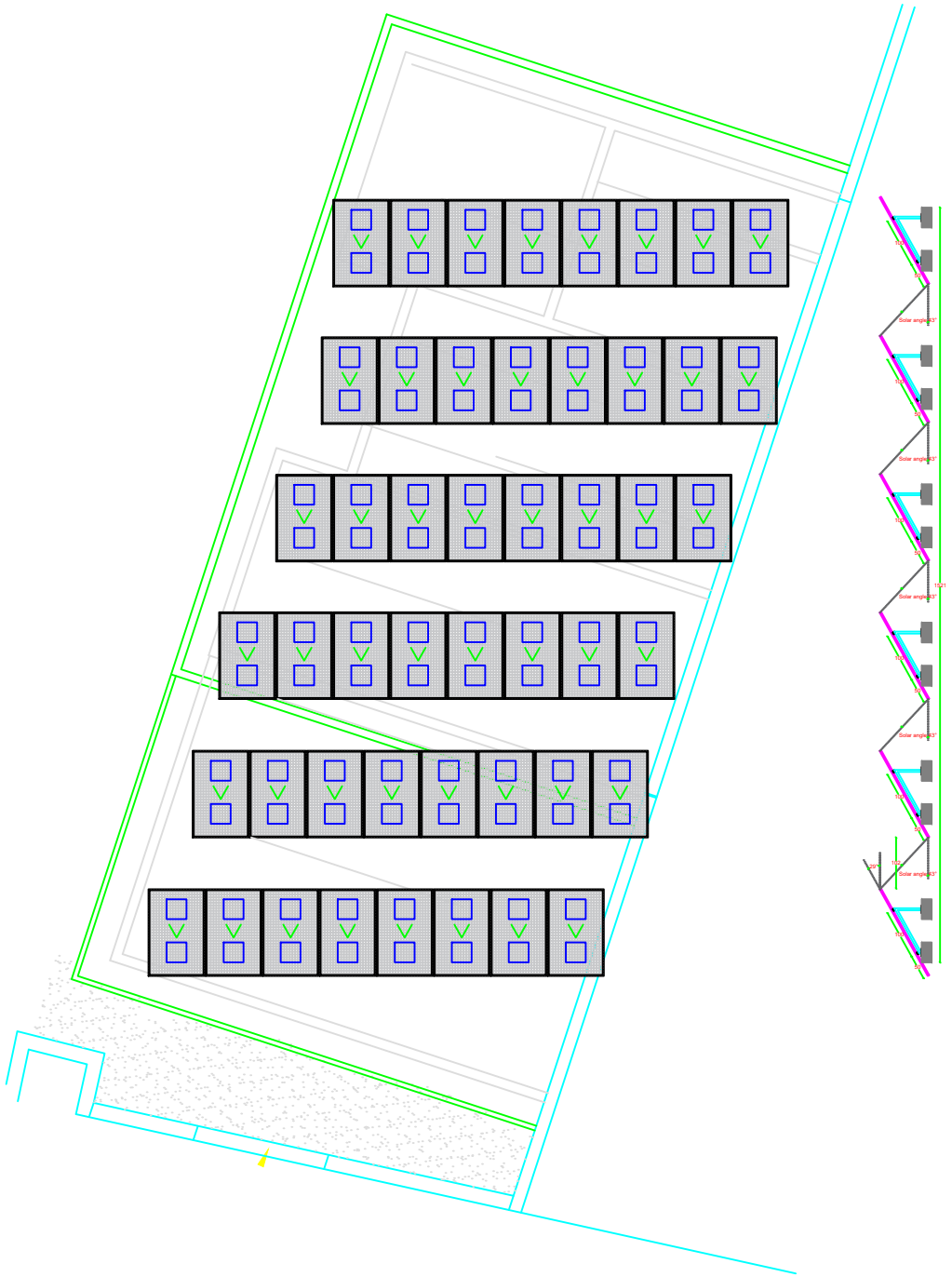


PANEL STANDARD DETAILS





ROOF 1 - 48 PANELS



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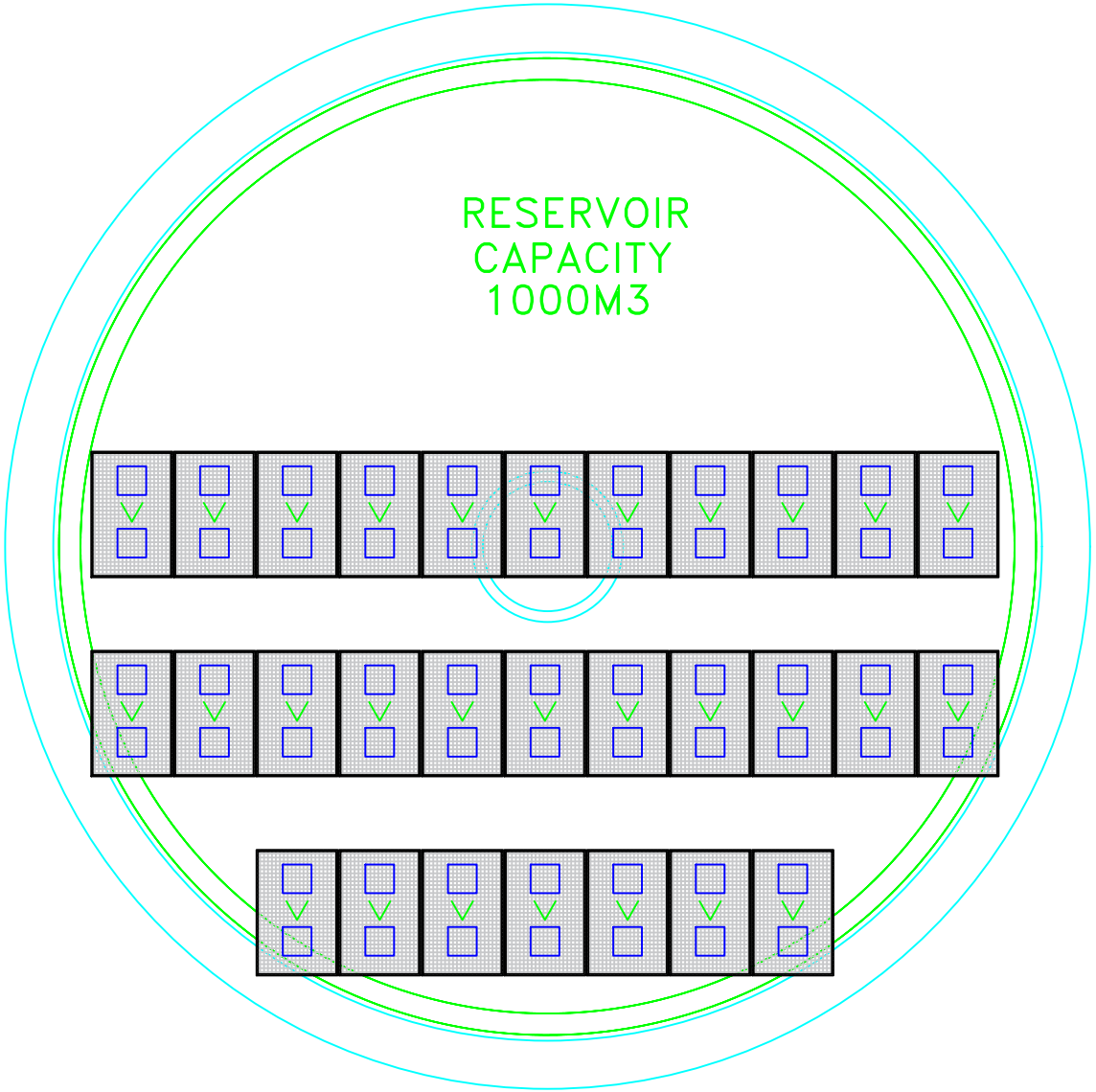
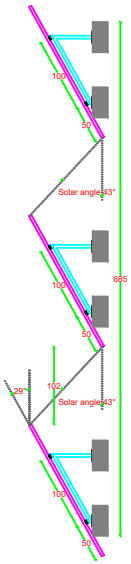


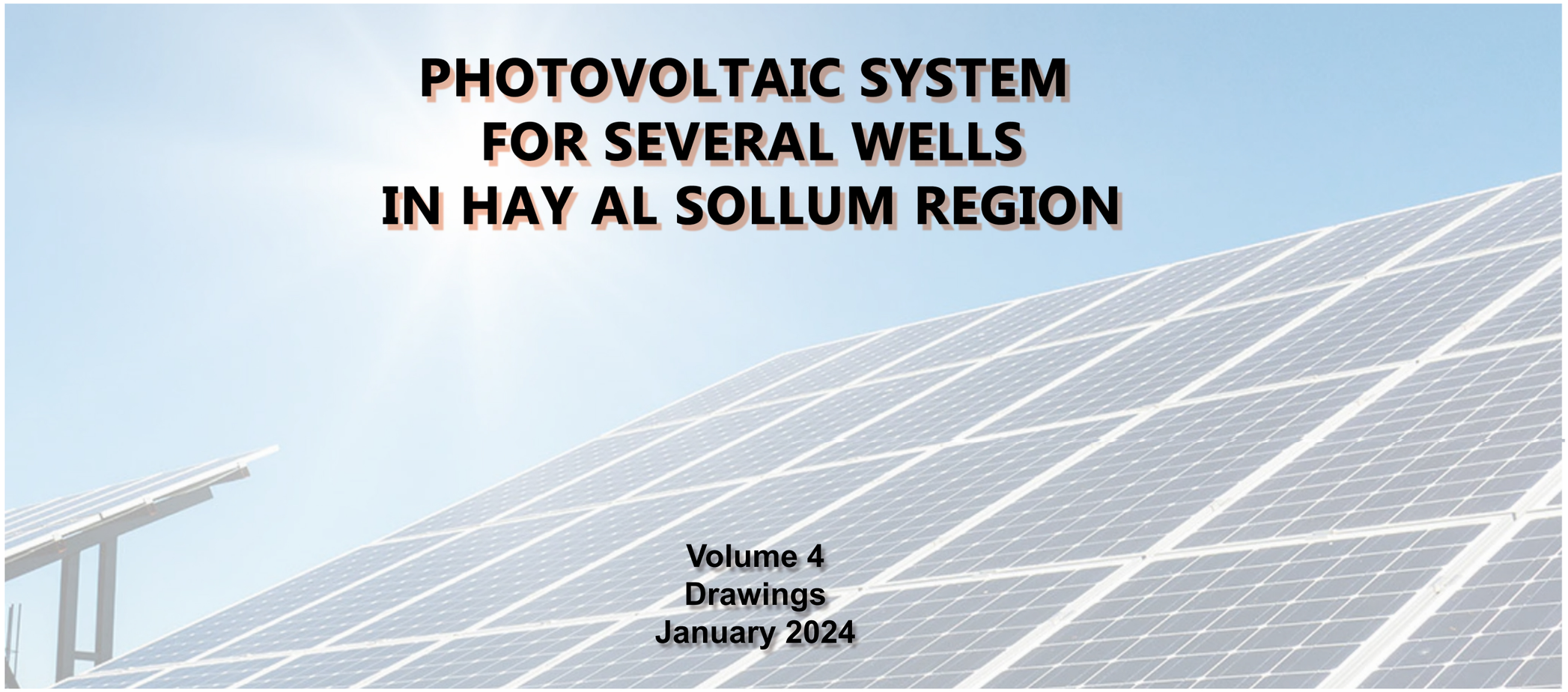


Contractor’s Name, Seal and Signature

REPUBLIC OF LEBANON

إتحاد بلديات الضاحية الجنوبية

PHOTOVOLTAIC SYSTEM FOR SEVERAL WELLS IN HAY AL SOLLUM REGION



Volume 4
Drawings
January 2024

TERA FOR PLANNING & ENGINEERING STUDIES S.A.R.L.
تيرا للتخطيط والدراسات الهندسية ش.م.م.

