

222 South 9th Street Minneapolis, MN 55402 Phone: 612-326-1500 E-mail: <u>steve.broyer@ecosrenewable.com</u> June 28th, 2019

To: Melanie A. Bachman Staff Attorney/Acting Executive Director Connecticut Siting Council 10 Franklin Square New Britain, CT 06051

Re: Petition NO. 1222 – Fisk Road Solar Development & Management Plan

Melanie-

I'm writing to request that the Connecticut Siting Council reviews the Development and Management Plan of the solar facility associated with Petition No. 1222 located southeast of Hartford Turnpike and South of Fisk Road, Hampton, Connecticut.

On July 21st, 2016 the Connecticut Siting Council (Council) approved the proposed construction, maintenance and operation of (3) 2.0MW AC and (1) 1.0MW AC solar photovoltaic electrical generation facilities. A condition of the approval is for the petitioner to prepare a Development and Management plan for the facility and submit it to the Council for approval prior to the commencement of construction.

On May 9th ,2019, the Council approved a request for an extension of construction time for the declaratory ruling until July 26th, 2021. The petitioner is now submitting a D&M plan for the first phase of construction for the project. Windham Solar LLC, is requesting approval for the construction of 2-2MW facilities in the NE corner of the site.

The petitioner has prepared a full project site design consistent with the 2002 CT guidelines for Erosion and Sediment control and the 2004 Connecticut Stormwater Quality manual. The projects final site design and associated SWPCP was submitted to CT-DEEP on March 28th, and was approved by CT-DEEP on June 28th, 2019. *(Exhibit A – DEEP General Permit Authorization GSN003450)* The SWPCP addresses several requirements of the development and management plan. The projects full SWPCP can be downloaded from the following

link: (<u>https://ecosenergy.box.com/s/wqo8cnr8zhto36kro5rq5xhkff8otqjv</u>). Two full copies of the SWPCP have been provided with this mailing.

- a) Final Site Plan, the final site plan illustrated in the Civil Documents associated with the SWPCP (Exhibit B – Civil Sitework Documents), locates the projects perimeter fencing infrastructure, access roadway design, and stormwater features. The solar facility shown in the sitework documents represents not only the approved projects 1-through 5 (6MW) of solar associated with the CSC approval on June 21st, 2016, but also includes the appropriate grading and stormwater design elements for the denied 2MW future project on the west side of the site. The petitioner included the 2MW future design in the sitework civil documents for review and comment/approval by DEEP. The petitioner does not intend to preform clearing or construction of any facility in this future area without additional CSC approvals. The petitioner intends to clear the area associated with the original CSC approval on June 21st, 2016, and construct (2) 2MW facilities in this first phase. The petitioner has kicked off all aspects of the solar facility design including electrical and structural racking. The (2) 2MW facilities will keep the approved row spacing, however the racking tilt angle will increase from 15 degrees to 25 degrees, preliminary design documents are attached, and the final design for the project will evolve to full construction documents during July 2019. (Exhibit C – Electrical Design Site Plan, Project One Lines and 90% Racking Design).
- b) Landscaping has been included in the civil sitework documents, and will be installed with this initial phase of construction.
- c) The SWCPC and final site design is based on the requirements set forth by the 2002 CT Guidelines for Erosion and Sedimentation Control and addresses all elements of stabilization during the construction process of the sitework and solar facility.
- d) The final site design incorporates a stormwater management plan consistent with the 2004 CT Stormwater quality Manual. The stormwater/hydrology report within the SWPCP considers the maximum effective impervious area associated with the project footprint per the direction of DEEP.
- e) Attached to this request is the resume of Bob Russo, who was the preparer of the Vernal Pool Habitat Impact Mitigation Plan, and qualified environmental inspector. Bob Russo, has been preforming inspections for the applicant on current active CT development project, to the satisfaction of DEEP and local AHJs. *(Exhibit D Bob Russo Resume)*
- f) Attached to this request is the Vernal Pool Habitat Impact Mitigation Plan. *(Exhibit E Vernal Pool Habitat Mitigation Plan)*
- g) The applicant plans on beginning site clearing for this project on August 1st, 2019, avoiding tree clearing during the June 1st to July 31st as a protective measure for the Northern Long Eared Bat.
- h) The applicant will require the projects selected contractor to adhere to the latest EPA or California Air Resources Board standards for diesel emissions as well as adhering to the provisions of Section 22a-174-18(b)(3)(C) regulating the idling of mobile sources to 3 minutes.
- i) The applicant will require the projects selected contractor will comply with the provisions of

Section 22a-174-18(b)(3)(C) of the Regulation so of Connecticut State Agencies that limit the idling of mobile sources to 3 minutes.

Sincerely,

By

Steven J Broyer



Connecticut Department of

ENERGY & ENVIRONMENTAL PROTECTION

79 Elm Street • Hartford, CT 06106-5127

www.ct.gov/deep

Affirmative Action/Equal Opportunity Employer

EXHIBIT A

Bureau of Materials Management and Compliance Assurance

Notice of Permit Authorization

June, 28 2019

Steven Broyer JEFFERSON SOLAR LLC 222 S 9th St Minneapolis, MN 55402-3382

Subject: General Permit Registration for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities Application NO.: 201904616

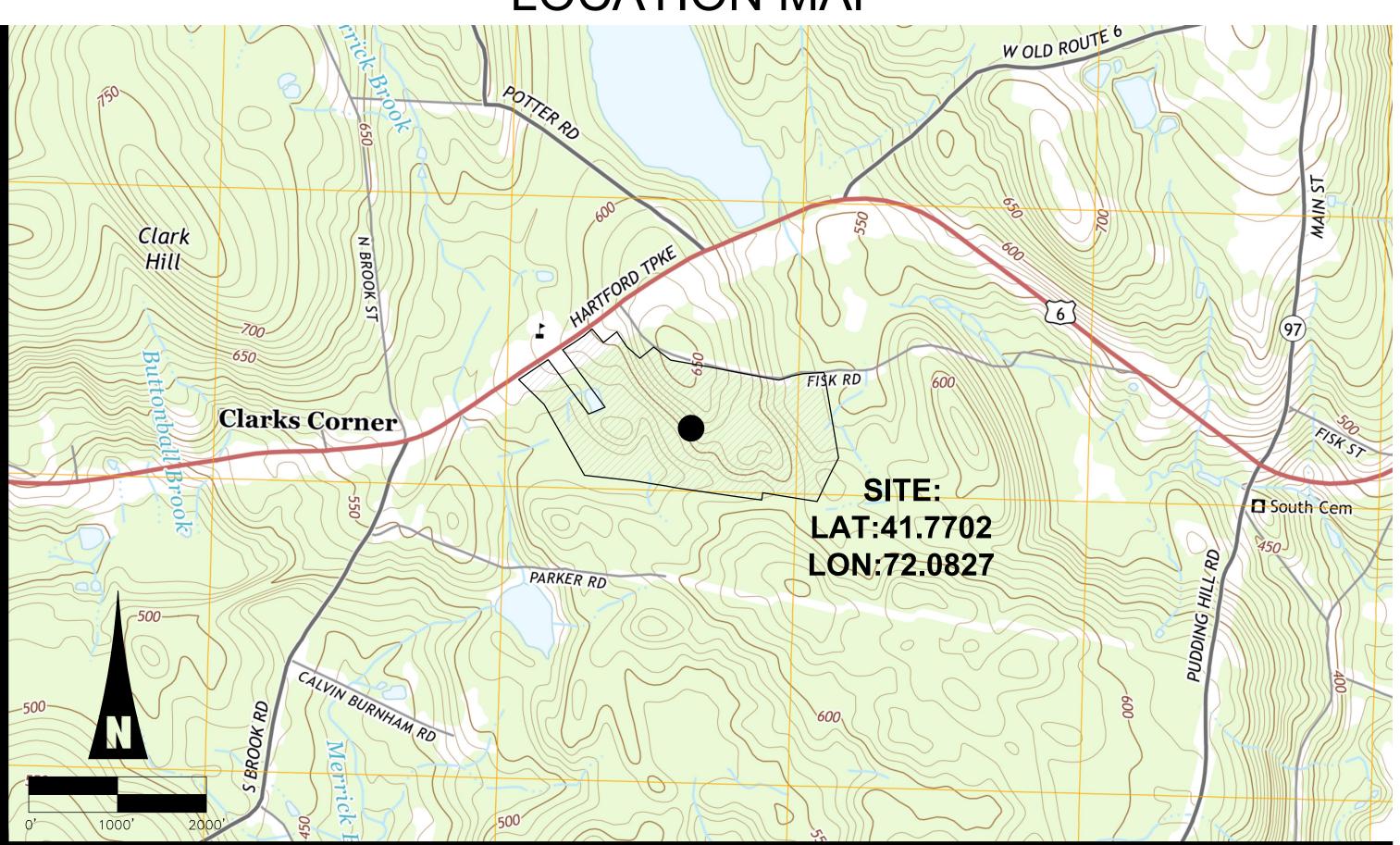
Steven Broyer:

The Department of Energy and Environmental Protection, Water Permitting and Enforcement Division of the Bureau of Materials Management and Compliance Assurance, has completed the review of the Fisk Road Solar (located at 111 Fisk Rd, Hampton) registration for the **General Permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities, effective 10/1/13 (general permit)**. The project is compliant with the requirements of the general permit and the discharge(s) associated with this project is (are) authorized to commence as of the date of this letter. Permit No. GSN003450 has been assigned to authorize the stormwater discharge(s) from this project.

Questions can be emailed to <u>deep.stormwater@ct.gov</u>.

FISK ROAD SOLAR CONNECTICUT SITING BOARD DOCUMENTS

LOCATION MAP



CONTACT INFO:

RECORD LANDOWNER: PLH, LLC 77 WATER STREET 8TH FLOOR NEW YORK, NY 10005 OWNER/DEVELOPER: ECOS ENERGY 222 SOUTH 9TH STREET SUITE 1600 MINNEAPOLIS, MN 55402

CIVIL ENGINEER: CLA ENGINEERS, INC. 317 MAIN STREET NORWICH, CT 06360



1/30/2019	1	COVER SHEET
1/30/2019	2	ALTA SURVEY (BY HELLSTROM LS, LLC)
1/30/2019	3	ALTA SURVEY (BY HELLSTROM LS, LLC)
1/30/2019	4	OVERALL SITE PLAN
1/30/2019	5	NORTH REMOVAL & EROSION CONTROL PLAN - 1"=60'
1/30/2019	5A	NORTH REMOVAL & EROSION CONTROL PLAN - 1"=60'
1/30/2019	6	SOUTH REMOVAL & EROSION CONTROL PLAN - 1"=60'
1/30/2019	7	DRAINAGE AREA 1 - SEDIMENT TRAP & WATER QUALITY BASIN
1/30/2019	8	DRAINAGE AREA 2 - SEDIMENT TRAP & WATER QUALITY BASIN
1/30/2019	9	DRAINAGE AREA 3 - SEDIMENT TRAP & WATER QUALITY BASIN
1/30/2019	10	DRAINAGE AREA 4 - SEDIMENT TRAP & WATER QUALITY BASIN
1/30/2019	11	DRAINAGE AREA 5 - SEDIMENT TRAP & WATER QUALITY BASIN
1/30/2019	12	DRAINAGE AREA 6 - SEDIMENT TRAP & WATER QUALITY BASIN
1/30/2019	13	DRAINAGE AREA 7- SEDIMENT TRAP & WATER QUALITY BASIN
1/30/2019	14	DRAINAGE AREA 8 - SEDIMENT TRAP & WATER QUALITY BASIN
1/30/2019	15	OVERALL LANDSCAPE PLAN
1/30/2019	16	CIVIL NOTES
1/30/2019	17	CIVIL DETAILS
RAWING INDEX		END DRAWING INCLUDED WITHIN THIS ISSUE

