CARSON CITY WASTE WATER TREATMENT PLANT SOLAR PHOTOVOLTAIC PROJECT

3320 EAST 5TH STREET, CARSON CITY, NV 89701

APN 10 - 031 - 06

PROJECT No. - 2.0805

BOARD OF SUPERVISORS

Bob Crowell	Mayor
Karen Abowd	Supervisor
Shelly Aldean	Supervisor
John McKenna	Supervisor
Molly Walt	Supervisor
Alan Glover	City Clerk

DESIGNED FOR:

CARSON CITY PUBLIC WORKS DEPARTMENT
OPERATIONS DIVISION
3505 BUTTI WAY
CARSON CITY, NV 89701
775-887-2355

GENERAL NOTES:

1. ALL WORK SHALL CONFORM TO THE "STANDARD SPECIFICATIONS FOR THE PUBLIC WORKS CONSTRUCTION" (SSPWC) AND THE "STANDARD DETAILS FOR PUBLIC WORKS CONSTRUCTION" (SDPWC) AS ADOPTED BY CARSON CITY. THE CONTRACTOR SHALL OBTAIN A PERMIT FOR PUBLIC WORKS CONSTRUCTION FROM THE CARSON CITY PERMIT CENTER PRIOR TO THE START OF CONSTRUCTION.

   ALL WORK IN NDOT RIGHT-OF-WAY SHALL CONFORM TO THE STATE OF NEVADA DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION, 2001 EDITION AND THE STATE OF NEVADA DEPARTMENT OD TRANSPORTATION STANDARD PLANS FOR ROAD AND BRIDGE CONSTRUCTION, 2007 EDITION.

2. ALL TRAFFIC CONTROL AND BARRICADING WITHIN THE CARSON CITY RIGHT-OF-WAY SHALL CONFORM TO SECTION 100.33, 332.04 AND 332.05 OF THE STANDARD SPECIFICATIONS, PART VI OF THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES, LATEST EDITION, AND THE UNR T2 CENTER TEMPORARY TRAFFIC CONTROL GUIDELINES LATEST EDITION. A TRAFFIC CONTROL PLAN MUST BE SUBMITTED AND APPROVED BY THE CARSON CITY ENGINEERING DIVISION PRIOR TO ANY STREET CLOSURES.

3. THE CONTRACTOR SHALL CALL UNDERGROUND SERVICE ALERT "CALL BEFORE YOU DIG" (811) OR (1-800-227-2600) AT LEAST TWO (2) WORKING DAYS PRIOR TO START OF CONSTRUCTION AND COMPLY WITH THE REQUIREMENTS OF NRS AND NAC 455 THROUGHOUT THE COURSE OF THE WORK, SEWER SERVICE LATERALS ARE NOT OWNED OR MARKED BY CARSON CITY.

4. THE CONTRACTOR SHALL CALL THE CARSON CITY ENGINEERING DIVISION (887-2300) TWO (2) WORKING DAYS PRIOR TO THE START OF CONSTRUCTION. THE CONTRACTOR SHALL CALL ONE (1) WORKING DAY PRIOR TO REQUIRED INSPECTIONS AND TESTING. THE REQUIRED INSPECTIONS AND TESTING ARE LISTED ON THE INSPECTION RECORD ISSUED WITH EACH PERMIT. THE CONTRACTOR MUST HAVE THE PERMIT NUMBER AND THE DESCRIPTION LISTED ON THE INSPECTION RECORD TO SCHEDULE REQUIRED INSPECTIONS AND TESTING. FOR CITY CONTRACTED PROJECTS, THE CONTRACTOR SHALL SCHEDULE INSPECTIONS PER THE CONTRACT DOCUMENTS.

5. FINAL INSPECTIONS WILL BE PERFORMED BY CARSON CITY ENGINEERING DIVISION ACCORDING TO THE CARSON CITY INSPECTIONS AND TESTING PROCEDURES. NOTE: THESE PROCEDURES REQUIRE SUBMITTAL OF RECORD DRAWING PRINTS BY THE CONTRACTOR AND 10 WORKING DAYS TO PREPARE A FINAL PUNCH LIST. ALL CONDITIONS OF THE FINAL INSPECTION MUST BE COMPLETED PRIOR TO FINAL ACCEPTANCE OR ANY APPROVAL OF A CERTIFICATE OF OCCUPANCY BY THE CARSON CITY ENGINEERING DIVISION.

6. MODIFICATIONS TO THE APPROVED PLANS REQUIRES REVIEW AND APPROVAL BY THE CARSON CITY ENGINEERING DIVISION. WORK PERFORMED WITHOUT WRITTEN APPROVAL BY CARSON CITY ENGINEERING WILL REQUIRE REMOVAL AT THE CONTRACTORS EXPENSE.

7. THE APPROVED PLAN, PERMIT AND INSPECTION RECORD MUST BE ON THE JOB SITE AT ALL TIMES.

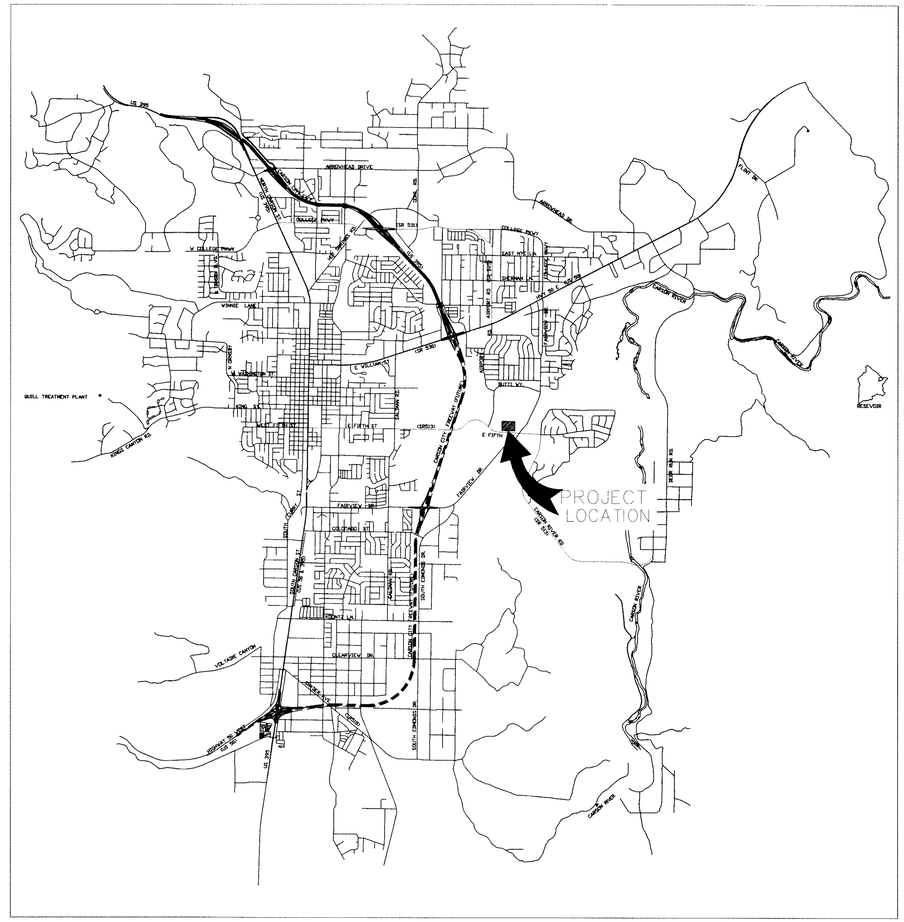
8. PLAN APPROVAL FOR SEWER AND WATER CONSTRUCTION SHALL EXPIRE ONE YEAR FROM DATE OF APPROVAL UNLESS CONSTRUCTION HAS BEEN INITIATED. (CCMC 12.06.180F, 12.01.140D)

9. THE CONTRACTOR WILL BE SOLELY AND COMPLETELY RESPONSIBLE FOR ACQUIRING A STORM WATER DISCHARGE PERMIT FROM THE NEVADA DIVISION OF ENVIRONMENTAL PROTECTION (NDEP) INCLUDING DEVELOPING, SUBMITTING AND IMPLEMENTING A STORM WATER POLLUTION PREVENTION PLAN (SWPPP). THE CONTRACTOR SHALL DEVELOP, PLACE AND MAINTAIN STORM WATER PROTECTION DEVICES IN COMPLIANCE WITH THE NEVADA CONTRACTORS FIELD GUIDE FOR CONSTRUCTION SITE BEST MANAGEMENT PRACTICES (JUNE 2008).

10. THE LOCATION OF EXISTING UTILITIES SHOWN ON THESE DRAWINGS IS BASED ON THE BEST INFORMATION AVAILABLE TO THE ENGINEER. IT SHALL BE THE CONTRACTORS RESPONSIBILITY TO VERIFY THESE LOCATIONS AT THE PROPOSED POINTS OF CONNECTIONS AND IN AREAS OF POSSIBLE CONFLICT WITH NEW UTILITY INSTALLATION. PRIOR TO BEGINNING CONSTRUCTION, POTHOLING IS REQUIRED. SHOULD THE CONTRACTOR FIND ANY DISCREPANCIES BETWEEN THE CONDITIONS EXISTING IN THE FIELD AND THE INFORMATION SHOWN ON THESE DRAWINGS, HE SHALL NOTIFY THE ENGINEER BEFORE PROCEEDING WITH CONSTRUCTION.

11. THE CONTRACTOR WILL BE SOLELY AND COMPLETELY RESPONSIBLE FOR THE CONDITIONS OF THE JOB SITE, INCLUDING SAFETY OF ALL PERSONS AND PROPERTY DURING PERFORMANCE OF THE WORK. THIS REQUIREMENT WILL APPLY CONTINUOUSLY AND NOT BE LIMITED TO NORMAL WORKING HOURS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE DESIGN AND CONSTRUCTION OF PROPER SHORING OF TRENCHES IN ACCORDANCE WITH OCCUPATIONAL SAFETY LAWS. THE DUTIES OF THE ENGINEER DO NOT INCLUDE REVIEW OF THE ADEQUACY OF THE CONTRACTORS SAFETY IN, ON, OR NEAR THE CONSTRUCTION SITE.

12. SHOULD IT APPEAR THAT THE WORK TO BE DONE, OR ANY MATTER RELATIVE THERETO, IS NOT SUFFICIENTLY DETAILED OR EXPLAINED ON THESE PLANS, THE CONTRACTOR SHALL CONTACT THE ENGINEER FOR SUCH FURTHER EXPLANATIONS AS MAY BE NECESSARY.



VICINITY MAP
NTS

NORTH

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DESIGN PROFESSIONALS:

LEAD DESIGNER — ROBERT CHO, PE, CEM, CMVP
PACIFICWEST ENERGY SOLUTIONS, INC.
561 KEYSTONE AVENUE #300
RENO, NV 89503
(800) 310-9080

STRUCTURAL ENGINEER — MATTHEW FETTIG, PE
COLOVICH ENGINEERING + DESIGN
1550 SWAN CIRCLE
RENO, NV 89509
(775) 750-6263

ELECTRICAL ENGINEER — MIKE PECORINO, P.E. LEED AP
CONSTRUCTION DESIGN SERVICES, INC.
150 WEST HUFFAKER LANE #103
RENO, NV 89511
(775) 826-4001 ext 14

REVIEWED FOR CITY REQUIREMENTS:

JEFF SHARP, P.E. - CITY ENGINEER — DATE

DEVELOPMENT ENGINEERING — DATE

DARREN SCHULZ, P.E. - DEPUTY PUBLIC WORKS DIRECTOR — DATE

PROFESSIONAL ENGINEER STATE OF NEVADA
TYSON COLOVICH
Exp. 12-31-12
CIVIL
No. 19370

PERMIT # _____

DESIGNED BY: RC
DRAWN BY: DN
CHECKED BY: RC
DWG NO.
SCALE (HORIZ): AS SHOWN
SCALE (VERT): AS SHOWN
PLOT DATE: 12-9-2011

CARSON CITY
PUBLIC WORKS DEPARTMENT
3505 BUTTI WAY CARSON CITY NEVADA 89701
PH: 775-887-2355 FAX: 775-887-2112

PACIFICWEST ENERGY SOLUTIONS
Conservation, Generation, Innovation
561 Keystone Ave # 300, Reno, NV 89503
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REV.	DATE	DESCRIPTION	BY	APP'D
0	08/30/2011	INITIAL DESIGN	CG	RC
1	09/28/2011	REVISIONS	CG	RC
2	12/08/2011	INITIAL RE-DESIGN	CG	RC

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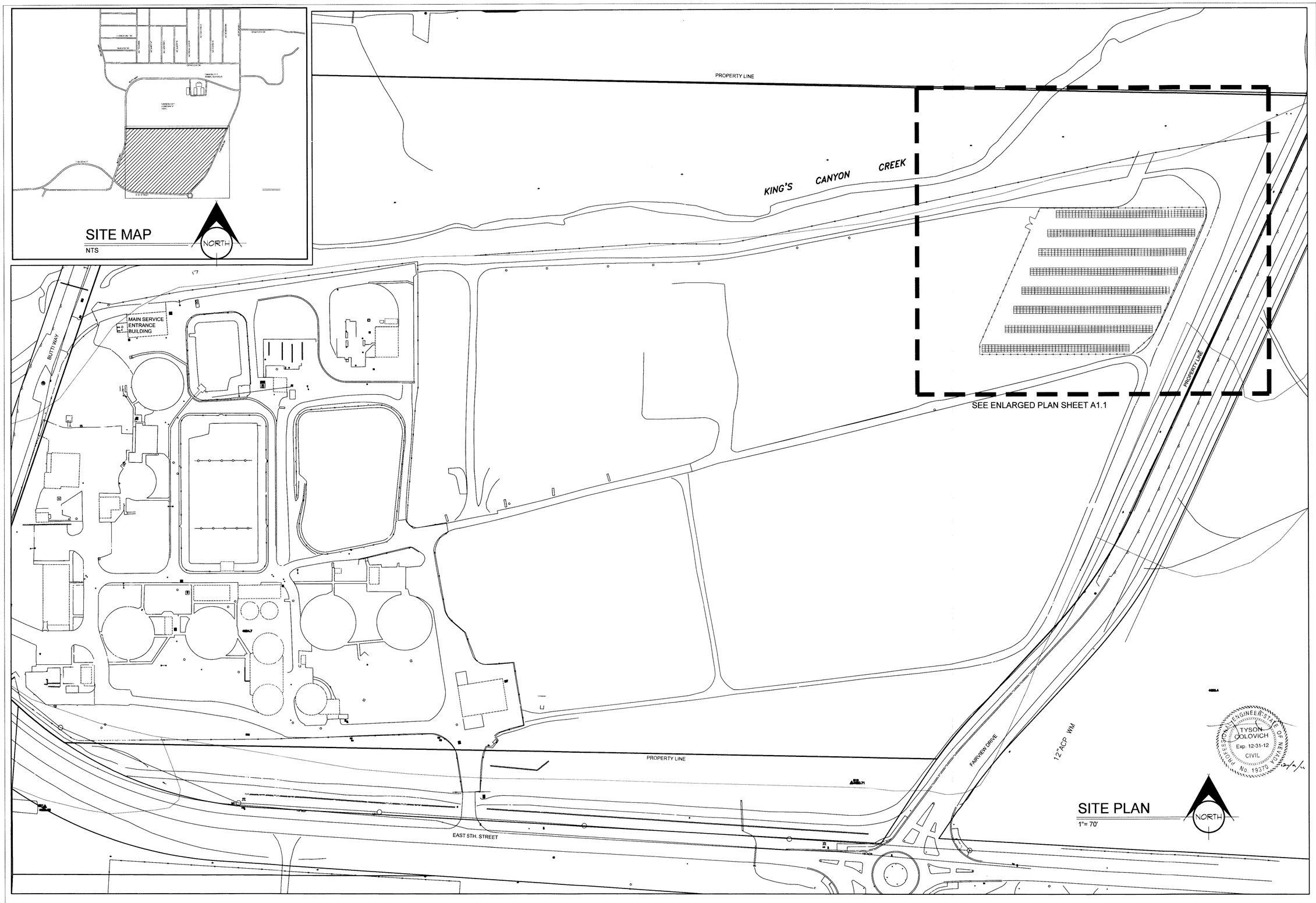
TITLE SHEET

SHEET
A0.0



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REV.	DATE	DESCRIPTION	BY	APP'D
0	06/30/2011	INITIAL DESIGN	CG	RC
1	08/26/2011	REVISION 1	CG	RC
2	12/06/2011	INITIAL RE-DESIGN	CG	RC

CARSON CITY WASTE WATER TREATMENT
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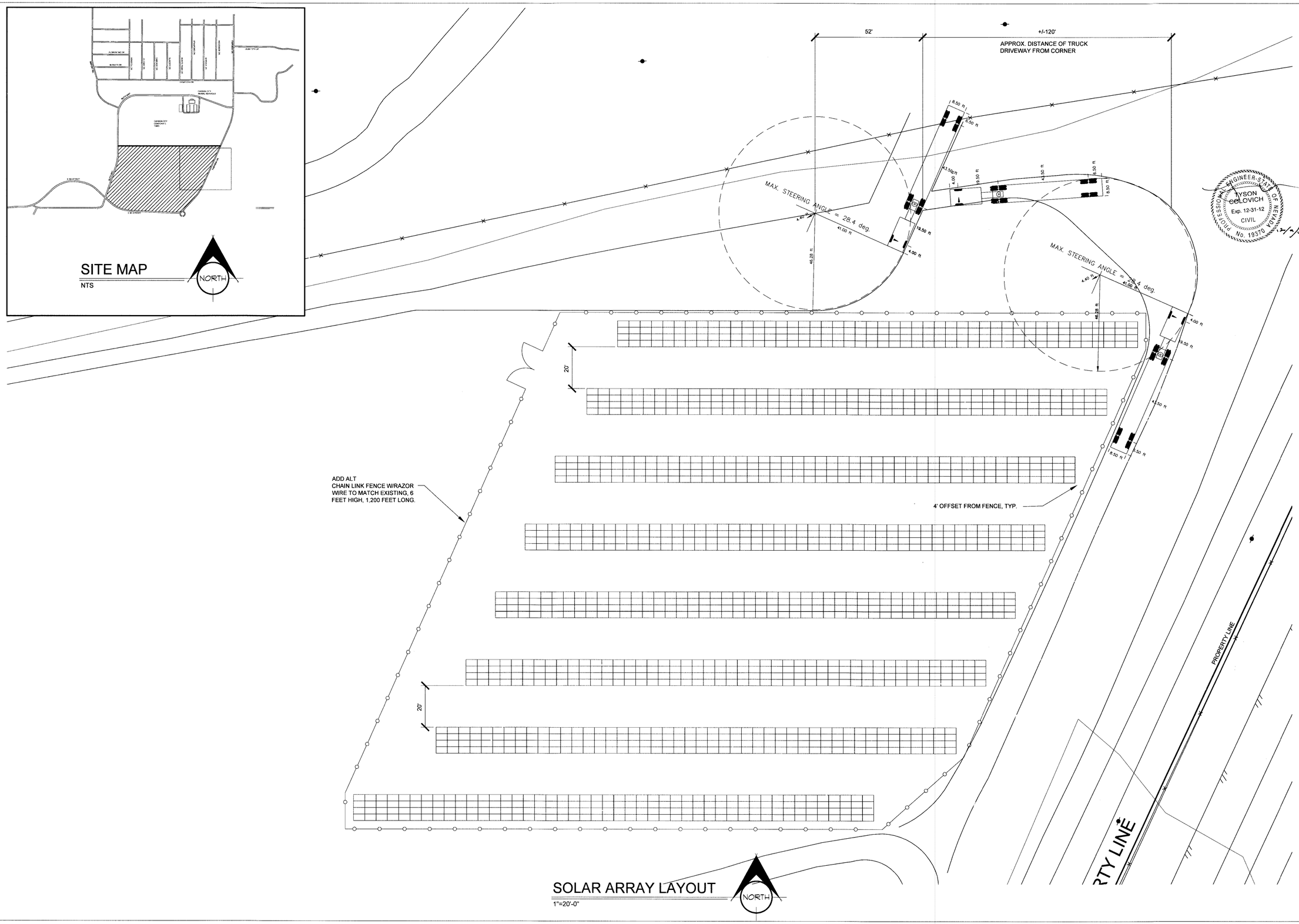
SITE PLAN

SHEET
A1.0



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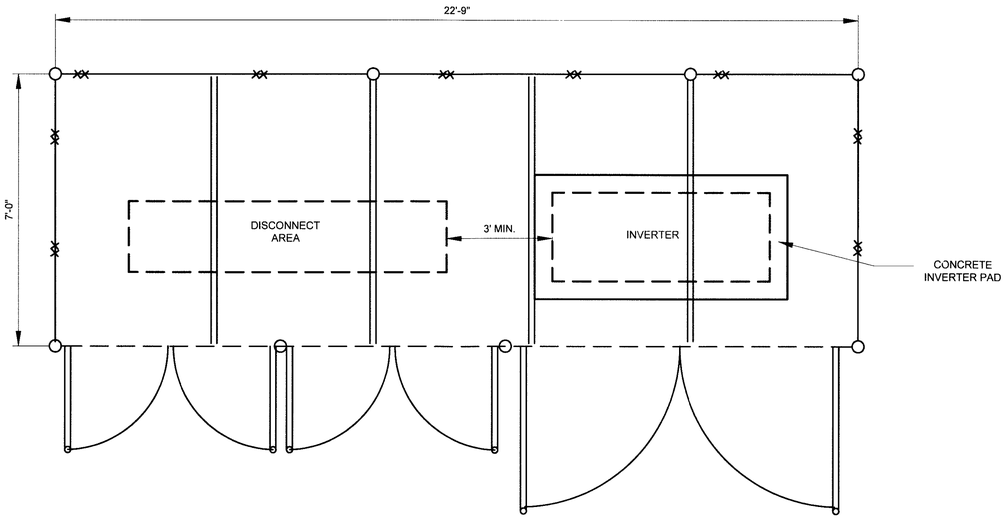
SOLAR ARRAY LAYOUT

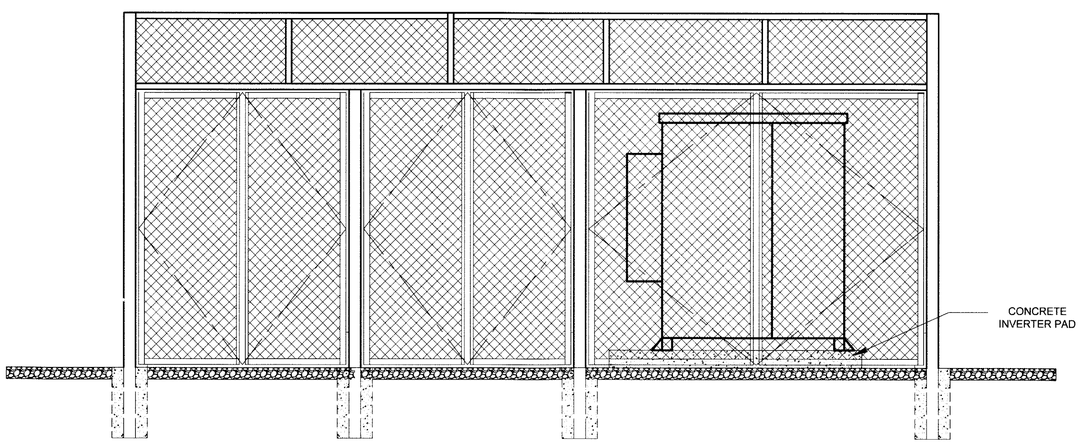
SHEET
A1.1

NOTES:

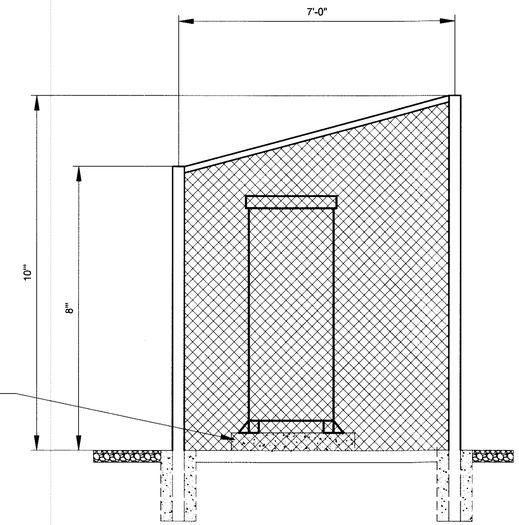
1. SHADE STRUCTURE TO BE GALVANIZED FENCE POST MATERIAL SUITABLE FOR CHAIN LINK INSTALLATION.
2. SHADE STRUCTURE SUPPORTS SHALL BE INSTALLED A MINIMUM OF 24" BELOW GRADE IN CONCRETE.
3. FRAME MEMBERS TO BE MINIMUM 2" GALVANIZED FENCE RAILS AND COVERED WITH CHAIN LINK FENCING MATERIAL. CONTRACTOR SHALL INSTALL BOTTOM AND TOP RAILS AND ANY OTHER RAIL MATERIAL NEEDED TO ENSURE STRUCTURE DOES NOT SAG.
4. COLOR MATCHING SLATS TO BE INSTALLED ON ALL SIDES OF STRUCTURE MATERIAL.
5. CONTRACTOR MUST SUBMIT SLAT COLOR TO OWNER FOR APPROVAL PRIOR TO INSTALLATION.
6. STRUCTURE MUST BE INSTALLED WITH ADEQUATE GROUNDING AND BONDING AS DETAILED IN APPROPRIATE ELECTRICAL DRAWINGS.