GENERAL NOTES

STRUCTURAL

1- MATERIAL

1. STRUCTURAL STEEL PLATES AND HOT ROLLED SECTIONS ARE TO CONFORM TO ASTM A36 WITH MINIMUM YIELD STRESS OF 235 N/MM2 OR EQUAL.
2. FLAT PLATES ARE TO CONFORM TO ASTM A36 WITH MINIMUM YIELD STRESS OF 235 N/MM2 OR EQUAL.
3. ANCHOR BOLTS :
   A- ARE TO CONFORM TO ASTM F1554 GRADE 55 WITH MINIMUM YIELD STRESS OF 380 N/MM2 WITH ASSOCIATED TWO NUTS AND WASHER, TYPICALLY USED
   B- ARE TO CONFORM TO ASTM F1554 GRADE 105 WITH MINIMUM YIELD STRESS OF 724 N/MM2 WITH ASSOCIATED TWO NUTS AND WASHER, WHERE SPECIFIED ONLY
4. HIGH-STRENGTH BOLTS, NUTS, AND WASHERS: ASTM A 490M, TYPE 1, OR DIN 6914 GRADE 10.9 HEAVY HEX STEEL STRUCTURAL BOLTS, HEAVY HEX CARBON-STEEL NUTS, AND HARDENED CARBON-STEEL WASHERS, UNCOATED OR EQUAL.
5. WELDING MATERIALS: CONFORM TO AWS CODE AND AWS FILLER METAL SPECIFICATIONS OR EQUAL SELECT MATERIALS WHICH ARE SUITABLE FOR USE WITH TYPES OF STEEL TO BE JOINED. UNLESS OTHERWISE INDICATED, CONNECTIONS ARE DESIGNED FOR:
   - METAL-ARC WELDING ELECTRODES: TO E70XX SERIES OF THE SPECIFICATION FOR MILD STEEL COVERED ARC-WELDING ELECTRODES, AWS A5.1, OR THE SPECIFICATION FOR LOW-ALLOY STEEL COVERED ARC-WELDING ELECTRODES, AWS A5.5. OR EQUAL
   - BARE ELECTRODES AND GRANULAR FLUX USED IN THE SUBMERGED-ARC PROCESS ARE TO CONFORM TO F7 X-EXXX AWS FLUX CLASSIFICATIONS OF THE SPECIFICATION FOR BASE MILD STEEL ELECTRODES AND FLUXES FOR SUBMERGED ARC WELDING, AWS A5.17, OR A5.23 OR THE OF AISC "SPECIFICATION FOR THE DESIGN, FABRICATION AND ERECTION OF STRUCTURAL STEEL FOR BUILDINGS" OR EQUAL.
6. EPOXY ACRYLATE:
   A TWO-COMPONENT CHEIMCAL ANCHORING SYSTEM WITH DENSITY 1.7 g/cm³ CONFORMING TO ASTM D1875 AND TENSILE STRENGTH 11 N/mm² CONFORMING TO ASTM D638.

7. CONCRETE:

- ALL CLASSES OF CONCRETE ARE TO BE NORMAL WEIGHT (2500 kg/m3), WELL MADE AND EXECUTED IN ACCORDANCE WITH THE PROJECT SPECIFICATIONS.
- REINFORCED CONCRETE SHOULD HAVE A MINIMUM 28 DAYS DESIGN COMPRESSIVE STRENGTH ON STANDARD 15 x 30cm CYLINDER 25MPa OTHERWISE AS INDICATED ON THE DRAWINGS.
- BLINDING CONCRETE SHOULD HAVE A MINIMUM 28 DAYS DESIGN COMPRESSIVE STRENGTH ON STANDARD 15 x 30cm CYLINDER: F'c =11 Mpa.
- FOR CYCLOPEAN CONCRETE, THE MINIMUM CEMENT CONTENT SHALL BE 150 kg/m .CONCRETE FOR SCREENING SHALL HAVE A MINIMUM CEMENT CONTENT of 200 kg/m .
- FOR STRUCTURAL CONCRETE, THE MINIMUM CEMENT CONTENT SHALL BE 350 kg/m .
- ALL CONCRETE FOR REINFORCED CONCRETE ELEMENTS WILL BE VIBRATED ACCORDING TO TECHINCAL SPECIFICATIONS.
- ALL STRUCTURAL ELEMENTS SHOULD BE 2 HOURS FIRE RATED.

8. REINFORCEMENT:

UNLESS OTHERWISE NOTED ON THE DRAWINGS, ALL REINFORCEMENT INCLUDING TIES AND STIRRUPS SHALL BE HIGH TENSILE, THE FOLLOWING STANDARD ABBREVIATIONS ARE USED IN CALLING UP GRADES OF REINFORCEMENT:

- HIGH TENSILE STEEL BARS : HA or T
- MILD STEEL BARS : Ø STEEL HAVING A MINIMUM YIELD STRESS = 4200 Kg/cm2.
- UNLESS OTHERWISE NOTED, SPLICE LENGTHS SHALL BE 50Ø .

9. CHEMICAL ANCHORING:

ONLY PURE EPOXY MATERIALS SHALL BE CONSIDERED FOR THIS PROJECT. THE EPOXY MATERIALS SHALL DEMONSTRATE ITS SUITABILITY TO WORK UNDER CRACKED CONCRETE. IT SHALL BE CERTIFIED FOR SEISMIC DESIGN WITH IBC FOR CATEGORIES C TO F AND FOR ETA CLASS C2.

10. REPAIR MORTAR:

REPAIR MORTAR SHALL BE SHRINKAGE COMPENSATED, POLYMER MODIFIED, PREMIXED MORTAR WITH A MINIMUM COMPRESSIVE STRENGTH OF 40 MPA AND CAPABLE TO DEVELOP A MINIMUM BOND STRENGTH OF 2 MPA WITH OLD CONCRETE AND STEEL REBAR.

REPAIR MORTAR SHALL BE HANDLED, MIXED AND APPLIED FOLLOWING ACCURATELY THE PRODUCT DATA SHEET

2- STEEL CHARACTERISTICS:

1. STEEL SHALL BE FABRICATED AND EXECUTED IN ACCORDANCE WITH THE FOLLOWING CODES:
   AISI, AMERICAN IRON AND STEEL INSTITUTE
   AISC, AMERICAN INSTITUTE OF STEEL CONSTRUCTION

2. FABRICATION MARKING AND PACKING :
   STRUCTURAL STEEL SHAPES, STEEL E-24 (ST37)
   PLATES & BARS, STEEL E-24
   HOT FORMED STEEL TUBING, ASTM A 501

3. HEADED ANCHOR RODS: ASTM F1554 (OR GRADE 8.8) NUTS ASTM A 563 HEAVY HEX CARBON STEEL.

4. CHEMICAL BOLTS FOR ANCHORAGE (IF ANY) :
   FISCHER PRODUCTS OR EQUIVALENT APPROVED TYPE FIS V INJECTION MORTAR WITH THREADED GALVANIZED ROD RG M20 OR RG M24

3- FABRICATION/ERECTION

1. ALL DIMENSIONS GIVEN ON CONTRACT DRAWINGS ARE TO BE CHECKED BY THE STEEL FABRICATOR PRIOR TO FABRICATION.
2. THE CONTRACTOR SHALL PROVIDE ALL HOLES IN THE STEELWORK REQUIRED BY OTHER TRADES. SUBJECT TO THE APPROVAL OF THE ENGINEER.
3. THE CONTRACTOR SHALL PROVIDE TEMPORARY BRACING AND SUPPORTS REQUIRED DURING ERECTION FOR THE PROPER ALIGNMENT AND ALSO AS NECESSARY TO GIVE AND MAINTAIN PROPER STABILITY OF ALL ELEMENTS.
4. THE THREADING OF THE PRESET ANCHOR BOLTS IS TO BE TESTED TO GUARANTEE THAT NO SLIP OF NUTS OCCURS BEFORE FAILURE OF THE ANCHOR BOLTS MATERIAL.
5. FABRICATION, ERECTION AND QUALITY CONTROL (INCLUDING TOLERANCES) TO BE AS DICTATED BY ASTM A6, AWS D1.1 AND AISC - ASD (MANUAL OF STEEL CONSTRUCTION).
6. ALL HOLES FOR STEEL BOLTS SHALL BE MAXIMUM 2 mm LARGER THAN THE NOMINAL DIAMETER OF THE BOLT, UNLESS OTHERWISE NOTED.
7. ALL HEAD PLATES CONNECTIONS AND BOLTED SPLICES ARE SLIP CRITICAL CONNECTIONS THAT REQUIRE FULL TORQUE TIGHTENING (BOLT PRETENSIONING) AS PER THE REQUIREMENTS OF RCSC SPECIFICATIONS FOR STRUCTURAL JOINTS.
8. PAINTING OF ALL FAYING SURFACES FOR HEAD PLATE CONNECTIONS AND SPLICE PLATES ARE TO BE CONSIDERED AS PER THE REQUIREMENTS OF CONDITIONS OF SLIP CRITICAL CONNECTIONS AS SPECIFIED IN RCSC SPECIFICATIONS FOR STRUCTURAL JOINTS.
9. MINIMUM SIZE OF FILLET WELDS IS S=0.7 OF MINIMUM WELDED THICKNESS UNLESS OTHERWISE NOTED.
10. NON-SHRINK GROUT TO HAVE A MINIMUM COMPRESSIVE STRENGTH OF 600 KG/CM2 AT 28 DAYS HAVING A WORKING TIME OF 2 HOURS.
11. CONTRACTOR IS TO SUBMIT WORKSHOP DETAIL DRAWINGS FOR THE ENGINEER'S APPROVAL PRIOR TO EXECUTION.
12. COMPOSITE STEEL/ CONCRETE FLOORING SHOULD NOT BE SUBJECTED TO CUTS/ OPENING OTHER THAN THOSE SHOWN ON DRAWING PRIOR TO OBTAINING THE ENGINEER'S APPROVAL.

4- WELDING

WELDING SHALL BE IN ACCORDANCE WITH THE SPECIFICATION OF A.W.S D1.1 AND AISC SPECIFICATIONS LATEST EDITION AND THE CODE FOR WELDING IN BUILDING CONSTRUCTION D1.0-69. ALL ELECTRODES TO HAVE A MINIMUM TENSILE STRENGTH OF 72Ksi (E70x18) OR EQUIVALENT APPROVED.

1. WELDING PROCESS:
   THE SHIELDED METAL ARC WELDING SMAW TECHNIQUE SHALL BE USED THROUGH THE WELDING PROCESS.
2. FILLER METALS:
   WELDING ELECTRODES TO BE USED ARE CLASSIFIED ACCORDING TO AWS D1.1 AS OF CATEGORIES AWS A5.1 OR A5.5.
3. QUALIFICATION OF WELDERS:
   ONLY WELDERS WITH A VALID QUALIFICATION CERTIFICATE AS PER THE LOCAL LAW AUTHORITY SHALL PERFORM THE REQUIRED WELDED JOINTS.
4. WELDING INSPECTION:
   INSPECT AND TEST FOR CONFORMANCE TO AWS REQUIREMENTS AND AS FOLLOWS:
   - ALL WELDS SHALL BE INSPECTED VISUALLY.
   - FILLET WELDS: TEST 25% OF ALL WELDS IN ACCORDANCE WITH DRY PENETRATION.