- MOST RECENT REVISION NUMBER - MOST RECENT ISSUE OR REVISION DATE

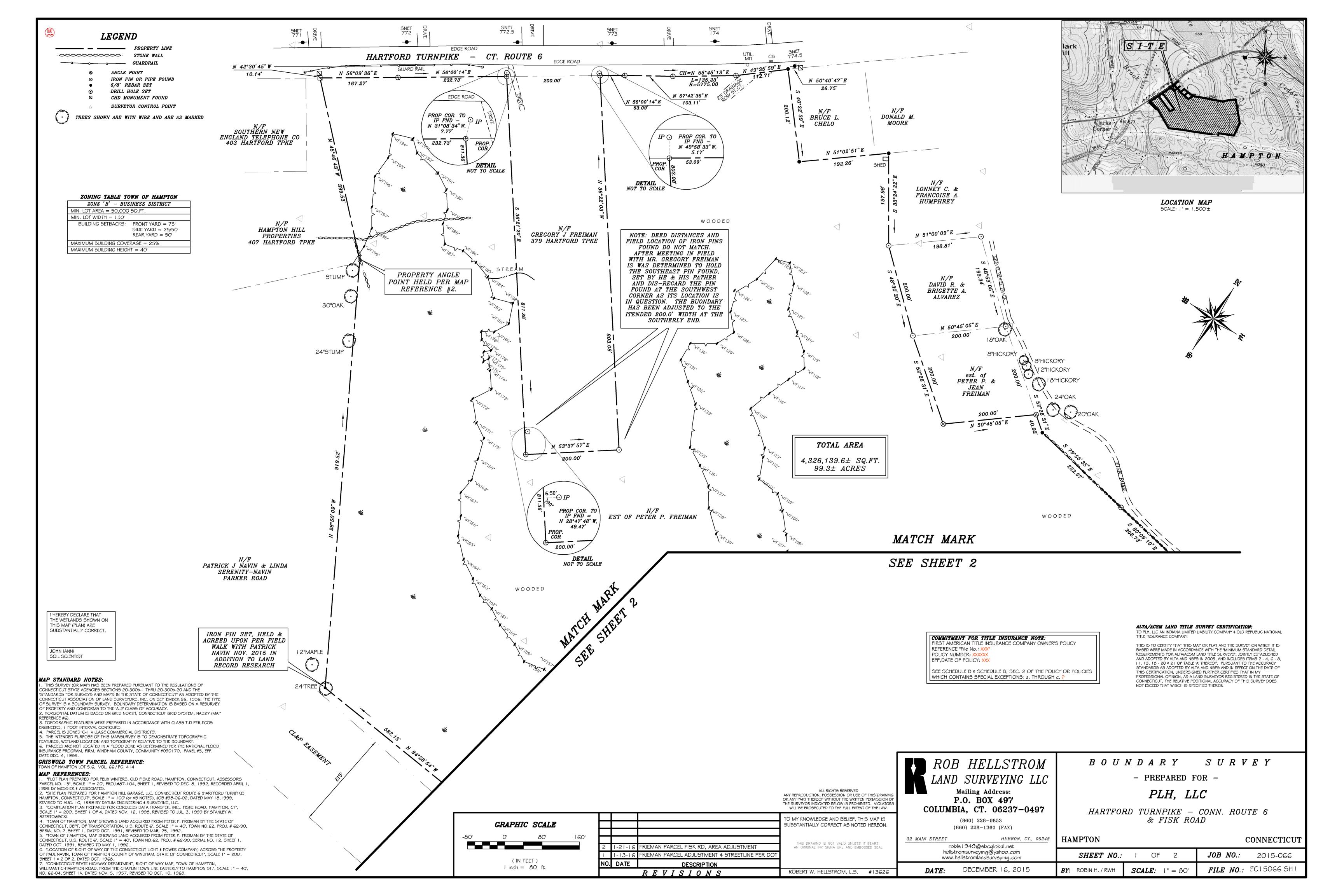
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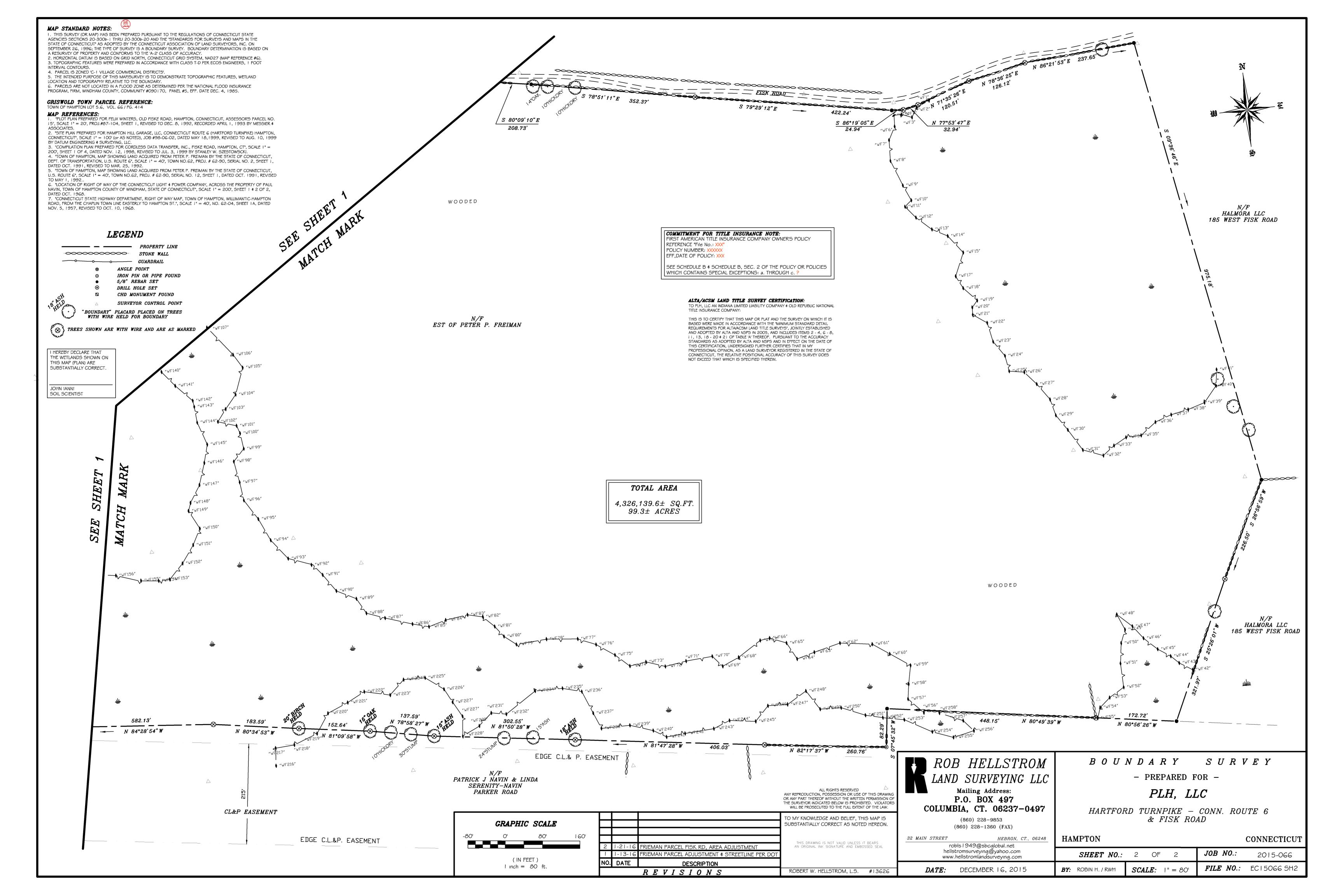
SHEET TITLE

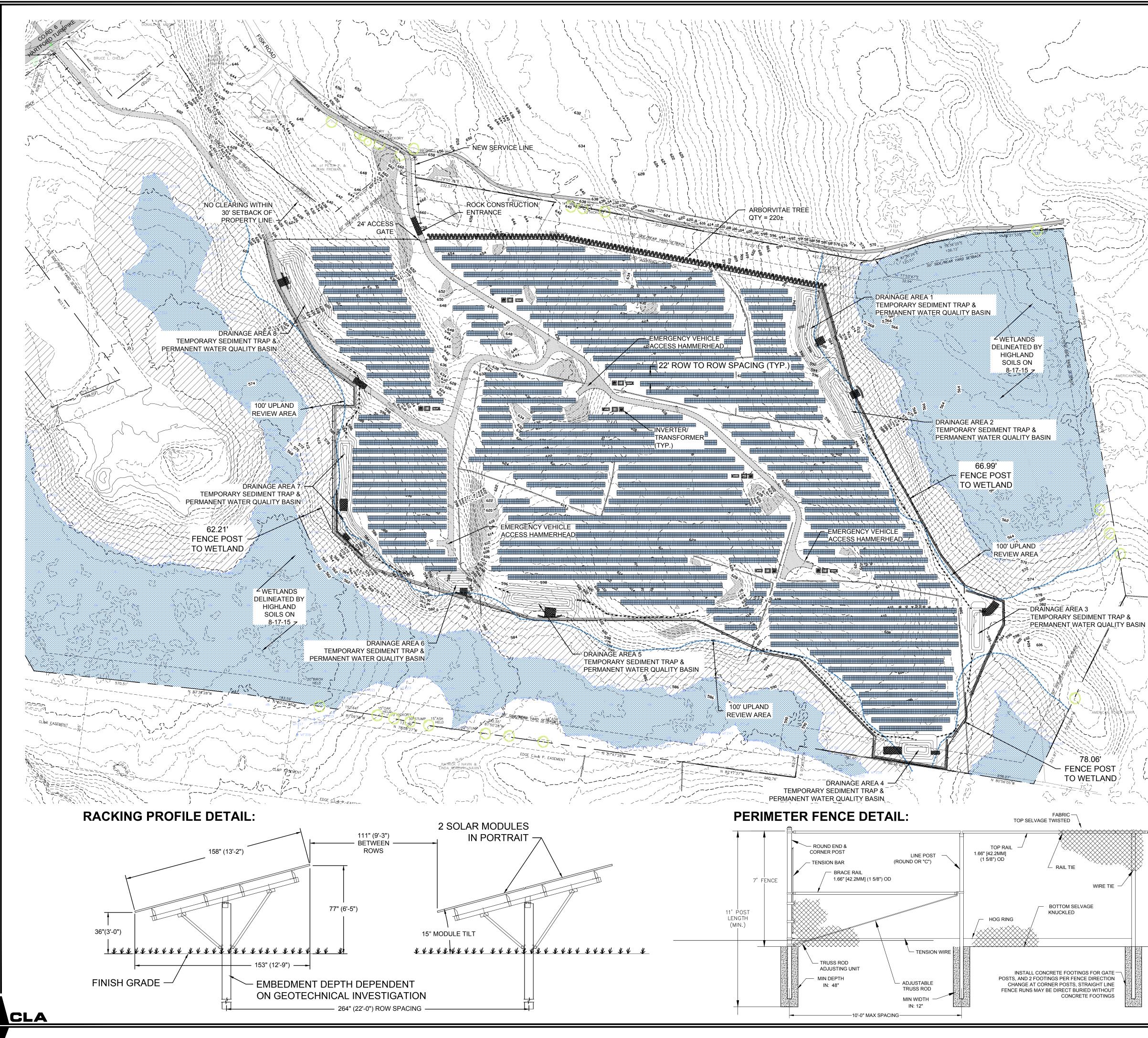
SURVEYOR: ROB HELLSTROM LAND SURVEYING LLC 32 MAIN STREET HEBRON, CT 06248 WETLAND DELINEATION: HIGHLAND SOILS LLC P.O.BOX 337 STORRS, CT 06268

EXHIBIT B

		CIVIL · STRUCTURAL · SURVEYING				
No.	DATE	REVISION	317 Main Street Norwich, CT (860) 886-1966 Fax (860) 88			
	WILL COMME) Hartford Turnpike mpton, Connecticut	Project No. CLA-6162		
"HILLING STATE	4 10 1055€ 0100 C 1 C 1 1 1 1 1 1 1 1 1 1 1 1 1 1	FISK ROAD SOLAR		Proj. Engineer E.B. Date: 01/30/19		
	ESCIONAL ENGLISH	C	OVER SHEET	Sheet No.		