PLAN VIEW



FRONT ELEVATION



SIDE ELEVATION

SHADE STRUCTURE DETAILS

1/2" = 1'-0"

NORTH

PROFESSIONAL ENGINEER - STATE OF NEVADA
TYSON COLOVICH
Exp. 12-31-12
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SHADE STRUCTURE DETAILS

SHEET
A2.0

PROJECT STRUCTURAL NOTES & SPECIFICATIONS

COLOVICH ENGINEERING ASSUMES THAT THE GENERAL CONTRACTOR AND ALL INVOLVED PARTIES HAVE READ AND UNDERSTAND NOTES LISTED IN PLANS

GENERAL REQUIREMENTS

A. THE INTENT OF THESE DRAWINGS IS TO SHOW ALL ITEMS NECESSARY TO COMPLETE THE STRUCTURE. ALL WORK AND CONSTRUCTION SHALL COMPLY WITH APPLICABLE BUILDING CODES, REGULATIONS, AND SAFETY REQUIREMENTS. FOR ITEMS, METHODS, AND/OR MATERIALS NOT SHOWN, ALL WORK SHALL CONFORM TO THE MINIMUM STANDARDS OF THE 2006 EDITION OF THE INTERNATIONAL BUILDING CODE, AND ANY OTHER REGULATING AGENCIES WHICH HAVE AUTHORITY OVER ANY PORTION OF THE WORK, AND THOSE CODES AND STANDARDS LISTED IN THESE NOTES AND SPECIFICATIONS. NOTES APPLY TO ALL WORK SHOWN ON THE STRUCTURAL DRAWINGS. NOTES ARE IN OUTLINE FORM.

B. CONTRACTOR SHALL BE RESPONSIBLE FOR THE SAFETY OF THE BUILDING DURING CONSTRUCTION AND FOR CONSTRUCTION METHODS. PROVIDE SHORING, TEMPORARY BRACING, ETC., AS NECESSARY TO PREVENT OVERSTRESSING DURING CONSTRUCTION, AND TO PROTECT WORKMEN AND PEDESTRIANS.

C. MATERIAL TESTING AND QUALITY CONTROL SHALL BE PROVIDED TO ENSURE WORK IN ACCORDANCE WITH THESE SPECIFICATIONS.

D. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND CONDITIONS PRIOR TO STARTING CONSTRUCTION. THE ARCHITECT SHALL BE NOTIFIED OF ANY DISCREPANCIES OR INCONSISTENCIES.

E. DO NOT SCALE THE DRAWINGS FOR WORKING DIMENSIONS.

F. NOTES AND DETAILS ON DRAWINGS SHALL TAKE PRECEDENCE OVER GENERAL NOTES AND TYPICAL DETAILS. TYPICAL DETAILS AS SHOWN ON THE S0.X DRAWINGS SHALL APPLY TO THE PROJECT DRAWINGS EXCEPT WHEN SPECIFIC DETAILS ARE SHOWN WHICH SHALL TAKE PRECEDENCE.

G. SEE ARCHITECTURAL DRAWINGS FOR THE FOLLOWING:
- SIZE AND LOCATION OF WINDOW AND DOOR OPENINGS.
- SIZE AND LOCATION OF CONCRETE CURBS, FLOOR DRAINS, AND DEPRESSED AREAS.
- SIZE AND LOCATION OF FLOOR AND ROOF OPENINGS EXCEPT AS SHOWN.
- SIZE AND LOCATION OF INTERIOR AND EXTERIOR NON-BEARING PARTITIONS.

H. SEE MECHANICAL, PLUMBING, AND ELECTRICAL DRAWINGS FOR THE FOLLOWING:
- ELECTRICAL CONDUIT RUNS, BOXES, AND OUTLETS IN WALLS AND SLABS.
- SIZE AND LOCATION OF EQUIPMENT BASES.
- PIPE RUNS, SLEEVES, HANGERS, TRENCHES, AND OPENINGS.
- CONCRETE INSERTS FOR FIXTURES.

I. THE CONTRACT STRUCTURAL DRAWINGS AND SPECIFICATIONS REPRESENT THE FINISHED STRUCTURE. THEY DO NOT INDICATE THE METHOD OF CONSTRUCTION. THE CONTRACTOR SHALL PROVIDE ALL MEASURES NECESSARY TO PROTECT THE STRUCTURE DURING CONSTRUCTION. SUCH MEASURES SHALL INCLUDE, BUT NOT BE LIMITED TO, BRACING, SHORING FOR LOADS DUE TO CONSTRUCTION QUIPMENT, ETC. OBSERVATION VISITS TO THE SITE BY THE STRUCTURAL ENGINEER SHALL NOT INCLUDE INSPECTION OF THE ABOVE ITEMS.

EARTHWORK

A. CLEAR ALL DEBRIS, PAVING AND ORGANICS. IN ADDITION ALL EXISTING FILL MATERIAL BELOW THE BUILDING IS TO BE REMOVED AND 8" OF NATIVE SOIL IS TO BE SCARIFIED, MOISTURE CONDITIONED TO NEAR OPTIMUM AND COMPACTED TO 90% PER ASTM 1557-91.

B. PROVIDE AND PLACE ENGINEERED FILL PER SOILS REPORT.

C. EXCAVATE AS NECESSARY TO CONSTRUCT IMPROVEMENTS. ALLOW ADEQUATE SPACE TO CONSTRUCT AND REMOVE FORMS.

D. AFTER EXCAVATION FOR FOOTINGS IS COMPLETE, MOISTURE CONDITION AND RECOMPACT FOOTING SUBGRADE TO 95% OF MAXIMUM DRY DENSITY PER ASTM D 1557.

E. A MAJORITY OF THE EXISTING FILL AND A PORTION OF THE NATIVE SOIL MAY BE ACCEPTABLE AS ENGINEERED FILL PROVIDED THE MATERIAL IS SCREED AND BLENDED TO MEET THE CRITERIA LISTED IN THE SOILS REPORT.

F. PLACE FILL AND BACKFILL IN UNIFORM HORIZONTAL LIFTS OF 8" COMPACTED THICKNESS. COMPACT IN ACCORDANCE WITH ASTM D 1557 TO 95% OF MAXIMUM DRY DENSITY WITHIN THE BUILDING AND 90% OUTSIDE THE BUILDING.

G. INTERIOR CONCRETE SLABS ON GRADE SHALL BE UNDERLAIN WITH AGGREGATE BASE. AGGREGATE BASE SHALL CONFORM TO NEVADA HIGHWAY DEPARTMENT TYPE 2, CLASS B AGGREGATE BASE. COMPACT BASE TO 95% OF MAXIMUM DRY DENSITY PER ASTM D 1557.

H. TRENCHING AND BACKFILL FOR UTILITIES SHALL COMPLY WITH THE REQUIREMENTS OF THIS SECTION. EXCAVATE 3" BELOW BOTTOM OF PIPE AND 4" MINIMUM EACH SIDE OF PIPE. BED PIPE IN CLEAN, COMPACTED SAND. SHAPE TRENCH BOTTOM FOR PIPE BELLS OR FITTINGS. BACKFILL AROUND PIPE AND TO 6" ABOVE TOP OF PIPE WITH CLEAN SAND. COMPACT SAND IN 6"LAYERS USING PROCEDURES AND EQUIPMENT WHICH DO NOT DAMAGE PIPE. BACKFILL NEXT 2 FEET ABOVE PIPE WITH EXCAVATED SOILS OF 3" MAXIMUM SIZE USING CARE NOT TO DAMAGE PIPE. DENSITY REQUIRED IS THE SAME AS FOR ADJACENT AREAS. BACKFILL MORE THAN 2 FEET ABOVE PIPE TO BE PER BACKFILL REQUIREMENTS ABOVE, USING EXCAVATED SOILS OF 3" MAXIMUM SIZE.

I. MAINTAIN TEMPORARY DRAINAGE ROUTES TO KEEP SURFACE WATER OUT OF EXCAVATIONS. PUMP FOOTINGS EXCAVATIONS IF WATER ACCUMULATES.

J. COMPLY WITH LOCAL ORDINANCES FOR DUST CONTROL.

CAST-IN-PLACE CONCRETE

A. CONCRETE MIX DESIGN IN ACCORDANCE WITH ASTM C 94 SHALL BE AS FOLLOWS:

CLASS	28-DAY STRENGTH	SIZE & TYPE AGGREGATE	MAX. SHRINKAGE	ENTRAINED AIR	MIN.SACKS PER C.Y.	MAX. SLUMP
"A"	3000 PSI	3/4" STONE	.065%	---	5.5	3"
"B"	4000 PSI	3/4" STONE	.065%	6% +/-1%	6.5	3"

* CLASS "A": WALL FOOTINGS, INTERIOR COLUMN FOOTINGS, AND RETAINING WALLS.
* CLASS "B": INTERIOR AND EXTERIOR SLABS ON GRADE, CURBS, AND OTHER SITEWORK CONCRETE.

B. CONCRETE SHALL BE PLACED AT THE MINIMUM PRACTICAL SLUMP NOT EXCEEDING THE SPECIFIED MAXIMUM DESIGN SLUMP. IF ADDITIONAL WORKABILITY AND SLUMP IS DESIRED, IT MAY BE OBTAINED WITH APPROVED ADMIXTURES WHICH DO NOT INCREASE WATER CONTENT OR SHRINKAGE OF SPECIFIED MIXES.

C. GROUT AND DRY PACK FOR STEEL BASE PLATES TO BE "EUCLID N-S GROUT" OR "EUCLID EUCO DRY PACK" MIXED AND PLACED IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS.

D. CLEAN AND ROUGHEN CONSTRUCTION JOINTS AND WET FORMS AND SUBGRADE PRIOR TO PLACING CONCRETE.

E. PLACE CONCRETE USING METHODS WHICH AVOID SEGREGATION. MECHANICALLY VIBRATE ALL CONCRETE TO CONSOLIDATE IT IN FORMS.

F. CONCRETE FINISHES:
1. INTERIOR FLOORS - SCREED TO AN EVEN, LEVEL PLANE, FLOAT AND STEEL TROWEL TO A SMOOTH DENSE, HARD FINISH.
2. EXTERIOR SLABS, WALKS, ETC. - AS ABOVE EXCEPT FOLLOWED WITH A MEDIUM BROOM FINISH PERPENDICULAR TO TRAFFIC, SEE SITE PLAN.
3. EXPOSED FORMED SURFACES - IMMEDIATELY AFTER FORMS ARE REMOVED, REMOVE SURFACE PROJECTIONS AND SACK AND PATCH ALL SURFACE DEFECTS.
4. FORMED SURFACES NOT EXPOSED - STRIP FORMS, PATCH LARGE HOLES OR DEFECTS.
5. ALL EXPOSED CONCRETE EDGES SHALL BE CHAMFERED 3/4" OR TOOLED TO A 1/2" RADIUS.

G. TOLERANCES: SLAB SURFACES SHALL MET THE FOLLOWING REQUIREMENTS PER ASTM E1155-87:
1. INTERIOR SLABS-ON-GRADE: FF GREATER THAN OR EQUAL TO 25, FL GREATER THAN OR EQUAL TO 20.
2. SITE FLATWORK, SLABS ON METAL DECK: FF GREATER THAN OR EQUAL TO 20, F1 GREATER THAN OR EQUAL TO 15.

H. CONCRETE CURING:
1. FRESHLY DEPOSITED CONCRETE SHALL BE PROTECTED FROM PREMATURE DRYING AND EXCESSIVE HOT OR COLD TEMPERATURES FOR A MINIMUM OF 5 DAYS.
2. INTERIOR SLABS - APPLY 1 COAT OF HIGH SOLIDS MEMBRANE CURING COMPOUND AS SOON AS POSSIBLE AFTER FINISHING. USE EUCLID CHEMICAL CO. "KUREZ-DR" AT AREAS TO RECEIVE CERAMIC TILE OR VINYL TILE. USE EUCLID "SUPER-REZ" JUST BEFORE PROJECT COMPLETION.
3. EXTERIOR CONCRETE - APPLY 1 COAT OF EUCLID "KUREZ-DR" CURING COMPOUND AS SOON AS POSSIBLE AFTER FINISHING.
4. REAPPLY CURING COMPOUND TO SAWCUT JOINTS IMMEDIATELY AFTER CUTTING IF MEMBRANE IS APPLIED PRIOR TO CUTTING.

I. WEATHER PROTECTION:
IN HOT WEATHER, FOLLOW "RECOMMENDED PRACTICE FOR HOT WEATHER CONCRETING", ACI 305. WHEN COMBINED EFFECTS OF RELATIVE HUMIDITY, CONCRETE, TEMPERATURE AND WIND RESULT IN A SURFACE EVAPORATION RATE IN EXCESS OF 0.2 LB./SQ. FT./HR. PROVIDE WIND BREAKS, FOGGING, COOLING, EVAPORATION RETARDANT, ETC., AS NECESSARY TO PREVENT PLASTIC SHRINKAGE CRACKING OF CONCRETE SURFACES. IN COLD WEATHER, FOLLOW "RECOMMENDED PRACTICE FOR COLD WEATHER CONCRETING", ACI 306.

J. ALL CONDUIT PLACED AT SLABS-ON-GRADE SHALL BE PLACED IN THE BASE MATERIALS AND NOT IN THE SLAB.

K. CLEAN UP: LEAVE CONCRETE SURFACES BROOM CLEAN. REMOVE ALL DEBRIS FROM CONCRETE WORK FROM THE SITE.

L. ALL CONCRETE WAS DESIGNED ASSUMING F'c = 2500 PSI. NO SPECIAL INSPECTION REQUIRED PER IBC 1704.4 EXEPTION 2.3.

CONCRETE FORMWORK

A. DESIGN FORMS AS RECOMMENDED IN ACI 347. CONSTRUCT FORMS OF ADEQUATE STRENGTH AND STIFFNESS TO OBTAIN REQUIRED FINISHED CONCRETE SURFACE AND LINE TOLERANCES. FORMS SHALL BE TIGHT ENOUGH TO PREVENT LEAKAGE OF MORTAR FINES.

B. USE NEW OR PROPERLY CLEANED USED FORM MATERIALS.

C. REMOVE ALL DIRT, CHIPS, SAWDUST, RUBBISH, WATER OR ICE FROM FORM PRIOR TO PLACEMENT OF CONCRETE.

D. COMPLY WITH THE REQUIREMENTS FOR CURING PRIOR TO STRIPPING OF FORMS.

E. ALL FOOTINGS SHALL BE FORMED.

F. FORMWORK TOLERANCES:
1. SLAB ON GRADE THICKNESS: PLUS 1/2", MINUS 1/4"
2. SLAB SURFACE ELEVATION: WITHIN 1/4" OF ELEVATION SHOWN
3. SLAB ON METAL DECK THICKNESS: PLUS OR MINUS 1/4" AT COLUMNS.
4. SLAB SURFACE FINISH: SEE ARCH'L.
5. ALL OTHER: 1/4" IN 10 FEET AND 1/2" OVERALL, EXCEPT VISIBLE LINES SHALL APPEAR STRAIGHT, TRUE AND FREE FROM SUDDEN TRANSITIONS, FORM FACING DEFLECTION LESS THAN L/240.

FOUNDATION PERFORMANCE REQUIREMENTS

A. FOOTINGS ARE DESIGNED BASED ON AN ALLOWABLE SOIL BEARING PRESSURE OF 2000 PSF. ALL FOOTINGS SHALL BE 24" BELOW ADJACENT EXTERIOR FINISH GRADE AT A MINIMUM UNLESS APPROVED BY GEOTECHNICAL ENGINEER. SOIL CLEARANCE FROM GRADE TO WOOD WILL BE A MINIMUM OF 8".

B. CONTRACTOR SHALL PROVIDE FOR PROPER DE-WATERING OF EXCAVATIONS FROM SURFACE WATER, GROUND WATER, SEEPAGE, ETC.

C. CONTRACTOR SHALL PROVIDE FOR DESIGN AND INSTALLATION OF ALL CRIBBING, SHEATHING AND SHORING REQUIRED TO SAFELY AND ADEQUATELY RETAIN THE EARTH BANKS.

CONCRETE REINFORCEMENT

A. ALL REINFORCING STEEL SHALL BE DETAILED AND PLACED IN CONFORMANCE WITH THE 'BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE' (ACI 318 LATEST APPROVED EDITION), AND THE 'MANUAL OF STANDARD PRACTICE FOR REINFORCED CONCRETE CONSTRUCTION' (LATEST ED.) BY THE C.R.S.I. AND THE W.C.R.S.I., AS MODIFIED BY THE PROJECT DRAWINGS AND SPECIFICATIONS.

B. DEFORMED REINFORCING BARS SHALL BE ASTM A-615 GRADE 60 U.N.O. USE A-706 FOR REBAR REQUIRING WELDING.

C. WELDING OF REINFORCING SHALL BE WITH LOW HYDROGEN ELECTRODES IN CONFORMANCE WITH 'RECOMMENDED PRACTICES FOR WELDING REINFORCING STEEL, ETC.', AMERICAN WELDING SOCIETY, AWS-D1.4. SEE SPECIFICATIONS.

D. ALL REINFORCING BAR BENDS SHALL BE MADE COLD.

E. WELDED WIRE FABRIC SHALL CONFORM TO ASTM A-185.

F. MINIMUM LAP OF WELDED WIRE FABRIC SHALL BE 6 INCHES OR ONE FULL MESH AND ONE HALF, WHICH EVER IS GREATER.

G. REINFORCING SPLICES SHALL BE MADE ONLY WHERE INDICATED ON THE DRAWINGS.

H. DOWELS BETWEEN FOOTINGS AND WALLS OR COLUMNS SHALL BE THE SAME GRADE, SIZE AND SPACING OR NUMBER AS THE VERTICAL REINFORCING, RESPECTIVELY.

I. ALL BARS SHALL BE MARKED SO THEIR IDENTIFICATION CAN BE MADE WHEN THE FINAL IN-PLACE INSPECTION IS MADE.

J. SPLICE REINFORCING BARS PER TYPICAL DETAILS AND TIGHTLY WIRE IN PLACE. SPLICE ALL REINFORCING BARS 2'-0" MINIMUM U.N.O.

K. ALL REINFORCING BARS TO BE TIED IN PLACE BEFORE POURING CONCRETE OR GROUT.

L. DO NOT SPLICE REINFORCING STEEL IN MIDDLE THIRD OF WALLS.

M. ALL EPOXIED REBAR TO USE SIMPSON "SET" EPOXY U.N.O.

ROUGH CARPENTRY

A. ALL FRAMING LUMBER SHALL BE DOUGLAS FIR COAST REGION WITH A MOISTURE CONTENT NOT EXCEEDING 19% AT THE TIME OF INSTALLATION. STUDS AND PLATES SHALL BE NO. 2 OR BETTER; BEAMS, POSTS, JOISTS AND HEADERS SHALL BE NO. 1 OR BETTER.

B. BOLTS AND METAL FABRICATIONS FOR CONNECTION OF ROUGH FRAMING MEMBERS SHALL BE FABRICATED AND DETAILED IN ACCORDANCE TO:
-ASTM A 307 (DESIGNATED MB) INSTALL STANDARD CUT WASHERS WHERE HEAD OR NUT BEARS ON WOOD.
-ASTM A325-N (DESIGNATED HSB) INSTALL STANDARD CUT WASHERS WHERE HEAD OR NUT BEARS ON WOOD.
-ANCHOR BOLTS TO ASTM F1554 OR A36 (DESIGNATED AB)

C .PROVIDE SIMPSON OR EQUAL FRAMING CONNECTORS WHERE SHOWN ON THE DRAWINGS. INSTALL IN STRICT ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS USING MANUFACTURER'S RECOMMENDED NAILS OR BOLTS TO OBTAIN THE FULL ICBO RATED LOAD CAPACITY.

D. CUT FRAMING MEMBERS SQUARE AND TO ACCURATE LENGTH TO OBTAIN FULL BEARING AT JOINTS. ERECT PLUMB AND LEVEL AND TO ACCURATE LINE. BOLT HOLES SHALL BE 1/16 INCH LARGER THAN BOLTS AND SHALL BE ACCURATELY DRILLED. SELECT MEMBERS SO THAT KNOTS OR DEFECTS DO NOT OCCUR AT NAIL OR BOLT LOCATIONS.

E. PLYWOOD SHALL CONFORM STRUCTURALLY TO THE APA STANDARDS, AND TO U.S. PRODUCT STANDARD PS-1. ALL PIECES SHALL BE GRADE STAMPED.

F. ALL SILLS OR PLATES RESTING ON CONCRETE OR MASONRY SHALL BE PRESSURE TREATED DOUGLAS FIR. WOOD PLATES OR SILLS SHALL BE BOLTED TO THE FOUNDATION OR FOUNDATION WALL. STEEL BOLTS WITH A MINIMUM NOMINAL DIAMETER OF 1/2 INCH SHALL BE USED IN SEISMIC CATEGORY A THROUGH C. STEEL BOLTS WITH A MINIMUM NOMINAL DIAMETER OF 5/8 INCH SHALL BE USED IN SEISMIC CATEGORY D-F. BOLTS SHALL BE EMBEDDED AT LEAST 7 INCHES INTO THE CONCRETE OR MASONRY. IN A TWO POUR SYSTEM EMBEDMENT SHALL BE INTO THE FIRST POUR. THERE SHALL BE A MINIMUM OF TWO BOLTS PER PIECE WITH ONE BOLT LOCATED NOT MORE THAN 12 INCHES OR LESS THAN 7 BOLT DIAMETERS FROM EACH END OF THE PIECE OR FROM A NOTCH GREATER THAN 1/2 THE WIDTH OF A PLATE. ALL ANCHOR BOLT WASHERS SHALL BE 3" X 3" X 0.229" PLATE WASHERS.

G. ALL STUD PARTITIONS OR WALLS OVER 10 FEET HIGH SHALL HAVE 2 X BRIDGING, SAME WIDTH AS THE STUD, PREFERABLY AT MID-HEIGHT BUT NOT TO EXCEED INTERVALS OF 8 FEET.

H. DO NOT NOTCH JOISTS, RAFTERS OR BEAMS, EXCEPT WHERE SHOWN IN DETAILS. OBTAIN ENGINEER'S APPROVAL FOR ANY HOLES OR NOTCHES NOT DETAILED. HOLES THROUGH SILLS, PLATES, STUDS AND DOUBLE PLATES IN INTERIOR, BEARING AND SHEAR WALLS SHALL NOT EXCEED 1/3 THE PLATE WIDTH. USE BORED HOLES LOCATED IN THE CENTER OF THE STUD OR PLATE.

I. APPROVED CROSS-BRIDGING OR SOLID BLOCKING SHALL BE SPACED AS FOLLOWS:
-FOR RAFTERS MORE THAN 8 IN. IN DEPTH, AT 10 FT. O.C. MAXIMUM
-FOR FLOOR JOISTS MORE THAN 4 IN. IN DEPTH, AT 8 FT. O.C. MAX.

J. NAILED CONNECTIONS SHALL CONFORM TO IBC TABLE 2304.9.1. EXCEPT AS OTHERWISE NOTED. ALL NAILS SPECIFIED ARE COMMON NAILS. NO SUBSTITUTIONS UNLESS APPROVED IN WRITING BY ENGINEER OF RECORD OR SPECIFICALLY ADDRESSED IN THESE CALCULATIONS OR THE PLANS. ALL NAILS EXPOSED TO WEATHER SHALL BE GALVANIZED. FASTENERS FOR PRESSURE-PRESERVATIVE TREATED AND FIRE-RETARDANT TREATED WOOD SHALL BE OF HOT-DIPPED ZINC COATED GALVANIZED, STAINLESS STEEL, SILICON BRONZE OR COPPER.

GLUED LAMINATED BEAMS

A. GLUED LAMINATED BEAMS SHALL BE DOUGLAS FIR WITH FB=2,400 PSI, FV=190 PSI, FC=450 PSI, AND E=1,900,000 PSI. GLUE WITH WATER RESISTANT GLUE FOR WET CONDITIONS OF USE. UNEXPOSED BEAMS SHALL BE INDUSTRIAL APPEARANCE GRADE, EXPOSED BEAMS SHALL BE ARCHITECTURAL APPEARANCE GRADE. MOISTURE CONTENT OF LUMBER, AT TIME OF MANUFACTURE, SHALL NOT EXCEED 12%.

B. PROVIDE AITC CERTIFICATION INDICATING THAT FABRICATION CONFORMS WITH U.S. PRODUCT STANDARD 56. STAMP EACH BEAM WITH AITC STAMP INDICATING IBC COMBINATION.

C. CUT FRAMING MEMBERS SQUARE AND TO ACCURATE LENGTH TO OBTAIN FULL BEARING AT JOINTS. ERECT PLUMB AND LEVEL AND TO ACCURATE LINE. BOLT HOLES SHALL BE 1/16 INCH LARGER THAN BOLTS AND SHALL BE ACCURATELY DRILLED. MISCUT OR POORLY FITTED JOINTS WILL NOT BE ACCEPTABLE. IMMEDIATELY AFTER FABRICATION OF BEAMS, AND AGAIN AFTER ANY FIELD CUTTING, ENDS OF BEAMS SHALL BE SEALED.

SPECIAL INSPECTION

A. SPECIAL INSPECTION, PER THE IBC 2006, CHAPTER 17, TABLE 1704.3 FOR STEEL, TABLE 1704.4 FOR CONCRETE SHALL BE REQUIRED FOR THE FOLLOWING TYPES OF WORK:
- ALL FIELD WELDING, EXCEPT METAL STUDS, FURRING CHANNELS, ETC.
- ALL FULL PENETRATION WELDS SHALL BE SPECIALLY INSPECTED IN ACCORDANCE WITH AWS AND THE CBC 2007. ALL FILLET WELDS SHALL BE VISUALLY INSPECTED.
- BOLTS INSTALLED IN CONCRETE.
- ALL ASTM A-325 HIGH STRENGTH BOLTS.
- ALL EXPANSION BOLTS AND ADHESIVE ANCHORS.
- ALL WOOD SHEARWALLS THAT HAVE NAILS SPACED 4" O.C. AND CLOSER WILL REQUIRE PERIODIC SPECIAL INSPECTION.
- ENGINEER OF RECORD TO VERIFY ALL SHEARWALLS, HOLDOWNS, NAILING, AND SHEAR TRANSFER CONNECTIONS AND OTHER ASPECTS OF THE LATERAL FORCE RESISTING SYSTEM TO ENSURE THEY ARE IN GENERAL CONFORMANCE WITH PLANS AND SPECIFICATIONS.