5- PAINTING AND COATING

ALL PAINTING TO BE IN ACCORDANCE WITH SPECIFICATIONS GIVEN AND APPROVED BY THE ARCHITECTS. STRUCTURAL STEEL PRIMERS PAINTS:SSPC

1. PRIMER

A ZINC-RICH PRIMER COAT, ADEQUATE TO THE SITE CONDITIONS, SHALL BE APPLIED BY SPRAYING. THE THICKNESS OF THE FILM IS 60 MICRONS (1 LAYER).

2. INTERMEDIATE PAINT

APPLY A HIGH-BUILD EPOXY INTERMEDIATE PAINT WITH MINIMUM DRY FILM THICKNESS OF 80MICRONS, FOR THE WHOLE AREAS (2 LAYERS)

3. FINAL COAT

APPLY A FINISH COAT P.U. WITH MINIMUM DRY FILM THICKNESS OF 50MICRONS.

4. NOTES

THE PRODUCTS AND THE APPLICATION SHOULD BE CONFORMING TO A WARRANTY OF 10 YEARS BEFORE THE FIRST MAINTENANCE.

6- BOLTING

1. ALL BOLTS UNLESS NOTED OTHERWISE SHALL BE AS FOLLOWING:
   - ALL BOLTS OF D <= 16MM ARE ASTM 325 OR DIN 18800 8.8
   - ALL BOLTS OF D > 16MM ARE ASTM 325 OR DIN 18800 8.8

2. ANCHOR BOLTS: ASTM A 307 (F 568)
   - UNFINISHED THREADED FASTNERS:ASTM A 307,GR A HIGH STRENGTH THREAD. FASTNERS:ASTM325
   - ALL NUTS (2H) AND WASHERS :ASTM A 194 (F436) OR EUROPEEN EQUIVALENT

3. ALL BOLTING UNLESS NOTED OTHERWISE WAS BEEN DESIGNED FOR SHEAR & BEARING WITH THREAD IN THE HOLE .

SOLAR & ELECTRICAL

SOLAR SYSTEM

1- THE FOLLOWING NOTES SHALL APPLY TO ALL THE ELECTRICAL DRAWING AS APPLICABLE UNLESS OTHERWISE INDICATED OR NOTED
2- DO NOT SCALE FROM THE LAYOUT DRAWINGS WORK
3- THE ELECTRICAL DRAWINGS SHALL BE READ IN CONJUCTION WHITH THE REST OF THE DRAWINGS
4- THE MAXIMUM FILLING RATIO OF ANY CONDUITS SHALL NOT EXCEED 40%, 60% SHALL BE KEPT FREE
5- THE PERFORMANCE RATIO OF THE SOLAR SYSTEM SHALL NOT BE LESS THAN 80%
6- THE MAXIMUM DC VOLTAGE DROP FROM SOURCE TO INVERTER SHALL NOT EXCEED 3%
7- THE MAXIMUM AC VOLTAGE DROP FROM SOURCE TO LOAD SHALL NOT EXCEED 5% WHERE 1.5% FROM SOURCE TO INVERTER AND 3.5% FROM INVERTER TO LOAD
8- THE CONTRACTOR MAY RUN MORE THAN ONE CIRCUIT IN THE SAME CONDUIT IN WHICH CASE A COMMON EQUIPMENT GROUNDING WIRE MAY BE SHARED
9- CHANGEOVER SWITCHES, DICONNECTORS SHALL HAVE INDICATORS FOR THEIR POSITIONS.
10- THE TERMINAL LUGS OF ALL CIRCUIT BREAKERS AND DISCONNECTING SWITCHES SHALL BE PROPERLY SIZED TO ACCOMODATE THEIR CORRESPONDING CONNECTED CABLES AS INDICATED ON THE DRAWINGS. THIS MIGHT NECESSITATE OFF _ STANDARD OVERSIZING
11- ALL CIRCUIT BREAKERS SHALL HAVE FRAME SIZES EQUAL TO THE TRIP RATING OR NEXT HIGHER STANDARD VALUE UNLESS THE BUSBAR BRACING OF THE CORRESPONDING PANELBOARD IS INDICATED WHICH CASE THE FRAME SIZE OF THE CIRCUIT BREAKERS IN THAT PANELBOARD SHALL BE INCREASED TO PROVIDE AN RMS SYMMETRICAL SHORT CIRCUIT INTERRUPTING RATING EQUAL TO OR GREATER THAN BRACING RATING.
12- ALL PV PANELS, MOUNTING STRUCTURE, METALIC EQUIPEMENT, FENCE SHALL BE CONNECTED TO EARTH.
13- OUTDOOR ENCLOSURES AND EQUIPMENTS SHALL BE IP 65
14- THE CONTRACTOR SHALL PROVIDE THE CLIENT WITH DETAILED SINGLE LINE DIAGRAMS THAT INCLUDES THE FOLLOWING:

- RATINGS ON ALL EQUIPMENT INCLUDING VOLTAGE, AMPERAGE, BREAKER RATINGS, EQUIPMENT, ENCLOSURES, BUS RATINGS, AND KVA/KW RATINGS.
- ALL WIRES AND CONDUIT SIZES.
- DETAILS FOR INTERCONNECTION OF PV ARRAY TO POWER DISTRIBUTION SYSTEM INCLUDING AUTOMATIC TRANSFER SWITCH, ETC. INCLUDING ELECTRICAL CHARACTERISTICS, UTILITY CONNECTIONS, ETC.

PV SOLAR SYSTEM	
<	DIRECTION OF INCLINATION OF THE SOLAR PANEL
SUN2000-12KTL	INVERTER 12KW
SUN-6KTL3-S	INVERTER 6KW

CABLE SIZE	CONDUIT SIZE				
	ø20mm	ø 25 mm	ø 32 mm	ø 38 mm	ø 50 mm
	MAXIMUM NUMBER OF CABLES (OTHER THAN GROUNDING)				
2.5 mm²	5	-	-	-	-
4 mm²	4	5	-	-	-
6 mm²	3	5	-	-	-
10 mm²	2	3	5	-	-
16 mm²	-	2	4	5	-
25 mm²	-	-	3	4	-
35 mm²	-	-	2	3	5
50 mm²	-	-	-	-	4

REPUBLIC OF LEBANON
MINISTRY OF INTERIOR AND MUNICIPALITIES

إتحاد بلديات الضاحية الجنوبية

Project Name:

PHOTOVOLTAIC SYSTEM FOR SEVERAL WELLS
IN HAY EL SOLLUM REGION

TERA FOR PLANNING & ENGINEERING STUDIES S.A.R.L.
تيرا للتخطيط والدراسات الهندسية ش.م.م.

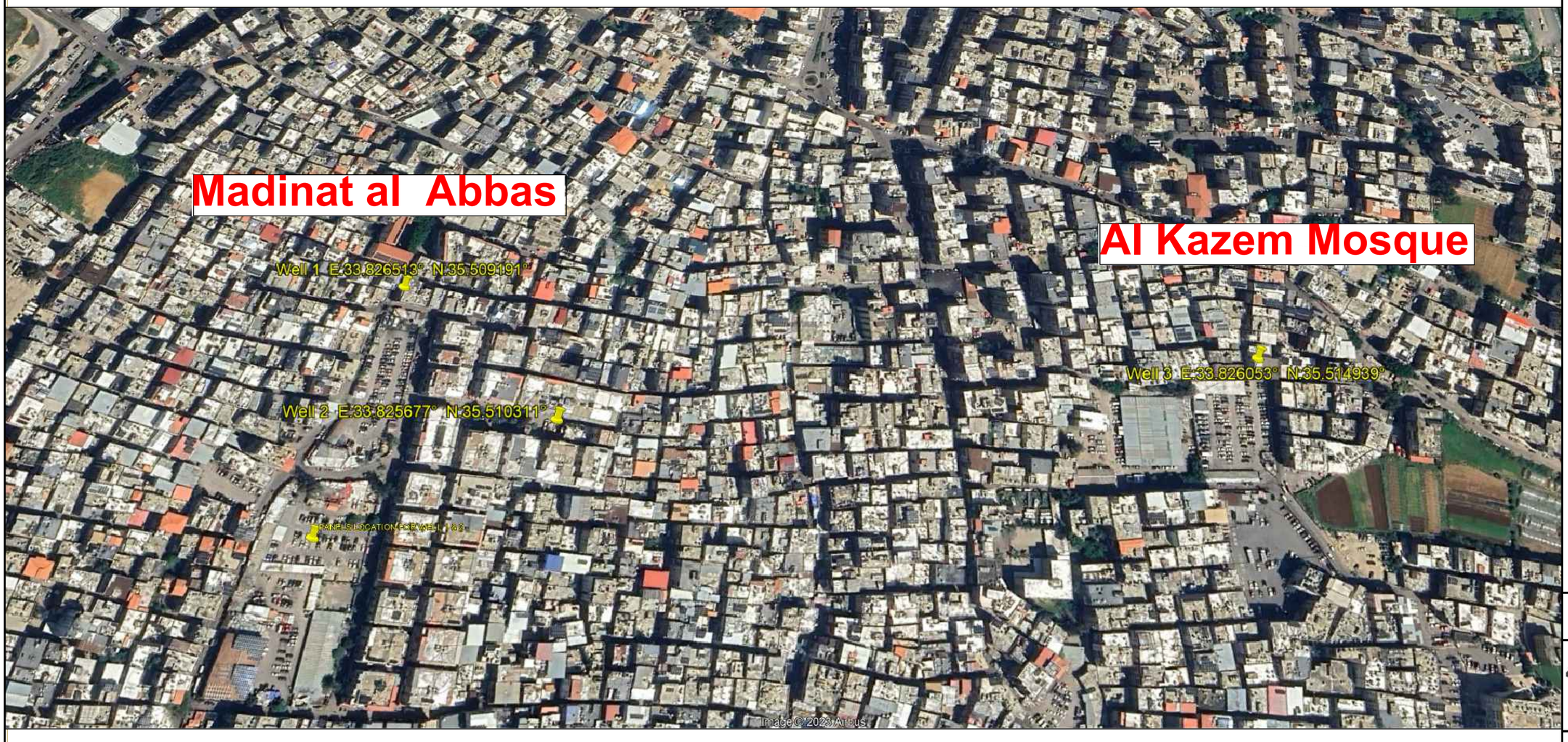
DRAWN BY:	DESIGNED BY:	CHECKED BY:	APPROVED BY:
R.K.	H.H.	A.S.	A.S.

PROJECT MANAGER : A.S.
JOB NUMBER : L2310

Drawing Title:
GENERAL NOTES

DATE January 2024
SCALE N.T.S.
DRAWING No. L2310D-GN-00
REV 00

PROJECTS LOCATION



NOTES:

1- ALL DIMENSIONS ARE IN METER UNLESS OTHERWISE MENTIONED.

2- DO NOT SCALE FROM THE DRAWINGS

3- THE CONTRACTOR SHALL PREPARE DETAILED SHOP DRAWINGS FOR APPROVAL BY THE ENGINEER BEFORE EXECUTION.

4- THE CONTRACTOR SHALL PROVIDE COMPLETE CALCULATION NOTES.

5- THE DISTRIBUTION OF PANELS IS INDICATIVE AND THE FINAL DISTRIBUTION SHALL BE DEFINED AND APPROVED BY THE ENGINEER DUE TO SITE CONDITIONS, INCLUDING AMENDMENTS AND MODIFICATIONS.

6- ANY EXISTING OBSTACLES AND UTILITIES SUCH AS CABLES, GENERATORS, TANKS, ETC. INTERFERING WITH THE EXECUTION OF WORKS SHALL BE REMOVED, RELOCATED OR REALIGNED AS DIRECTED BY THE ENGINEER.

7- FOR TYPICAL DETAILS REFER TO DRAWING "L2310D-ST-DT-01 & 02".

8- CABLE JOINT AND SPLICING SHALL NOT BE USED UNLESS APPROVED BY THE ENGINEER.