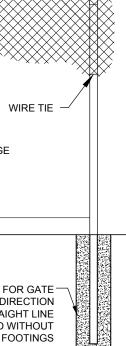
PROJECT AREAS & IMPACTS:

TOTAL SITE AREA = 99.29 ACRES PROJECT ARRAY FOOTPRINT= 34.8 ACRES (FULL PROJECT FENCE LINE LIMITS) TOTAL AREA OF DISTURBANCE= 35.4 ACRES

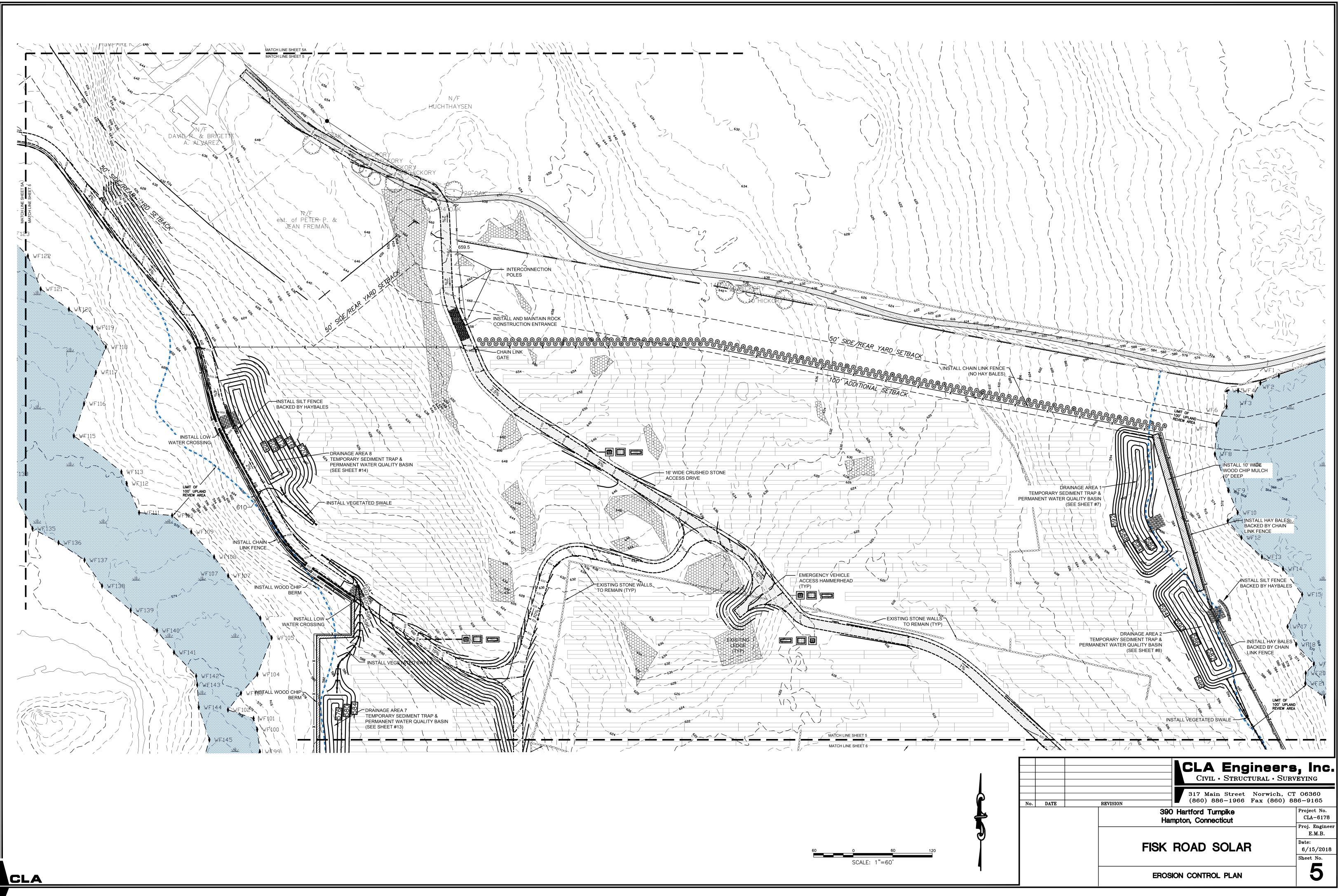
LEGEND:

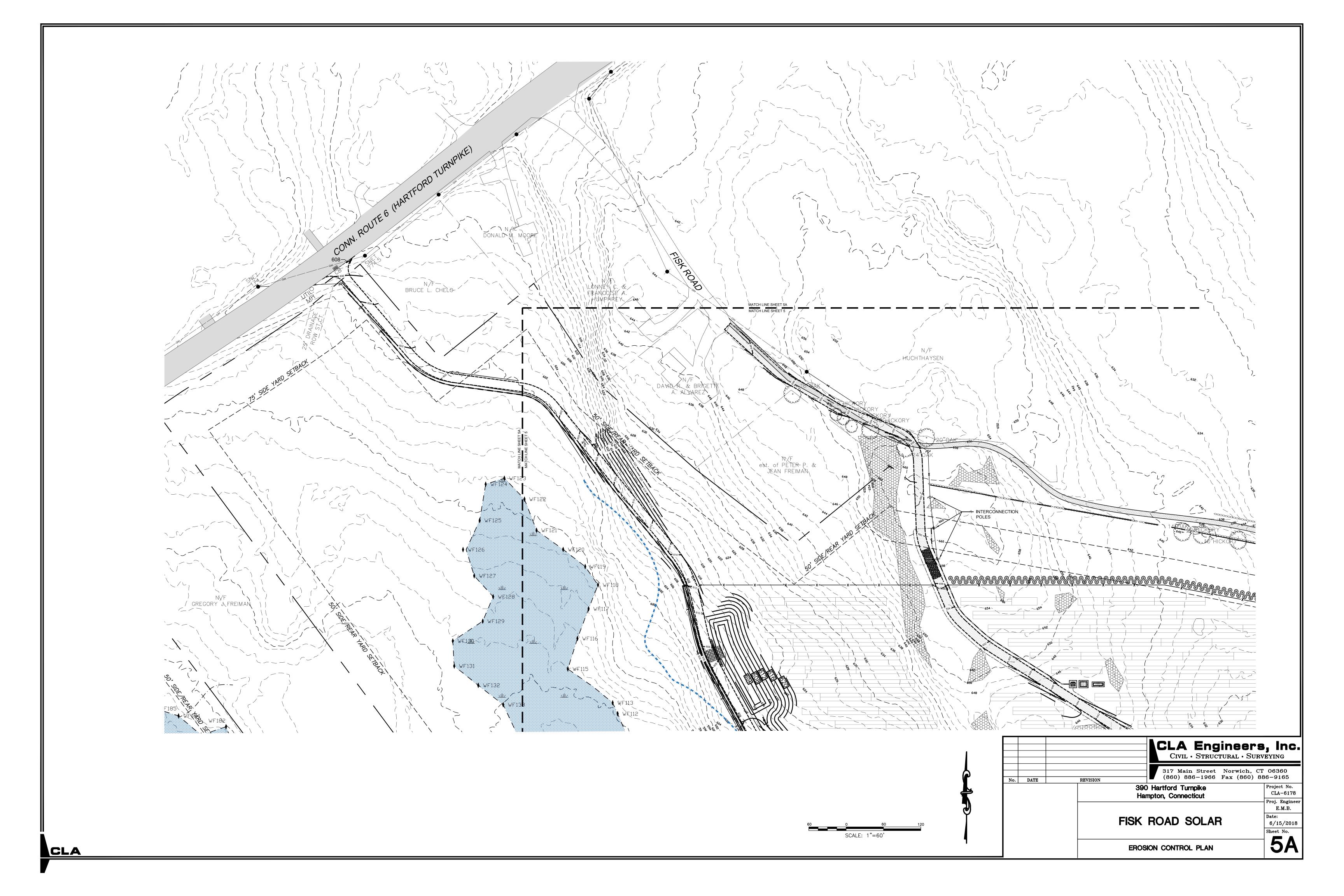
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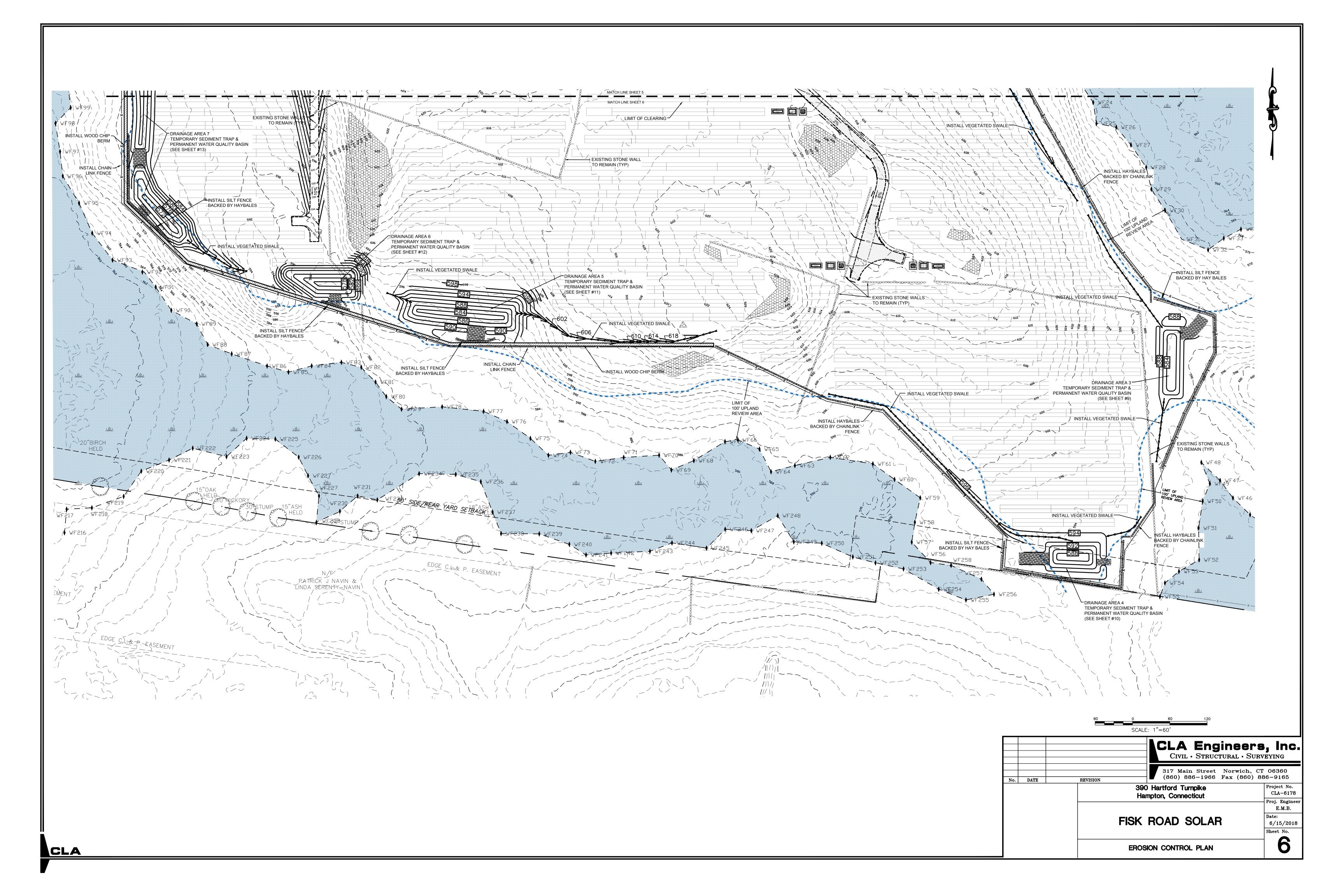
- EXISTING PROPERTY LINE PROPOSED PROJECT FENCE PROPOSED GRAVEL ACCESS ROAD 9 x 4 SOLAR MODULE BOCK 100' WETLAND BUFFER AREA BEDROCK OUTCROP WETLAND DELINEATION LINE