ENGINEERED WOOD PRODUCTS

A. TJI'S SHALL BE AS MANUFACTURED BY TRUS JOIST MACMILLAN OF SIZES INDICATED ON THE DRAWINGS. EACH MEMBER SHALL BE IDENTIFIED WITH A STAMP INDICATING THE JOIST TYPE, NER REPORT NUMBER, MANUFACTURER'S NAME,PLANT NUMBER AND INSPECTION AGENCY'S LOGO.

B. WEB STIFFENERS AND OTHER MISCELLANEOUS ITEMS NECESSARY FOR THE COMPLETE INSTALLATION OF JOISTS SHALL BE FURNISHED BY THE JOIST MANUFACTURER.

C. LAMINATED VENEER LUMBER (LVL) SHALL BE AS MANUFACTURED BY TRUS JOIST MACMILLAN WITH E=1,900,000 PSI, Fb=2600 PSI AND Fv=285 PSI. EACH MEMBER SHALL BE IDENTIFIED WITH A STAMP INDICATING THE PRODUCT TYPE AND GRADE, NER REPORT NUMBER, MANUFACTURER'S NAME, PLANT NUMBER AND INSPECTION AGENCY'S LOGO. ALL MULTIPLE-PLY LVL MEMBERS TO BE ATTACHED WITH (3) ROWS OF 16D COMMON NAILS AT 12" O.C. FOR ENTIRE LENGTH OF MEMBER. FOR A THREE PIECE MEMBER THE NAILING IS FROM EACH SIDE.

D. LAMINATED STRAND LUMBER (LSL) SHALL BE AS MANUFACTURED BY TRUS JOIST MACMILLAN WITH E=1,700,000 PSI, Fb=2600 PSI AND Fv=400 PSI. EACH MEMBER SHALL BE IDENTIFIED WITH A STAMP INDICATING THE PRODUCT TYPE AND GRADE, NER REPORT NUMBER, MANUFACTURER'S NAME, PLANT NUMBER AND INSPECTION AGENCY'S LOGO. ALL MULTIPLE-PLY LVL MEMBERS TO BE ATTACHED WITH (3) ROWS OF 16D COMMON NAILS AT 12" O.C. FOR ENTIRE LENGTH OF MEMBER. FOR A THREE PIECE MEMBER THE NAILING IS FROM EACH SIDE.

E. PARALLEL STRAND LUMBER (PSL) SHALL BE AS MANUFACTURED BY TRUS JOIST MACMILLAN WITH E=2,000,000 PSI, Fb=2900 PSI AND Fv=290 PSI. EACH MEMBER SHALL BE IDENTIFIED WITH A STAMP INDICATING THE PRODUCT TYPE AND GRADE, NER REPORT NUMBER, MANUFACTURER'S NAME, PLANT NUMBER AND INSPECTION AGENCY'S LOGO.

F. ANTHONY POWER BEAM (APB) SHALL BE AS MANUFACTURED BY ANTHONY FOREST PRODUCTS WITH E=2,100,000 PSI, Fb=3000 PSI AND Fv=290 PSI. EACH MEMBER SHALL BE IDENTIFIED WITH A STAMP INDICATING THE PRODUCT TYPE AND GRADE, NER REPORT NUMBER, MANUFACTURER'S NAME, PLANT NUMBER AND INSPECTION AGENCY'S LOGO.

G. CUT FRAMING MEMBERS SQUARE AND TO ACCURATE LENGTH TO OBTAIN FULL BEARING AT JOINTS. ERECT PLUMB AND LEVEL AND TO ACCURATE LINE. BOLT HOLES SHALL BE 1/16 INCH LARGER THAN BOLTS AND SHALL BE ACCURATELY DRILLED. MISCUT OR POORLY FITTED JOINTS WILL NOT BE ACCEPTABLE.

STRUCTURAL STEEL

A. REQUIRED STRUCTURAL STEEL GRADES:
-ALL STRUCTURAL STEEL PLATES, AND RODS, SHALL CONFORM TO ASTM A36 Fy=36KSI
-GIRDER KNIFE PLATES AND CHORD SPLICE PLATES SHALL CONFORM TO ASTM A572, GRADE 50
-"W" STEEL SHAPES SHALL CONFORM TO ASTM A992 Fy=50 KSI
-RECT. HSS STEEL TUBING TO ASTM A500, GRADE B, Fy=46KSI
-ROUND HSS STEEL TUBING TO ASTM A500, GRADE B, Fy=42KSI
-STEEL PIPE TO ASTM A53, Fy=35KSI

B. ALL BOLTS SHALL CONFORM TO ASTM A 307 (DESIGNATED MB) AND ASTM A325-N (DESIGNATED HSB); DRAG TIES & MOMENT CONNECTORS SHALL BE A325-SC; ANCHOR BOLTS TO ASTM F1554 GRADE 36 U.N.O. HIGH STRENGTH BOLTS SHALL BE LOAD INDICATOR BOLTS SUCH AS LEJUENE OR EQUAL.

C. ALL DETAILING, FABRICATION AND ERECTION SHALL CONFORM TO THE LATEST EDITION OF THE AISC SPECIFICATIONS.

D. ALL WELDS SHALL BE IN CONFORMITY WITH THE STRUCTURAL WELDING CODE (AWS D1.1) OF THE AMERICAN WELDING SOCIETY FOR THE MATERIAL BEING WELDED. ALL WELDING SHALL BE PERFORMED BY CERTIFIED WELDERS APPROVED BY THE LOCAL BUILDING AUTHORITY. ALL SHOP WELDING SHALL BE IN AN APPROVED FABRICATORS SHOP AUTHORIZED BY THE LOCAL BUILDING AUTHORITY OR SPECIAL INSPECTION PER THE IBC SHALL BE PROVIDED. ALL FIELD WELDING SHALL REQUIRE SPECIAL INSPECTION PER IBC SECTION 1704.

E. EMBEDMENT ANCHORS SHALL BE HEADED ANCHOR STUDS WITH FLUXED ENDS, AUTOMATICALLY END WELDED.

F. ALL STRUCTURAL AND MISCELLANEOUS STEEL WORK, EXCEPT STEEL TO BE EMBEDDED IN CONCRETE, SPRAY FIRE PROOFED, OR FIELD WELDED, SHALL BE SHOP PAINTED AND TOUCHED UP IN THE FIELD AFTER ERECTION.

G. PROVIDE 3" MIN. CONCRETE COVER FOR ALL STEEL EXPOSED TO EARTH.

H. BOLT HOLES IN STEEL SHALL BE 1/16 INCH LARGER THAN NOMINAL SIZE OF BOLT USED, EXCEPT ANCHOR BOLT HOLES FOR COLUMN BASE PLATES WHICH MAY BE 3/16 INCH LARGER.

I. ALL STRUCTURAL STEEL SURFACES SHALL BE SHOP PAINTED. ALL STEEL, AND ALL PLATES & BOLTS EXPOSED TO WEATHER AND ALL EXTERIOR GLU-LAM BEAM CONNECTIONS SHALL BE HOT DIPPED GALVANIZED.

J. WELD LENGTHS CALLED FOR ON PLANS ARE THE NET EFFECTIVE LENGTH REQUIRED. USE E70XX ELECTRODES WITH Fy = 70 ksi.

K. SHOP DRAWINGS SHALL BE SUBMITTED TO THE STRUCTURAL ENGINEER FOR REVIEW AND COMMENT PRIOR TO FABRICATION.

MASONRY

A. CONCRETE BLOCK SHALL BE HOLLOW LOAD-BEARING CONCRETE MASONRY UNITS CONFORMING TO ASTM C90 GRADE N-1 HAVING AN F'M = 1500 PSI. USE BOND BEAM UNITS AT HORIZONTAL REINFORCING.

B. CEMENT TYPE SHALL CONFORM WITH SPECIFICATIONS.

C. REINFORCING BARS, SEE NOTES UNDER 'REINFORCING STEEL' FOR REQUIREMENTS. USE ASTM A-615, GRADE 60.

D. MORTAR MIX SHALL CONFORM TO REQUIREMENTS OF THE SPECIFICATIONS.

E. GROUT SHALL CONFORM TO REQUIREMENTS OF THE SPECIFICATONS. USE SUFFICIENT WATER FOR GROUT TO FLOW INTO ALL JOINTS OF THE MASONRY WITHOUT SEGREGATION. GROUT SHALL ATTAIN A MINIMUM COMPRESSIVE STRENGTH OF 3000 PSI AT 28 DAYS.

F. PROVIDE A MINIMUM OF 1/2 INCH GROUT BETWEEN MAIN REINFORCING AND MASONRY UNITS.

G. ALL CELLS IN CONCRETE BLOCKS SHALL BE FILLED SOLID WITH GROUT, UNLESS NOTED OTHERWISE IN THE DRAWINGS OR SPECIFICATIONS.

H. CELLS SHALL BE IN VERTICAL ALIGNMENT. DOWELS IN FOOTINGS SHALL BE SET TO ALIGN WITH CORES CONTAINING REINFORCING STEEL.

I. REFER TO ARCHITECTURAL DRAWINGS FOR SURFACE AND HEIGHT OF UNITS, LAYING PATTERN AND JOINT TYPE. USE OPEN END UNITS WHERE STACKED BOND PATTERN IS REQUIRED.

J. ALL VERTICAL REINFORCING SHALL HAVE A MINIMUM LAP SPLICE OF 48-BAR DIAMETERS. WHEN TWO BARS OCCUR IN ONE CELL, THE SPLICE SHALL BE INCREASED TO 62-BAR DIAMETERS. ALL HORIZONTAL REINFORCING SHALL HAVE A MINIMUM LAP SPLICE OF 48-BAR DIAMETERS, STAGGER ALL HORIZONTAL REBAR SPLICES.

K. MECHANICAL PIPES AND ELECTRICAL CONDUITS WHICH PASS THROUGH MASONRY WALLS DO NOT REQUIRE SLEEVES, UNLESS OTHERWISE INDICATED IN THE PROJECT SPECIFICATIONS, MECHANICAL OR ELECTRICAL DRAWINGS. IF SLEEVES ARE REQUIRED, INSTALL SLEEVES BEFORE GROUTING. DO NOT CUT ANY REINFORCING WHICH MAY INTERFERE WITH SLEEVE PLACEMENT. CORING OPENINGS IN GROUTED MASONRY IS NOT PERMITTED. NOTIFY THE STRUCTURAL ENGINEER IN ADVANCE OF CONDITIONS NOT SHOWN ON THE STRUCTURAL DRAWINGS. NO PIPES OR ELECTRICAL CONDUIT SHALL PASS THROUGH MASONRY LINTELS UNLESS SPECIFICALLY DETAILED.

L. ALL JOINTS, EXPOSED OR HIDDEN, SHALL BE TOOLED CONCAVE.

M. PROVIDE SPECIAL INSPECTION AND MASONRY TESTING AS FOLLOWS:
1. MASONRY TESTING: OWNER TO EMPLOY AND PAY FOR THE SERVICES OF A TESTING LABORATORY EXPERIENCED IN PERFORMING TYPES OF TESTS INDICATED.
2. MASONRY TESTS SHALL BE BY THE UNIT STRENGTH METHOD PER SECTION 2105.2.2.1 OF THE INTERNATIONAL BUILDING CODE PER THE FOLLOWING:
A. MORTAR SHALL COMPLY WITH THE MORTAR TYPE REQUIRED IN TABLE 2105.2.2.2 OF THE INTERNATIONAL BUILDING CODE.
B. GROUT SHALL BE TESTED FOR EACH 5000 SQUARE FEET OF WALL PER THE INTERNATIONAL BUILDING CODE.
C. CONCRETE MASONRY UNITS SHALL BE TESTED FOR EACH 5000 SQUARE FEET OF WALL PER THE INTERNATIONAL BUILDING CODE.
3. SPECIAL INSPECTION SHALL CONFORM TO THE FOLLOWING REQUIREMENTS.
A. CONSTRUCTION SHALL BE PERIODICALLY CHECKED FOR CONFORMANCE TO THE INTERNATIONAL BUILDING CODE SECTION 1704.5
B. BEFORE GROUTING, ALL CELLS SHALL BE CHECKED FOR REINFORCING PLACEMENT.
C. BEFORE GROUTING, ALL CELLS SHALL BE VERIFIED THAT THE GROUT SPACE IS FREE OF DEBRIS.

ABBREVIATIONS

AB	ANCHOR BOLT	DIA	DIAMETER	HORIZ (H)	HORIZONTAL	REINF	REINFORCEMENT
ARCH'L	ARCHITECTURAL	DL	DEAD LOAD	HSB	HIGH STRENGTH BOLTS	REQ'D	REQUIRED
BM	BEAM	DT	DRAG TRUSS	INT	INTERIOR	SHTG	SHEATHING
BN	BOUNDARY NAIL	EA	EACH	KS	KING STUDS	SIM	SIMILAR
BOT (B)	BOTTOM	EF	EACH FACE	LL	LIVE LOAD	SQ	SQUARE
CJ	CONTROL JOINT	EN	EDGE NAILING	MAX	MAXIMUM	STD	STANDARD
CL	CENTER LINE	ES	EACH SIDE	MB	MACHINE BOLT	SYM	SYMMETRICAL
CLR	CENTER LINE CLEAR	EW	EACH WAY	MECH	MECHANICAL	T & B	TOP & BOTTOM
CMU	CONCRETE MASONRY UNITS	EXIST (E)	EXISTING	MFR	MANUFACTURER	T & G	TONGUE AND GROOVE
COL	COLUMN	EXT	EXTERIOR	MIN	MINIMUM	TN	TOE NAIL
CONC	CONCRETE	FF	FINISH FLOOR	NTS	NOT TO SCALE	TYP	TYPICAL U.N.O.
CONT	CONTINUOUS	FIN	FINISH	OC	ON CENTER	(UNO)	UNLESS NOTED OTHERWISE
CJP	COMPLETE JOINT PENETRATION	FLR	FLOOR	PL	PLATE	VERT	VERTICAL
CTR	CENTER	FTG	FOOTING	PLY	PLYWOOD	W/	WITH
DF	DOUGLAS FIR	GA	GAUGE	PSL	PARALLEL STRAND LUMBER	W/O	WITHOUT
		GLB	GLUE-LAM BEAM	WF	WIDE FLANGE BEAM	WWF	WELDED WIRE FABRIC
		HDR	HEADER	PT	PRESSURE TREATED		

DESIGN CRITERIA

DESIGN CRITERIA BASED ON 2006 INTERNATIONAL BUILDING CODE (IBC)

APPLICABLE SNOW LOADING:

PROJECT ELEVATION:	4624 FT.
EXPOSURE CATEGORY:	C
GROUND SNOW LOAD:	30 PSF
REDUCED ROOF SNOW LOAD (35° TILT):	23 PSF

DEAD LOADING:

SOLAR PANEL DEAD LOAD:	2.5 PSF
MISC. DEAD LOAD:	0.5 PSF
TOTAL DEAD LOAD:	3.0 PSF

WIND DESIGN:

WIND SPEED (3) SEC GUST:	100 MPH
EXPOSURE:	C
IMPORTANCE FACTOR (I):	1.0
TOPOGRAPHIC FACTOR (Kzt):	1.0

SEISMIC DESIGN:

SEISMIC DESIGN CATEGORY (IBC 1613.5.6):	D
OCCUPANCY CATEGORY:	II
IMPORTANCE FACTOR (I):	1.0
Ss:	1.584g
S1:	0.600g
Fa:	1.0
Fv:	1.5
SDS:	1.056g
SD1:	0.600g
NORTH / SOUTH R VALUE:	1.25
EAST / WEST R VALUE:	1.25

SOIL DESIGN:

ALLOWABLE SOIL BEARING PRESSURE:	1500 PSF (IBC 1840.2)
FROST DEPTH:	24" (PER LOCAL CODE)

PROFESSIONAL ENGINEER STATE OF NEVADA
TYSON COLOVICH
Exp. 12-31-12
CIVIL
No. 19370
12/9/11

REV.	DATE	DESCRIPTION	BY	APP'D
1	06-30-11	Initial Design	CE	RC
2	08-19-11	Revision 2	CE	RC
3	12-6-11	Initial Re-Design	CE	RC

CARSON CITY
PUBLIC WORKS DEPARTMENT
3505 BUTTI WAY, CARSON CITY, NEVADA 89701
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PACIFICWEST
ENERGY SOLUTIONS
Conservation, Generation, Innovation
561 Keystone Ave. # 300, Reno, NV 89503
800-310-9080 Office / 800-310-9596 Fax

DESIGNED BY:	TWC
DRAWN BY:	MCF
CHECKED BY:	TWC
DWG NO.:	
SCALE (HORIZ):	1 1/2" = 1'-0"
SCALE (VERT):	1 1/2" = 1'-0"
PLOT DATE:	12-9-11

CARSON CITY WASTE WATER TREATMENT PLANT SOLAR PHOTOVOLTAIC PROJECT
3320 EAST 5TH STREET
CARSON CITY, NV 89701

PROJECT NO.
001PW_11

STRUCTURAL GENERAL NOTES

SHEET
S0.0

TYPICAL STRUCTURAL NOTES AT FOUNDATION:

TYPICAL CONCRETE SONO-TUBES AT FRONT/LOW SIDE OF ARRAY:

USE 12"Φ x 18" DEEP SONO-TUBE FOOTINGS @ 6'-0" O.C. w/ (4) #4's VERTICAL HOOKED TO GRADE BEAM BELOW.
- USE 2500 PSI CONCRETE

TYPICAL CONCRETE SONO-TUBES AT BACK/HIGH SIDE OF ARRAY:

USE 12"Φ x 30" DEEP SONO-TUBE FOOTINGS @ 6'-0" O.C. w/ (4) #4's VERTICAL HOOKED TO GRADE BEAM BELOW.
- USE 2500 PSI CONCRETE

TYPICAL CONCRETE GRADE BEAMS:

USE 24" WIDE x 12" DEEP CONTINUOUS FOOTING TYP. U.N.O.
w/ (3) #4 BARS CONTINUOUS HORIZONTAL IN FOOTING AT TOP & BOTTOM
- USE 4000 PSI CONCRETE, **SPECIAL INSPECTION REQUIRED**

TYPICAL CONCRETE INVERTER PAD:

USE 12" CONCRETE SLAB (TYPICAL U.N.O.)
w/ #4 BARS CONTINUOUS @ 12" O.C. EACH WAY, 2" CLR. FROM TOP OF SLAB
OVER 8" TYPE "2" BASE COMPACTED TO 95% RELATIVE COMPACTION
OVER NATIVE SOIL COMPACTED TO 95% RELATIVE COMPACTION
CONSULT WITH ALL SUB-CONTRACTORS OF ALL TRADES FOR VERIFICATION OF:
INSTALLATION OF ALL CONDUIT, PIPING, DUCTING, TREATMENTS, WATERPROOFING, WIRING OR ANY OTHER MATERIAL OR PROCESS TO BE PROVIDED UNDER SLAB PRIOR TO PLACING CONCRETE.

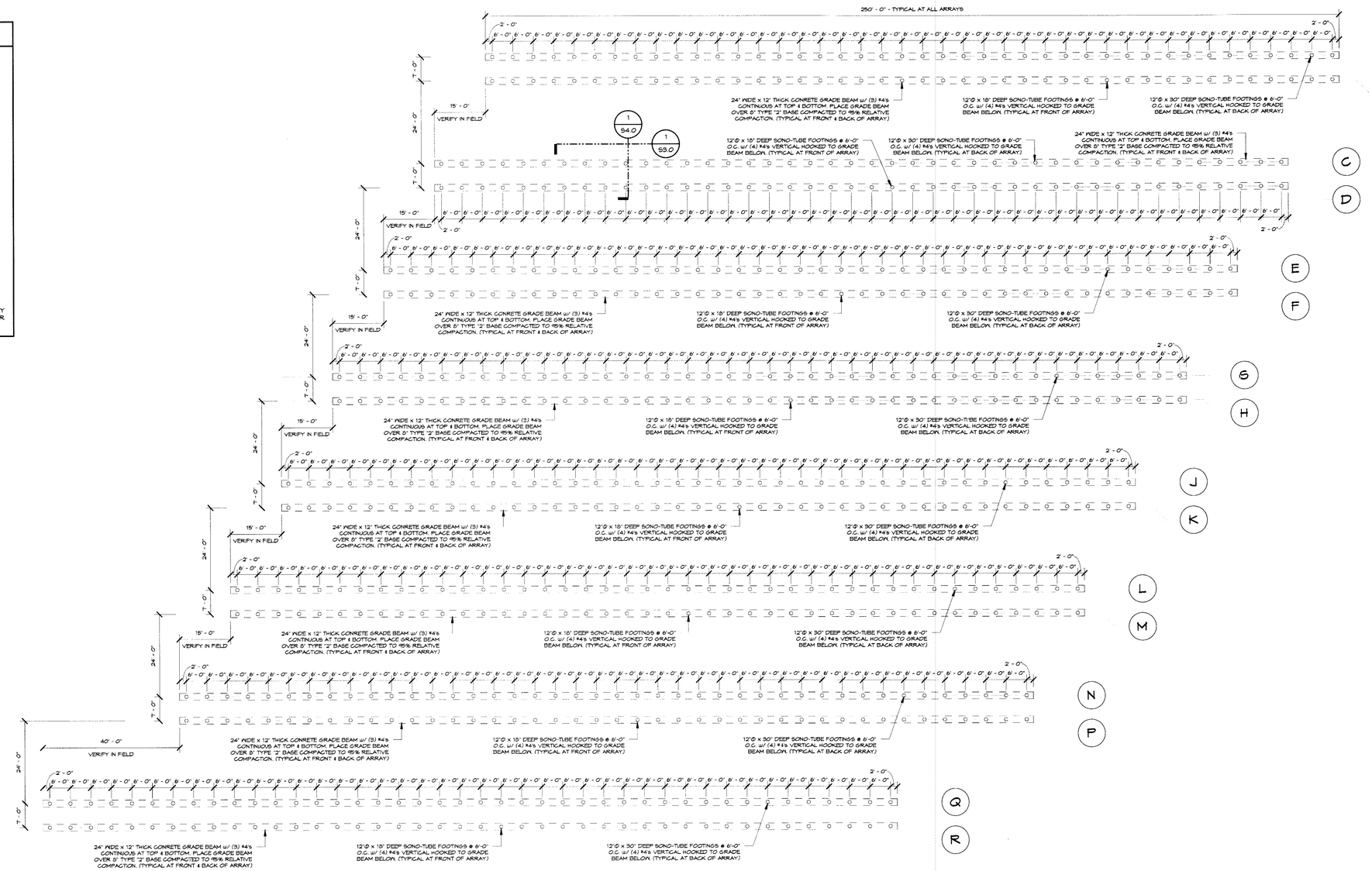
DIMENSIONS:

BUILDING DIMENSIONS SHOWN ARE FOR GENERAL REFERENCE ONLY. SEE THE ARCHITECTURAL DRAWINGS (S.A.D.) FOR ACTUAL BUILDING DIMENSIONS. ANY DISCREPANCIES ARE TO BE BROUGHT TO THE ATTENTION OF THE ENGINEER AND ARCHITECT SO CLARIFICATION CAN BE MADE. ALL DIMENSIONS SHALL BE VERIFIED BY THE CONTRACTOR AND SUBMITTED IN WRITING TO THE ENGINEER AND ARCHITECT FOR REVIEW PRIOR TO CONSTRUCTION.