LEGEND:

<	SOLAR PANELS

REPUBLIC OF LEBANON

MINISTRY OF INTERIOR AND MUNICIPALITIES

إتحاد بلديات الضاحية الجنوبية

Project Name:

PHOTOVOLTAIC SYSTEM FOR SEVERAL WELLS IN HAY EL SOLLUM REGION

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تيرا للتخطيط والدراسات الهندسية ش.م.م.

DRAWN BY:	DESIGNED BY:	CHECKED BY:	APPROVED BY:
R.K.	H.H.	A.S.	A.S.

PROJECT MANAGER : A.S.

JOB NUMBER : L2310

Drawing Title:

GENERAL LAYOUT
PLAN VIEW

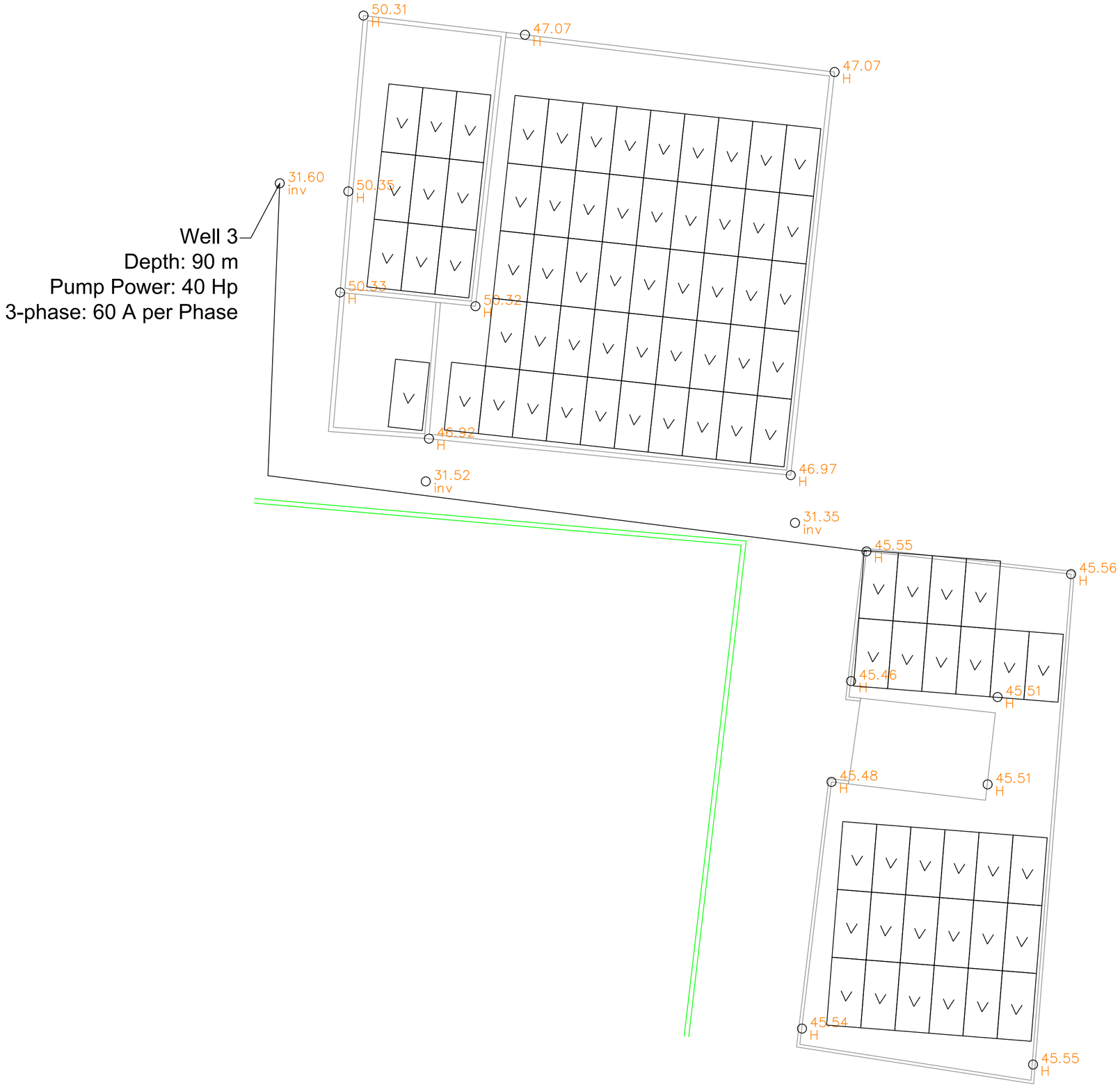
DATE January 2024

SCALE AS SHOWN

DRAWING No. L2310D-G-PL-01

REV 00

PLAN VIEW AND SOLAR PANELS DISTRIBUTION - AL KAZEM MOSQUE



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5- THE DISTRIBUTION OF PANELS IS INDICATIVE AND THE FINAL DISTRIBUTION SHALL BE DEFINED AND APPROVED BY THE ENGINEER DUE TO SITE CONDITIONS, INCLUDING AMENDMENTS AND MODIFICATIONS.

6- ANY EXISTING OBSTACLES AND UTILITIES SUCH AS CABLES, GENERATORS, TANKS, ETC. INTERFERING WITH THE EXECUTION OF WORKS SHALL BE REMOVED, RELOCATED OR REALIGNED AS DIRECTED BY THE ENGINEER.

7- FOR TYPICAL DETAILS REFER TO DRAWING "L2310D-ST-DT-01 & 02".

8- CABLE JOINT AND SPLICING SHALL NOT BE USED UNLESS APPROVED BY THE ENGINEER.

LEGEND:

< SOLAR PANELS

REPUBLIC OF LEBANON

MINISTRY OF INTERIOR AND MUNICIPALITIES

إتحاد بلديات الضاحية الجنوبية

Project Name:

PHOTOVOLTAIC SYSTEM FOR SEVERAL WELLS IN HAY EL SOLLUM REGION

TERA FOR PLANNING & ENGINEERING STUDIES S.A.R.L.
تيرا للتخطيط والدراسات الهندسية ش.م.م.

DRAWN BY:	DESIGNED BY:	CHECKED BY:	APPROVED BY:
R.K.	H.H.	A.S.	A.S.

PROJECT MANAGER : A.S.

JOB NUMBER : L2310

Drawing Title:

PLAN VIEW 2/2

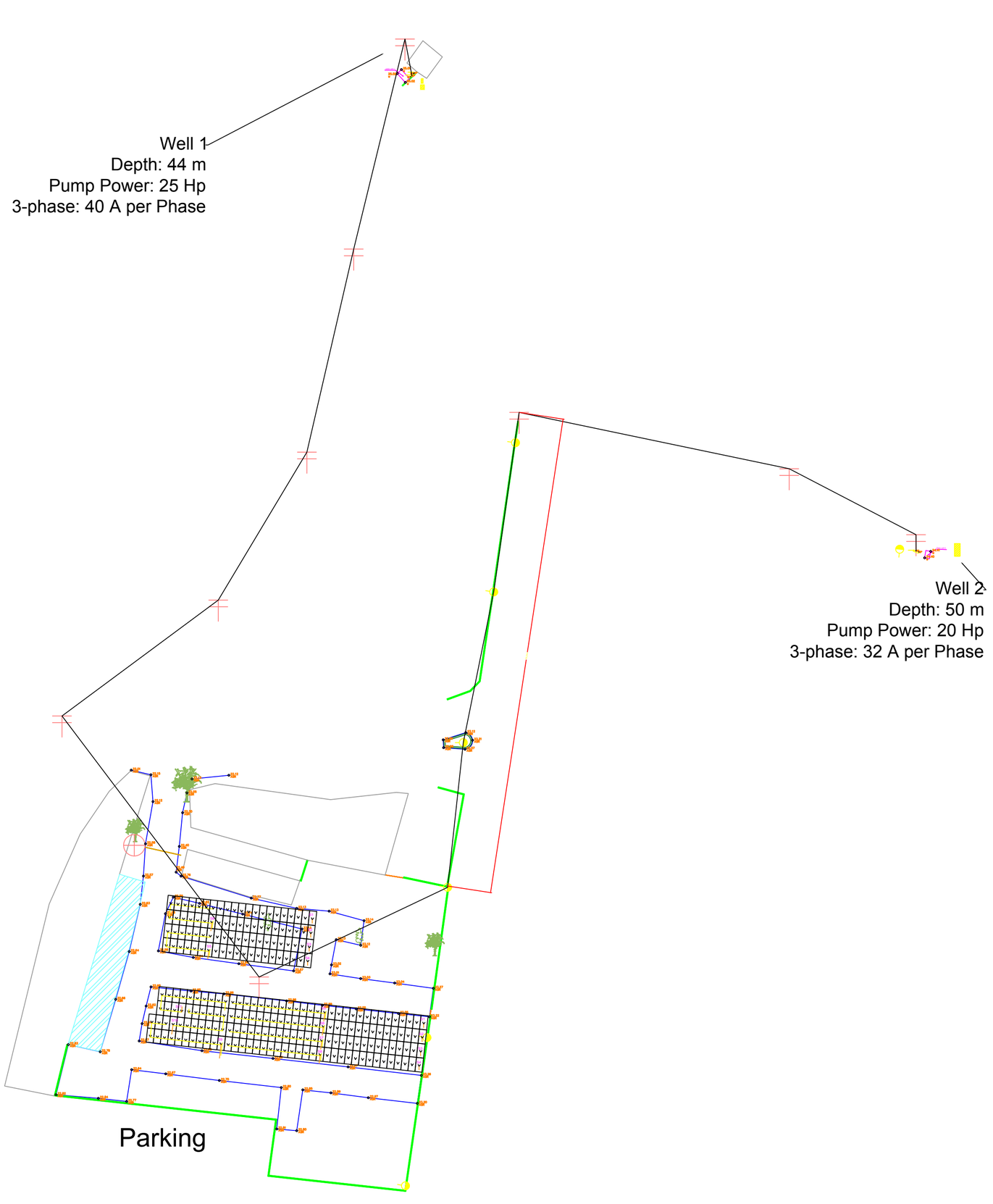
DATE January 2024

SCALE 1/50

DRAWING No. L2310D-G-PL-03

REV 00

PLAN VIEW AND SOLAR PANELS DISTRIBUTION - MADINAT AL ABBAS



NOTES:

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LEGEND:

< SOLAR PANELS

REPUBLIC OF LEBANON

MINISTRY OF INTERIOR AND MUNICIPALITIES

إتحاد بلديات الضاحية الجنوبية

Project Name:

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DRAWN BY:	DESIGNED BY:	CHECKED BY:	APPROVED BY:
R.K.	H.H.	A.S.	A.S.

PROJECT MANAGER : A.S.