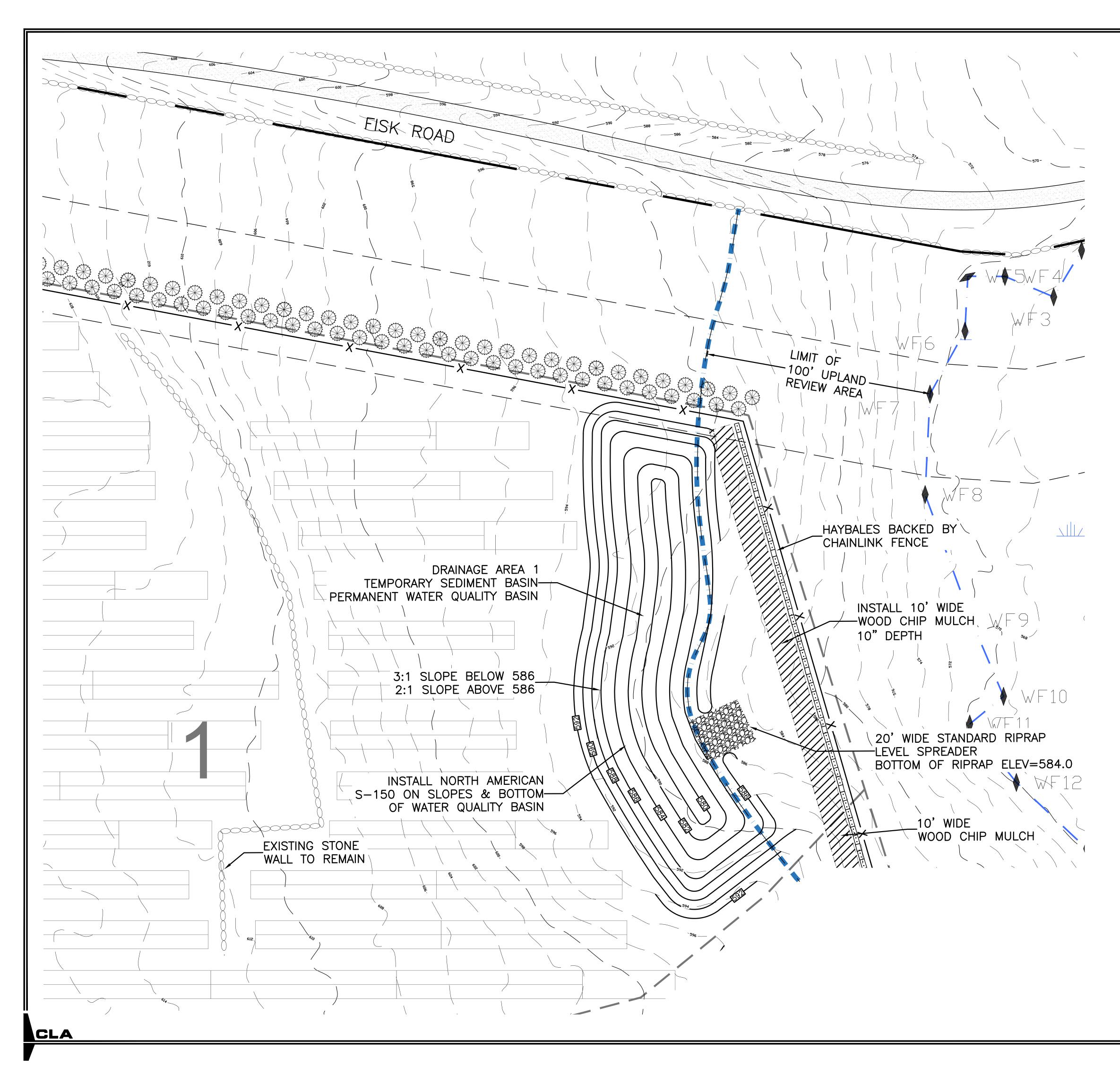


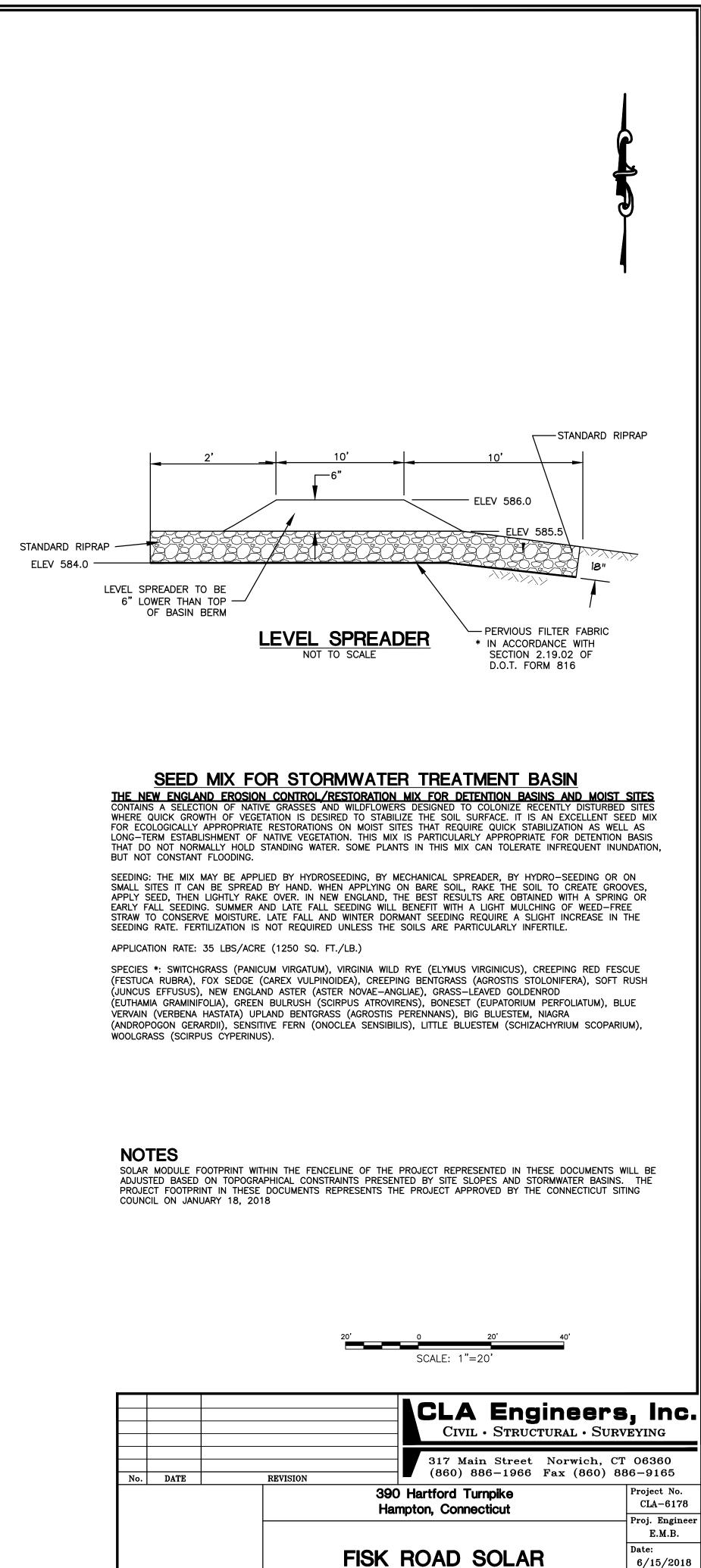
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	CIVIL · STRUCT	neers, Inc.
No. DATE		Norwich, CT 06360 Fax (860) 886-9165
	390 Hartford Turnpike Hampton, Connecticut	Project No. CLA-6178
	FISK ROAD SOLAR	Proj. Engineen E.M.B. Date: 6/15/2018
	OVERALL SITE PLAN	Sheet No.