STRUCTURAL ELEMENT & WALL LEGEND

BEAM/HEADER
FLOOR JOIST
FLOOR TRUSS
TRUSS/RAFTER
LEDGER
POST ABOVE
POST BELOW
BOLT HOLDOWN
STRAP HOLDOWN
HANGER

X'-X" 2x SHEARWALL
X'-X" 2x DOUBLE SHEARWALL
X8 SIP WALL
WALL ABOVE
2x NON-LOAD BEARING WALL
CONCRETE WALL
C.M.U. WALL
SONO-TUBE FOOTING
CONTINUOUS FOOTING
SPREAD FOOTING



1 Solar Structure Foundation Plan
1/16" = 1'-0"

CONCRETE FOOTING TOTALS		
TYPE	WIDTH	VOLUME
Foundation - 24" Concrete	2' - 0"	296.30 CY

STRUCTURAL COLUMN SCHEDULE			
TYPE	LENGTH	COUNT	VOLUME
12"Φ SONO-TUBE	1' - 6"	336	14.66 CY
12"Φ SONO-TUBE	2' - 6"	336	24.43 CY

PROFESSIONAL ENGINEER STATE OF NEVADA
TYSON GOLOVICH
Exp. 12-31-12
CIVIL
No. 19370

DESIGNED BY:	TWC
DRAWN BY:	MCF
CHECKED BY:	TWC
DWG NO.:	
SCALE (HORIZ):	As indicated
SCALE (VERT):	As indicated
PLOT DATE:	12-9-11

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CARSON CITY WASTE WATER TREATMENT
PLANT SOLAR PHOTOVOLTAIC PROJECT
3320 EAST 5TH STREET
CARSON CITY, NV 89701

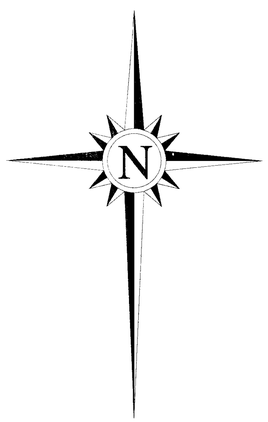
PROJECT NO.
001PW_11

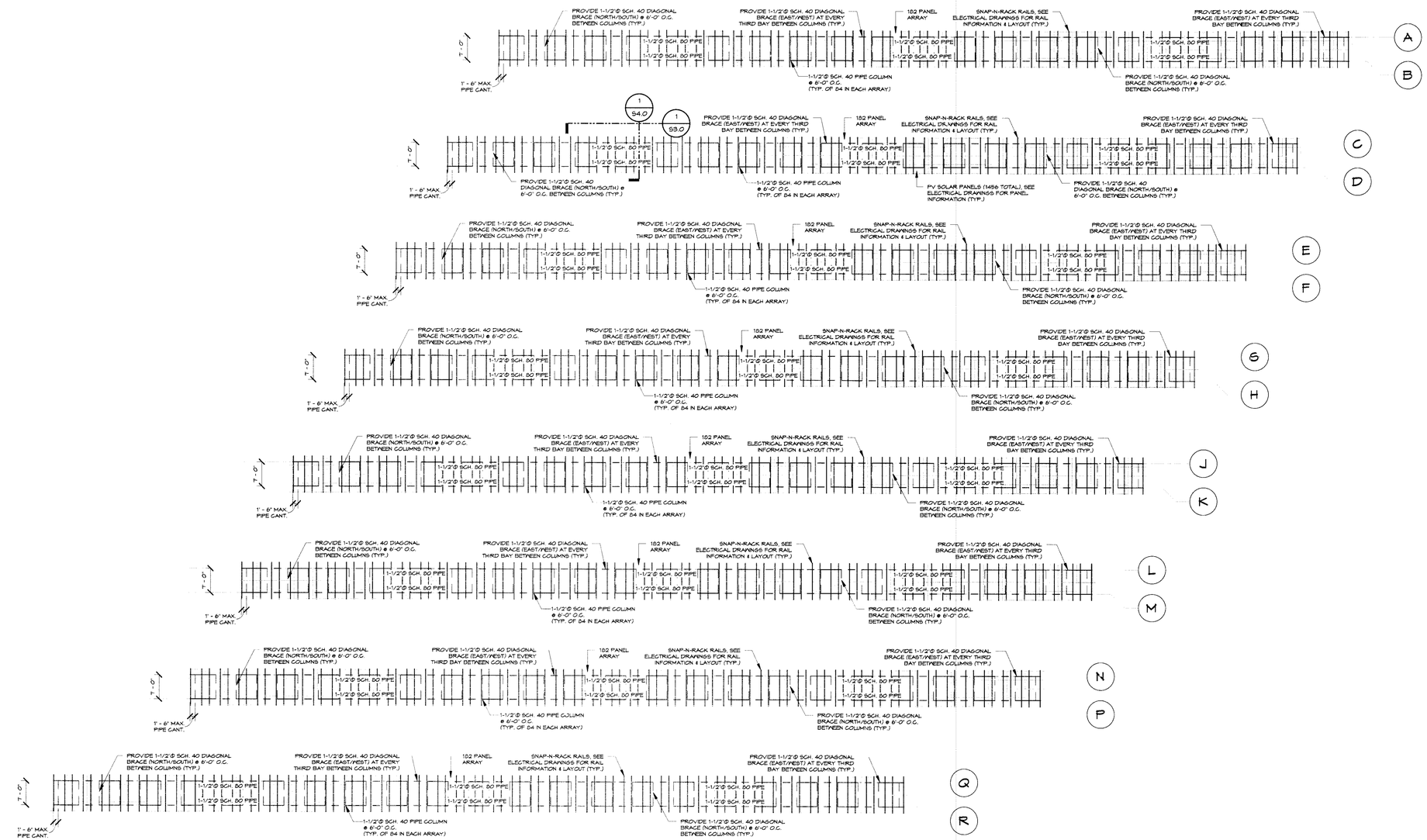
STRUCTURAL FOUNDATION PLAN

SHEET
S1.0

STRUCTURAL ELEMENT & WALL LEGEND

- BEAM/HEADER
- FLOOR JOIST
- FLOOR TRUSS
- TRUSS/RAFTER
- LEDGER
- POST ABOVE
- POST BELOW
- BOLT HOLDOWN
- STRAP HOLDOWN
- J.L. HANGER
- X-X" / X — 2x SHEARWALL
- X-X" / X/X — 2x DOUBLE SHEARWALL
- X8 — SIP WALL
- WALL ABOVE
- 2x NON-LOAD BEARING WALL
- CONCRETE WALL
- C.M.U. WALL
- SONO-TUBE FOOTING
- CONTINUOUS FOOTING
- SPREAD FOOTING





1 Solar Structure Framing Plan
1/16" = 1'-0"

DESIGNED BY:	TWC
DRAWN BY:	MCF
CHECKED BY:	TWC
DWG NO.:	
SCALE (HORIZ):	As indicated
SCALE (VERT):	As indicated
PLOT DATE:	12-9-11

CARSON CITY
PUBLIC WORKS DEPARTMENT
3505 BUTTI WAY, CARSON CITY, NEVADA 89701
PH: 775-887-2355 FAX: 775-887-2112

PACIFICWEST
ENERGY SOLUTIONS
Conservation, Generation, Innovation
561 Mono Avenue, Reno, Nevada 89503
800-316-9080 Office / 800-319-9596 Fax

REV.	DATE	DESCRIPTION	BY	APPD
1	06-30-11	Initial Design	CE	RC
2	08-19-11	Revision 2	CE	RC
3	12-6-11	Initial Re-Design	CE	RC

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STRUCTURAL FRAMING PLAN

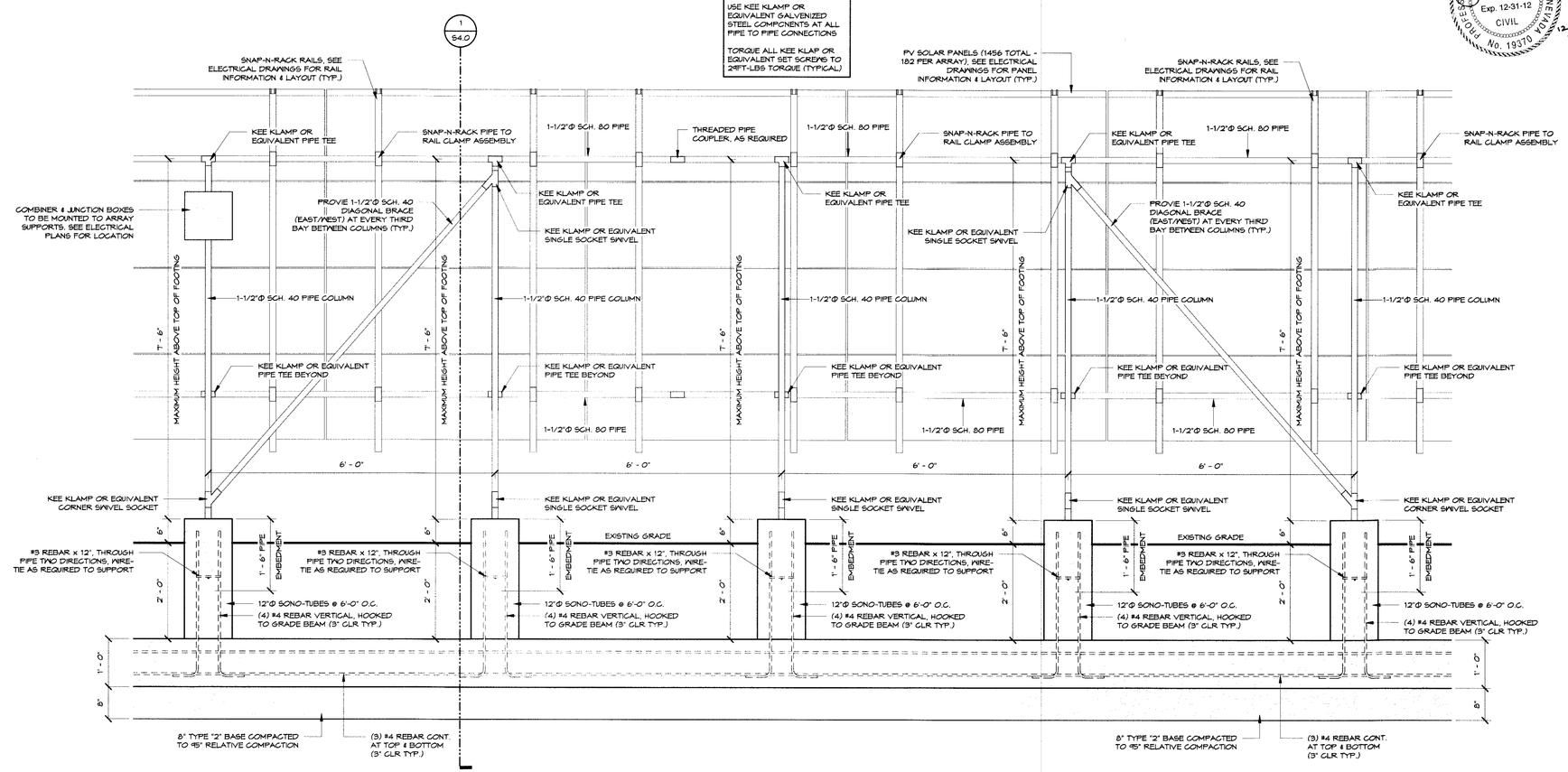
PROFESSIONAL ENGINEER STATE OF NEVADA
TYSON COLOVICH
Exp. 12-31-12
CIVIL
No. 19370
12/12/11

SHEET
S2.0

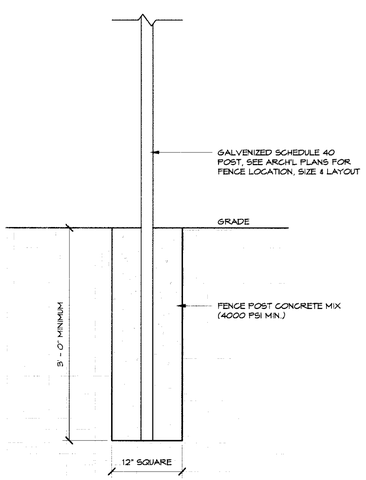
CONNECTOR NOTE:

USE KEE KLAMP OR EQUIVALENT GALVENIZED STEEL COMPONENTS AT ALL PIPE TO PIPE CONNECTIONS

TORQUE ALL KEE KLAP OR EQUIVALENT SET SCREWS TO 24FT-LBS TORQUE (TYPICAL)



1 Solar Structure Detail
3/4" = 1'-0"



2 Fence & Electrical Equipment Support Post Detail
1" = 1'-0"

PROFESSIONAL ENGINEER - STATE OF NEVADA
TYSON COLOVICH
Exp. 12-31-12
CIVIL
No. 19370
12/9/11

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REV.	DATE	DESCRIPTION	BY	APP'D
1	08-30-11	Initial Design	CE	RC
2	09-9-11	Initial Re-Design	CE	RC
3	12-6-11	Initial Re-Design	CE	RC

CARSON CITY WASTE WATER TREATMENT PLANT SOLAR PHOTOVOLTAIC PROJECT
3320 EAST 5TH STREET
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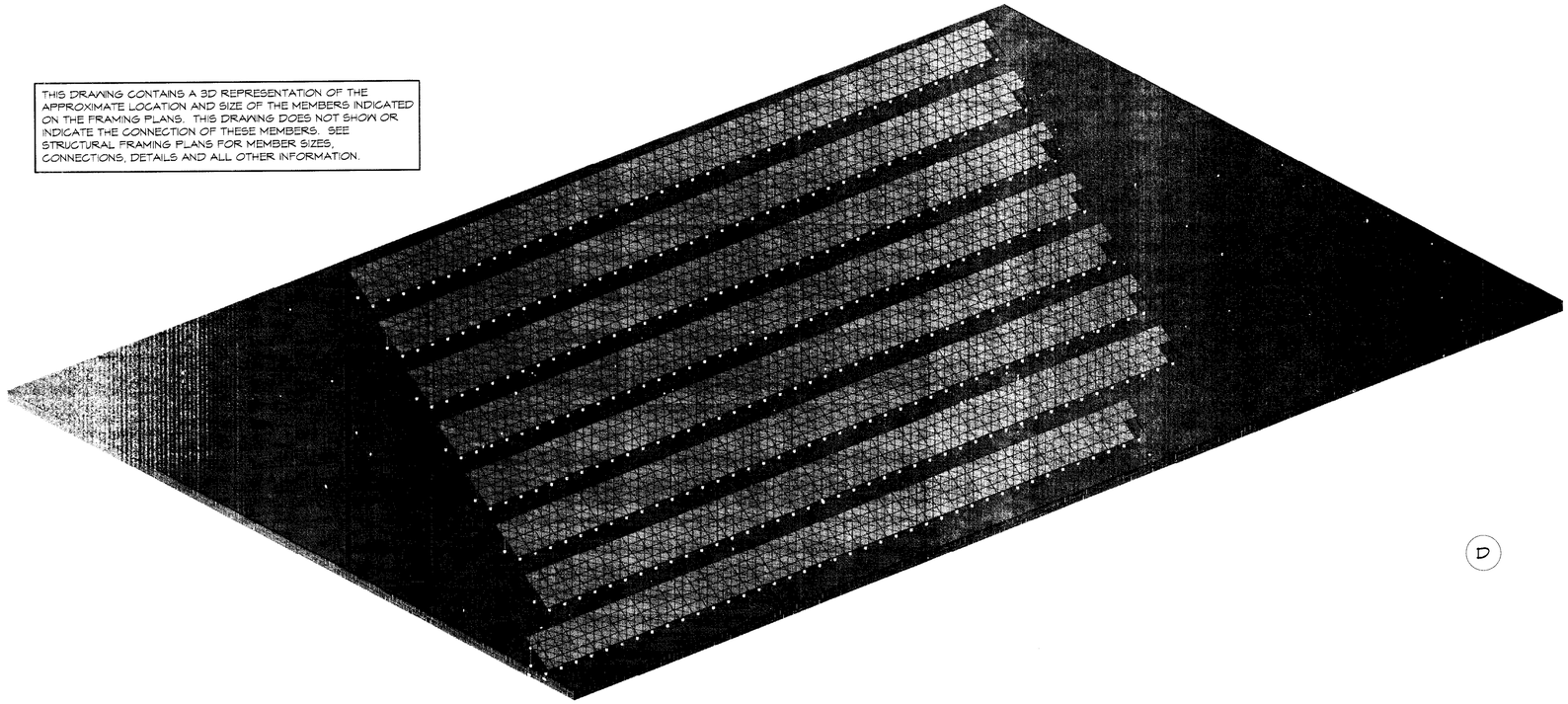
PROJECT NO. 001PW_11
STRUCTURAL DETAILS

SHEET
S3.0

THIS DRAWING CONTAINS A 3D REPRESENTATION OF THE APPROXIMATE LOCATION AND SIZE OF THE MEMBERS INDICATED ON THE FRAMING PLANS. THIS DRAWING DOES NOT SHOW OR INDICATE THE CONNECTION OF THESE MEMBERS. SEE STRUCTURAL FRAMING PLANS FOR MEMBER SIZES, CONNECTIONS, DETAILS AND ALL OTHER INFORMATION.



3 Solar Structure 3d View

D

C

CONNECTOR NOTE:
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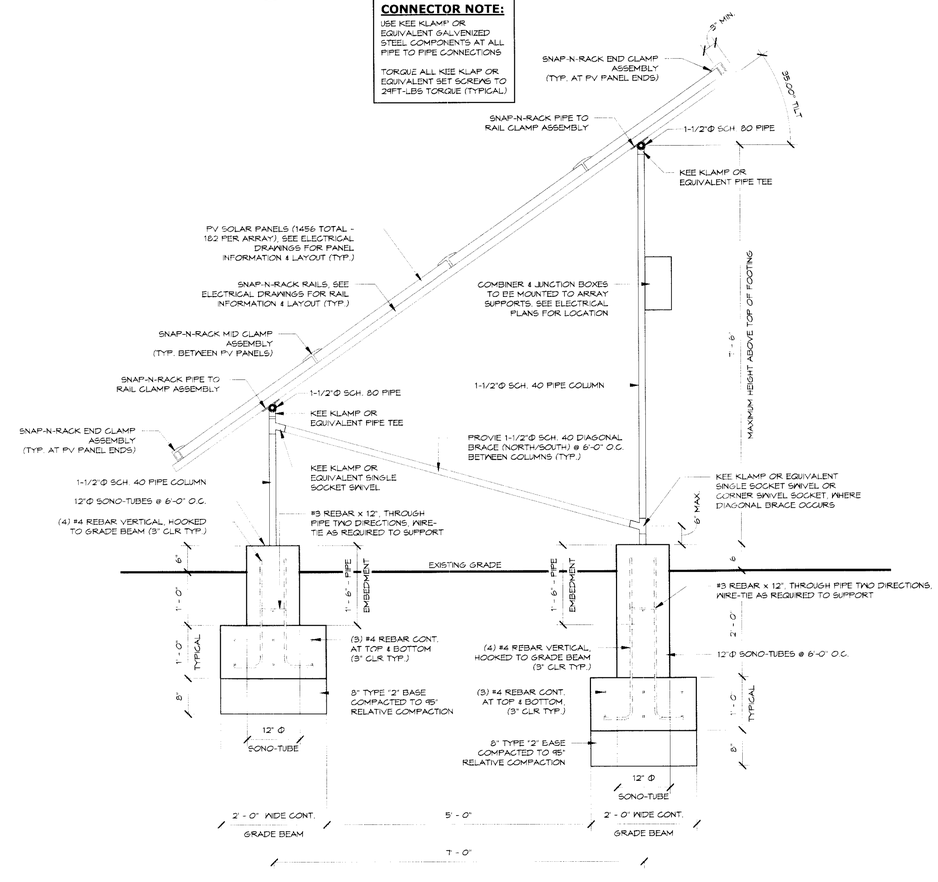
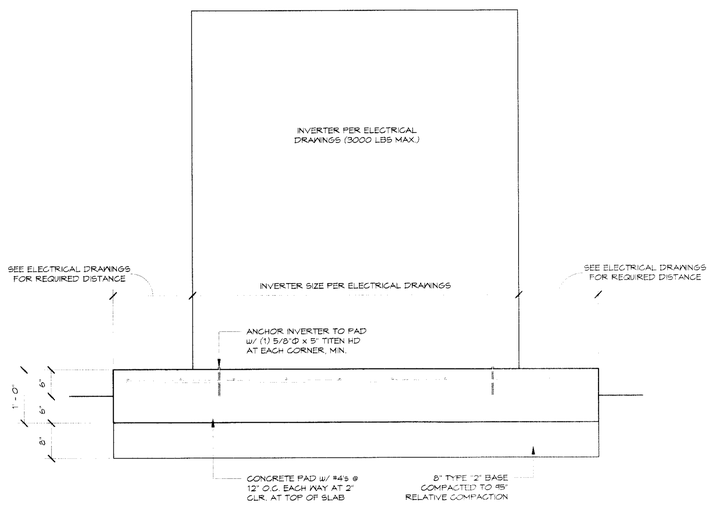
TORQUE ALL KEE KLAP OR EQUIVALENT SET SCREWS TO 24FT-LBS TORQUE (TYPICAL)



1 Solar Structure Detail
3/4" = 1'-0"



2 Inverter Pad Detail
3/4" = 1'-0"

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REV.	DATE	DESCRIPTION	BY	APP'D
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STRUCTURAL DETAILS

SHEET
S4.0

GENERAL NOTES:

1. ALL WORK TO BE PERFORMED IN ACCORDANCE WITH THE LOCAL ADOPTED VERSION OF THE 2005 N.E.C. AND ALL APPLICABLE LOCAL CODES AND ORDINANCES.

2. THE ELECTRICAL CONTRACTOR SHALL VERIFY REQUIREMENTS FOR EQUIPMENT FURNISHED BY OTHERS TO BE CONNECTED TO THE ELECTRICAL SYSTEM. THE ELECTRICAL CONTRACTOR SHALL PROVIDE ALL MATERIALS NECESSARY, SUCH AS WIRE, CONDUIT, FUSE, TRANSFORMERS, ETC. FOR PROPER INSTALLATION AND ELECTRICAL OPERATION OF SUCH EQUIPMENT.

3. PROVIDE TO STRUCTURAL ENGINEER THE LOCATIONS AND DIMENSIONS OF ALL PENETRATIONS THROUGH STRUCTURAL WALLS FOR THEIR APPROVAL PRIOR TO INSTALLATION.

4. ELECTRICAL CONTRACTOR SHALL CONTACT THE ENGINEERS OFFICE IN WRITING WITH A REQUEST FOR INFORMATION (RFI) PRIOR TO PROCEEDING WITH ANY WORK NOT CLEARLY SHOWN IN DOCUMENTS HEREIN.

PV SYSTEM DESCRIPTION

A. ADVANCED ENERGY SOLARON 333KW PV
B. TRINA MODULES TSM-235PA05 (TOTAL OF 1456)
C. TOTAL CONNECTED POWER (DC SYSTEM INPUT)= 235 W X 1,456 = 342,160 WATTS
D. TOTAL AC OUTPUT = (MODULE CEC)(INVERTER EFFICIENCY)(NUMBER OF MODULES)
211.3Wx9.75x1456 = 299,962 WATTS

5. ALL WIRING TO CONFORM TO N.E.C. ARTICLE 690, PHOTOVOLTAIC SYSTEM.

6. INSTALLATION SHALL ALSO CONFORM TO N.E.C. ARTICLE 705 INTERCONNECTED ELECTRIC POWER PRODUCTION SOURCES.

7. PROVIDE DC GROUND-FAULT PROTECTION AT THE INVERTER PER N.E.C. 690.5.

8. INVERTER SHALL BE INTERACTIVE AND SHALL DE-ENERGIZE ITS AS OUTPUT TO THE CONNECTED ELECTRICAL PRODUCTION AND DISTRIBUTION NETWORK UPON LOSS OF VOLTAGE IN THAT SYSTEM AND SHALL REMAIN IN THAT STATE UNTIL THE ELECTRICAL PRODUCTION AND DISTRIBUTION NETWORK HAS BEEN RESTORED.

9. PROVIDE LABELING OF PV SYSTEM PER N.E.C. 690.

10. CIRCUITING AND WIRING REQUIREMENTS: ON ARRAY OPEN WIRING IS ALLOWED AND SHALL CONSIST OF PV WIRE INSTALLED BY THE MANUFACTURER OF THE MODULE. EXTENSIONS OF THESE CIRCUITS SHALL BE IN #10 USE-2 STRANDED COPPER CONDUCTORS. WIRE MANAGEMENT SHALL CONSIST OF CABLE CLIPS HOLDING CONDUCTORS TO THE MODULES AND UV RATED TY-RAPS HOLDING CONDUCTORS TO THE STRUCTURE MEMBERS. ALL OTHER CIRCUITING SHALL BE IN CONDUIT. EMT MAY BE USED IN WET OR DRY LOCATIONS NOT SUBJECT TO MECHANICAL DAMAGE. INTERMEDIATE OR RIGID METAL CONDUIT SHALL BE USED IN AREAS SUBJECT TO MECHANICAL DAMAGE. PVC SCHEDULE 40 WITH WRAPPED RIGID ELBOWS FOR STUB UPS SHALL BE USED IN CONCRETE AND BELOW GRADE. ALL WIRING METHODS AND MATERIAL SHALL COMPLY TO N.E.C. CHAPTER 3.

11. NEGATIVE OR POSITIVE CONDUCTOR OF THE PV ARRAY TO BE SOLIDLY GROUNDED TO MAIN SERVICE BUILDING GROUND. CONNECTION TO BE MADE INTERNALLY AT INVERTER DC GROUND FAULT CIRCUITRY. CARE MUST BE TAKEN TO ENSURE NEGATIVE (GROUNDED) CONDUCTOR AND EQUIPMENT GROUND (BOND) CONDUCTOR ARE ISOLATED FROM ONE ANOTHER DOWNSTREAM OF DC GROUND FAULT CIRCUITRY. IF TWO BECOME BONDED TOGETHER GROUND FAULT CIRCUITRY IS DEFEATED.

12. BIPOLAR INVERTER & ARRAYS: POSITIVE FUSED AND NEGATIVE FUSED ARRAYS ARE SEPARATE AND INDEPENDENT OF ONE ANOTHER. THEY ONLY COMBINE AT THE INVERTER. POSITIVE FUSED AND NEGATIVE FUSED FEEDERS MUST BE KEPT SEPARATE AND INDEPENDENT OF ONE ANOTHER. THEY SHALL NOT SHARE ANY COMMON PULL BOX OR WIREWAY. ALL DISCONNECTS, COMBINER BOXES AND JUNCTION BOXES SHALL BE CLEARLY LABELED 'POSITIVE FUSED, NEGATIVE GROUNDED' OR ' NEGATIVE FUSED, POSITIVE GROUNDED'.

13. BIDDING CONTRACTOR SHALL HAVE CURRENT C2 ELECTRICAL STATE OF NEVADA CONTRACTORS LICENSE.

14. BIDDING CONTRACTOR SHALL SUBMIT WITH THEIR PROPOSAL A COMPANY RESUME, A LIST OF SIMILAR PROJECTS AND REFERENCES FROM THE OWNERS OF THE SIMILAR PROJECTS.

ELECTRICAL DRAWING SPECIFICATIONS:

1.0 **GENERAL:**

1.1 ALL ELECTRICAL WORK SHALL COMPLY WITH ALL APPLICABLE CITY, COUNTY, STATE, AND SERVING ELECTRICAL UTILITY CODES ORDINANCES, RULES, AND REGULATIONS. THE ENTIRE INSTALLATION SHALL COMPLY WITH OR SURPASS THE REQUIREMENTS OF THE ADOPTED EDITION OF THE NATIONAL ELECTRICAL CODE.

1.2 ALL MATERIAL SHALL BE NEW, OF FIRST CLASS QUALITY, SHALL BE U.L. LISTED AND LABELED AND FREE OF DEFECTS

1.3 ALL CUTTING AND PATCHING REQUIRED FOR INSTALLATION OF NEW RACEWAYS AND EQUIPMENT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR. ALL WORK SHALL BE PERFORMED BY TRADESMAN EXPERIENCED IN THE WORK REQUIRED. ALL FINISHES SHALL MATCH EXISTING ADJACENT FINISHES. PATCH ALL OPENINGS IN FIRE RATED WALLS IN A MANNER MAINTAINING THE ORIGINAL FIRE AND SMOKE RATINGS.

1.4 CONTRACTOR SHALL REMOVE AND REINSTALL ALL CEILING TILES AS REQUIRED FOR THE EXECUTION FOR ELECTRICAL WORK

1.5 CONTRACTOR SHALL BE RESPONSIBLE FOR ANY LOSS OR DAMAGE CAUSED BY HIM OR HIS WORKMEN TO THE FACILITY DURING THE COURSE OF CONSTRUCTION. CONTRACTOR SHALL BE RESPONSIBLE FOR REPAIRING OR REPLACING SUCH LOSS OR DAMAGE AT NO ADDITIONAL COST TO THE OWNER.