JOB NUMBER : L2310

Drawing Title:

PLAN VIEW 1/2

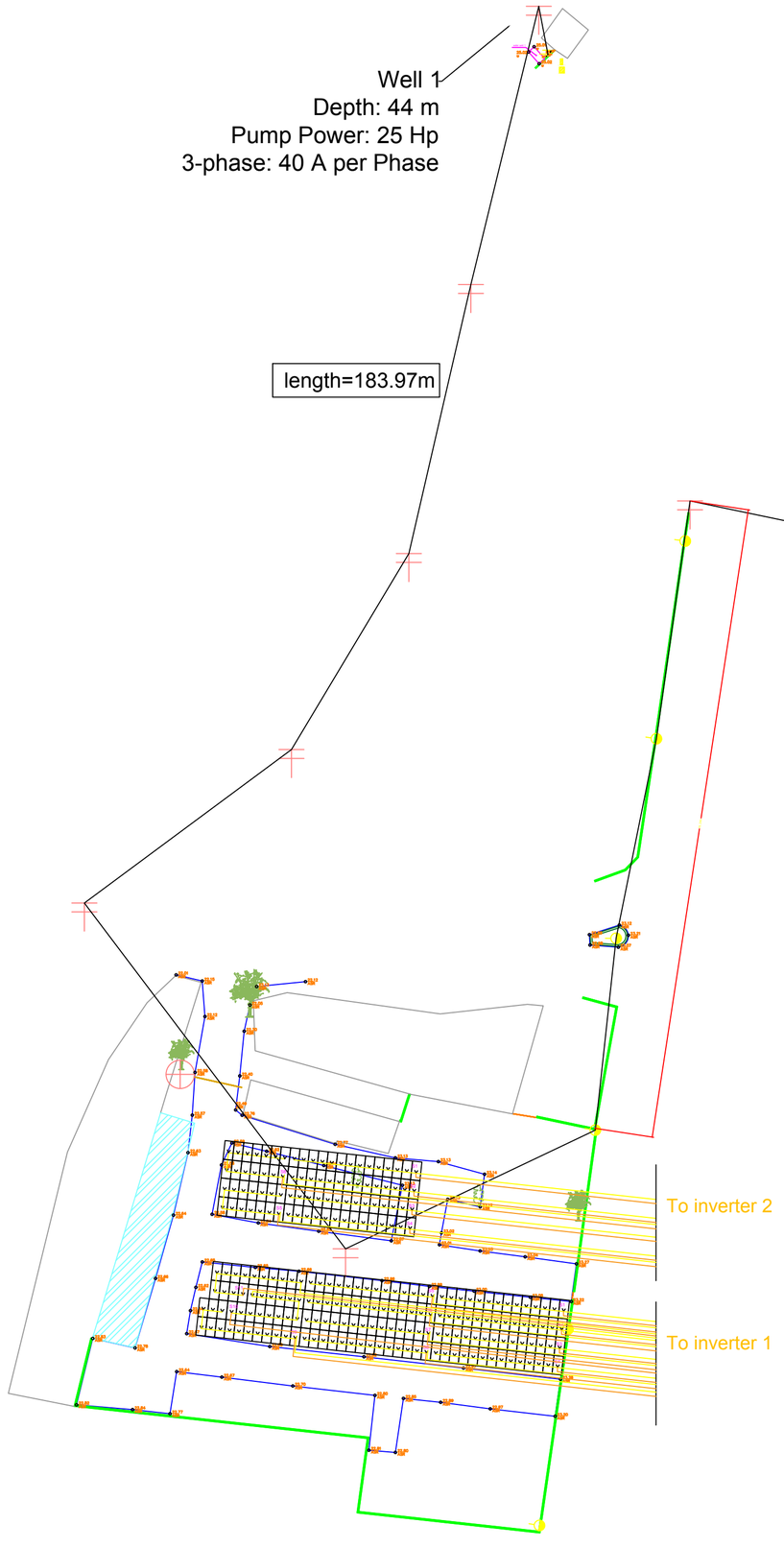
DATE January 2024

SCALE 1/250

DRAWING No. L2310D-G-PL-02

REV 00

PLAN VIEW 1/2



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REPUBLIC OF LEBANON

MINISTRY OF INTERIOR AND MUNICIPALITIES

إتحاد بلديات الضاحية الجنوبية

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تيرا للتخطيط والدراسات الهندسية ش.م.م.

DRAWN BY:	DESIGNED BY:	CHECKED BY:	APPROVED BY:
R.K.	H.H.	A.S.	A.S.

PROJECT MANAGER : A.S.

JOB NUMBER : L2310

Drawing Title:

ELECTRICAL
PLAN VIEW 1/2

DATE January 2024

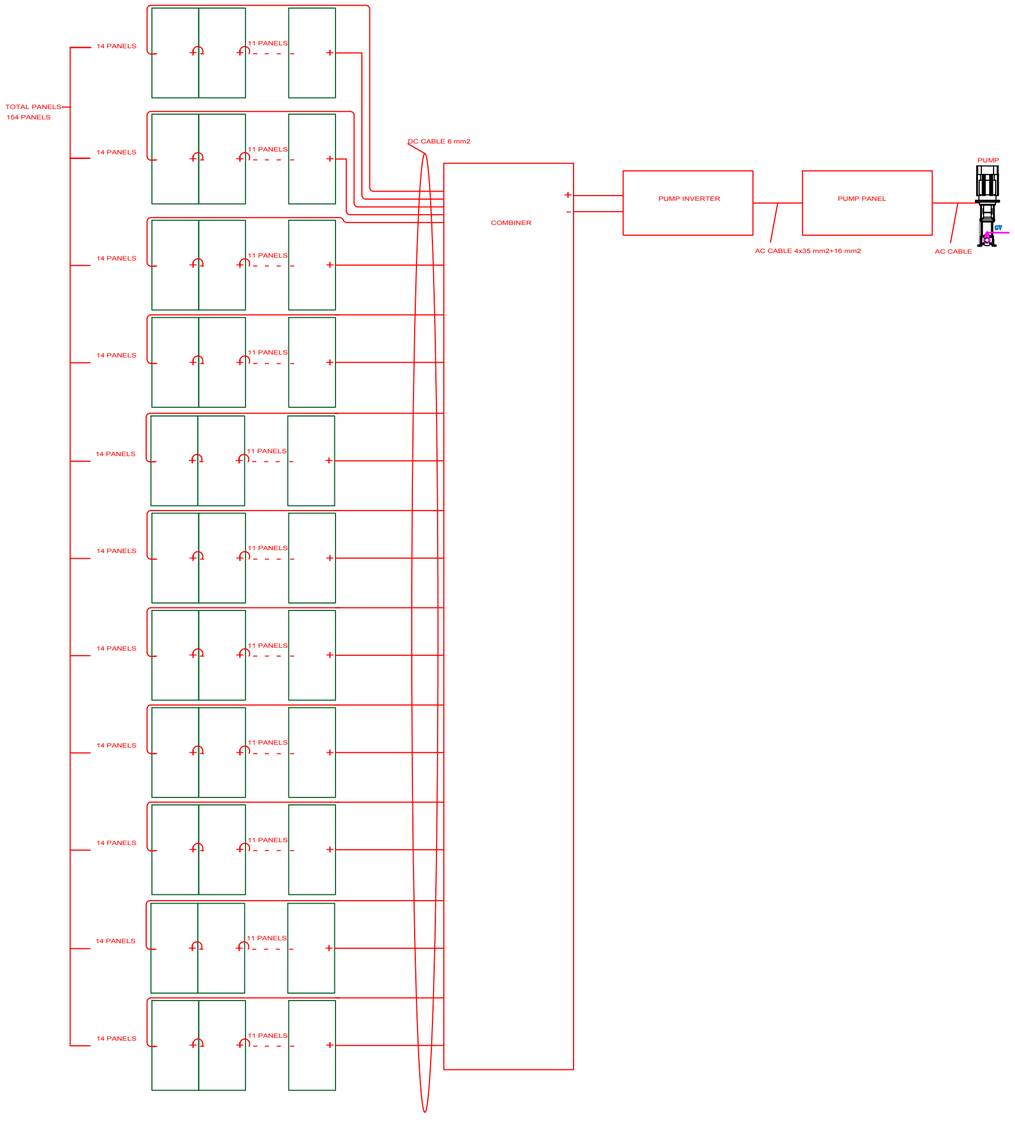
SCALE N.T.S.

DRAWING No. L2310D-EL-PL-01

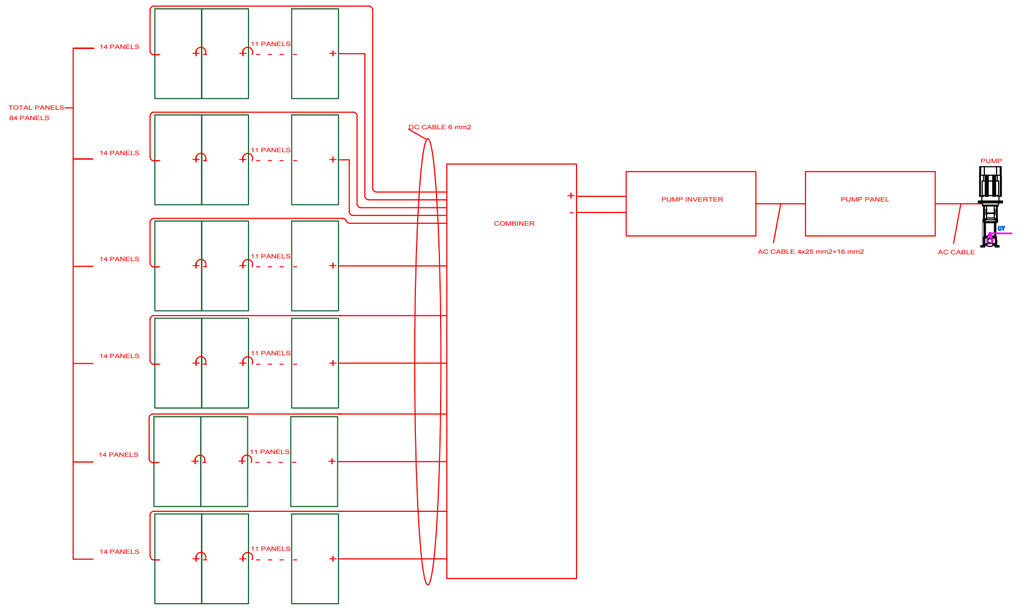
REV 00

LINE DIAGRAM

WELL 1



WELL 2



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DRAWN BY:	DESIGNED BY:	CHECKED BY:	APPROVED BY:
R.K.	H.H.	A.S.	A.S.

PROJECT MANAGER : A.S.

JOB NUMBER : L2310

Drawing Title:

ELECTRICAL
LINE DIAGRAM 1/2

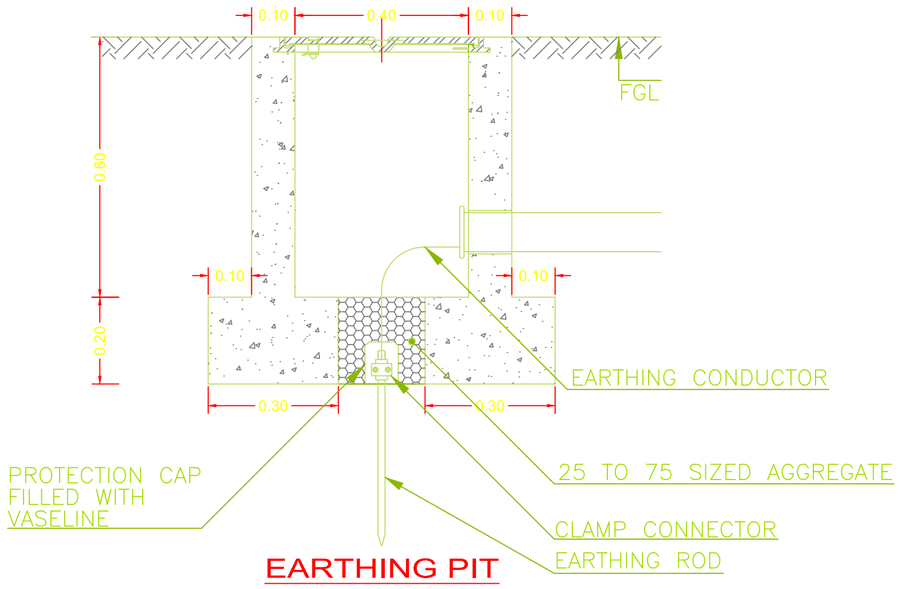
DATE January 2024

SCALE N.T.S.