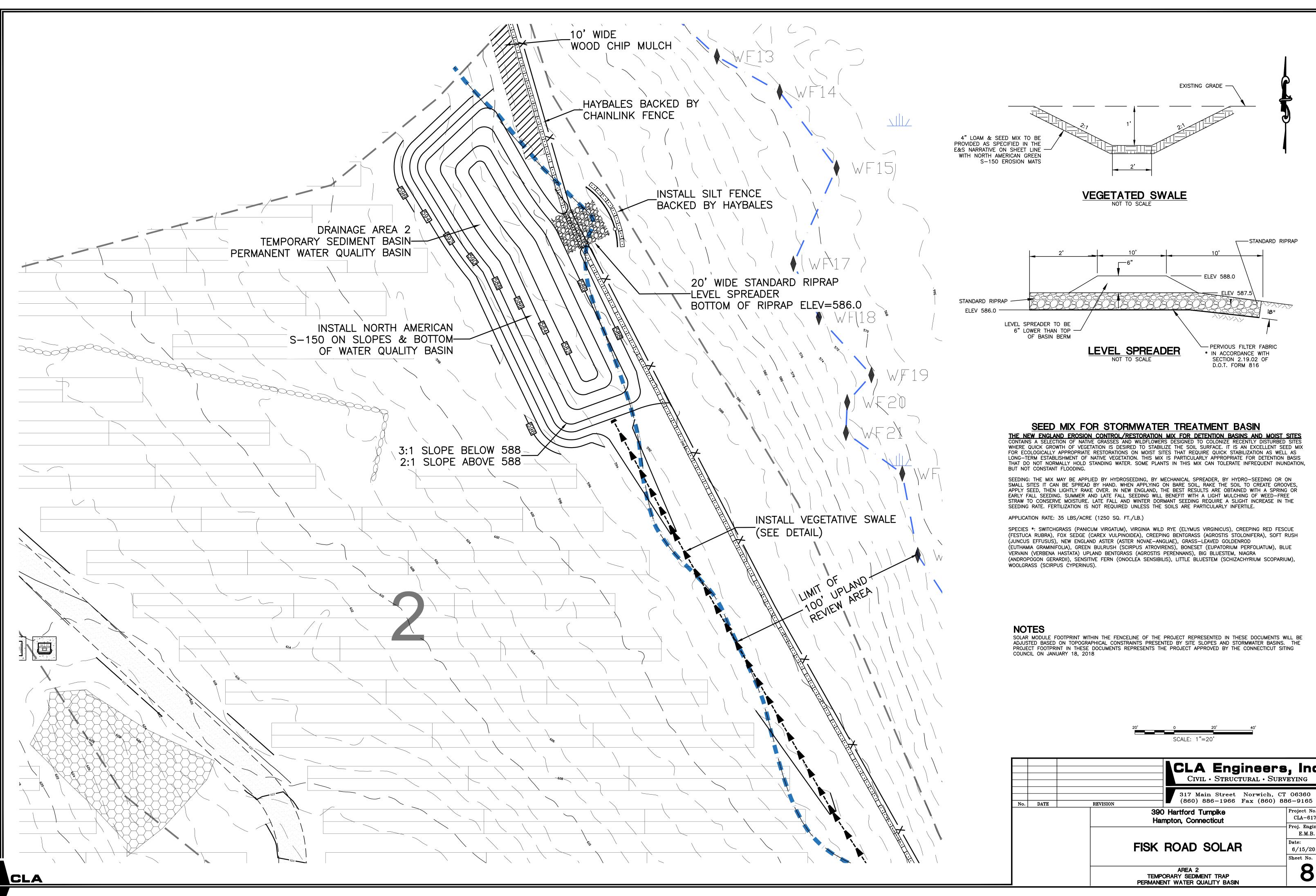






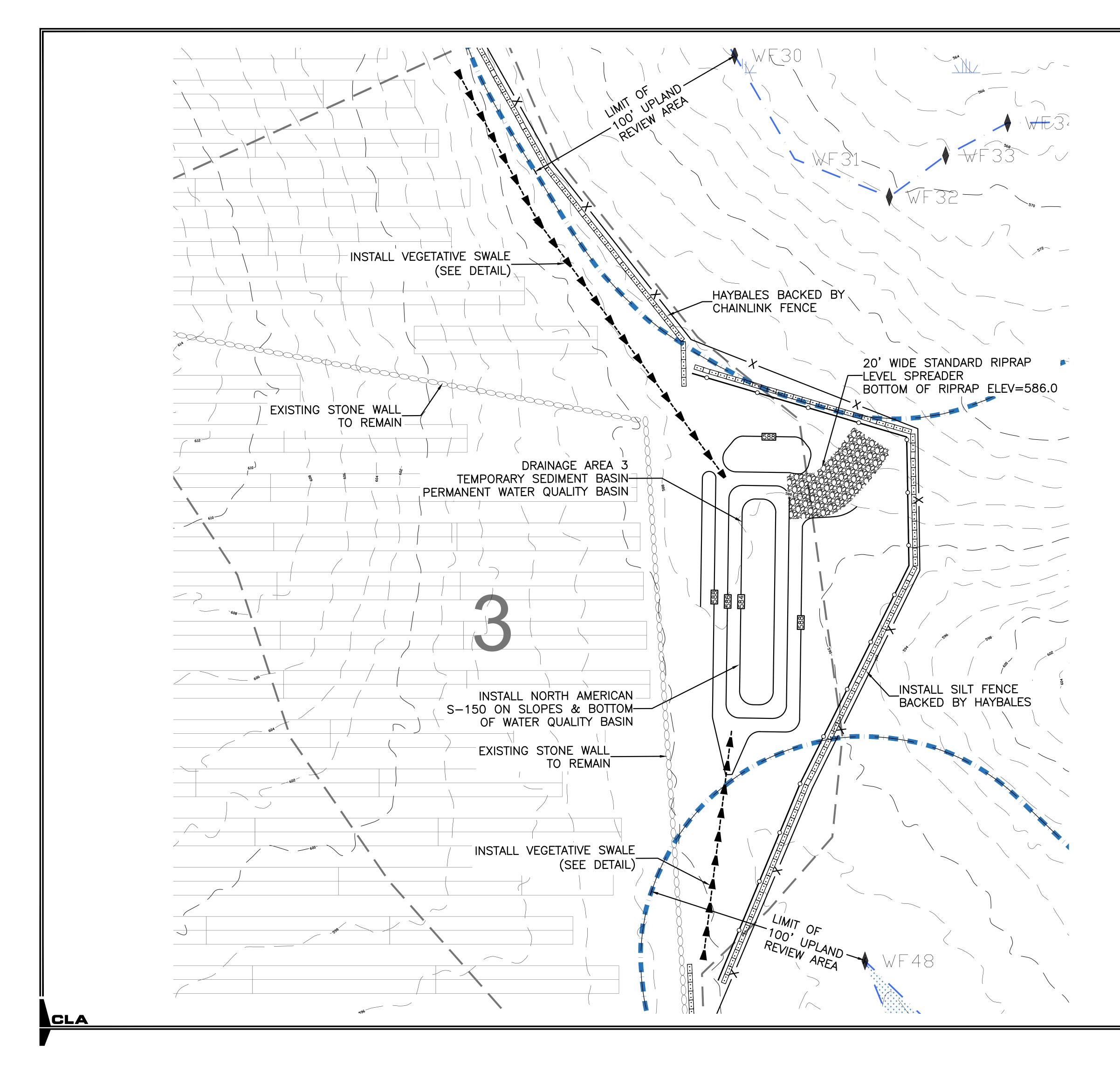


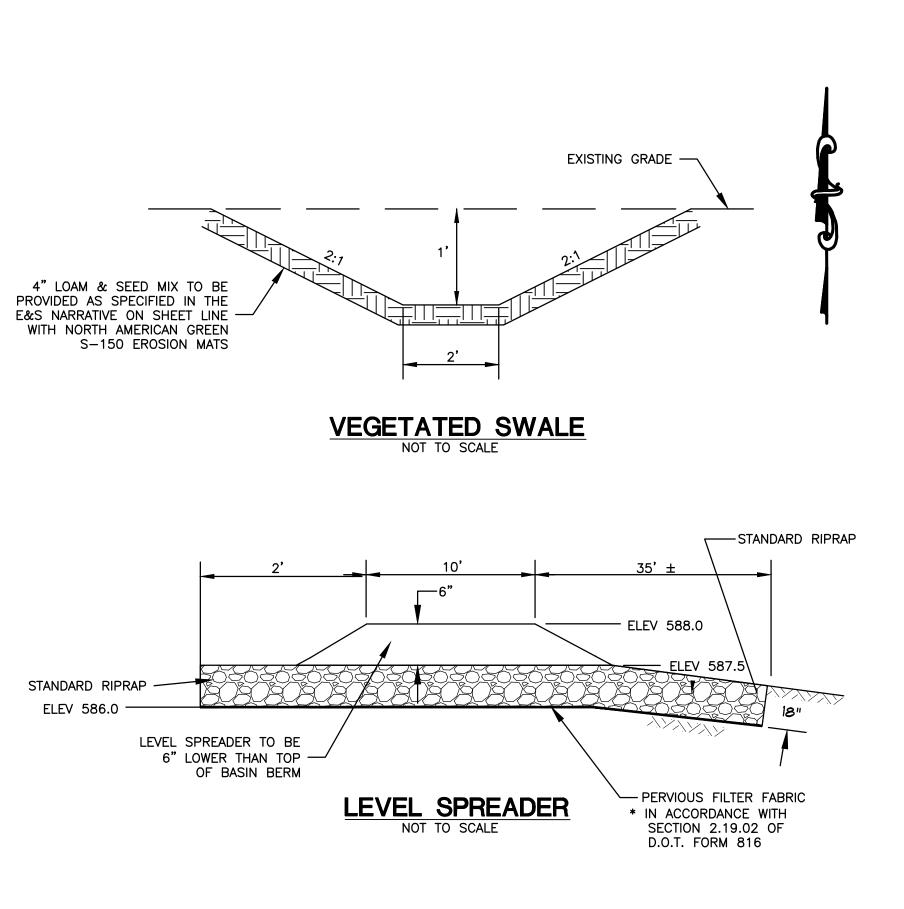
AREA 1 TEMPORARY SEDIMENT TRAP PERMANENT WATER QUALITY BASIN Sheet No.



20'	0	20'	<u> </u>
	SCALE:	1"=20'	

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No.	DATE	REVISION	317 Main Street Norwich, CT (860) 886-1966 Fax (860) 88	
			390 Hartford Turnpike Hampton, Connecticut	Project No. CLA-6178
				Proj. Engineer E.M.B.
			FISK ROAD SOLAR	Date: 6/15/2018
				Sheet No.
			AREA 2 TEMPORARY SEDIMENT TRAP PERMANENT WATER QUALITY BASIN	8





SEED MIX FOR STORMWATER TREATMENT BASIN

THE NEW ENGLAND EROSION CONTROL/RESTORATION MIX FOR DETENTION BASINS AND MOIST SITES CONTAINS A SELECTION OF NATIVE GRASSES AND WILDFLOWERS DESIGNED TO COLONIZE RECENTLY DISTURBED SITES WHERE QUICK GROWTH OF VEGETATION IS DESIRED TO STABILIZE THE SOIL SURFACE. IT IS AN EXCELLENT SEED MIX FOR ECOLOGICALLY APPROPRIATE RESTORATIONS ON MOIST SITES THAT REQUIRE QUICK STABILIZATION AS WELL AS LONG-TERM ESTABLISHMENT OF NATIVE VEGETATION. THIS MIX IS PARTICULARLY APPROPRIATE FOR DETENTION BASIS THAT DO NOT NORMALLY HOLD STANDING WATER. SOME PLANTS IN THIS MIX CAN TOLERATE INFREQUENT INUNDATION, BUT NOT CONSTANT FLOODING.

SEEDING: THE MIX MAY BE APPLIED BY HYDROSEEDING, BY MECHANICAL SPREADER, BY HYDRO-SEEDING OR ON SMALL SITES IT CAN BE SPREAD BY HAND. WHEN APPLYING ON BARE SOIL, RAKE THE SOIL TO CREATE GROOVES, APPLY SEED, THEN LIGHTLY RAKE OVER. IN NEW ENGLAND, THE BEST RESULTS ARE OBTAINED WITH A SPRING OR EARLY FALL SEEDING. SUMMER AND LATE FALL SEEDING WILL BENEFIT WITH A LIGHT MULCHING OF WEED-FREE STRAW TO CONSERVE MOISTURE. LATE FALL AND WINTER DORMANT SEEDING REQUIRE A SLIGHT INCREASE IN THE SEEDING RATE. FERTILIZATION IS NOT REQUIRED UNLESS THE SOILS ARE PARTICULARLY INFERTILE.

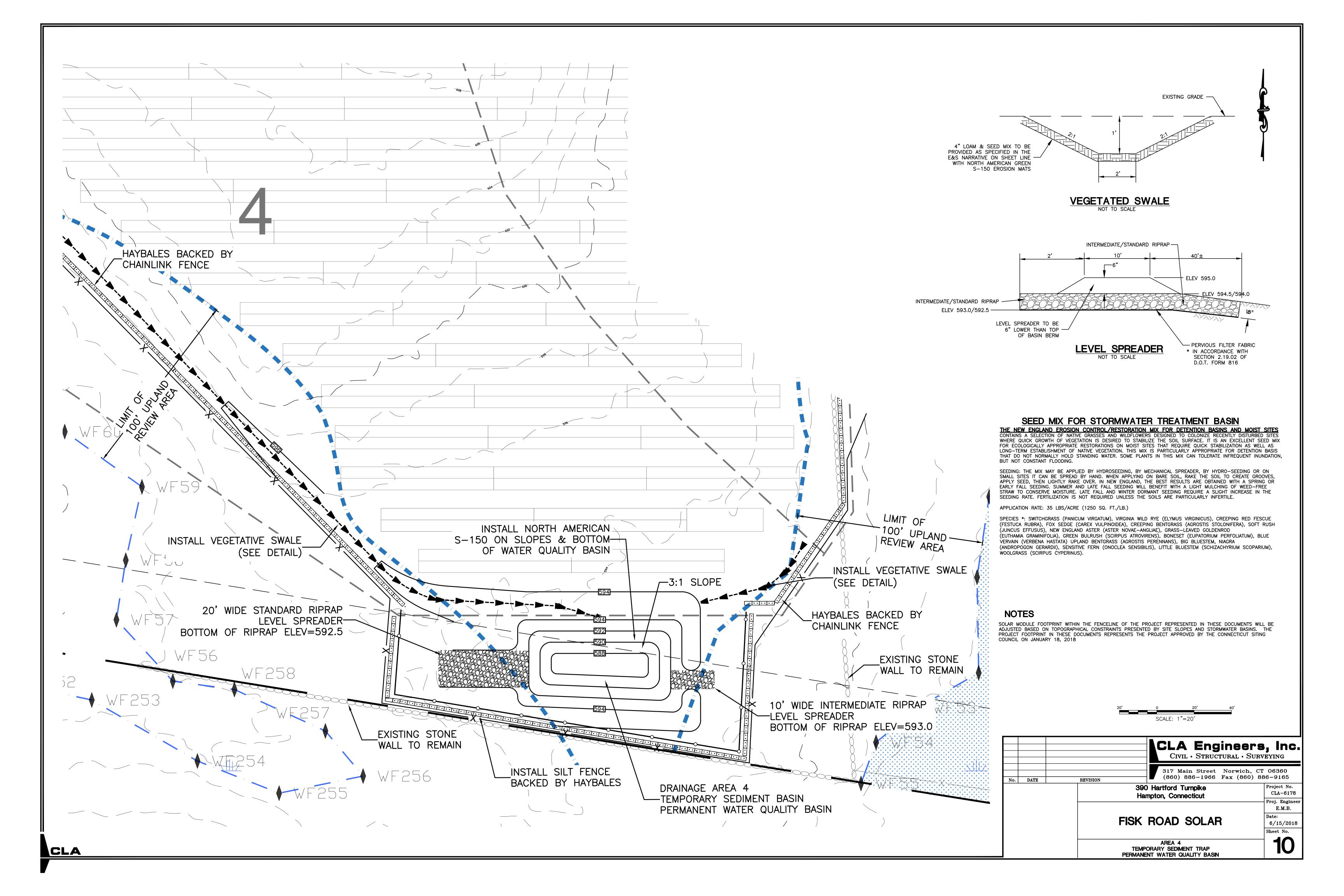
APPLICATION RATE: 35 LBS/ACRE (1250 SQ. FT./LB.)