1.6 DRAWINGS ARE DIAGRAMMATIC IN NATURE AND CANNOT SHOW EVERY CONNECTION. JUNCTION BOXES, WIRE, CONDUIT, ETC. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING A COMPLETE AND FUNCTIONAL ELECTRICAL SYSTEM.

1.7 NO DESIGN CHANGES SHALL BE MADE TO THE ELECTRICAL SYSTEM WITHOUT THE PRIOR APPROVAL OF THE ELECTRICAL ENGINEER AND THE ELECTRICAL INSPECTOR.

2.0 **SCOPE OF WORK:**

2.1 FURNISH ALL MATERIALS, TOOL, AND LABOR REQUIRED FOR THE ELECTRICAL INSTALLATION UNLESS OTHERWISE NOTED ON PLANS. ALL PERMITS AND INSPECTIONS SHALL BE PROVIDED AS REQUIRED BY THE LOCAL CODE AUTHORITY.

2.2 THE CONTRACTOR SHALL VISIT THE SITE TO DETERMINE EXISTING CONDITIONS PRIOR TO SUBMITTING A BID.

2.3 CONCEAL ALL CONDUIT WORK UNLESS AS NOTED ON SPECIFIC DESIGN DRAWINGS.

2.4 COORDINATE ALL POWER OUTAGES WITH THE OWNERS REPRESENTATIVE IN ADVANCE.

2.5 RESTORE ALL SURFACES THAT WERE DAMAGED (PAINTING, PATCHING, PLASTERING, ETC.) DUE TO THE INSTALLATION OR REMOVAL OF ELECTRICAL ITEMS TO MATCH EXISTING FINISH.

2.6 PANEL DESIGNATIONS SHOWN ON THESE DRAWINGS ARE GIVEN FOR CLARIFICATION OF CIRCUITING ONLY AND MAY NOT CORRESPOND TO THE DESIGNATIONS FOUND IN THE FIELD.

2.7 ACQUIRE COMPLETE SET OF CONTRACT DRAWINGS AND FURNISH TO UTILITY FOR UTILITY DESIGN AND COORDINATION.

2.8 INCLUDE ALL CHARGES THAT MAY APPLY FROM THE POWER COMPANY. PROVIDE ALL WORK REQUIRED FOR THE INSTALLATION OF UTILITY SERVICES.

2.9 FULLY GUARANTEE THE INSTALLATION FOR A PERIOD OF TWO YEARS FROM THE DATE OF FINAL ACCEPTANCE BY THE OWNER AGAINST ANY IMPERFECT WORKMANSHIP AND MALFUNCTION OF EQUIPMENT. ANY WORK IDENTIFIED TO BE DEFECTIVE WITHIN THE GUARANTEE PERIOD SHALL BE PROMPTLY REPAIRED OR REPLACED AT NO ADDITIONAL COST TO THE OWNER. NOTE THAT INVERTER SHALL HAVE A MINIMUM WARRANTY OF SEVEN YEARS AND PV MODULES A MINIMUM OF 20 YEARS

ELECTRICAL DRAWING SPECIFICATION (cont.):

3.0 **SUBMITTALS:**

3.1 FURNISH TO THE ELECTRICAL ENGINEER'S OFFICE COMPLETE ELECTRICAL ROOM LAYOUT DRAWINGS (WHERE INSTALLATION VARIES FROM DESIGN HEREIN), SHOWING EXACT LOCATIONS AND DIMENSION OF ELECTRICAL EQUIPMENT PRIOR TO COMMENCEMENT OF CONSTRUCTION AND INSTALLATION OF STUB-UPS: INCLUDING TELEPHONE AND DATA EQUIPMENT ROOMS. CONTRACTOR IS REQUIRED TO SUPPLY DRAWING OF MAIN SERVICE INTERCONNECTION ROOM WITH SUPPORTING DIMENSIONS AND LOCATIONS OF ALL EQUIPMENT INSTALLED.

3.2 PROVIDE A MINIMUM OF SIX (6) SETS OF SHOP DRAWINGS FOR THE FOLLOWING: DISCONNECT SWITCHES, SERVICE ENTRANCE EQUIPMENT. ALL SHOP DRAWING SUBMITTALS SHALL BE BOUND, LABELED, AND MARKED TO IDENTIFY EXACTLY WHICH ITEM SHALL BE PROVIDED. SUBMIT ALL SHOP DRAWINGS FOR REVIEW AT THE SAME TIME.

3.3 SUBMIT UTILITY COORDINATION DRAWINGS AS REQUIRED BY THE LOCAL UTILITIES.

4.0 **SUBSTITUTIONS:**

4.1 EQUIPMENT LISTED BY BRAND NAME OR CATALOG NUMBER SHALL BE INTERPRETED AS ESTABLISHING A STANDARD OF QUALITY. SUBSTITUTIONS WILL BE CONSIDERED IF A WRITTEN REQUEST IS SUBMITTED TO THE ENGINEER A MINIMUM OF EIGHT (8) WORKING DAYS PRIOR TO THE BID DATE. THE REQUEST SHALL INCLUDE THE FOLLOWING:

A. A STATEMENT DECLARING THAT THE EQUIPMENT PROPOSED IS EQUAL TO THAT SPECIFIED BY HAVING THE SAME PHYSICAL CHARACTERISTICS AND DIMENSIONS, AND WILL MEET THE DRAWING LAYOUT AND STRUCTURAL CONDITIONS.
B. THE SPECIFIED AND SUBMITTAL CATALOG NUMBERS OF THE EQUIPMENT UNDER CONSIDERATION.
C. AN EQUIPMENT CUT SHEET WITH DRAWING, DIMENSIONS, AND SPECIFICATIONS.
D. SAMPLE MAY BE REQUIRED AT THE ENGINEERS DISCRETION.
E. COMPLETE CALCULATIONS AND WET STAMPED ENGINEERING DRAWINGS FOR ANY AND ALL DEVIATIONS IN TOTAL OUTPUT, INVERTER SIZE OR NUMBER, AND INDIVIDUAL PANEL OUTPUT.

4.2 ANY CONFLICT ARISING FROM THE USE OF SUBSTITUTED MATERIAL SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR, WHO SHALL BEAR ALL COSTS REQUIRED TO MAKE THE EQUIPMENT COMPLY WITH THE INTENT OF THE PLANS AND SPECIFICATIONS.

4.3 NO MATERIAL OR APPARATUS SHALL BE SUBSTITUTED AFTER THE BID OPENING UNLESS APPROVED IN WRITING BY THE ENGINEER.

4.4 MANUFACTURERS SHALL NOT BE CONSIDERED APPROVED AS EQUAL UNTIL LISTED IN A FORMAL ADDENDUM. LISTING AS EQUAL DOES NOT RELIEVE THE ELECTRICAL CONTRACTOR FROM MEETING THE REQUIREMENTS OF THE CONTRACT DOCUMENTS.

4.5 THERE IS NO KNOWN SUBSTITUTION FOR THE ADVANCED ENERGY SOLARON 333KW BIPOLAR, TRANSFORMERLESS PV INVERTER.

4.6 ALLOWDED SUBSTITUTIONS FOR PV MODULES:
A. SOLARWORLD SUNMODULE SW235 POLY
B. SHARP ND-L235Q2.

5.0 **CONDUIT AND WIRE:**

5.1 WHERE WIRING AND CONDUIT SIZES ARE INDICATED FOR HOMERUNS, THESE SIZES APPLY TO THE ENTIRE LENGTH FROM THE PROTECTIVE DEVICE IN THE PANELS TO THE EQUIPMENT OR LAST WIRING DEVICE.

5.2 CONCEAL ALL CONDUIT IN WALLS, PARTITIONS, ABOVE CEILING OR IN FLOOR SLAB UNLESS NOTED OTHERWISE ON PLANS.

5.3 EMT FITTINGS MUST BE COMPRESSION TYPE OR STEEL COMPRESSION TYPE, EACH WITH CODE SIZED BOND WIRE.

5.4 ALL WIRING SHALL BE IN CONDUIT, EXCEPT PV STRING WIRING. RIGID OR INTERMEDIATE METALLIC CONDUIT (IMC) SHALL BE USED FOR ALL CONDUIT , WHERE SUBJECT TO MOISTURE OR WHERE SUBJECT TO PHYSICAL DAMAGE. ELECTRICAL METALLIC TUBING (EMT) MAY BE USED FOR EXTERIOR OR INTERIOR, PROTECTED LOCATIONS.

5.5 FLEXIBLE METALLIC CONDUIT SHALL BE USED FOR ALL CONNECTIONS TO MOTORS, OR EQUIPMENT SUBJECT TO VIBRATION. LIQUID-TIGHT CONDUIT SHALL BE USED WHERE SUBJECT TO MOISTURE. BOND FLEXIBLE CONDUIT PER N.E.C. REQUIREMENTS.

5.6 INSTALL A PULL WIRE IN ALL EMPTY CONDUITS WHERE REQUIRED.

5.7 ALL CONDUCTORS SHALL BE COPPER. MINIMUM CIRCUIT WIRING SHALL BE #12 AWG. OTHER SIZES AS INDICATED ON THE DRAWINGS OR AS REQUIRED BY CODE. INSULATION FOR ALL CONDUCTORS (OTHER THAN USE -2 PV WIRE WHERE SPECIFIED) SHALL BE THWN-2.

5.8 CIRCUIT NUMBERS ARE SHOWN FOR CIRCUIT IDENTIFICATION. CIRCUITING SHALL AGREE WITH THE NUMBERING ON THE PANEL SCHEDULE PROVIDED. BALANCE THE LOAD AS EVENLY AS POSSIBLE BETWEEN EACH PHASE LEG.

5.9 ALL SECONDARY SERVICES, FEEDERS, AND BRANCH CIRCUIT CONDUCTORS SHALL BE COLOR CODED AS FOLLOWS:

AC FEEDERS			DC FEEDERS		
208/120 VOLT	PHASE	480/277 VOLT	POSITIVE FUSED		NEGATIVE FUSED
BLACK	A	BROWN	BLACK	PLUS	WHITE W/BLACK STRIPE
RED	B	ORANGE	WHITE	MINUS	YELLOW
BLUE	C	YELLOW	GREEN/BARE	GROUND	GREEN/BARE
WHITE	NEUTRAL	GRAY			
GREEN	GROUND	GREEN			

5.10 CONTROL WIRES SHALL BE PURPLE OR VIOLET. ALL BRANCH CIRCUIT CONDUCTORS SHALL HAVE SOLID COLOR COMPOUND OR SOLID COLOR COATING.

5.11 ALL CONDUITS PENETRATING ROOFS, FLOORS, OR WALLS SHALL BE MADE WATERTIGHT BY PROPER FLASHING, CAULKING, OR SEALING.

5.12 PROVIDE ALL FIXTURES AND DEVICES WITH SUITABLE METAL OUTLET BOXES, CONFORMING TO N.E.C. ARTICLE 314. SUPPORT BOXES RIGIDLY FROM STRUCTURE.

6.0 **GROUNDING:**

6.1 GROUNDING OF ELECTRICAL SERVICE AND EQUIPMENT SHALL BE PER THE APPLICABLE SECTIONS OF N.E.C. ARTICLE 250 AND AS SHOWN ON THE DRAWINGS.

6.2 PROVIDE AN INSULATED EQUIPMENT GROUNDING CONDUCTORS, IN ACCORDANCE WITH N.E.C. 250-122, IN ALL CONDUITS WITH CONDUCTORS.

6.3 PV GROUNDING AND BONDING MUST COMPLY WITH DRAWING REQUIREMENTS. ALL GROUNDING AND BONDING DEVICES AND PANELS SUPPLIED MUST BE U.L. 467 AND 1703 LISTED. SUBSTITUTION OF GROUNDING AND BONDING DEVICES IS NOT ALLOWED WITHOUT WRITTEN PERMISSION FROM ENGINEER.

6.4 BOND ALL EXPOSED NON-CURRENT CARRYING METALLIC PARTS FOR PV SYSTEM TOGETHER AND TO THE EXISTING BUILDING GROUND PER N.E.C. 690

7.0 **WIRING DEVICES:**

7.1 ALL ELECTRICAL COMPONENTS INSTALLED OUTDOORS, EXPOSED TO WEATHER, OR IN DAMP LOCATIONS SHALL BE WEATHERPROOF, NEMA 3R.

7.2 SERVICE ENTRANCE ASSEMBLY AND ALL OF ITS COMPONENTS SHALL BE BRACED TO WITHSTAND A MINIMUM OF 100% OF THE AVAILABLE FAULT CURRENT SUPPLIED BY THE POWER COMPANY.

7.3 LABEL ALL SERVICE ENTRANCE EQUIPMENT, PANELBOARDS, AND MAJOR SINGLE LINE COMPONENTS WITH PERMANENTLY AFFIXED PHENOLIC LETTERING (2" MINIMUM). LABEL ALL RECEPTACLES, DEVICES, JUNCTION BOXES, DISCONNECT SWITCHES, ETC. WITH VINYL ADHESIVE TAPE INDICATING PANEL AND CIRCUIT NUMBER.

7.4 ALL SAFETY SWITCHES SHALL BE HEAVY DUTY TYPE, WITH COVER INTERLOCK AND HANDLE LOCK OFF PROVISIONS. SWITCHES SHALL BE MANUFACTURED BY APPROVED MANUFACTURER AND SHALL BE U.L. LISTED. RATING AND FUSING SHALL BE AS SHOWN ON THE DRAWINGS. ALLOWED MANUFACTURERS ARE: EATON, SIEMENS, GENERAL ELECTRIC OR SQUARE D.

7.5 ALL ELECTRICAL CONNECTION TO BE MADE WITH A CALIBRATED TORQUE WRENCH TO MANUFACTURERS RECOMMENDED VALUES. PROVIDE DOCUMENTATION TO THE ELECTRICAL ENGINEER OF ALL ELECTRICAL CONNECTIONS.

ELECTRICAL ABBREVIATIONS AND SYMBOL SCHEDULE

ABBREVIATIONS:

A	AMPERES
AC	ALTERNATING CURRENT
AF	AMPERES FRAME (RATING)
AFC	AVAILABLE FAULT CURRENT
AFG	ABOVE FINISHED GRADE
AFF	ABOVE FINISHED FLOOR
AHU	AIR HANDLING UNIT
AIC	AMPERES INTERRUPTING CAPACITY
AL	ALUMINUM
AT	AMPERES TRIP (SETTING)
AUX	AUXILIARY
BRKR	BREAKER
C	CONDUIT
CB	CIRCUIT BREAKER
CKT	CIRCUIT BREAKER
COMB	COMBINATION
COMM	COMMUNICATIONS
CP	CONTROL PANEL
CPT	CONTROL POWER TRANSFORMER
CT	CURRENT TRANSFORMER
CU	COPPER
DC	DIRECT CURRENT
DISC	DISCONNECT
DP	POWER DISTRIBUTION PANEL
DWG	DRAWING
EC	ELECTRICAL CONTRACTOR
EDF	ELECTRIC DRINKING FOUNTAIN
EF	EXHAUST FAN
EG	EQUIPMENT GROUND
ELEC	ELECTRICAL – ELECTRIC
EM	EMERGENCY
EMT	ELECTRICAL METALLIC TUBING
EO	ELECTRICALLY OPERATED
F	FUSE
FA	FIRE ALARM
FAAP	FIRE ALARM ANNUNCIATE PANEL
FACP	FIRE ALARM CONTROL PANEL
FSD	FIRE SMOKE DAMPER
FDR	FEEDER
FLA	FULL LOAD AMPERES
FLEX	FLEXIBLE
GFCI	GROUND FAULT CIRCUIT INTERRUPTER
GND	GROUND
HID	HIGH INTENSITY DISCHARGE
HP	HORSE POWER
HOA	HAND-OFF-AUTO
JB	JUNCTION BOX
KV	KILOVOLTS
KVA	KILOVOLTS-AMPERES
KW	KILOWATTS
LTG	LIGHTING
MBJ	MAIN BONDING JUMPER
MC	MECHANICAL CONTRACTOR
MCA	MINIMUM CIRCUIT AMPACITY
MCC	MOTOR CONTROL CENTER
MECH	MECHANICAL CONTRACTOR
MH	MANHOLE
MISC	MISCELLANEOUS
MTD	MOUNTED
MTG	MOUNTING
NC	NORMALLY CLOSED
NEC	NATIONAL ELECTRIC CODE
NEU	NEUTRAL
NF	NON-FUSED
NIC	NOT IN CONTRACT
NL	NIGHT LIGHT
NO	NORMALLY OPEN
NTS	NOT TO SCALE
OL'S	OVERLOADS
P	POLE
PA	PUBLIC ADDRESS
PB	PUSH BUTTON
PH	PHASE
PNL	PANEL
PT	POTENTIAL TRANSFORMER
PWR	POWER DISTRIBUTION PANEL
RECP	RECEPTACLE
RLA	RUNNING LOAD AMPERES
RSC	RIGID STEEL CONDUIT
RTU	ROOF TOP UNIT
SCHED	SCHEDULE
SES	SERVICE ENTRANCE SECTION
SS	SPECIAL SYSTEMS
SWBD	SWITCHBOARD
TMB	TELEPHONE MOUNTING BOARD
TYP	TYPICAL
UND	UNLESS NOTED OTHERWISE
V	VOLTS
VP	VANDAL PROOF
W	WIRE
WG	WIRE GUARD
WH	WATER HEATER
WP	WEATHER PROOF (WHILE IN USE)

GENERAL SYMBOLS:

- RECESSED OR SURFACE JUNCTION BOX IN ACCESSIBLE LOCATION WITH FLEXIBLE CONDUIT CONNECTION.
- MOTOR, HP, VOLTAGE & PHASE AS INDICATED MECH EQUIP SCHEDULE.
- ELECTRICAL PANELBOARD 480 / 277V, 3PH, 4W, WITH CNO, UMO,FLUSH/ SURFACE MOUNT AT +6'-6" AFF TO TOP. STUB OUT THREE 3/4" C INTO ACCESSIBLE SPACE.
- ELECTRICAL PANELBOARD 208 / 277V, 3PH, 4W, WITH CNO, UMO,FLUSH/ SURFACE MOUNT AT +6'-6" AFF TO TOP. STUB OUT THREE 3/4" C INTO ACCESSIBLE SPACE.
- TRANSFORMER, TYPE AND RATING AS SPECIFIED ON PLAN.
- SERVICE ENTRANCE SECTION, DISTRIBUTION PANELBOARD, OR MOTOR CONTROL CENTER AS SPECIFIED ON PLAN.
- CONDUIT CONCEALED IN FINISH AREAS OR ABOVE CEILING SPACE.
- CONDUIT CONCEALED IN CONCRETE OR BELOW FLOOR.
- UG — UNDERGROUND CIRCUIT OR DUCTBANK.
- SS — UNDERGROUND SPECIAL SYSTEMS COMMUNICATIONS CIRCUIT OR DUCTBANK.
- BUS — PLUG-IN BUSWAY.
- UTL — UTILITY UNDERGROUND CIRCUIT OR DUCTBANK.
- FA — UNDERGROUND FIRE ALARM CONDUIT.
- CT — CABLE TRAY.
- CONDUIT TURNING UP.
- CONDUIT TURNING DOWN.
- CONDUIT STUB OUT, AS NOTED ON PLANS.
- SR — POWER /COMMUNICATIONS DIVIDED RACEWAY SURFACE MTD AT +16" AFF. UNO. PROVIDE SEPARATE CONDUITS FOR EACH SYSTEM. TYPE AS SPECIFIED ON PLAN.
- HOME RUN TO PANELBOARD OR AS NOTED. ALL CONDUCTORS SHALL BE COPPER AND HAVE CODE SIZED GROUNDING CONDUCTORS. MINIMUM BRANCH CIRCUIT WIRING SHALL BE #12 AVG. OTHER SIZES AS INDICATED ON THE DRAWINGS. ELECTRICAL SCHEDULES OR AS REQUIRED BY CODE. INSULATION SHALL BE THHN/ THNW FOR CONDUCTORS #8 AND SMALLER XHHW FOR #4 AND LARGER.

CONTROL SYMBOLS:

NOTE: PROVIDE NEMA OR ENCLOSURE IN EXTERIOR APPLICATIONS.

- S — SINGLE POLE TOGGLE SWITCH MTD AT +48" AFF.
- S_{3W} — THREE-WAY TOGGLE SWITCH MTD AT +48" AFF.
- S_{4W} — FOUR-WAY TOGGLE SWITCH MTD AT +48" AFF.
- S_K — SINGLE POLE KAY OPERATED SWITCH MTD AT +48" AFF.
- S_K — HP RATED MANUAL MOTOR STARTER WITH SWITCH CONTROL& THERMAL OVERLOAD PROTECTION.
- S_{OC} — OCCUPANCY SENSOR OR MOTION DETECTOR MANUAL OVERRIDE SWITCH. RATED FOR 2000VA.
- SS — DUAL LEVEL SWITCHING. ONE SWITCH CONTROLS OUTER LAMPS AND ONE SWITCH CONTROLS REMAINING INNER LAMPS.
- D F — INCANDESCENT MANUAL SLIDE DIMMER MTD AT +48" AFF. RATED FOR 2000VA. SUBSCRIPT "F" INDICATES FLUORESCENT.
- PI — PASSIVE INFRARED/ ULTRASONIC OCCUPANCY SENSOR.
- MOTOR CONTROLLER FURNISHED WITH EQUIPMENT.
- MOTOR CONTROLLER FURNISHED BY ELECTRICAL CONTRACTOR.
- HEAVY DUTY SAFETY DISCONNECT SWITCH 250V-30A-3P, UNO, HP-RATED, REFER TO EQUIPMENT SCHEDULE(S) AND OTHER SPECIFICATIONS.
- COMBINATION MOTOR STARTER/ DISCONNECT SWITCH FUSIBLE WITH 120V CONTROL TRANSFORMER, HOA SWITCH, AND PILOT LIGHT IN ENCLOSURE. FUSE PER EQUIPMENT MANUFACTURER'S RECOMMENDATIONS OR EQUIP SCHEDULES SPECIFICATIONS. SUBSCRIPT INDICATES STARTER SIZE.
- VFD — VARIABLE FREQUENCY DRIVE. FURNISHED BY MECHANICAL CONTRACTOR, INSTALLED BY ELECTRICAL CONTRACTOR.
- ATS — AUTOMATIC TRANSFER SWITCH.
- MTS — MANUAL TRANSFER SWITCH.
- TS — TIME SWITCH.
- PC — PHOTOCELL ROOF MOUNTED. UNO
- CU — PACKAGE CONTROL UNIT. PROVIDED BY EQUIPMENT SUPPLIER.
- C — CONTACTOR, SQUARE D CLASS 8903 (SUBSCRIPT "1" INDICATES NUMBER OF POLES, "E" INDICATES ELECTRICALLY HELD, "M" INDICATES MECHANICALLY HELD)
- PUSHBUTTON STATION
- MICRO SWITCH
- D — DOOR BELL PUSH BUTTON WITH LOW VOLTAGE WIRING TO CHIME
- C — DOOR BELL CHIME WITH CONTROL TRANSFORMER

SINGLE LINE DIAGRAM SYMBOLS:

- LSIG — LONG-TIME/ SHORT-TIME/ INSTANTANEOUS / GROUND FAULT TRIP SETTINGS
- CIRCUIT BREAKER
- FUSIBLE SWITCH, SIZE AS INDICATED ON PLANS
- MOTOR STARTER, # INDICATES NEMA SIZE
- 480V DRAIN-OUT CIRCUIT BREAKER
- DRAW-OUT FUSE
- 1 — 15KV DRAW-OUT CIRCUIT BREAKER AND OVER-CURRENT RELAY. # INDICATES BREAKER NUMBER/ DESIGNATION.
- COMBINATION MOTOR CONTROLLER, FUSIBLE SWITCH TYPE.
- COMBINATION MOTOR CONTROLLER, CIRCUIT BREAKER TYPE.
- GROUND
- M — METER
- ST — SHUNT TRIP
- GFP — GROUND FAULT PROTECTION
- CURRENT TRANSFORMER
- DPM — DIGITAL POWER METER
- TRANSIENT VOLTAGE SURGE SUPPRESSOR UNIT
- DISTRIBUTION TRANSFORMER
- DELTA CONNECTION
- WYE CONNECTION WITH GROUND
- FEED THROUGH LUG CONNECTION
- ELECTRICAL PANEL BOARD, MAIN LUG ONLY
- ELECTRICAL PANEL BOARD, MAIN CIRCUIT BREAKER
- AUTOMATIC TRANSFER SWITCH
- GENERATOR WITH INTEGRAL PROTECTION
- OUTLET FIXTURE
- DEDICATED BLOCK HEATER OUTLET - SINGLE 20 AMPERE RECEPTACLE
- FLOOD LIGHT FIXTURE
- W — WALLPACK FIXTURE
- FLUORESCENT FIXTURE
- JB — JUNCTION BOX
- S_1 — SWITCH THAT CONTROL WALL PACK CIRCUIT
- S_2 — SWITCH THAT CONTROL FLOOD LIGHT CIRCUIT
- S_{1F} — SWITCH THAT CONTROLS ROW 1 FLUORESCENT FIXTURES
- S_{2F} — SWITCH THAT CONTROLS ROW 2 FLUORESCENT FIXTURES
- S_{3F} — SWITCH THAT CONTROLS ROW 3 FLUORESCENT FIXTURES
- S_{4F} — SWITCH THAT CONTROLS ROW 4 FLUORESCENT FIXTURES

COMMUNICATION SYMBOLS:

NOTE: WHERE COMB PWR/COMM DEVICES ARE USED, PROVIDE SEPARATE CONDUITS.
NOTE: PROVIDE DOUBLE GANG BOXES WITH SINGLE GANG DEVICE RING.