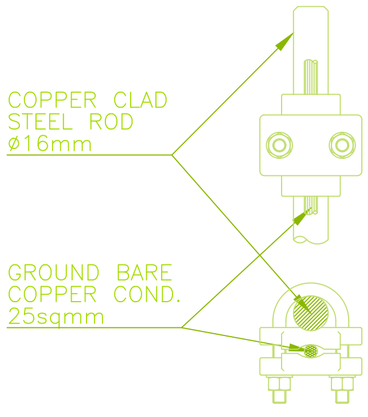
DRAWING No. L2310D-EL-DE-01

REV 00

EARTHING DETAIL



EARTHING PIT



CLAMP CONNECTOR

NOTES:

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REPUBLIC OF LEBANON

MINISTRY OF INTERIOR AND MUNICIPALITIES

إتحاد بلديات الضاحية الجنوبية

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IN HAY EL SOLLUM REGION

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DRAWN BY:	DESIGNED BY:	CHECKED BY:	APPROVED BY:
R.K.	H.H.	A.S.	A.S.

PROJECT MANAGER : A.S.

JOB NUMBER : L2310

Drawing Title:

ELECTRICAL
TYPICAL DETAILS

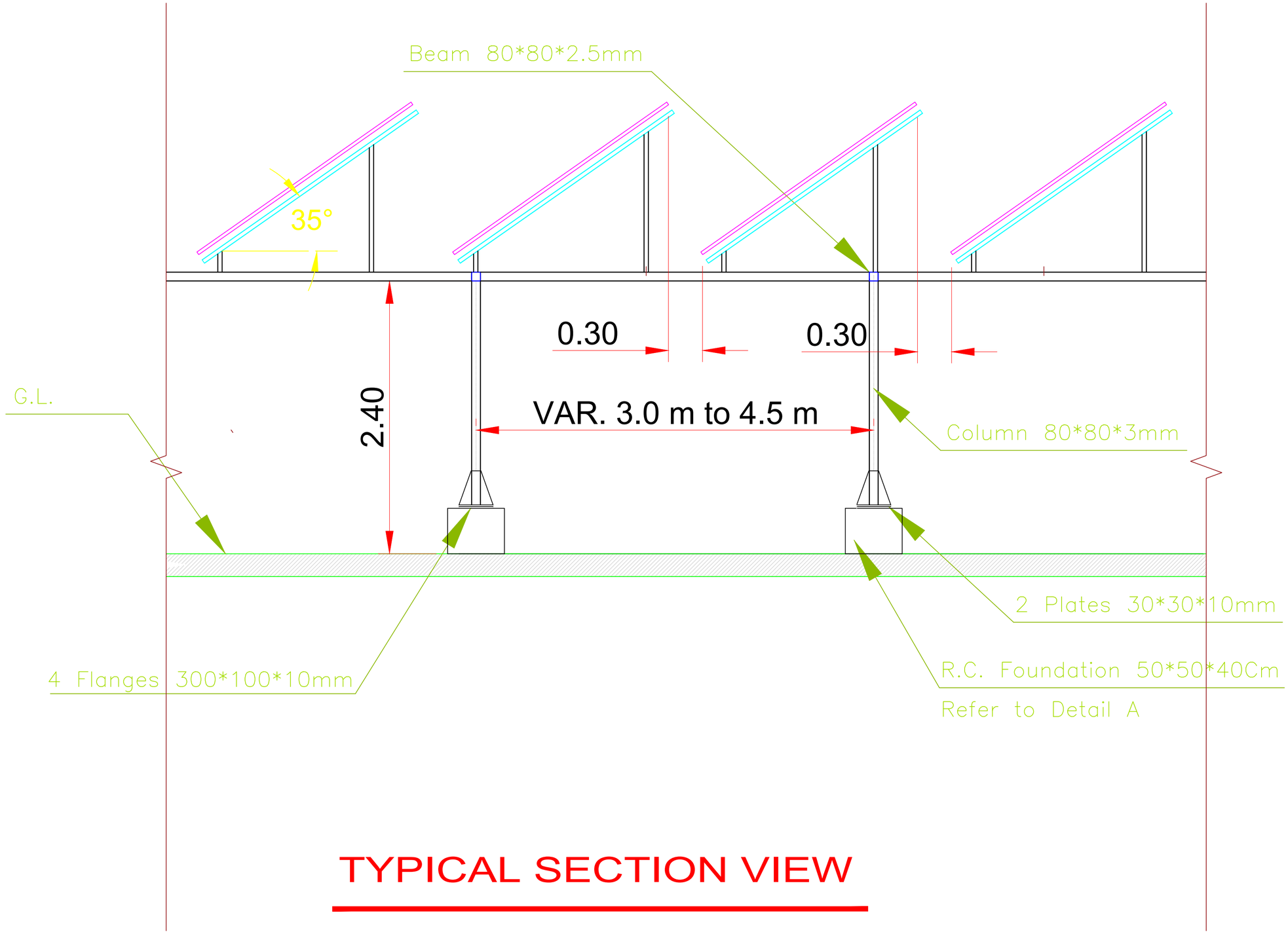
DATE January 2024

SCALE AS SHOWN

DRAWING No. L2310D-EL-DE-03

REV 00

SOLAR MOUNTING STRUCTURE DETAILS



TYPICAL SECTION VIEW

1- UNLESS OTHERWISE MENTIONED, ALL THE DIMENSIONS ARE IN CENTIMETERS.

2- THE CONTRACTOR SHALL PREPARE DETAILED SHOP DRAWING FOR DESIGN BEFORE EXECUTION.

3- THE INSTALLATION OF PANELS ON THE STEEL STRUCTURE SHALL BE AS THE MANUFACTURER'S AND THE SUPPLIER'S RECOMMENDATIONS AND AS DIRECTED BY THE ENGINEER.

4- THE DESIGN TAKE IN CONSIDERATION A WIND PRESSURE OF 120 KM/H.

5- ALL STEEL STRUCTURE CONNECTIONS MUST BE FULLY WELDED.

6- THE WELD SIZE SHALL BE 0.7t WHERE t IS THE SMALLEST THICKNESS BETWEEN THE TWO WLEDED ELEMENTS, OR MINIMUM VALUE 3mm.

7- ALL WELDED PART SHALL BE COVERED WITH ANTI-CORROSION COATING.

8- HOT DIP GALVANIZED TUBES AND BRACKETS TO BE USED (MILL CERTIFICATE TO BE PROVIDED ACCORDINGLY).

9- ALL THE ENDINGS OF THE TUBES SHOULD BE CLOSED WITH SUITABLE COVERS (PLASTIC OR RUBBER) TO PREVENT WATER INFILTRATION.

10- STEEL GRADE TYPE A36.

11- ALL EXPOSED BOLTS, NUTS AND WASHERS TO BE MADE OF STAINLESS STEEL (SS316).

12- STEEL PLATE HOLES SHALL BE 3mm THAN THE NORMAL DIAMETER OF THE BOLT.

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DRAWN BY:	DESIGNED BY:	CHECKED BY:	APPROVED BY:
R.K.	H.H.	A.S.	A.S.

PROJECT MANAGER : A.S.

JOB NUMBER : L2310

Drawing Title:

STRUCTURAL DETAILS 2/3

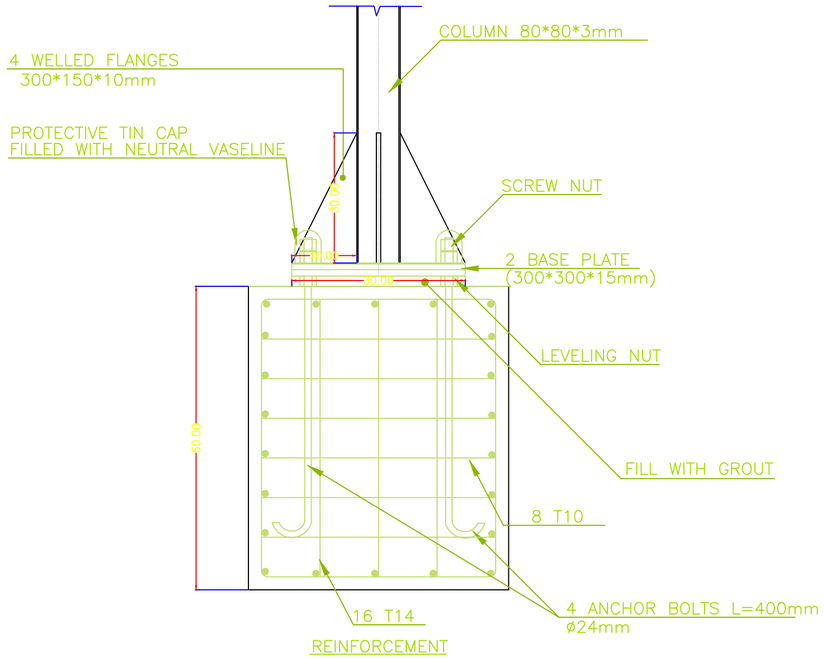
DATE January 2024

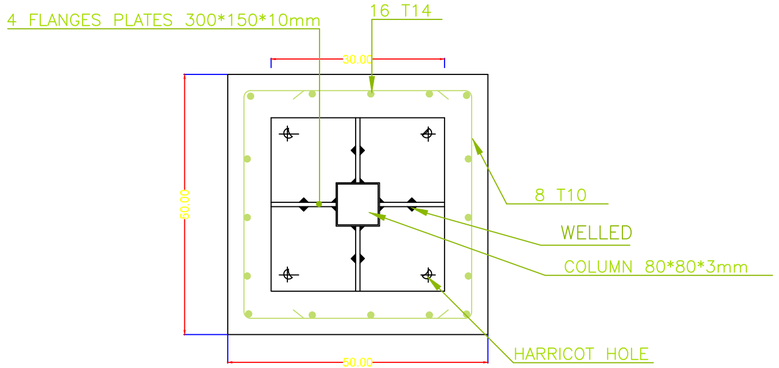
SCALE 1/50

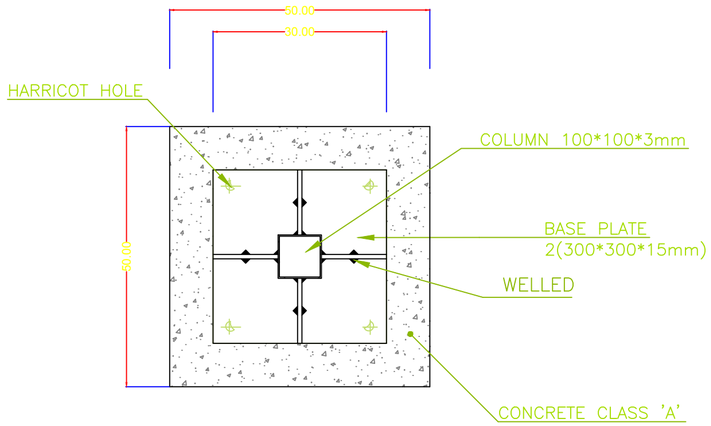
DRAWING No. L2310D-ST-DE-02

REV 00

SOLAR MOUNTING STRUCTURE - FOUNDATION DETAILS

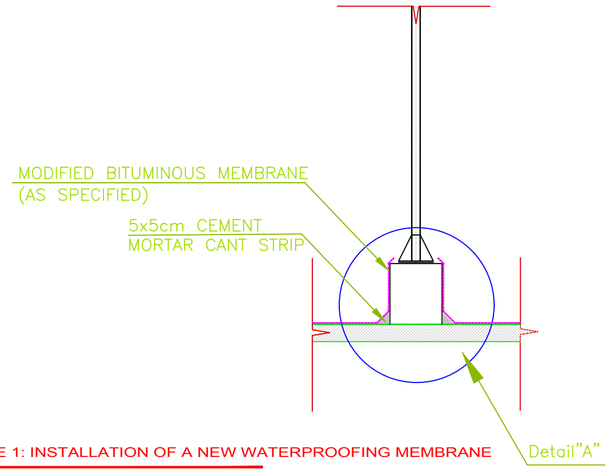




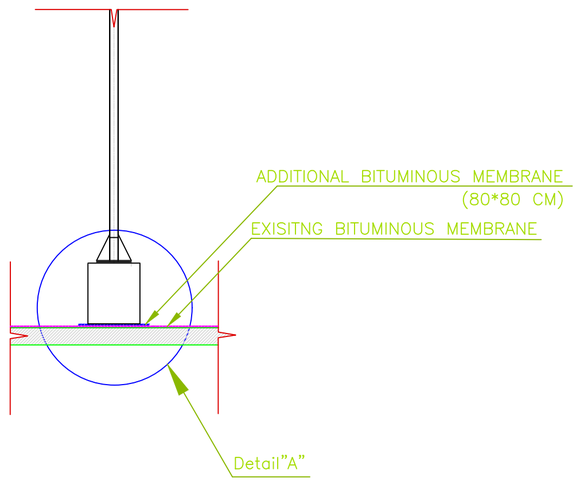


DETAIL "A"