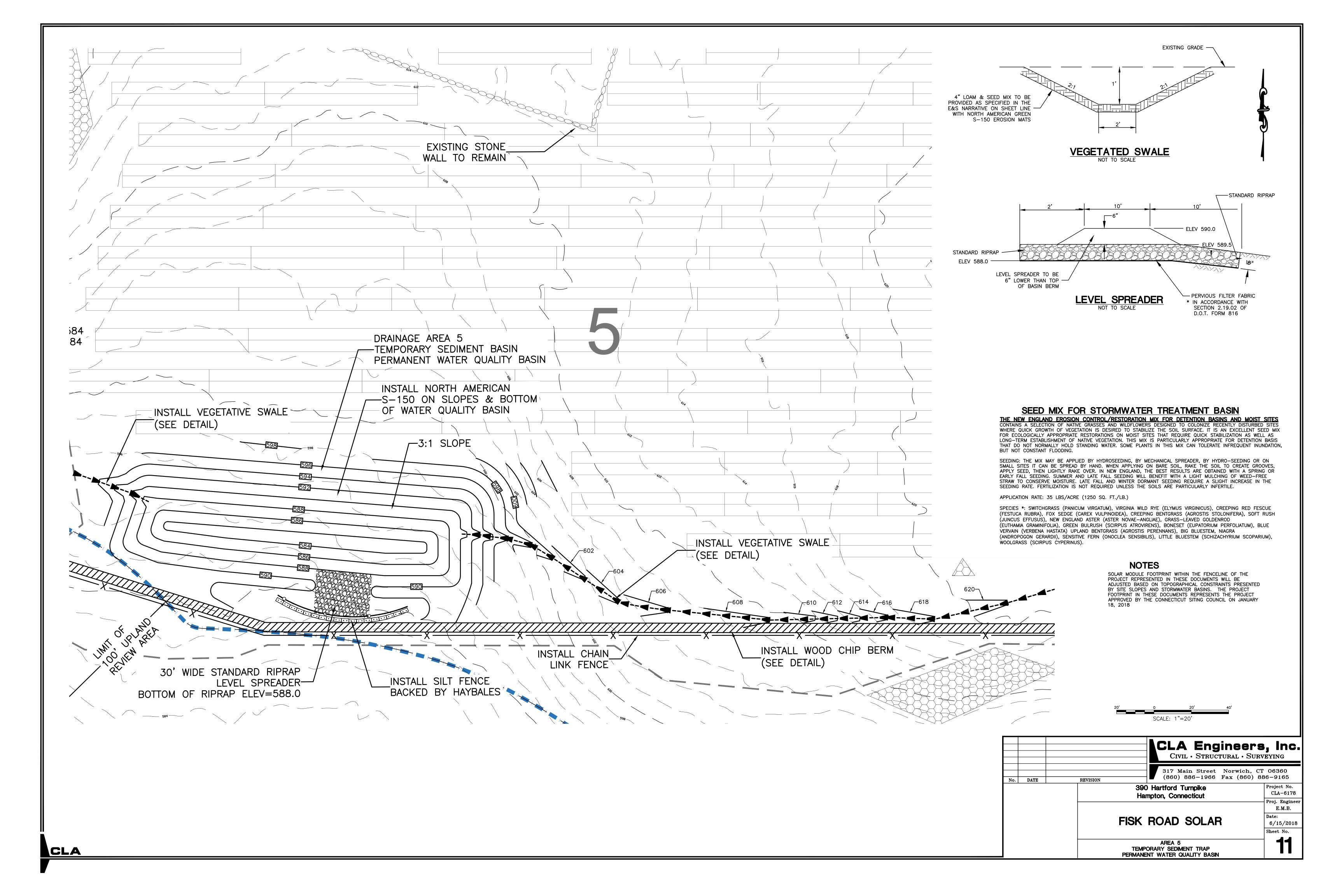
SPECIES *: SWITCHGRASS (PANICUM VIRGATUM), VIRGINIA WILD RYE (ELYMUS VIRGINICUS), CREEPING RED FESCUE (FESTUCA RUBRA), FOX SEDGE (CAREX VULPINOIDEA), CREEPING BENTGRASS (AGROSTIS STOLONIFERA), SOFT RUSH (JUNCUS EFFUSUS), NEW ENGLAND ASTER (ASTER NOVAE-ANGLIAE), GRASS-LEAVED GOLDENROD (EUTHAMIA GRAMINIFOLIA), GREEN BULRUSH (SCIRPUS ATROVIRENS), BONESET (EUPATORIUM PERFOLIATUM), BLUE VERVAIN (VERBENA HASTATA) UPLAND BENTGRASS (AGROSTIS PERENNANS), BIG BLUESTEM, NIAGRA (ANDROPOGON GERARDII), SENSITIVE FERN (ONOCLEA SENSIBILIS), LITTLE BLUESTEM (SCHIZACHYRIUM SCOPARIUM), WOOLGRASS (SCIRPUS CYPERINUS).

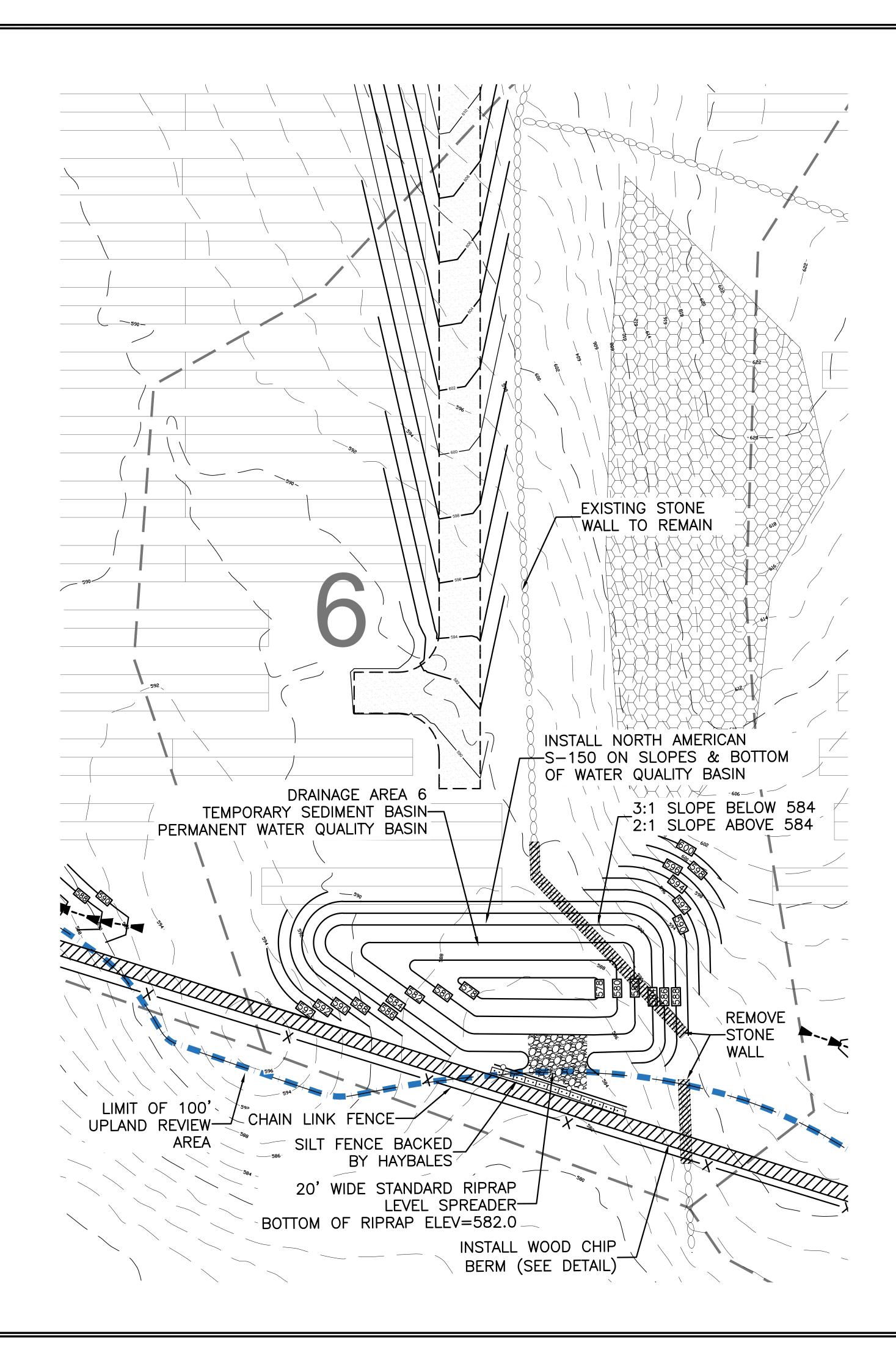
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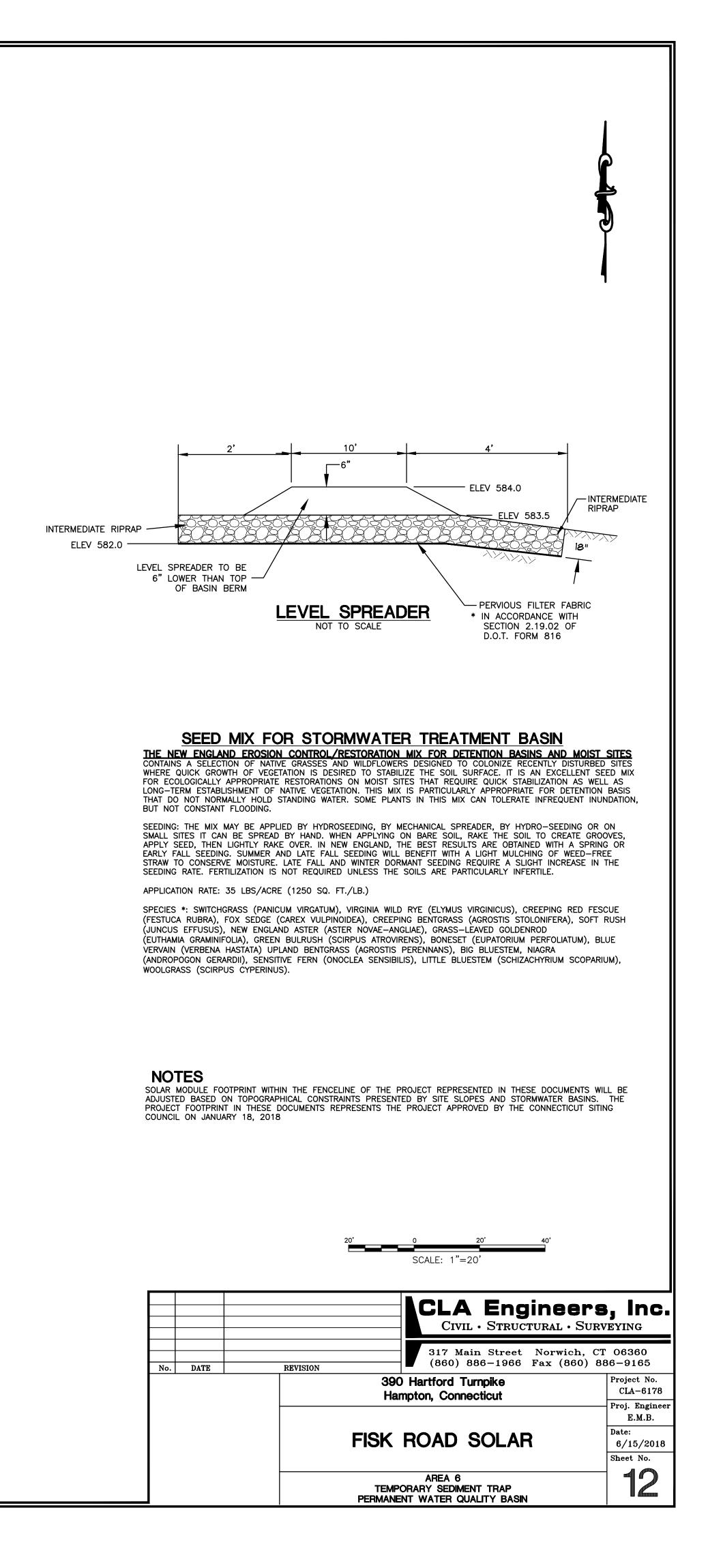
SOLAR MODULE FOOTPRINT WITHIN THE FENCELINE OF THE PROJECT REPRESENTED IN THESE DOCUMENTS WILL BE ADJUSTED BASED ON TOPOGRAPHICAL CONSTRAINTS PRESENTED BY SITE SLOPES AND STORMWATER BASINS. THE PROJECT FOOTPRINT IN THESE DOCUMENTS REPRESENTS THE PROJECT APPROVED BY THE CONNECTICUT SITING COUNCIL ON JANUARY 18, 2018