- TELEVISION OUTLET BOX MTD +78" AFF.UNO. PROVIDE WITH 1"C WITH PULLWIRE TO ACCESSIBLE CEILING SPACE OR CABLE TRAY.
- VOICE OUTLET BOX MTD +42" AFF WITH 3/4" C AND PULLWIRE TO ACCESSIBLE CEILING SPACE OR CABLE TRAY.
- VOICE/ INTERCOMM OUTLET BOX MTD +16" AFF WITH 3/4" C AND PULLWIRE TO ACCESSIBLE CEILING SPACE OR CABLE TRAY.
- DATA OUTLET BOX MTD +16" AFF. UNO. PROVIDE WITH 1"C WITH PULLWIRE TO ACCESSIBLE CEILING SPACE OR CABLE TRAY.
- COMB VOICE /DATA OUTLET BOX MTD +16" AFF. UNO. PROVIDE WITH 1"C WITH PULLWIRE TO ACCESSIBLE CEILING SPACE OR CABLE TRAY.
- VOICE OUTLET BOX WITH FLUSH FLOOR MTD SERVICE FITTING AND 3/4" C AND PULLWIRE TO ACCESSIBLE CEILING SPACE OR CABLE TRAY.
- DATA OUTLET BOX WITH FLUSH FLOOR MTD SERVICE FITTING.
- COMB VOICE/ DATA OUTLET BOX WITH FLUSH FLOOR MTD SERVICE FITTING.
- FLUSH JB WITH GROMMETED HOLE FOR COMMUNICATIONS MTD +8" AFF, UNO.
- TELEPHONE MOUNTING BOARD. 4' WIDE x 8' HIGH x 3/4" DEEP (UNO) PLYWOOD WITH #6 COPPER GND WIRE TO BLDG GROUNDING SYSTEM.
- INTERCOMM PHONE (CLASSROOM HANDSET) MTD AT +48" AFF, UNO.

Construction Design Services, inc.
ELECTRICAL ENGINEERING

DESIGNED BY:	RC
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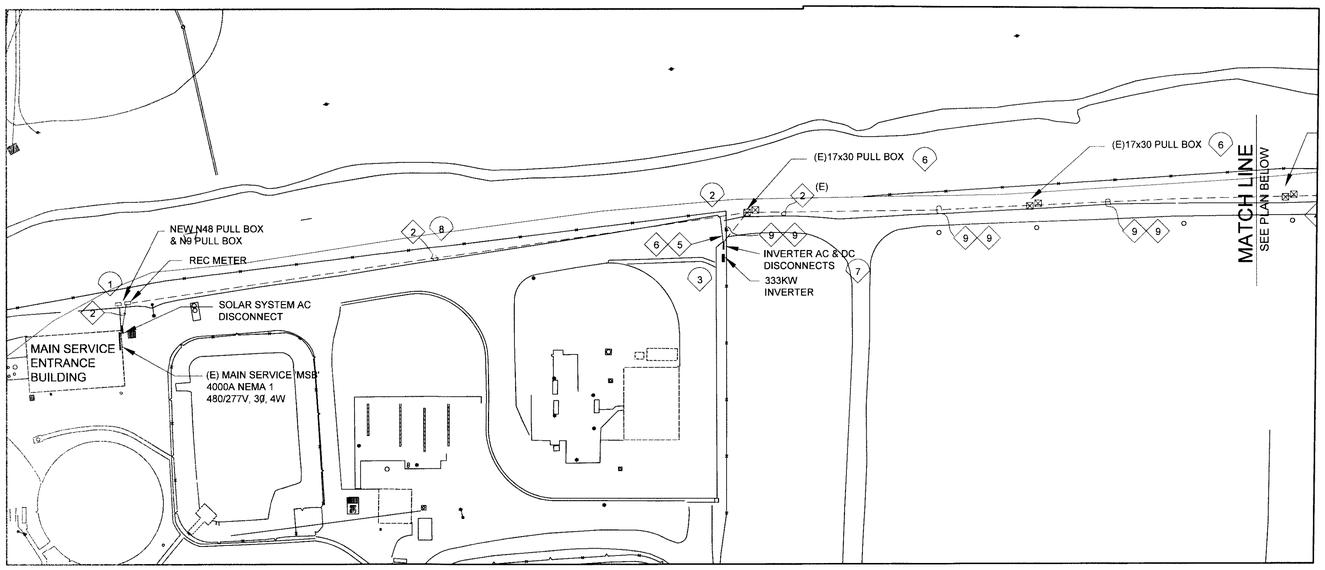
PROFESSIONAL ENGINEER STATE OF NEVADA
MICHAEL A. PECORINO
Exp. 12-31-11
ELECTRICAL
No. 15678

REV.	DATE	DESCRIPTION	BY	APP'D
0	06/30/2011	INITIAL DESIGN	CG	RC
1	08/26/2011	REVISION 1	CG	RC
2	12/06/2011	INITIAL RE-DESIGN	CG	RC

CARSON CITY WASTE WATER TREATMENT
PLANT SOLAR PHOTOVOLTAIC PROJECT
3320 EAST 5TH ST., CARSON CITY, NV 89701
PROJECT NO. - 2.0805
ELECTRICAL GENERAL NOTES,
DRAWING SPECIFICATIONS, & SYMBOLS

SHEET
E0.0



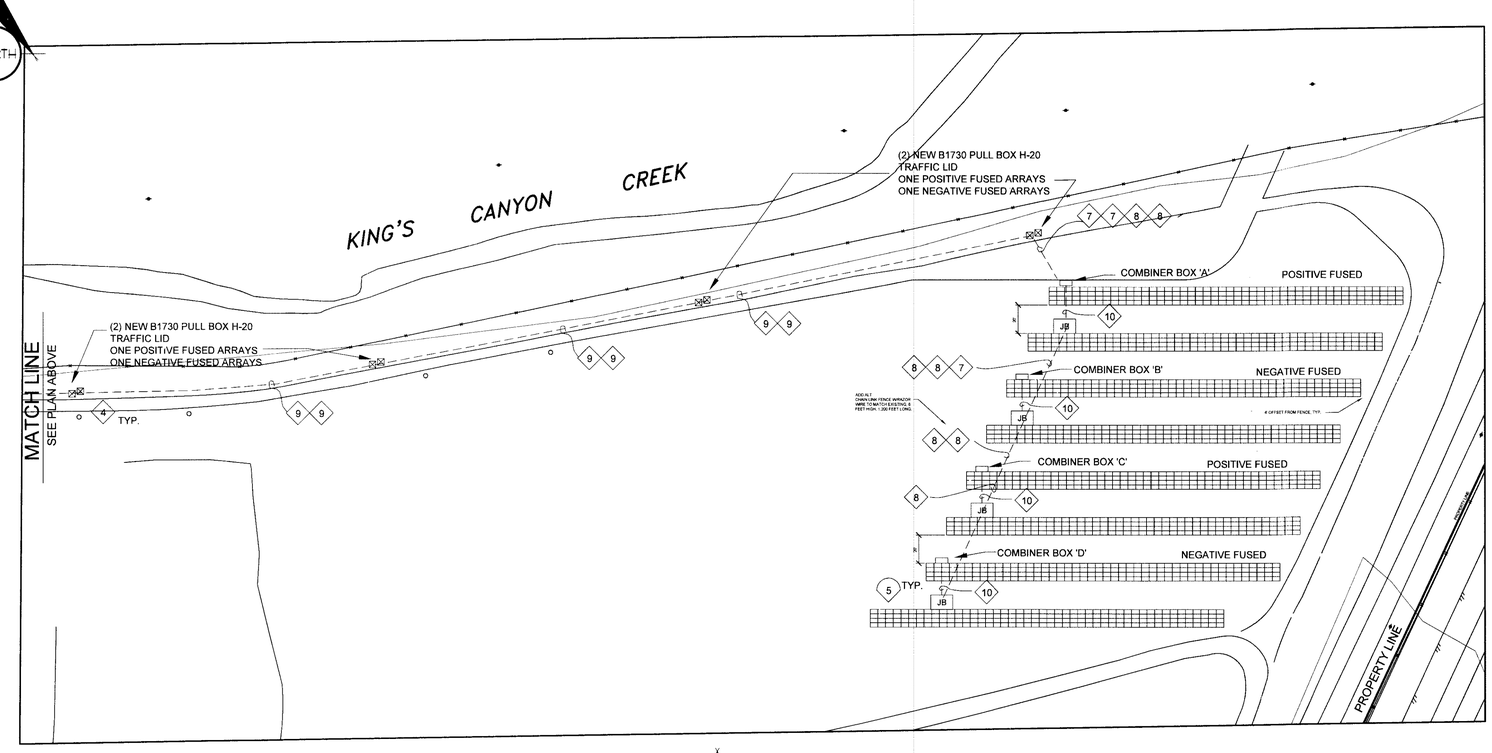
SITE PLAN

1"= 50'

NORTH

SHEET NOTES:

1. INTERCEPT (3) EXISTING 4" CONDUITS & (1) EXISTING 2" CONDUIT AND INSTALL A NEW N48 PULL BOX FOR THE POWER CONDUITS AND A N9 PULL BOX FOR THE COMMUNICATION CONDUIT. PULL BOXES ARE IN A LANDSCAPE AREA AND TRAFFIC RATED LIDS ARE REQUIRED. EXTEND CONDUITS TO NV ENERGY'S REC METER. SEE THE SINGLE LINE & DETAILS. (1) 4" CONDUIT TO MAIN SERVICE ENTRANCE BUILDING WILL BE SPARE.
2. INTERCEPT (3) EXISTING 4" CONDUITS & (1) EXISTING 2" CONDUIT, REROUTE CONDUITS TO THE INVERTER DISCONNECTS AND THE 2" COMMUNICATION CONDUIT TO THE TELEMETRY ENCLOSURE. SEE THE SINGLE LINE & DETAILS.
3. INVERTER AC & DC DISCONNECTS. AC DISCONNECT TO HAVE (3) REROUTED EXISTING 4" CONDUITS AND (2) NEW 3" CONDUITS TO THE INVERTER. DC DISCONNECTS TO HAVE (2) NEW 4" CONDUITS REROUTE TO EXISTING PULL BOX & (2) NEW 2" CONDUITS TO INVERTER. SEE SINGLE LINE & DETAILS.
4. B1730 17"x30" CONCRETE BOX & H20 TRAFFIC RATED LID. COMPONENTS, LID B, N-36 BOX, (2) EXTENSIONS. BOX TO BE PLACED ON 12" OF 3/4" DRAIN ROCK, COMPACTED TO 95%. LID TO BE SECURED WITH (2) PENTA HEX HEAD BOLTS. NV ENERGY STOCK NUMBERS CONCRETE H-20 BOX #24-0035, 12" CONCRETE EXTENSION #24-0485, LID #24-1186. INSTALL ONE PULL BOX FOR POSITIVE FUSED ARRAY FEEDERS & ONE PULL BOX FOR NEGATIVE FUSED ARRAY FEEDERS.
5. COMBINER BOX: (28) STRINGS WITH 15A FUSES, RATED FOR 540AMPS AT 1000V DC, NEMA 4X FIBERGLASS ENCLOSURE. MOUNTED TO ARRAY STRUCTURE WITH UNISTRUT HELD TO 1-1/2" POLES WITH U-BOLTS, TO ALLOW FOR EXPANSION & CONTRACTIONS.
6. INSTALL SECOND 17"x30" PULL BOX NEXT TO EXISTING PULL BOX. SEPARATE CONDUITS BETWEEN BOXES. ONE PULL BOX FOR POSITIVE FUSED ARRAY FEEDERS AND OTHER FOR NEGATIVE FUSED ARRAY FEEDERS.
7. A N36 PULL BOX MAY BE INSTALLED TO ALLOW FOR FEWER CONDUIT ENTRIES INTO INVERTER AC DISCONNECT.
8. EXISTING CONDUITS ARE ENCASED IN A RED CEMENT SLURRY MIX. THIS CONDITION WILL BE ENCOUNTERED AT THE NEW REC METER AND AT THE EXISTING 17x30 PULL BOXES.



SITE PLAN

1"= 50'

NORTH

Construction Design Services, inc.
ELECTRICAL ENGINEERING

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CHECKED BY: RC
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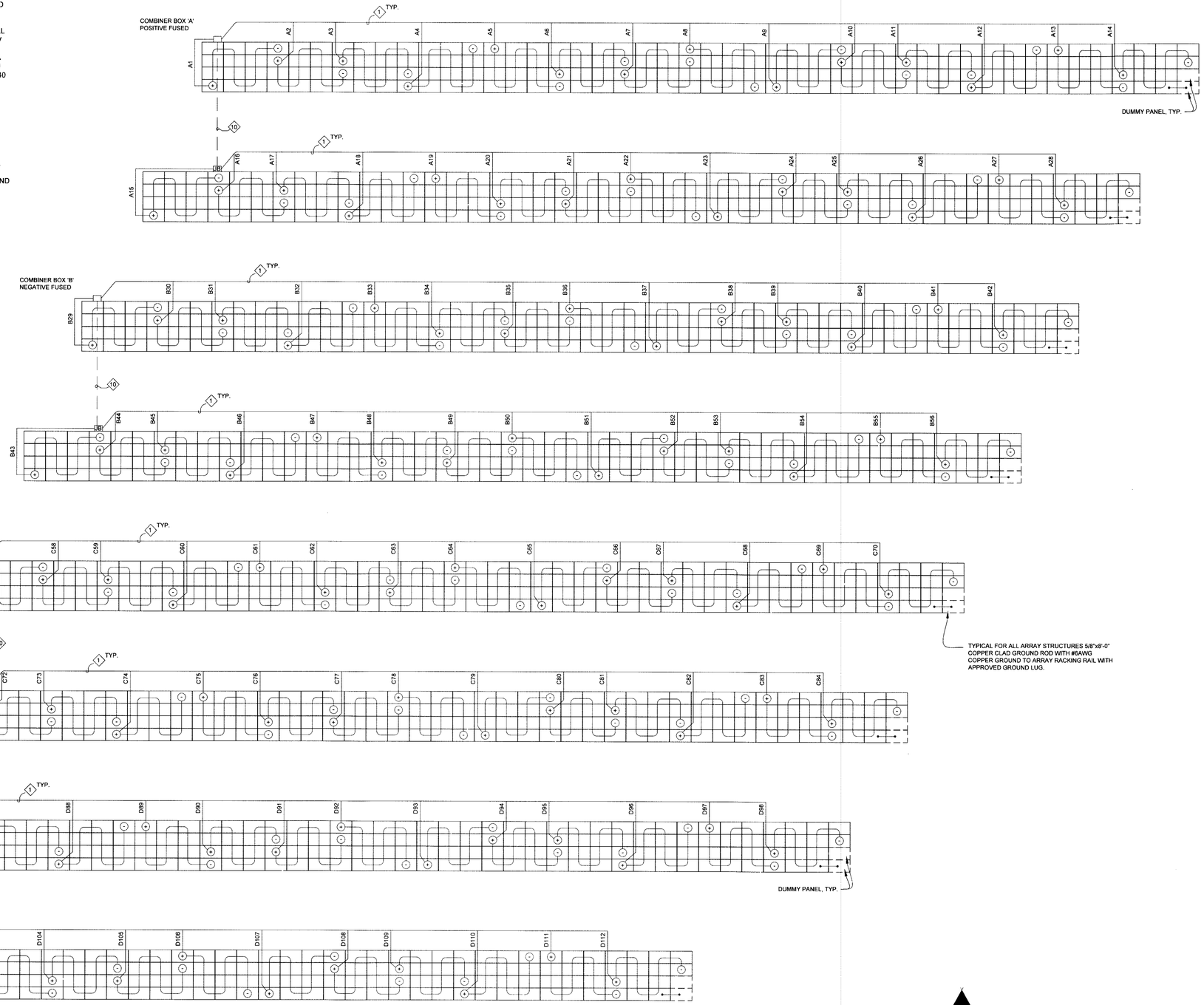
CARSON CITY WASTE WATER TREATMENT
PLANT SOLAR PHOTOVOLTAIC PROJECT
3320 EAST 5TH ST., CARSON CITY, NV 89701
PROJECT NO. - 2.0805

ELECTRICAL SITE PLAN

SHEET
E1.0

GENERAL NOTES:

1. CIRCUITING AND WIRING REQUIREMENTS: ON ARRAY OPEN WIRING IS ALLOWED AND SHALL CONSIST OF PV WIRE INSTALLED BY THE MANUFACTURER OF THE MODULE, EXTENSIONS OF THESE CIRCUITS SHALL BE IN #10 USE-2 STRANDED COPPER CONDUCTORS WITH MC-4 MALE & FEMALE CONNECTORS. WIRE MANAGEMENT SHALL CONSIST OF METAL CABLE CLIPS HOLDING CONDUCTORS TO THE MODULES AND UV RATED TY-RAPS HOLDING CONDUCTORS TO THE STRUCTURE MEMBERS, EVERY FORTH CABLE TIE SHALL BE A VINYL JACKETED STAINLESS STEEL CABLE TIE WITH A CRIMP SLEEVE. ALL OTHER CIRCUITING SHALL BE IN CONDUIT. EMT MAY BE USED IN WET OR DRY LOCATIONS NOT SUBJECT TO MECHANICAL DAMAGE. PVC SCHEDULE 40 WITH WRAPPED RIGID ELBOWS FOR STUBS UPS SHALL BE USED IN CONCRETE AND BELOW GRADE. ALL WIRING METHODS AND MATERIALS SHALL COMPLY TO NEC CHAPTER 3.
2. ALL COMBINER BOXES. WIREWAYS, JUNCTION BOXES AND OTHER ELECTRICAL EQUIPMENT MOUNTED TO THE ARRAY STRUCTURE SHALL HAVE 1-5/8" UNISTRUT BOLTED TO THE 1-1/2" PIPE WITH U-BOLTS. TECK SCREWS ARE NOT ALLOWED TO ATTACH EQUIPMENT OR UNISTRUT TO THE ARRAY STRUCTURE.
3. WEEB CLIPS SHALL BE USED TO BOND THE MODULES TO THE ARRAY RACKING RAIL. (2) WEEBS PER MODULE ARE REQUIRED. THE RAILS SHALL BE BONDED TOGETHER WITH A #10 AWG SOLID COPPER CONDUCTOR AND AN APPROVED GROUND LUG. BOND WIRE SHALL ORIGINATE AT THE COMBINER BOX AND BOND ARRAY TO EXISTING ELECTRICAL SERVICE GROUND SYSTEM.



ARRAY PLAN

NOT TO SCALE

NORTH

Construction Design Services, inc.
ELECTRICAL ENGINEERING

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DRAWN BY: DN
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REGISTERED PROFESSIONAL ENGINEER
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CARSON CITY WASTE WATER TREATMENT
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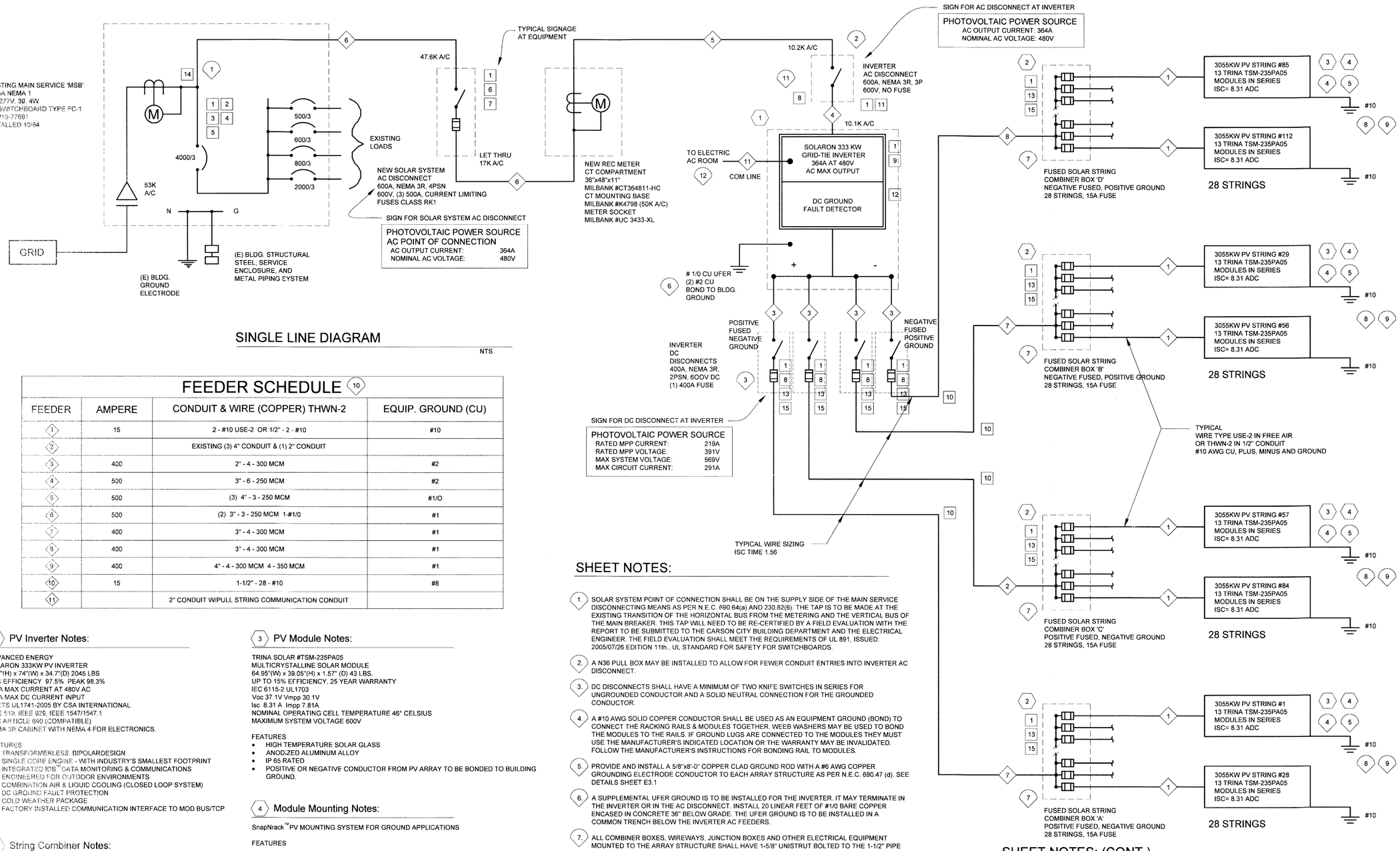
ELECTRICAL PANEL WIRING

SHEET
E1.1



SINGLE LINE DIAGRAM

NTS

FEEDER SCHEDULE (10)

FEEDER	AMPERE	CONDUIT & WIRE (COPPER) THWN-2	EQUIP. GROUND (CU)
1	15	2 - #10 USE-2 OR 1/2" - 2 - #10	#10
2		EXISTING (3) 4" CONDUIT & (1) 2" CONDUIT	
3	400	2" - 4 - 300 MCM	#2
4	500	3" - 6 - 250 MCM	#2
5	500	(3) 4" - 3 - 250 MCM	#1/O
6	500	(2) 3" - 3 - 250 MCM 1-#1/0	#1
7	400	3" - 4 - 300 MCM	#1
8	400	3" - 4 - 300 MCM	#1
9	400	4" - 4 - 300 MCM 4 - 350 MCM	#1
10	15	1-1/2" - 28 - #10	#8
11		2" CONDUIT W/PULL STRING COMMUNICATION CONDUIT	

(1) PV Inverter Notes:

ADVANCED ENERGY
SOLARON 333KW PV INVERTER
81.2"(H) x 74"(W) x 34.7"(D) 2045 LBS
CEC EFFICIENCY 97.5% PEAK 98.3%
400A MAX CURRENT AT 480V AC
500A MAX DC CURRENT INPUT
MEETS UL1741-2005 BY CSA INTERNATIONAL
IEEE 519, IEEE 929, IEEE 1547/1547.1
NEC ARTICLE 690 (COMPATIBLE)
NEMA 3R CABINET WITH NEMA 4 FOR ELECTRONICS.

FEATURES
- TRANSFORMERLESS BIPOLARDESIGN
- SINGLE CORE ENGINE - WITH INDUSTRY'S SMALLEST FOOTPRINT
- INTEGRATED IDS™ DATA MONITORING & COMMUNICATIONS
- ENGINEERED FOR OUTDOOR ENVIRONMENTS
- COMBINATION AIR & LIQUID COOLING (CLOSED LOOP SYSTEM)
- DC GROUND FAULT PROTECTION
- COLD WEATHER PACKAGE
- FACTORY INSTALLED COMMUNICATION INTERFACE TO MOD BUS/TCP

(2) String Combiner Notes:

AMTEC SOLAR #PR-36-FG
PROMINENCE SERIES 36 STRING COMBINER BOX
BOX RATED 540A AT 1000V DC
25.59"(H) x 21.59"(W) x 10.39"(D) 45 LBS.

FEATURES
- NEMA 4x FIBERGLASS ENCLOSURE
- 36 FINGER SAFE, NON-LOAD BREAK FUSE HOLDERS 30A , 1000V DC RATED
- BUSBARS C11000 ALLOY (COPPER) ELECTRO PLATED TO PREVENT CORROSION, RATED CONTINUOUS DUTY
- LEXAN SAFETY SHIELDS OVER ALL LIVE PARTS
- ALL COMPONENTS LABELED, WIRE RANGES, TORQUE VALUES
- INSULATORS SUPPORT ALL BUSBARS 1000V DC RATED
- LISTED TO UL 1741, CAN.CSA C22.2 LISTED CE LISTED @ 1000V DC

(3) PV Module Notes:

TRINA SOLAR #TSM-235PA05
MULTICRYSTALLINE SOLAR MODULE
64.95"(W) x 39.05"(H) x 1.57" (D) 43 LBS.
UP TO 15% EFFICIENCY, 25 YEAR WARRANTY
IEC 6115-2 UL1703
Voc 37.1V Vmpp 30.1V
Isc 8.31 A Impp 7.81A
NOMINAL OPERATING CELL TEMPERATURE 46° CELSIUS
MAXIMUM SYSTEM VOLTAGE 600V

FEATURES
- HIGH TEMPERATURE SOLAR GLASS
- ANODIZED ALUMINUM ALLOY
- IP 65 RATED
- POSITIVE OR NEGATIVE CONDUCTOR FROM PV ARRAY TO BE BONDED TO BUILDING GROUND.