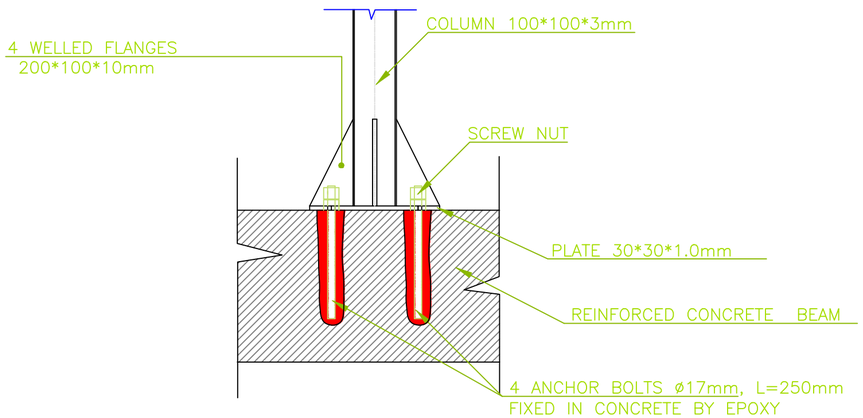
WATERPROOFING DETAILS



CASE 1: INSTALLATION OF A NEW WATERPROOFING MEMBRANE



CASE 2: EXISTING EXPOSED WATERPROOFING MEMBRANE



DETAIL "B"

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4- THE DESIGN TAKE IN CONSIDERATION A WIND PRESSURE OF 120 KM/H.

5- CONCRETE:

- ALL CLASSES OF CONCRETE ARE TO BE NORMAL WEIGHT (2500 kg/m³), WELL MADE AND EXECUTED IN ACCORDANCE WITH THE PROJECT SPECIFICATIONS.

- REINFORCED CONCRETE SHOULD HAVE A MINIMUM 28 DAYS DESIGN COMPRESSIVE STRENGTH ON STANDARD 15 x 30cm CYLINDER: F'c = 250 Kg/cm².

- BLINDING CONCRETE SHOULD HAVE A MINIMUM 28 DAYS DESIGN COMPRESSIVE STRENGTH ON STANDARD 15 x 30cm CYLINDER: F'c =110 Kg/cm²..

- FOR STRUCTURAL CONCRETE, THE MINIMUM CEMENT CONTENT SHALL BE 350 kg/m .

6- CONCRETE COVER:

-THE MINIMUM CONCRETE PROTECTIVE COVER FOR REINFORCEMENT SHALL BE AS FOLLOWS:
3 CM FOR SLABS, BEAMS AND COLUMNS
5 CM FOR ALL FOUNDATIONS AND WALLS

-CLASS F 2(FAIR FACING) FORM WORK SHALL BE APPLIED FOR ALL INTERNAL CONCRETE SURFACES.
OTHER WISE AS SHOWN ON DRAWINGS OR AS DIRECTED BY THE ENGINEER.

7- REINFORCEMENT:

- UNLESS OTHERWISE NOTED ON THE DRAWINGS, ALL REINFORCEMENT INCLUDING TIES AND STIRRUPS SHALL BE HIGH TENSILE STEEL HAVING A MINIMUM YIELD STRESS = 4200 Kg/cm²

- THE FOLLOWING STANDARD ABBREVIATIONS ARE USED IN CALLING UP GRADES OF REINFORCEMENT:
HIGH TENSILE STEEL BARS : T
MILD STEEL BARS : Ø

- UNLESS OTHERWISE NOTED, SPLICE LENGTH SHALL BE 50Ø.

REPUBLIC OF LEBANON

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TERA FOR PLANNING & ENGINEERING STUDIES S.A.R.L.
تيرا للتخطيط والدراسات الهندسية ش.م.م.

DRAWN BY:	DESIGNED BY:	CHECKED BY:	APPROVED BY:
R.K.	H.H.	A.S.	A.S.

PROJECT MANAGER : A.S.

JOB NUMBER : L2310

Drawing Title:

STRUCTURAL DETAILS 3/3

DATE January 2024

SCALE AS SHOWN

DRAWING No. L2310D-ST-DE-03

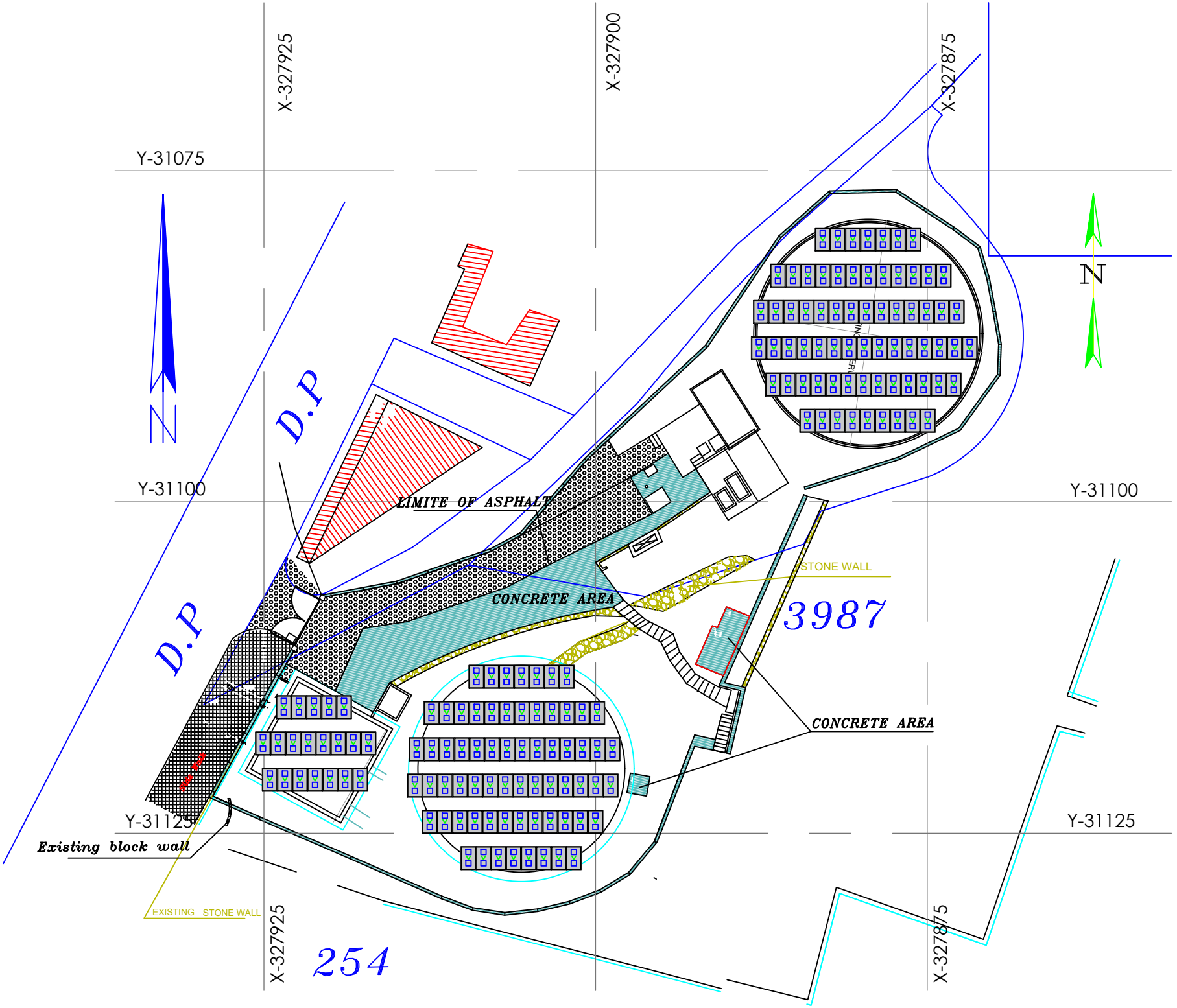
REV 00

PHOTOVOLTAIC SYSTEM FOR PUMPING STATION IN BEIT MERRY

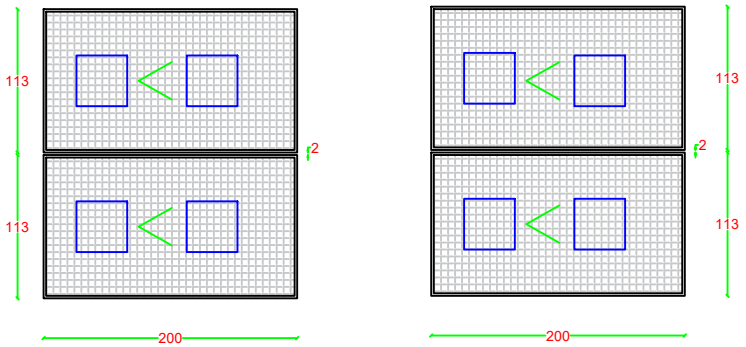
Volume 4

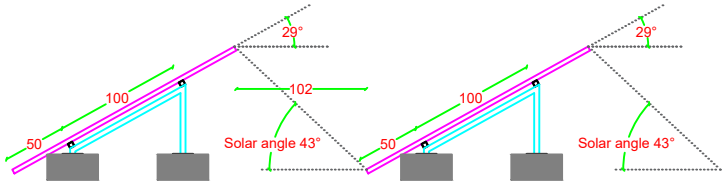
DRAWINGS

(FEBRUARY 2024)