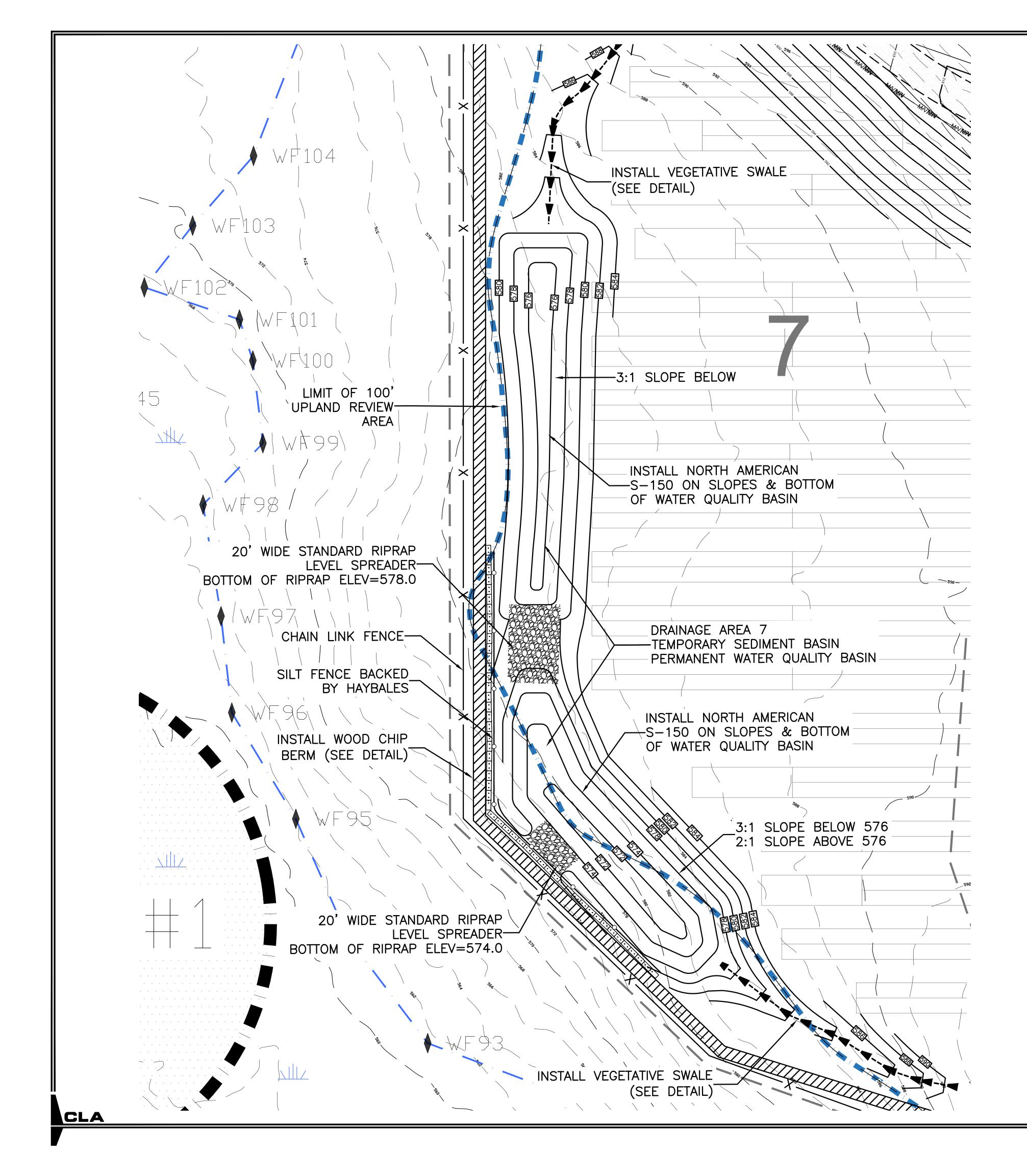
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			Engineers, Inc. Structural · Surveying
No.	DATE		h Street Norwich, CT 06360 6-1966 Fax (860) 886-9165
	·	390 Hartford Turi Hampton, Connec	
			Proj. Engineer E.M.B.
		FISK ROAD S	OLAR Date: 6/15/2018
			Sheet No.
		AREA 3 TEMPORARY SEDIMENT PERMANENT WATER QUAL	