(4) Module Mounting Notes:

SnapNrack™ PV MOUNTING SYSTEM FOR GROUND APPLICATIONS

FEATURES
- THE SnapNracK™ GROUND RAIL AND RAIL TO PIPE CLAMP SIMPLIFIES INSTALLING MULTI-POLE, FIXED TILT GROUND MOUNT SYSTEMS.
- THE GROUND RAIL ACCEPTS ALL THE STANDARD MODULE MOUNTING CLAMPS AND THE PIPE CLAMP IS DESIGNED FOR 1.5" SCHEDULE 40 STEEL PIPE SUBSTRUCTURES.
- CAN BE INSTALLED WITH TILT ANGLES UP TO 45 DEGREES AND IN LOCATIONS THAT MAY SEE WINDS SPEEDS UP TO 105 MPH.

SHEET NOTES:

1. SOLAR SYSTEM POINT OF CONNECTION SHALL BE ON THE SUPPLY SIDE OF THE MAIN SERVICE DISCONNECTING MEANS AS PER N.E.C. 690.64(a) AND 230.82(6). THE TAP IS TO BE MADE AT THE EXISTING TRANSITION OF THE HORIZONTAL BUS FROM THE METERING AND THE VERTICAL BUS OF THE MAIN BREAKER. THIS TAP WILL NEED TO BE RE-CERTIFIED BY A FIELD EVALUATION WITH THE REPORT TO BE SUBMITTED TO THE CARSON CITY BUILDING DEPARTMENT AND THE ELECTRICAL ENGINEER. THE FIELD EVALUATION SHALL MEET THE REQUIREMENTS OF UL 891, ISSUED: 2005/07/26 EDITION 11th., UL STANDARD FOR SAFETY FOR SWITCHBOARDS.
2. A N36 PULL BOX MAY BE INSTALLED TO ALLOW FOR FEWER CONDUIT ENTRIES INTO INVERTER AC DISCONNECT.
3. DC DISCONNECTS SHALL HAVE A MINIMUM OF TWO KNIFE SWITCHES IN SERIES FOR UNGROUNDED CONDUCTOR AND A SOLID NEUTRAL CONNECTION FOR THE GROUNDED CONDUCTOR.
4. A #10 AWG SOLID COPPER CONDUCTOR SHALL BE USED AS AN EQUIPMENT GROUND (BOND) TO CONNECT THE RACKING RAILS & MODULES TOGETHER. WEEB WASHERS MAY BE USED TO BOND THE MODULES TO THE RAILS. IF GROUND LUGS ARE CONNECTED TO THE MODULES THEY MUST USE THE MANUFACTURER'S INDICATED LOCATION OR THE WARRANTY MAY BE INVALIDATED. FOLLOW THE MANUFACTURER'S INSTRUCTIONS FOR BONDING RAIL TO MODULES.
5. PROVIDE AND INSTALL A 5/8"x8'-0" COPPER CLAD GROUND ROD WITH A #6 AWG COPPER GROUNDING ELECTRODE CONDUCTOR TO EACH ARRAY STRUCTURE AS PER N.E.C. 690.47 (d). SEE DETAILS SHEET E3.1
6. A SUPPLEMENTAL UFER GROUND IS TO BE INSTALLED FOR THE INVERTER. IT MAY TERMINATE IN THE INVERTER OR IN THE AC DISCONNECT. INSTALL 20 LINEAR FEET OF #1/0 BARE COPPER ENCASED IN CONCRETE 36" BELOW GRADE. THE UFER GROUND IS TO BE INSTALLED IN A COMMON TRENCH BELOW THE INVERTER AC FEEDERS.
7. ALL COMBINER BOXES, WIREWAYS, JUNCTION BOXES AND OTHER ELECTRICAL EQUIPMENT MOUNTED TO THE ARRAY STRUCTURE SHALL HAVE 1-5/8" UNISTRUT BOLTED TO THE 1-1/2" PIPE WITH U-BOLTS. TECK SCREWS ARE NOT ALLOWED TO ATTACH EQUIPMENT OR UNISTRUT TO THE ARRAY STRUCTURE.
8. WEEB CLIPS SHALL BE USED TO BOND THE MODULES TO THE ARRAY RACKING RAIL. (2) WEEBS PER MODULE ARE REQUIRED. THE RAILS SHALL BE BONDED TOGETHER WITH A #10 AWG SOLID COPPER CONDUCTOR AND AN APPROVED GROUND LUG. BOND WIRE SHALL ORIGINATE AT THE COMBINER BOX AND BOND ARRAY TO EXISTING ELECTRICAL SERVICE GROUND SYSTEM.
9. PROVIDE & INSTALL A 5/8" x8'-0" COPPER CLAD GROUND ROD AND A #6 AWG COPPER GROUND CONDUCTOR TERMINATING IN AN APPROVED GROUND LUG ON THE RACKING RAIL OF EACH ARRAY STRUCTURE AS PER N.E.C. 690.47(D), SEE DETAIL SHEET E3.1
10. ALL UNDERGROUND FEEDERS TO BE ENCASED IN A RED CONCRETE SLURRY. TYPICALLY 5-200 PSI, 15-35% AIR, 3-10 SLUMP MIXES, WITH RED DYE.

SHEET NOTES: (CONT.)

11. INSTALL GFCI MAINTENANCE RECEPTACLE BELOW INVERTER DISCONNECT. INSTALL (2) #2 THWN-2 CONDUCTORS IN ONE OF THE THREE FEEDERS. THIS CIRCUIT WILL ALSO FEED A HANDY BOX WITH A DUPLEX RECEPTACLE IN THE FIBER OPTIC CABINET BEHIND THE INVERTER DISCONNECT. THE #2 THWH-2 CONDUCTORS SHALL BE REDUCED IN SIZE TO #12 THWN-2 CONDUCTORS AT THE MAIN SERVICE BUILDING AND AT THE INVERTER DISCONNECT UNDERGROUND PULL BOX. INCLUDE IN BID A 20/1, BOLT ON BREAKER AND 30' OF GRC OR IMC RUN ON THE EXTERIOR AND IN THE INTERIOR OF THE ELECTRICAL ROOM FROM THE 24x30x10 EXTERIOR PULL CAN TO THE NEAREST 208v PANEL WITH A SPARE SPACE FOR THE MAINTENANCE RECEPTACLE CIRCUIT.
12. DATA ACQUISITION SYSTEM, EXTEND EXISTING 2" CONDUIT, STUBBED AT THE NORTHEAST CORNER OF THE MAIN SERVICE ENTRANCE BUILDING, TO THE COMMUNICATION CABINET IN THE ELECTRICAL, +/- 30 FEET AND THE NEW TELEMETRY ENCLOSURE NEAR THE INVERTER. SEE THE DETAIL SCOPE OF WORK IN THE BID DOCUMENTS FOR THE SPECIFICATIONS OF THIS WORK. SEE DETAILS ON SHEET E3.0

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Conservation, Generation, Innovation
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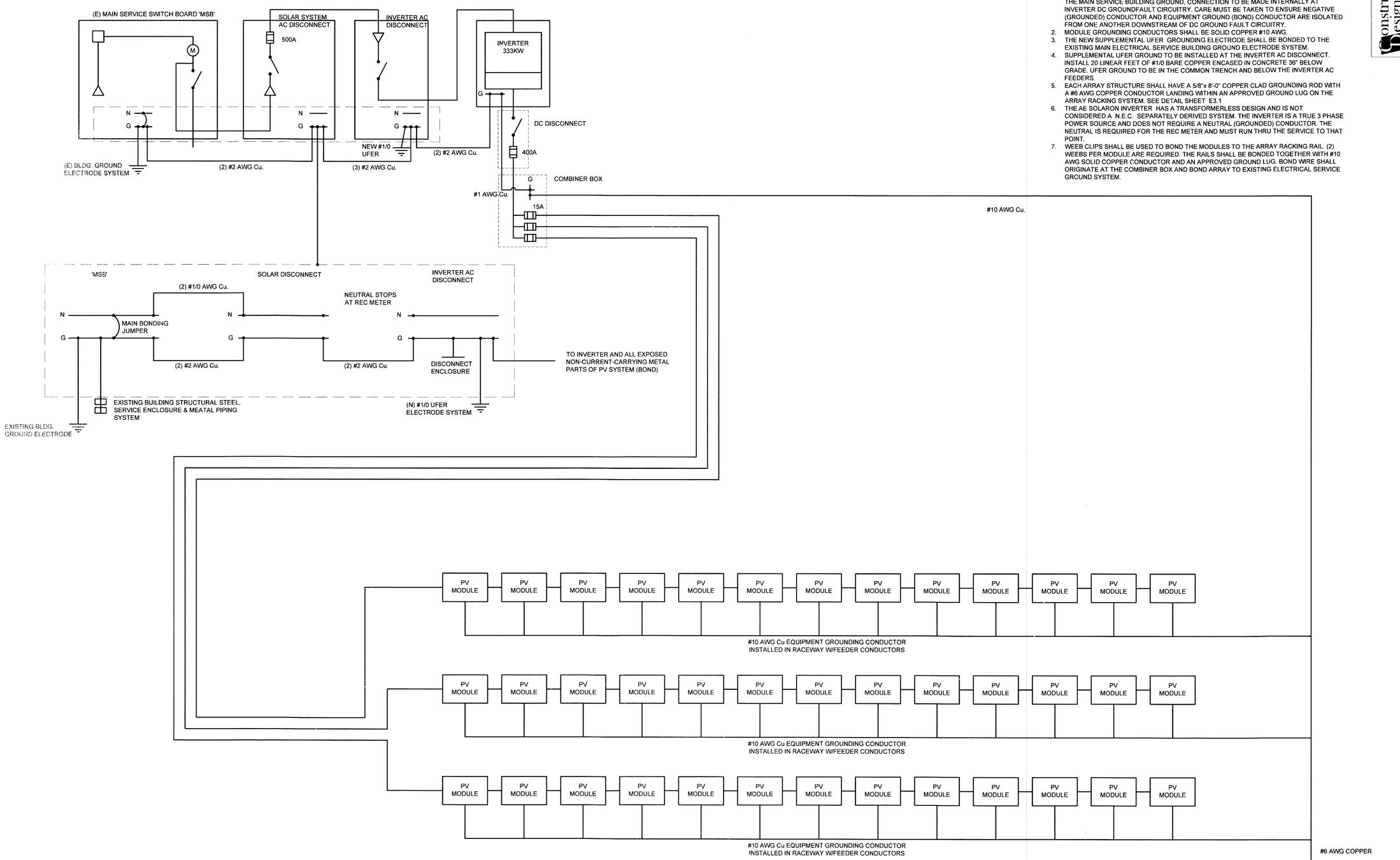
PROFESSIONAL ENGINEER - STATE OF NEVADA
MICHAEL A. PECORINO
Exp. 12-31-11
ELECTRICAL
No. 15678

REV.	DATE	DESCRIPTION	BY	APPD
0	06/30/2011	INITIAL DESIGN	CG	RC
1	09/26/2011	REVISION 1	CG	RC
2	12/06/2011	INITIAL RE-DESIGN	CG	RC

CARSON CITY WASTE WATER TREATMENT
PLANT SOLAR PHOTOVOLTAIC PROJECT
3320 EAST 5TH ST., CARSON CITY, NV 89701
PROJECT NO. - 2.0805

ELECTRICAL SINGLE LINE

SHEET
E2.0



GROUNDING & BONDING DETAILS

NTS

General Notes:

1. POSITIVE OR NEGATIVE CONDUCTOR OF THE PV ARRAY TO BE SOLIDLY GROUNDED TO THE MAIN SERVICE BUILDING GROUND, CONNECTION TO BE MADE INTERNALLY AT INVERTER DC GROUNDFAULT CIRCUITRY. CARE MUST BE TAKEN TO ENSURE NEGATIVE (GROUNDED) CONDUCTOR AND EQUIPMENT GROUND (BOND) CONDUCTOR ARE ISOLATED FROM ONE ANOTHER DOWNSTREAM OF DC GROUND FAULT CIRCUITRY.
2. MODULE GROUNDING CONDUCTORS SHALL BE SOLID COPPER #10 AWG.
3. THE NEW SUPPLEMENTAL UFER GROUNDING ELECTRODE SHALL BE BONDED TO THE EXISTING MAIN ELECTRICAL SERVICE BUILDING GROUND ELECTRODE SYSTEM.
4. SUPPLEMENTAL UFER GROUND TO BE INSTALLED AT THE INVERTER AC DISCONNECT. INSTALL 20 LINEAR FEET OF #1/0 BARE COPPER ENCASED IN CONCRETE 36" BELOW GRADE. UFER GROUND TO BE IN THE COMMON TRENCH AND BELOW THE INVERTER AC FEEDERS.
5. EACH ARRAY STRUCTURE SHALL HAVE A 5/8"x 8'-0" COPPER CLAD GROUNDING ROD WITH A #6 AWG COPPER CONDUCTOR LANDING WITHIN AN APPROVED GROUND LUG ON THE ARRAY RACKING SYSTEM. SEE DETAIL SHEET E3.1
6. THE AE SOLARON INVERTER HAS A TRANSFORMERLESS DESIGN AND IS NOT CONSIDERED A N.E.C. SEPARATELY DERIVED SYSTEM. THE INVERTER IS A TRUE 3 PHASE POWER SOURCE AND DOES NOT REQUIRE A NEUTRAL (GROUNDED) CONDUCTOR. THE NEUTRAL IS REQUIRED FOR THE REC METER AND MUST RUN THRU THE SERVICE TO THAT POINT.
7. WEEB CLIPS SHALL BE USED TO BOND THE MODULES TO THE ARRAY RACKING RAIL. (2) WEEBS PER MODULE ARE REQUIRED. THE RAILS SHALL BE BONDED TOGETHER WITH #10 AWG SOLID COPPER CONDUCTOR AND AN APPROVED GROUND LUG. BOND WIRE SHALL ORIGINATE AT THE COMBINER BOX AND BOND ARRAY TO EXISTING ELECTRICAL SERVICE GROUND SYSTEM.

Construction Design Services, inc.
ELECTRICAL ENGINEERING

DESIGNED BY: RC
DRAWN BY: DN
CHECKED BY: RC
DWG NO.:
SCALE (HORIZ): AS SHOWN
SCALE (VERT): AS SHOWN
PLOT DATE: 12-9-2011

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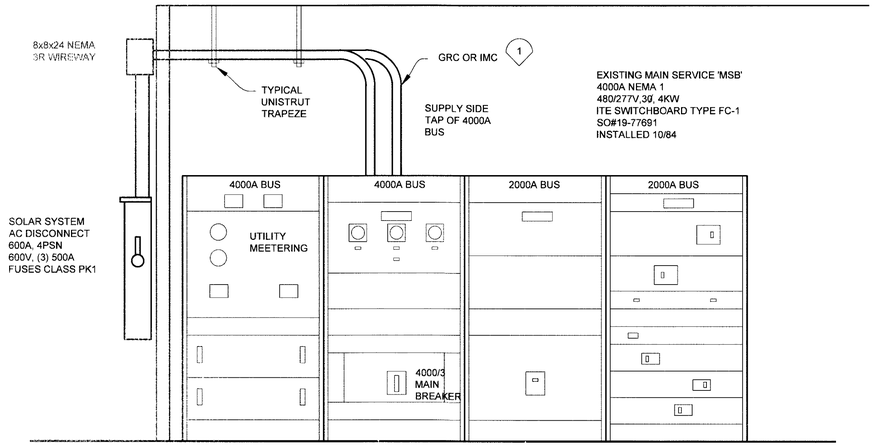
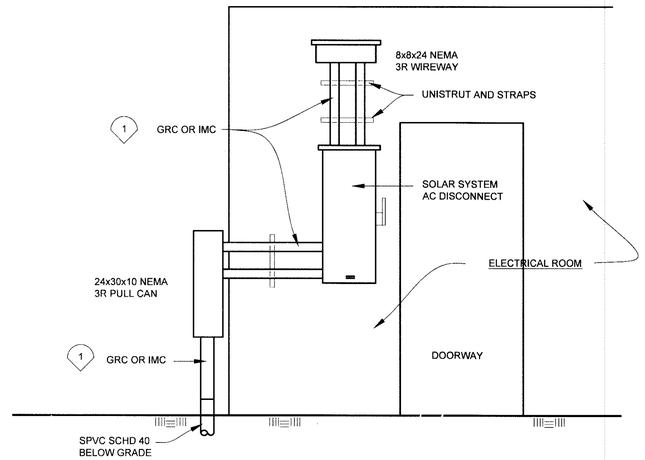
ELECTRICAL GROUNDING & BONDING DETAILS

SHEET
E2.1



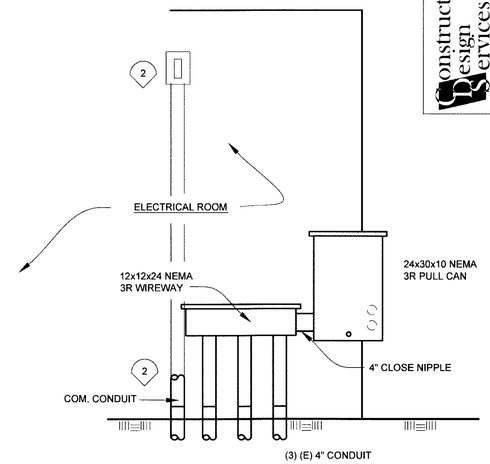
Electrical Room 'MSB'

NTS



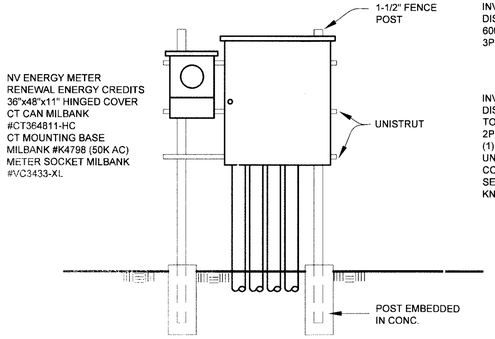
North Face Main Service Entrance Building

NTS



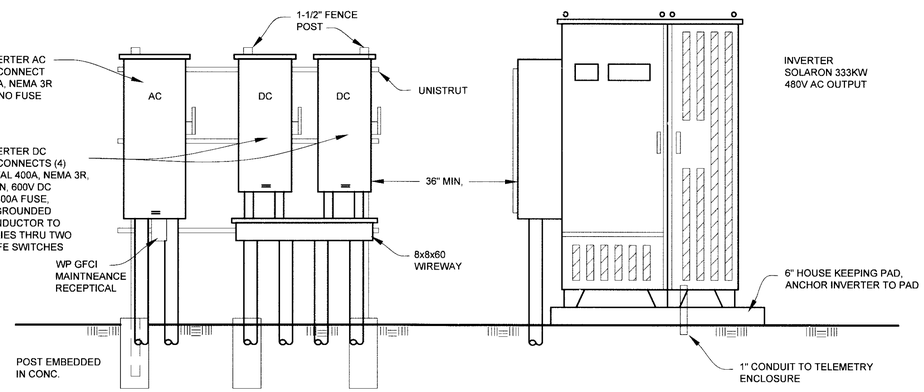
East Face Main Service Entrance Building

NTS



REC Meter

NTS

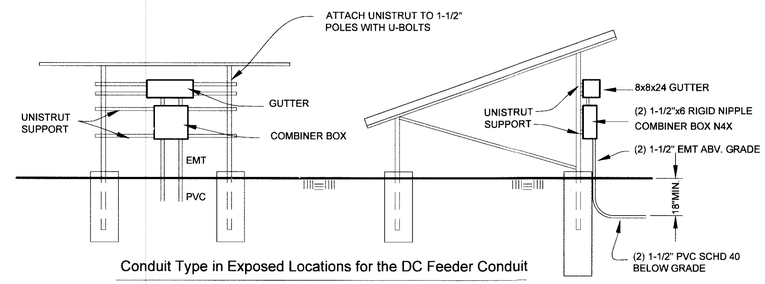


Inverter & Disconnects

NTS

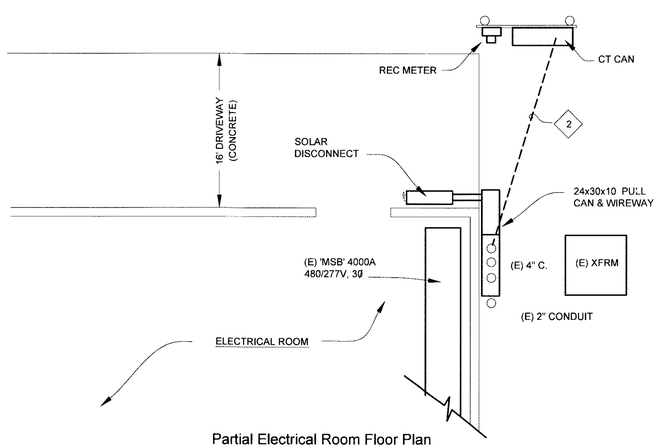
Equipment and Switchgear Elevations

NTS



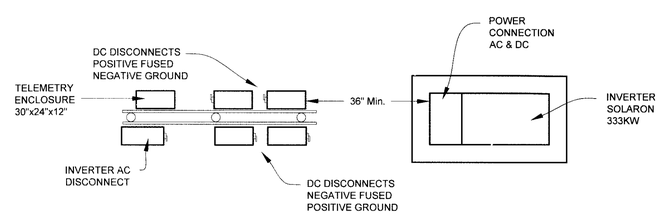
Conduit Type in Exposed Locations for the DC Feeder Conduit

NTS



Partial Electrical Room Floor Plan

NTS



Inverter Pad Floor Plan

NTS

SHEET NOTES:

1. GRC OR IMC TO MATCH EXISTING CONDUITS RAN IN THE MAIN SERVICE ENTRANCE BUILDING
2. EXTEND 2" COMMUNICATION CONDUIT TO FAR END OF ELECTRICAL ROOM +/- 30 FEET TO EXISTING COMMUNICATION CABINET.
3. TELEMETRY ENCLOSURE, INSTALL A HANDY BOX WITH A DUPLEX RECEPTACLE INSIDE ENCLOSURE, 2" CONDUIT BACK TO MAIN SERVICE ENTRANCE BUILDING AND A 1" CONDUIT TO THE INVERTER.

Construction Design Services, inc.
ELECTRICAL ENGINEERING

DESIGNED BY: RC
DRAWN BY: DN
CHECKED BY: RC
DWG NO.
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CARSON CITY WASTE WATER TREATMENT
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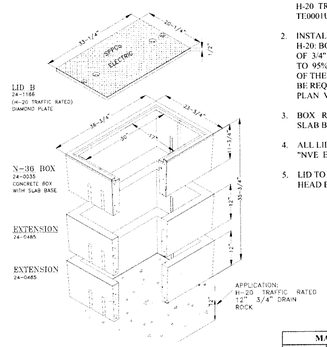
ELECTRICAL EQUIPMENT ELEVATIONS

SHEET
E3.0

17" X 30" BOX H-20 TRAFFIC CONCRETE VB0057U

17" X 30" BOX CONCRETE H-20 TRAFFIC RATED ISOMETRIC DETAIL



STK#	DESCRIPTION	WEIGHT (LBS)
24-0035	CONCRETE H-20 BOX WITH SLAB BASE	318.113
24-0485	12"" CONC. EXTN H-20	244
24-1186	LID B H-20 RATED PLATE	111

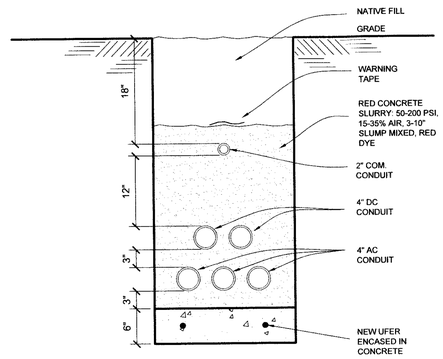
CONSTRUCTION NOTES

1. BOX TO BE USED IN: H-20 TRAFFIC APPLICATIONS. SEE TE0001U, SECTION 2.
2. INSTALLATION: H-20 BOX TO BE PLACED ON 12" OF 3/4" DRAIN ROCK, COMPACTED TO 95%. A FULL CONCRETE WRAP OF THE TOP SECTION OF BOX WILL BE REQUIRED. SEE TE0020U, "BOX PLAN VIEW."
3. BOX REQUIRES 2 EXTENSIONS AND SLAB BASE.
4. ALL LIDS/COVERS TO BE MARKED "NVE ELECTRIC".
5. LID TO BE SECURED WITH 2 PENTA HEAD BOLTS.