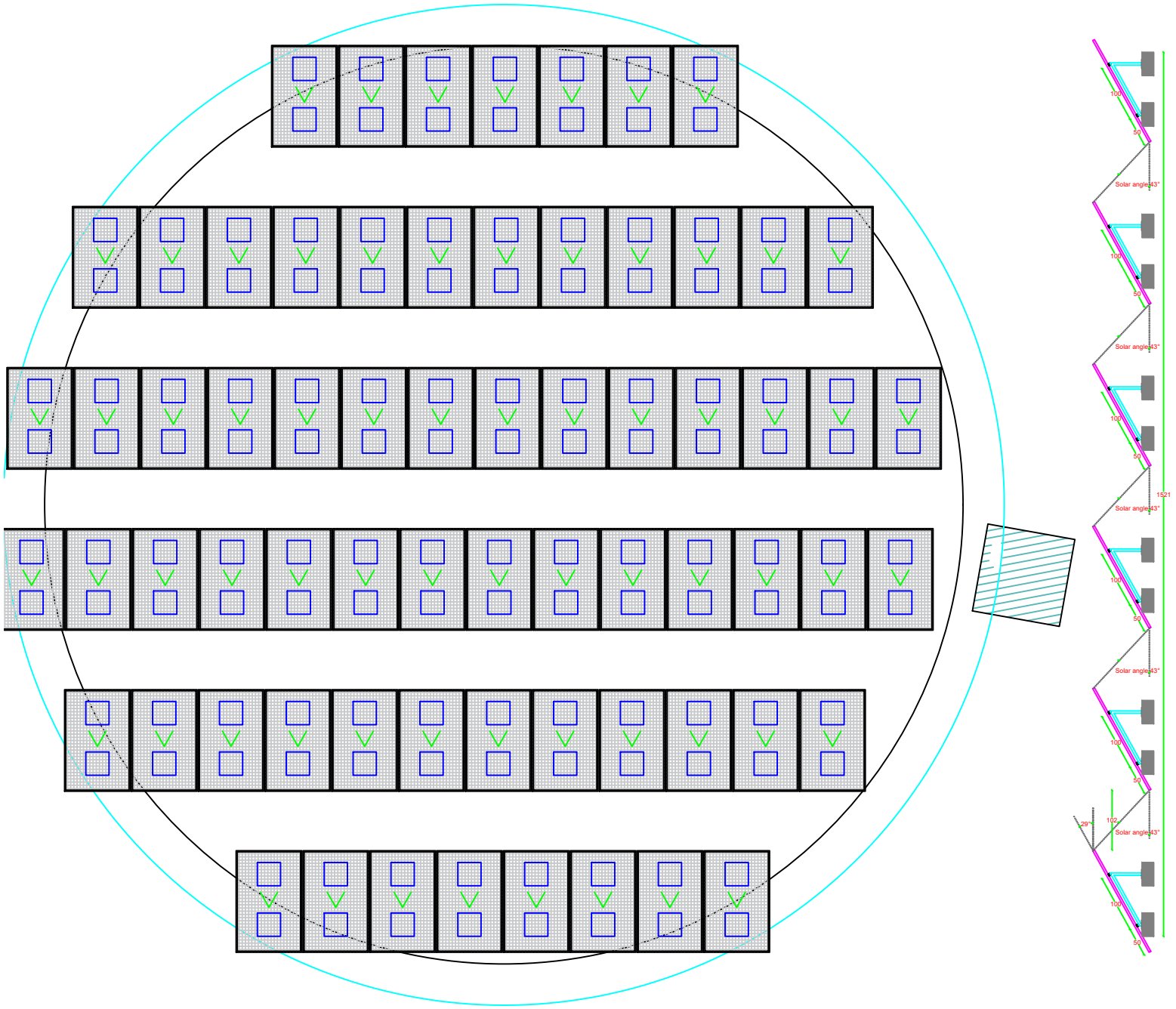

X-327925
X-327900
X-327875
Y-31075
Y-31100
Y-31125
N
D.P
D.P
LIMITE OF ASPHALT
CONCRETE AREA
STONE WALL
3987
CONCRETE AREA
Existing block wall
EXISTING STONE WALL
254

PANEL STANDARD DETAILS

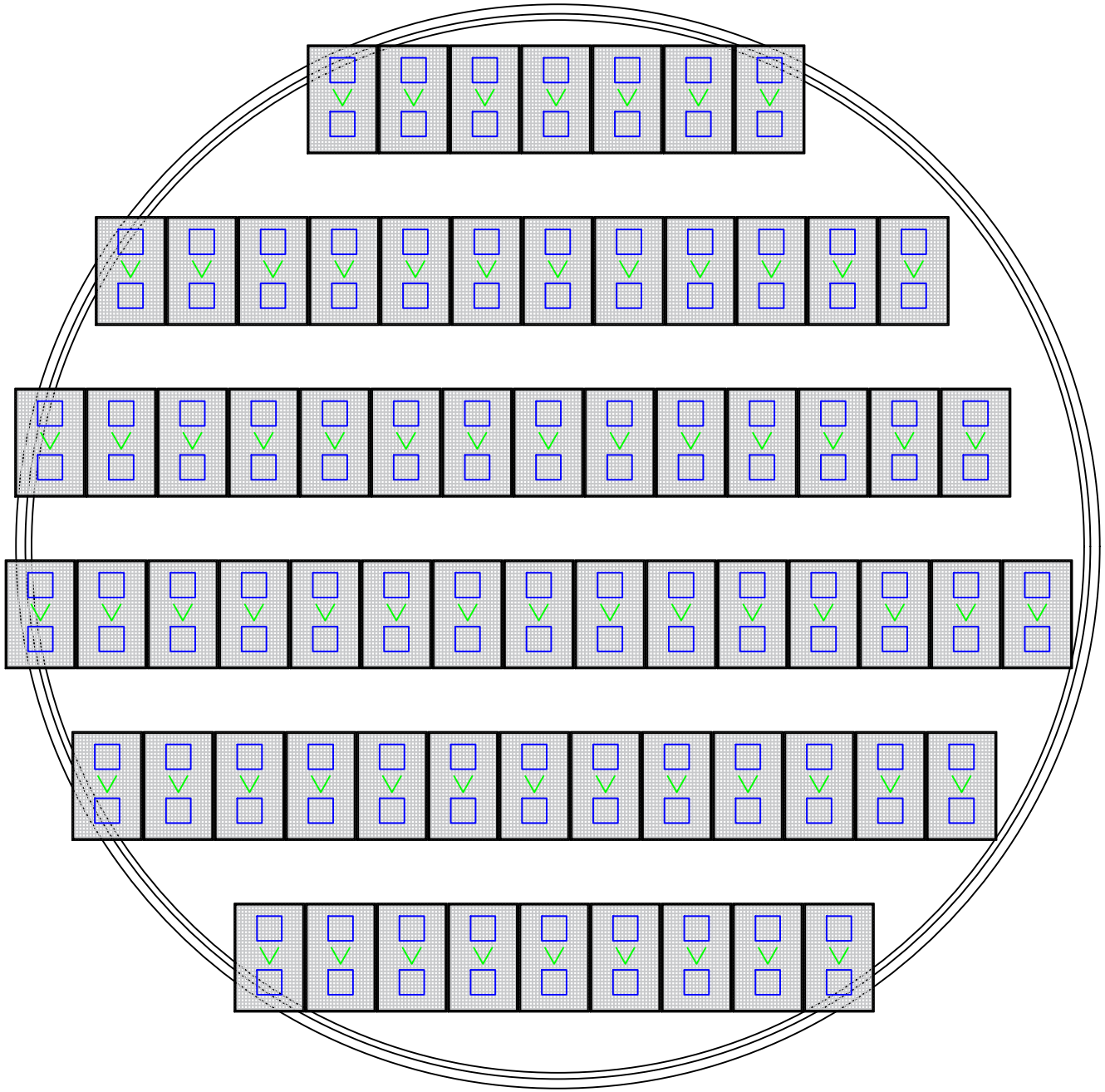


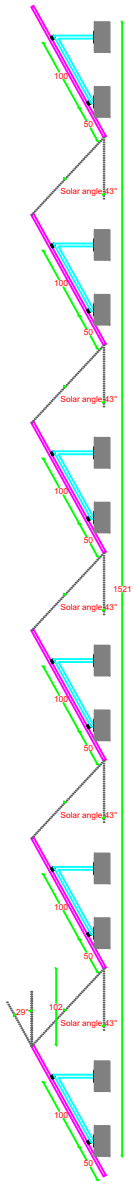


RESERVOIR 1 ROOF - 67 PANELS

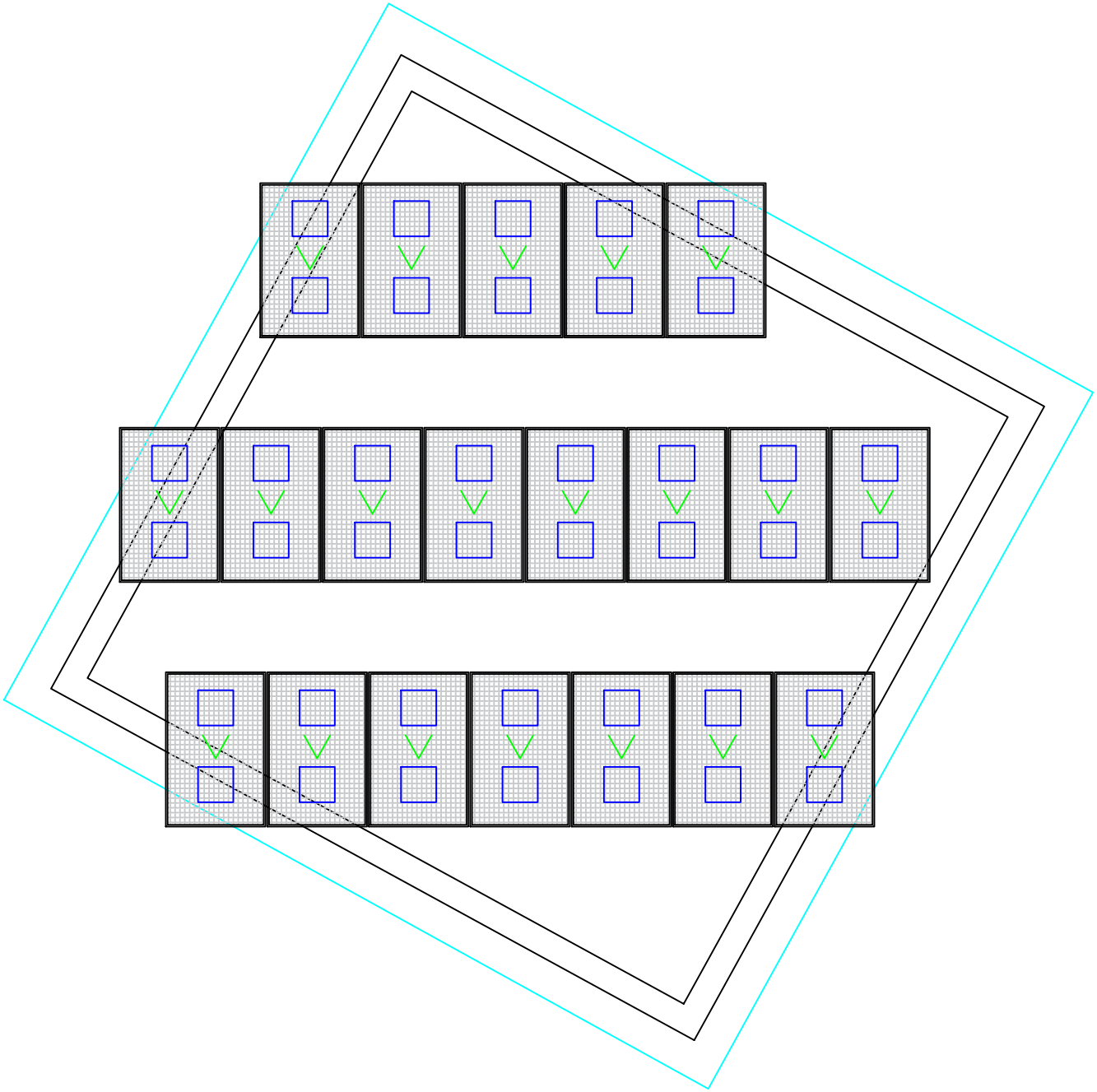


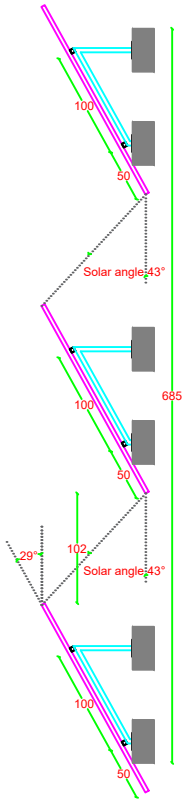
RESERVOIR 2 ROOF - 70 PANELS





CHAMBER ROOF - 20 PANELS





Contractor’s Name, Seal and Signature