MAXIMUM CONDUCTORS			
N-36 BOX	MAX RUNS	< 350 TX OR QX	< 4/0 TX OR QX
1PHASE	6	2	4
3PHASE	4	2	2

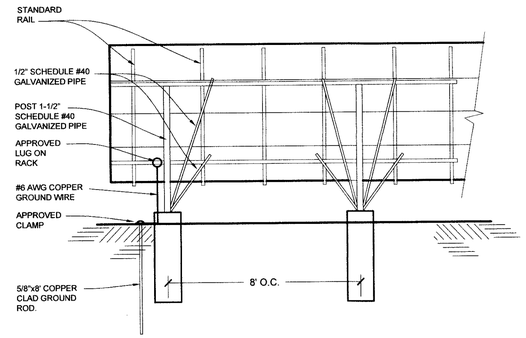
NOTE: REFER TO CAB 09U VOLUME 5 FOR COMPLETE APPLICATION

NVEnergy	VOLUME 5 – ENGINEERING & CONSTRUCTION STANDARD	VB0057U
Drawn: JVS / Eng: MB / Appr: DA / Date: 2/08	17" X 30" BOX H-20 TRAFFIC CONCRETE	Revision: 4 Page 1 of 1



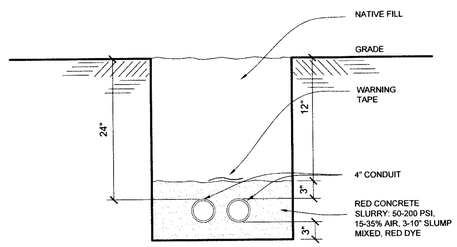
DC FEEDERS

NTS



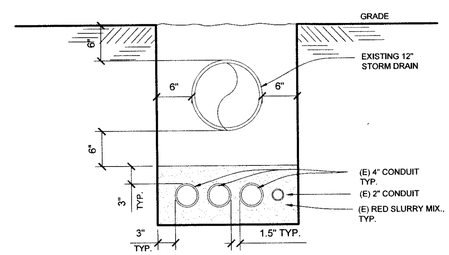
ARRAY GROUND DETAIL - REAR ELEVATION

NTS



DC FEEDERS

NTS



DC FEEXISTING FEEDER #2 DETAILS

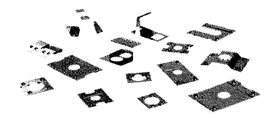
NTS

TRENCH DETAILS

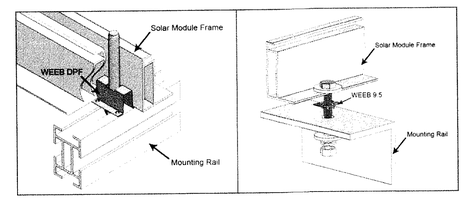
wiley

WEEB Washer, Electrical Equipment Bond

The WEEB line of products is designed to bond solar PV modules to mounting structures and create an electrical path to ground. WEEBs eliminate the need for older, more costly grounding methods and greatly reduce the amount of labor and materials used in installations. The innovative WEEB design removes the need to run ground wire to each individual module and eliminates the need for surface preparation on anodized aluminum components. To install, WEEBs are placed between PV modules and mounting rails at clamping points or at bolted connections. When anti-seize is applied and the hardware is tightened down to the appropriate torque spec, the WEEBs' specialized teeth embed into anodized aluminum, galvanized steel, or any electrically conductive metal to establish a gas tight electrical connection.



- Material: 304 stainless steel
- Listed to ANSI-UL 467 by Intertek ETL for use in Canada and the USA
- Maximum electrical equipment ground conductor size when used with 2 WEEBs contacting each module in an assembly: 6 AWG
- Outdoor rated



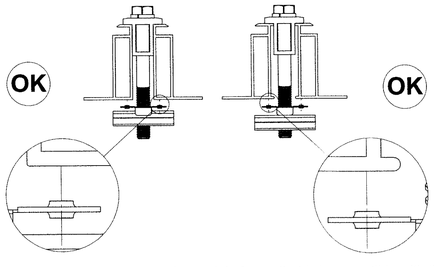
Contact us at: 845.247.4798 www.wiley.com

WEEB COMPATIBILITY

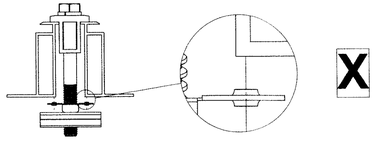
The WEEB family of products can be used to bond anodized aluminum, galvanized steel, steel and other electrically conductive metal structures.

Standard Top Down Clamps

The WEEBs used for bonding the PV modules to the mounting rails are compatible with various cross-sections of module frames. The following are examples of module frames that are compatible. Notice that the WEEB teeth are positioned completely under the edge of the module frame.



The following is an example of a module frame that is incompatible with the WEEB. The WEEB teeth are positioned only partially under the edge of the module due to the lip on the top edge of the module.



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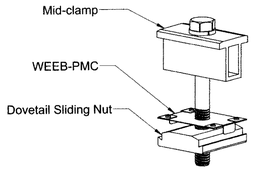
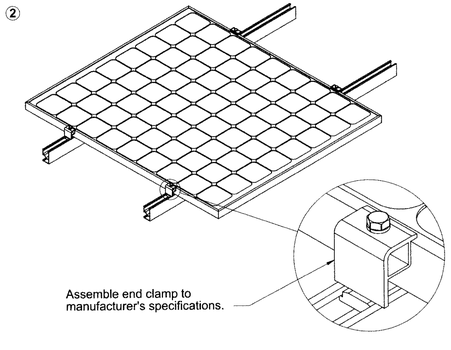
WEEB-PMC ASSEMBLY

①



Pre-assemble WEEB-PMC to mid-clamp assembly as shown. Pre-assembling WEEB-PMC to mid-clamp assembly will contain the small individual parts, reducing the possibility of losing parts during installation.

②



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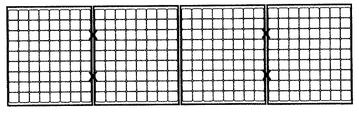
WEEB-PMC LAYOUT

⑥

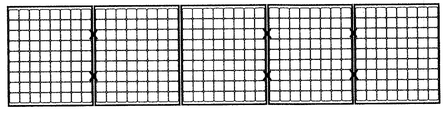
EVEN NUMBER OF MODULES IN ROW



X DENOTES PLACES TO INSTALL WEEB-PMC

C X R = 4 X 1
WEEB-PMC NEEDED = C X R = 4 X 1 = 4

ODD NUMBER OF MODULES IN ROW



X DENOTES PLACES TO INSTALL WEEB-PMC

C X R = 5 X 1
WEEB-PMC NEEDED = [C+1] X R = [5+1] X 1 = 6

Note:
When replacing a single faulty module, also remove the adjacent module which contacts the same WEEBs as the faulty module. This will ensure that there are never ungrounded modules in the array.

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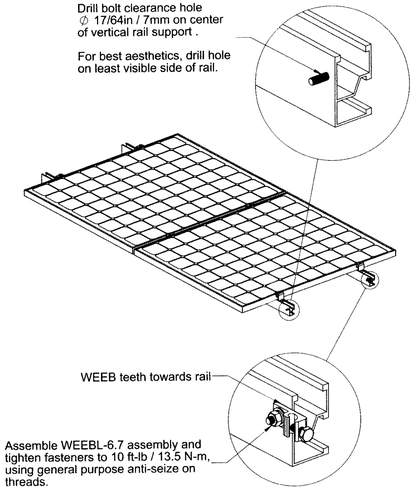
WEEBLUG ASSEMBLY

⑦



Important note:
WEEB-6.7 that sits under the WEEBLug is for SINGLE USE ONLY! Ensure position is correct before tightening.

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ELECTRICAL DETAILS

SHEET
E4.0

NOTE: SIGNS SHALL HAVE YELLOW BACKGROUNDS WITH BLACK LETTERS AND SHALL BE PERMANENTLY ATTACHED WITH SCREWS. SHALL BE NON-REVERSABLE TYPE. LETTERING SHALL BE ENGRAVED AND BE SUITABLE FOR THE ENVIRONMENT.

1 GENERAL SAFETY SIGN

⚠ WARNING!
ELECTRIC SHOCK HAZARDS DO NOT TOUCH TERMINALS TERMINALS ON BOTH SIDES MAY BE ENERGIZED IN THE OPEN POSITION

2 SIGN FOR MAIN SERVICE PANEL

THIS SERVICE IS FED FROM MULTIPLE SOURCES GRID AND PV ARRAY

3 SIGN FOR MAIN SERVICE PANEL

⚠ WARNING!
TURN OFF PHOTOVOLTAIC AC DISCONNECT PRIOR TO WORKING INSIDE PANEL

4 SIGN FOR MAIN SERVICE PANEL

CAUTION: SOLAR ELECTRIC SYSTEM CONNECTED

5 SIGN FOR MAIN SERVICE PANEL

⚠ CAUTION
POWER TO THIS BUILDING IS ALSO SUPPLIED FROM THE FOLLOWING SOURCES WITH DISCONNECT LOCATED AS SHOWN:
BUILDING MAP HERE

6 SIGN FOR SOLAR SYSTEM AC DISCONNECT

SOLAR AC DISCONNECT FOR UTILITY OPERATION

7 SIGN FOR SOLAR SYSTEM AC DISCONNECT

⚠ CAUTION
PHOTOVOLTAIC POWER SOURCE
AC OUTPUT OF CONNECTION
AC OUTPUT CURRENT 364A
NOMINAL AC VOLTAGE 480V

8 SIGN FOR INVERTER DC DISCONNECTS

⚠ CAUTION
SOLAR DC DISCONNECT
RATED IMPP CURRENT 219A
RATED VMPP VOLTAGE 391V
MAX SYSTEM VOLTAGE 569V
MAX CIRCUIT CURRENT 291A

9 SIGN FOR INVERTER AC DISCONNECT

⚠ CAUTION
SOLAR AC DISCONNECT
AC OUTPUT CURRENT 364A
NOMINAL AC VOLTAGE 480V

10 SIGN FOR CONDUIT

CAUTION: SOLAR CIRCUIT

11 SIGN FOR INVERTER

SOLAR SOURCE EMERGENCY DISCONNECT
RED WITH WHITE LETTERS

12 SIGN FOR INVERTER AT GROUND-FAULT INDICATOR

⚠ WARNING
ELECTRIC SHOCK HAZARD IF GROUND FAULT IS INDICATED, NORMALLY GROUNDED CONDUCTORS MAY BE UNGROUNDED AND ENERGIZED

13 DC DISCONNECT & COMBINER BOX

⚠ WARNING
OPEN INVERTER AC DISCONNECT SWITCH PRIOR TO OPENING OR CLOSING ANY DC DISCONNECT OR DC FUSE BLOCK

14 SIGN FOR MAIN SERVICE

PHOTOVOLTAIC SUPPLY SIDE TAP LOCATED AT THIS POINT

15 BiPOLAR SOURCE AND OUTPUT CIRCUITS

⚠ WARNING
BIPOLAR PHOTOVOLTAIC ARRAY DISCONNECTION OF NEUTRAL OR GROUNDED CONDUCTORS MAY RESULT IN OVERVOLTAGE ON ARRAY OR INVERTER

SAFETY SIGNS

Engineering Specification Sheet
PROMINENCE SERIES 36 string combiner box

GENERAL INFORMATION

- **Description:** 36 string fused combiner box with 540A at 1000VDC maximum output.
- **Dimensions:**

		Part number
NEMA 4X Fiberglass (Standard):	25.59" x 21.59" x 10.39", 45 lbs.	PR-36-FG
NEMA 4 Metallic (Optional):	25.59" x 21.59" x 10.39", 52 lbs.	PR-36-S
NEMA 4X 316 Stainless (Optional)	25.59" x 21.59" x 10.39", 59 lbs.	PR-36-SS

- **Fuse holders:** 36 finger safe, non-load break fuse holders. 30A, 1000VDC rated.

TECHNICAL SPECIFICATIONS

Input Wires:	Fuses:	36 total, 8-14AWG, 75°C, Cu Wire
Output Wires:	Fused, Non-Fused:	2 ea. 350MCM-6AWG, 90°C, Cu/Al Wire
Ground Terminals:		2 ea. 350MCM-6AWG, 90°C, Cu/Al Wire 13 total, 4-14AWG, 90°C, Cu/Al Wire
Operating Temperature, Humidity:		-10°C to +60°C (15°F to 130°F), 0-100% Humidity

- **Busbars:** C11000 Alloy (Copper), electroplated to prevent corrosion. Rated continuous duty.

FEATURES

- **Safety shields:** Lexan shields over all live parts for a completely deadfront unit.
- **Labeling:** All components, wire ranges, torque values silkscreened onto backpan.
- **Mounting panel:** White powder coat with integrated wire management, hydraulically inserted threaded nuts for maximum gripping strength.
- **Insulators:** All busbars are supported by 1000VDC rated insulators for added rigidity.

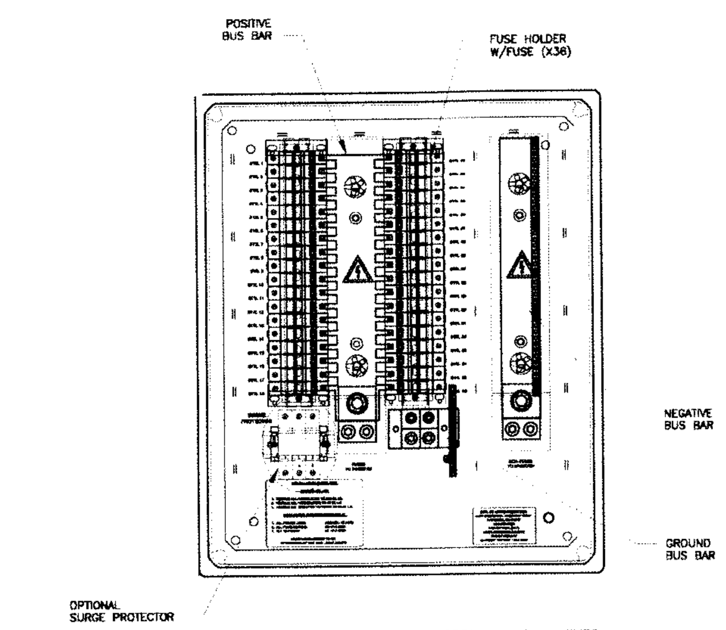
OPTIONS

- **Surge Protection:** Surge protection can be added for an additional cost. Just add "SP" at the end of part number.

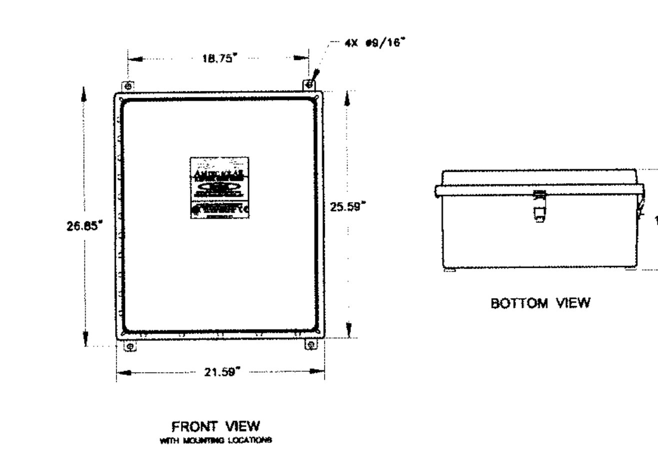
APPROVALS

- Listed to UL1741, CAN/CSA C22.2 Listed, CE Listed @ 1000Volts.

AMtec Solar
2501 Industrial Parkway West, Hayward CA 94545
www.amtecsolar.com
510.887.2289



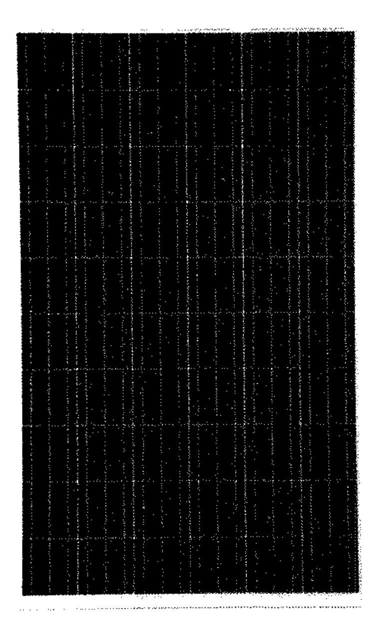
DRAWING ABOVE SHOWS INTERNAL COMPONENTS



-Layouts shown are for standard NEMA 4X fiberglass enclosure-

AMtec Solar
2501 Industrial Parkway West, Hayward CA 94545
www.amtecsolar.com
510.887.2289

The Universal Solution



Module can bear snow loads up to 5400Pa and wind loads up to 2400Pa

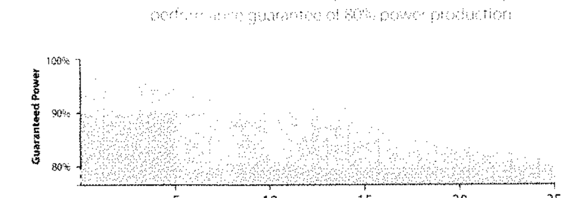
Guaranteed power output (0~+3%)

High performance under low light conditions (Cloudy days, mornings and evenings)

Independently certified by international certification bodies

Manufactured according to International Quality and Environment Management System (ISO9001, ISO14001)

linear performance warranty



Trina Solar (U.S.), Inc.
100 Century Center,
Suite 340, San Jose CA 95112,
USA

T +1 800 696 7114
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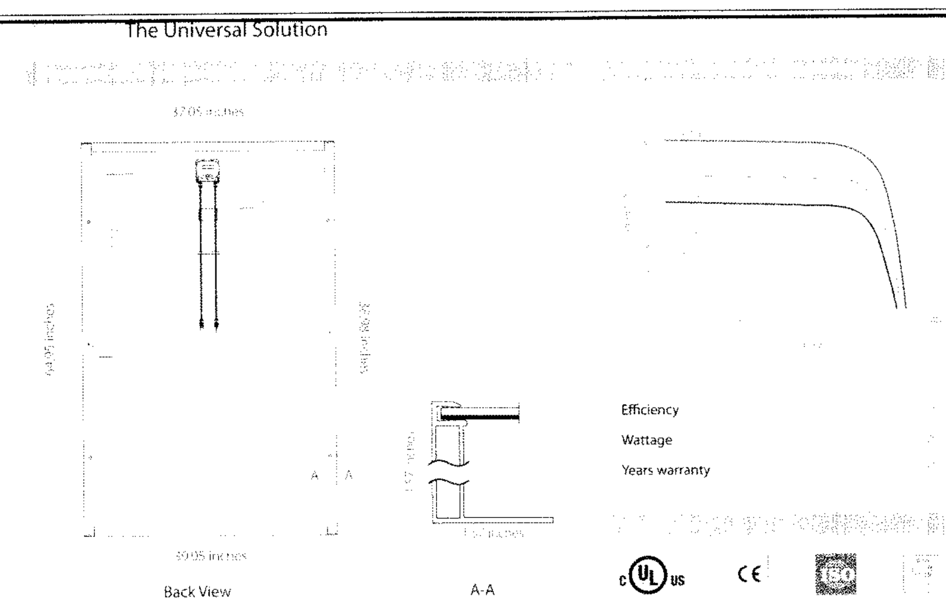
E usa@trinasolar.com

Only by matching an efficient cost-structure with proven performance will we, as an industry, achieve grid parity. And at Trina Solar, we have both.

The Universal Solution



CAUTION:

kW PV Inverter

Benefits

Increase system ROI

Reduce balance-of-system (BoS) costs

Expect high energy output in various outdoor environments

Monitor and control with flexible, integrated communications

Rely on worldwide service and support

Features

333 kW, transformerless, bipolar design

Single core engine—with the industry's smallest footprint and lightest weight in its class

97.5% CEC efficiency

Integrated IDS™ data monitoring and communications

Remote PV Tie (RPT™) accessory

Nearly three decades of experience in solar PV industry

24 x 7 x 365 global service and support

Awards

2009 recipient of ECN Magazine Reader's Choice Tech Award in the Energy Efficiency category

2009 Solar Awards winner in the Energy Usage category

2009 recipient of EE Times ACE Award in the Most Innovative Renewable Energy category

2008 recipient of Frost & Sullivan North American Product Innovation Award

The Solaron® 333 kW inverter is a truly advanced photovoltaic inverter for commercial grid-tie PV installations. With 97.5% CEC and 98.3% peak efficiencies, the 333 kW model offers integrators and independent power producers higher PV system ROI and better BoS optimization. Both local and remote communications and control are always available via the IDS™ integrated data system for greater performance insight. An optional Remote PV Tie (RPT™) accessory can cut your BoS costs even further, and our SafeGuard® program offers proactive service that goes far beyond the standard warranty.

The Solaron® 333 kW PV inverter, with its reliable design and upgraded features, is ideally suited for commercial PV installations. This field-proven bipolar, transformerless inverter helps you increase energy harvest and realize a substantial return on your solar technology investment.

With its robust controls, closed-loop cooling, and patented, soft-switching technology, the Solaron inverter repeatably achieves breakthrough 97.5% CEC and 98.3% peak efficiencies. Higher total system efficiency means better cost-per-kWh over the life of your PV system.

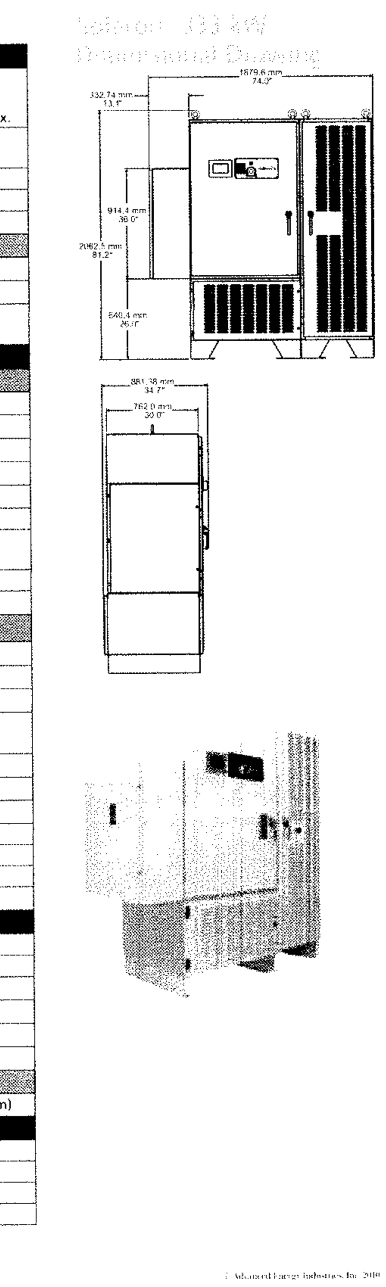
A secure, integrated LCD and keypad provide fundamental unit data on the exterior inverter cabinet. In addition, the on-board Integrated Data System (IDS™) software—included at no additional charge—provides Internet connectivity and collects and stores a wide range of real-time data, including detailed unit configuration monitoring and control information.

Connect to any Solaron inverter with your web browser to view a suite of built-in graphical representations of minute-by-minute temperature, current, and voltage data—or gather data in Modbus® or CSV format to configure your own custom data and analysis reports.

With the addition of an AE Solaron Remote PV Tie (RPT™) accessory, you can further reduce BoS installation costs and achieve even higher system efficiency. The RPT accessory reduces large-diameter copper cables as well as I²R losses for up to 4% more power during operation. This eliminates common inverter installation obstacles and provides greater energy output per panel count.

If needed, AE's worldwide service organization is available 24 x 7 x 365 for support. We also offer proactive services, including extended warranties (up to 20 years) and SafeGuard® programs to help you maximize uptime and power generation. Our highly trained specialists can perform routine system queries, remote testing and diagnostics, and annual on-site inspections, all at a nominal cost.

Physical	
Dimensions	81.2" (H) x 74.0" (W) x 34.7" (D) 206.2 cm (H) x 188.0 cm (W) x 88.1 cm (D) Dimensions include cabinet handles and connection box.
Enclosure	Modular cabinet design with sturdy e-coat steel enclosures for transportability and strength
Weight	2045 lb (927.5 kg) unit weight 2344 lb (1063.2 kg) shipping weight
Environmental Rating	NEMA3R with NEMA4 (electronics)
Connector and Cable Specifications	
Output Power Connectors	2 x 500 MCM wires (Cu or Al)
Input Power Connector	4 x 500 MCM wires (Cu or Al)
User Display	Front panel LCD and keypad; security lock-outs; emergency shutdown button
Electrical	
Output Power	
Max Power	333 kW at 480 VAC
Voltage Range	432 to 528 VAC, 3 Φ, 60 Hz, grounded Wye connection
Frequency	60 Hz
Line Power Factor	> 0.99 typical
AC Current Distortion (THD)	< 5%
AC Line Current	400 A typical 445 A max at 86°F (30°C) and low-line voltage; can be limited with field-adjustable settings 420 A max at 122°F (50°C)
Peak & CEC Efficiency	98.3% and 97.5%
Input Power	
Array Configuration	Separable bipolar using standard PV modules
Voltage	± 330 to ± 600 VDC
DC MPP Current	500 ADC max
Open-Circuit Wake-up Voltage	± 425 VDC default (configurable)
Standby Tare Losses	< 100 W
MPPT Window	± 330 to ± 600 VDC
Reactive Power Range	+ 100 to -125 kVAR max
Factory-Installed Communication Interfaces	RS-232, RS-422, and RS-485 Ethernet PCMCIA
Data Storage	> 10 years / 2 GB SD card (upgradeable)
Environmental	
Ambient Operating Temperature	-4°F to 122°F (-20°C to 50°C) Cold weather option to -31°F (-35°C)
Storage Temperature	-22°F to 158°F (-30°C to 70°C)
Relative Operating Humidity	0% to 95% non-condensing
Atmospheric Pressure	800 to 1060 mbar (80 to 106 kPa)
Elevation	6000' (1828.8 m) derate max ambient above 6000'
Cooling Requirements	
Cooling Medium	Combination air and liquid cooling (closed loop system)
Regulatory	
Directives and Standards	NRTL certified to UL 1741-2005 by CSA International IEEE 519, 929, 1547/1547.1 NEC Article 690 (compatible) CEC eligible – 97.5%



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Construction Design Services, inc.
ELECTRICAL ENGINEERING

DESIGNED BY:	RC
DRAWN BY:	DN
CHECKED BY:	RC
DWG NO.:	
SCALE (HORIZ):	AS SHOWN
SCALE (VERT):	AS SHOWN
PLOT DATE:	12-9-2011

CARSON CITY
PUBLIC WORKS DEPARTMENT
3505 BUTTI WAY CARSON CITY, NEVADA 89701
PH: 775-887-2355 FAX: 775-887-2112

PACIFICWEST ENERGY SOLUTIONS
561 Keystone Ave. # 300, Reno, NV 89503
800-310-9080 Office / 800-310-9596 Fax

MICHAEL A. PECORINO
ELECTRICAL
No. 15678
PROFESSIONAL ENGINEER, STATE OF NEVADA

REV	DATE	DESCRIPTION	BY	APP'D
0	06/30/2011	INITIAL DESIGN	GG	RC
1	08/26/2011	REVISION 1	GG	RC
2	12/06/2011	INITIAL RE-DESIGN	GG	RC

CARSON CITY WASTE WATER TREATMENT PLANT SOLAR PHOTOVOLTAIC PROJECT
3320 EAST 5TH ST., CARSON CITY, NV 89701
PROJECT NO.: 2.0805

ELECTRICAL EQUIPMENT SPECIFICATIONS & LABELING DETAILS

SHEET
E5.0