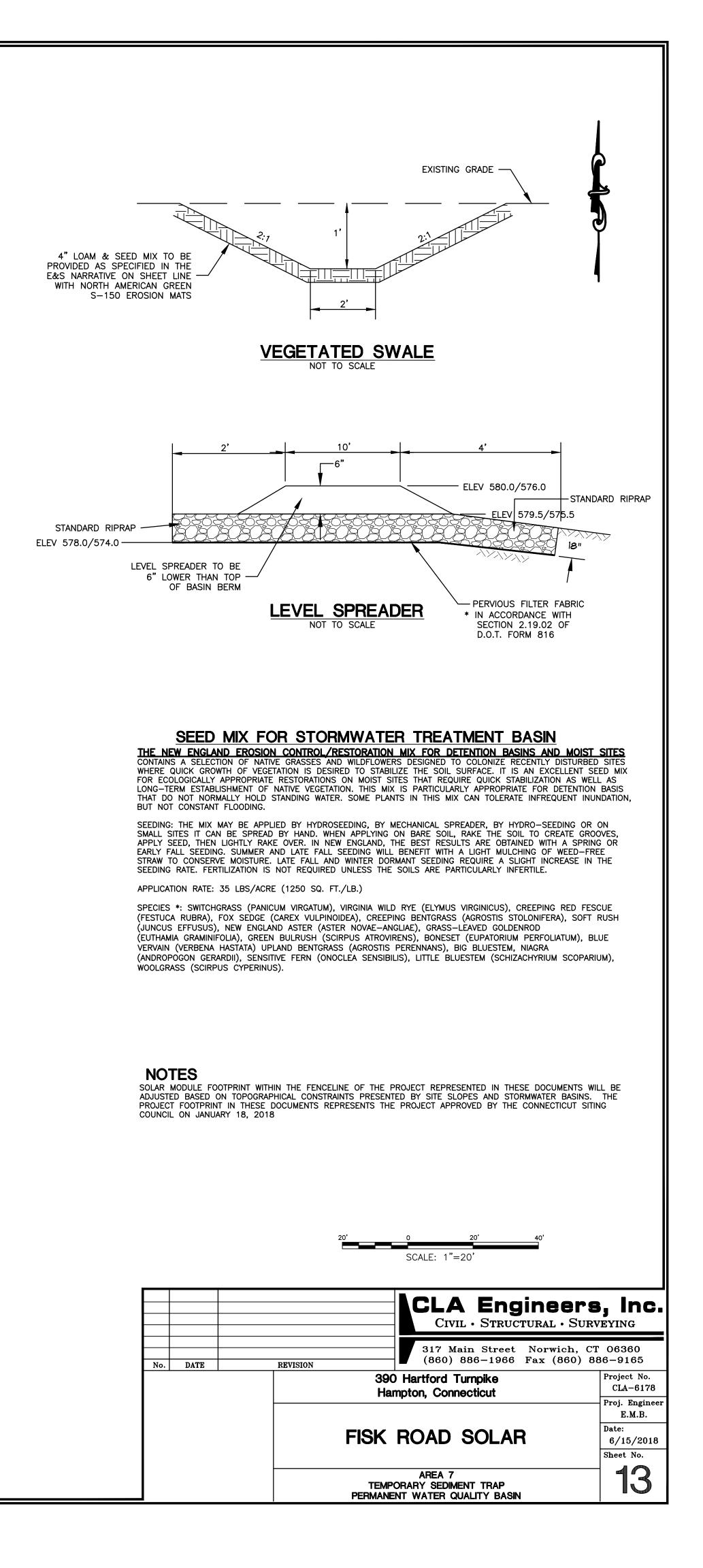


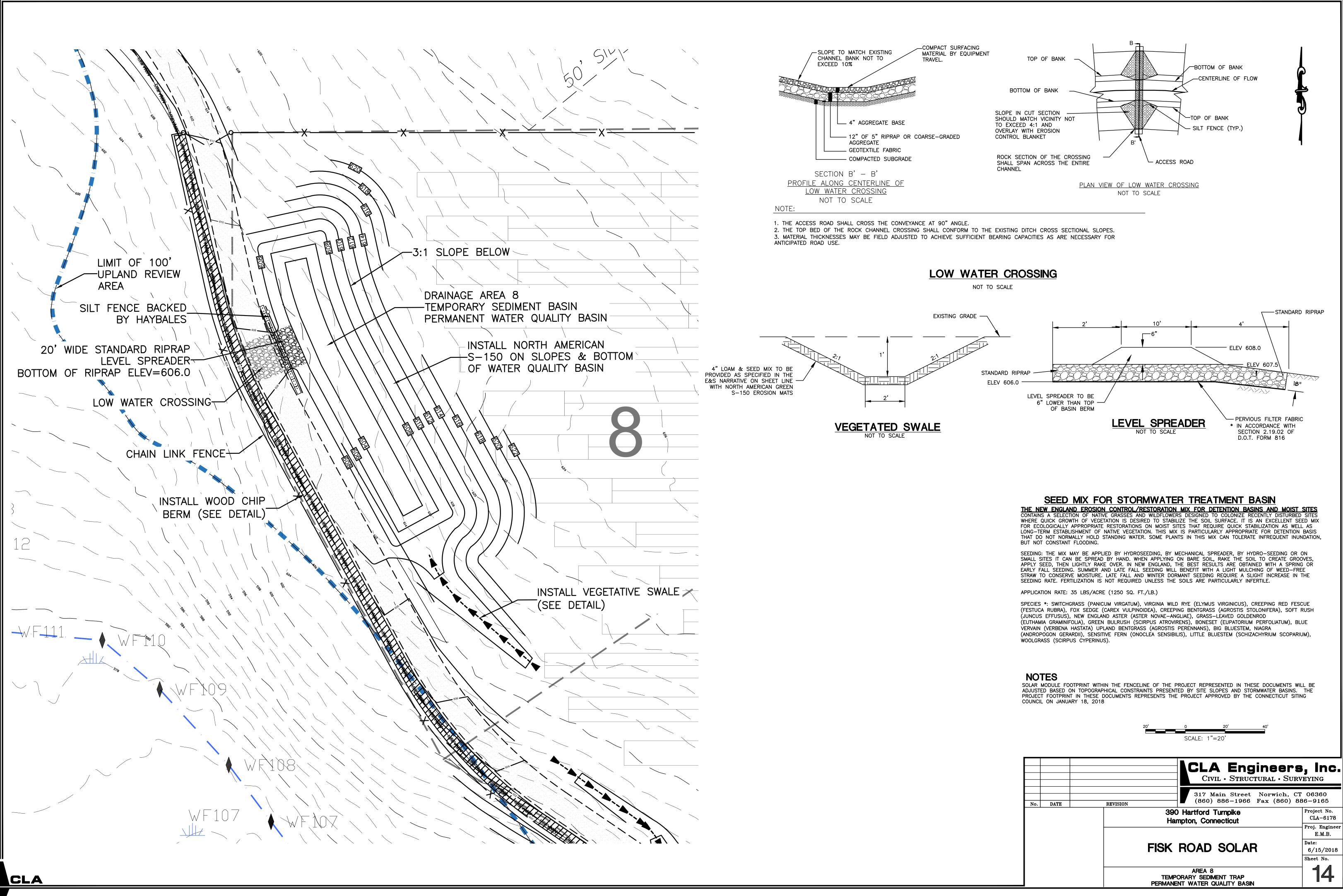


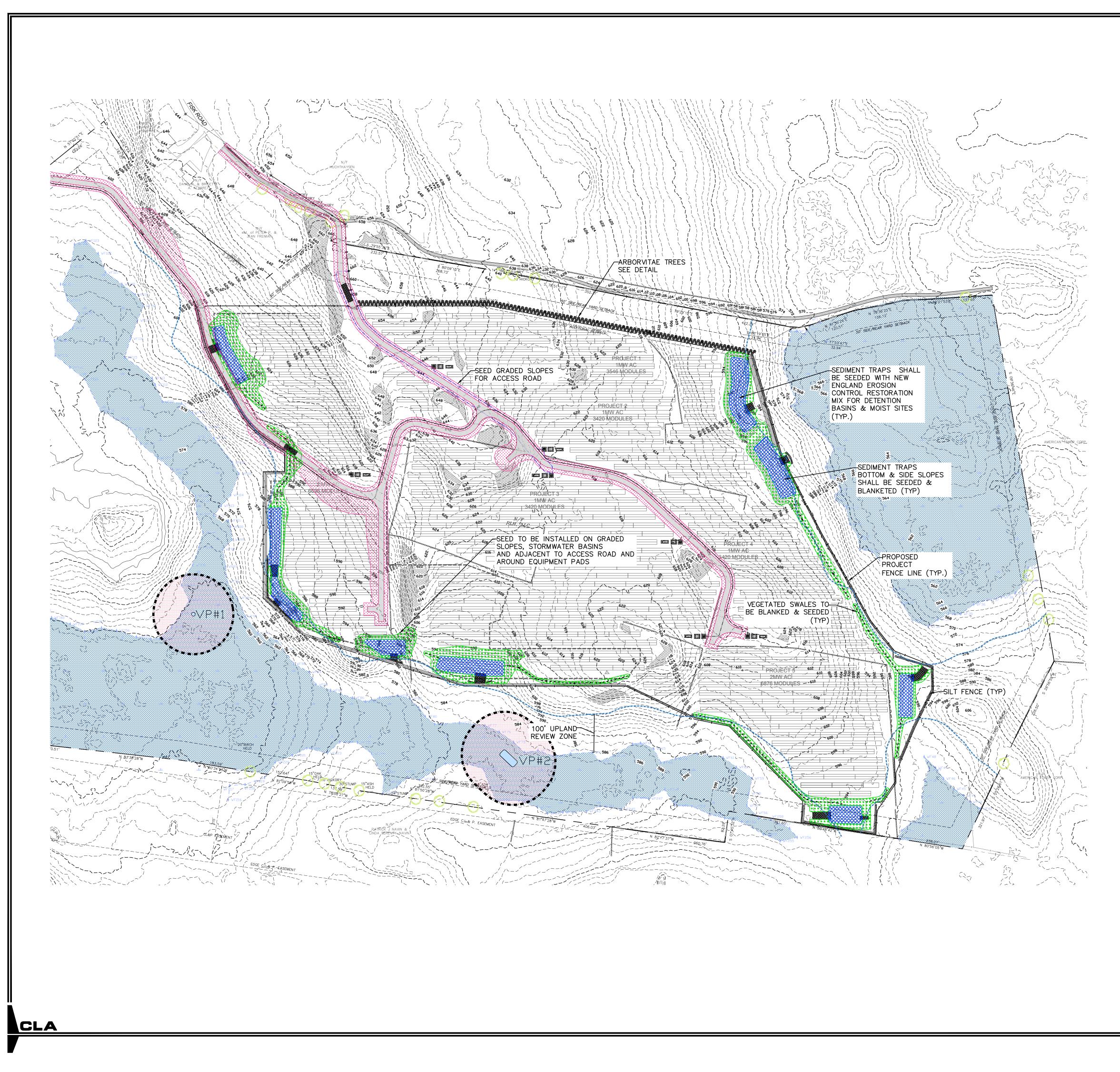






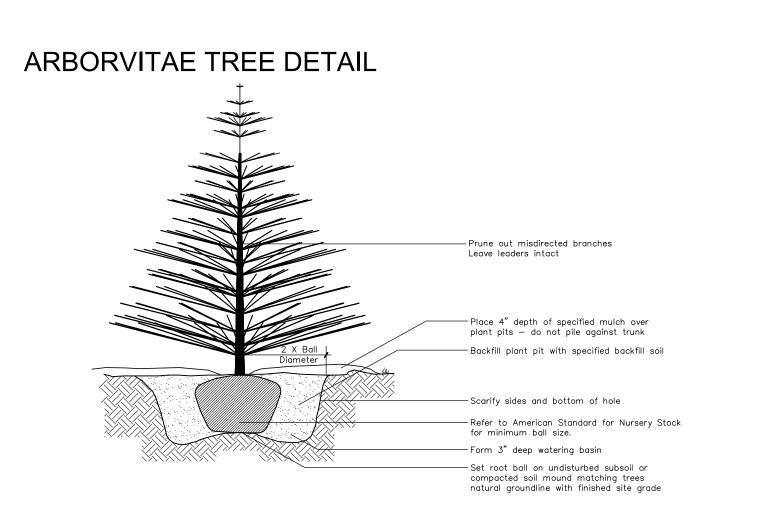






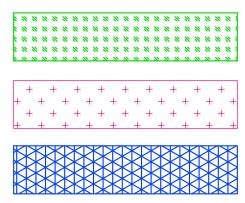
SEEDING NOTES:

- THE CONTRACTOR SHALL SEED ALL DISTURBED AREAS ASSOCIATED WITH TREE REMOVAL AND SITE CLEARING. CONTRACTOR SHALL A INSTALL A 50% / 50% CLOVER / FESCUE MIX OR ENGINEER APPROVED ALTERNATE SEED MIXTURE.
- 2. SEDIMENT TRAPS BOTTOM AND SIDE SLOPES SHALL BE SEEDED WITH THE NEW ENGLAND EROSION CONTROL/RESTORATION MIX FOR DETENTION BASIN AND MOIST SITES. CONTRACTOR TO PROVIDED SEED MIXTURE TO ENGINEER PRIOR TO SEEDING BASINS.
- 3. ALL SEDIMENT TRAP BOTTOM AND SIDE SLOPES SHALL BE SEEDED AND BLANKETED.
- 4. OPEN FIELD AND BRUSH FIELD SEED AREAS SHALL BE SEEDED IN GRUBBED AREAS.



NOTES

SOLAR MODULE FOOTPRINT WITHIN THE FENCELINE OF THE PROJECT REPRESENTED IN THESE DOCUMENTS WILL BE ADJUSTED BASED ON TOPOGRAPHHICAL CONSTRAINTS PRESENTED BY SITE SLOPES AND STORMWATER BASINS. THE PROJECT FOOTPRINT IN THESE DOCUMENTS REPRESENTS THE PROJECT APPROVED BY THE CONNECTICUT SITING COUNCIL ON JANUARY 18, 2018



SWALE/SLOPE BLANKET AREAS - 1.9 ACRES SITE GRADING SEEDING - 2.5 ACRES

RESTORATION MIX SEEDING - 1.2 ACRES

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No.	DATE		REVISION				Norwich, CT Fax (860) 88	
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				FISK R	OAD S	OLAF	2	Date: 6/15/2018 Sheet No.
				LAN	DSCAPE PL	AN		15

ROAD DESIGN PARAMETERS

ROAD MAINTENANCE CAN BE EXPECTED OVER THE LIFE OF THE PERMANENT FACILITY.

SPECIAL PROVISIONS FOR GRADING AND EROSION CONTROL

THE CONTRACTOR SHALL PROVIDE EROSION CONTROL MEASURES AS PLANNED AND SPECIFIED FOLLOWING BEST MANAGEMENT PRACTICES AS OUTLINED BY THE STATE OF CONNECTICUT AND BEING IN CONFORMANCE WITH THE NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) GENERAL STORMWATER PERMIT. SEE THE STORMWATER POLLUTION CONTROL PLAN (SWPCP) FOR EROSION CONTROL AND RESTORATION SPECIFICATIONS. UNLESS OTHERWISE NOTED OR MODIFIED HEREIN, ALL SECTIONS OF THE GENERAL CONDITIONS SHALL APPLY.

EXECUTION

- 1. CLEARING AND GRUBBING
- A. THE CONTRACTOR SHALL BE REQUIRED TO REMOVE ALL TREES, STUMPS, BRUSH, AND DEBRIS WITHIN THE GRADING LIMITS SHOWN ON THE PLANS. THE CONTRACTOR IS TO REMOVE ONLY THOSE TREES WHICH ARE DESIGNATED BY THE OWNER'S REPRESENTATIVE FOR REMOVAL, AND SHALL EXERCISE EXTREME CARE AROUND EXISTING TREES TO BE SAVED. 2. TOPSOIL STRIPPING
- A. TOPSOIL SHALL BE STRIPPED FROM ALL ROADWAY AREAS THROUGH THE ROOT ZONE.
- TOPSOIL SHALL NOT BE STRIPPED OUTSIDE OF THE DESIGNATED DISTURBANCE AREAS. B. ANY TOPSOIL, THAT HAS BEEN STRIPPED, SHALL BE RE-SPREAD OR STOCKPILED WITHIN GRADING AREAS AND/OR USED AS FILL OUTSIDE OF THE DISTURBANCE AREAS, AS DIRECTED BY THE ENGINEER.
- 3. EMBANKMENT CONSTRUCTION.
 - A. EMBANKMENT CONSTRUCTION SHALL CONSIST OF THE PLACING OF SUITABLE FILL MATERIAL AFTER TOPSOIL STRIPPING, ABOVE THE EXISTING GRADE. GENERALLY, EMBANKMENTS SHALL HAVE COMPACTED SUPPORT SLOPES OF TWO AND A HALF FEET HORIZONTAL TO ONE FOOT VERTICAL. THE MATERIAL FOR EMBANKMENT CONSTRUCTION SHALL BE OBTAINED FROM THE ACCESS ROAD EXCAVATION (SEE GEOTECHNICAL REPORT FOR RESTRICTIONS), OR ANY SUITABLE, APPROVED SOIL OBTAINED OFFSITE BY CONTRACTOR, AS DIRECTED OR APPROVED BY THE ENGINEER. THIS MATERIAL SHALL BE PLACED IN LIFTS NOT TO EXCEED 9".
- B. SIDE SLOPES GREATER THAN 2.5:1 WILL NOT BE PERMITTED, UNLESS OTHERWISE NOTED ON THE PLAN.

TESTING REQUIREMENTS

- 1. TESTING SHALL BE PERFORMED BY A DESIGNATED INDEPENDENT TESTING AGENCY 2. SUBMIT TESTING AND INSPECTION RECORDS SPECIFIED TO THE CIVIL ENGINEER OF RECORD FOR REVIEW.
- A. THE ENGINEER WILL REVIEW THE TESTING AND INSPECTION RECORDS TO CHECK CONFORMANCE WITH THE DRAWINGS AND SPECIFICATIONS. THE ENGINEER'S REVIEW DOES NOT RELIEVE THE CONSTRUCTION CONTRACTOR FROM THE RESPONSIBILITY FOR CORRECTING DEFECTIVE WORK.
- 3. PROOF ROLLING:
- A. PROOF-ROLLING SHALL BE PERFORMED IN THE PRESENCE OF THE GEOTECHNICAL ENGINEER OR QUALIFIED GEOTECHNICAL REPRESENTATIVE USING A FULLY LOADED TANDEM AXLE DUMP TRUCK WITH A MINIMUM GROSS WEIGHT OF 25 TONS OR A FULLY LOADED WATER TRUCK WITH AN EQUIVALENT AXLE LOADING. PROOF-ROLLING ACCEPTANCE STANDARDS INCLUDE NO RUTTING GREATER THAN 1.5 INCHES, AND NO "PUMPING" OF THE SOIL BEHIND THE LOADED TRUCK.
- 4. SIEVE ANALYSIS:
- A. SIEVE ANALYSIS SHALL BE CONDUCTED IN ACCORDANCE WITH AASHTO T27
- 5. PROCTOR A. PROCTORS SHALL BE DETERMINED IN ACCORDANCE WITH ASTM D-1557
- 6. ATTERBERG LIMITS:
- A. ATTERBERG LIMITS SHALL BE DETERMINED IN ACCORDANCE WITH AASHTO T89 AND T90 7. MOISTURE DENSITY (NUCLEAR DENSITY): A. MOISTURE DENSITY TESTING SHALL BE DONE IN ACCORDANCE WITH AASHTO T310

SUBGRADE COMPACTION, TEST ROLLING AND AGGREGATE BASE COMPACTION:

- 1. FILL MATERIAL: A. SOILS USED AS FILL MATERIAL SHALL BE TESTED FOR GRAIN SIZE ANALYSIS, MOISTURE CONTENT, ATTERBERG LIMITS ON FINES CONTENT, AND PROCTOR TESTS (MODIFIED DRY MAXIMUM DENSITY).
 - a. FOR PLACED & COMPACTED FILLS, PROVIDE ONE COMPACTION TEST PER LIFT FOR EVERY 1000 FT OF ROAD LENGTH. INCLUDE THE LOCATION, DRY DENSITY, MOISTURE CONTENT, AND COMPACTION PERCENT BASED ON MODIFIED PROCTOR MAXIMUM DRY DENSITY.
- B. IN ROADWAY CUT AREAS, OR WHERE EMBANKMENT CONSTRUCTION REQUIRES LESS THAN 12 INCHES OF FILL PLACEMENT, COMPACT TO A MINIMUM OF 95 PERCENT OF THE MATERIAL'S MODIFIED PROCTOR MAXIMUM DRY DENSITY.

2. COMPACTED SUBGRADE:

- A. THE ENTIRE SUBGRADE SHALL BE PROOF-ROLLED PRIOR TO THE PLACEMENT OF THE AGGREGATE BASE TO IDENTIFY AREAS OF UNSTABLE SUBGRADE.
- B. IF PROOF ROLLING DETERMINES THAT THE SUBGRADE STABILIZATION CANNOT BE ACHIEVED, THE FOLLOWING ALTERNATIVES WILL BE IMPLEMENTED: a. REMOVE UNSUITABLE MATERIAL AND REPLACE WITH SUITABLE EMBANKMENT.
- b. SCARIFY, DRY, AND RECOMPACT SUBGRADE AND PERFORM ADDITIONAL PROOF ROLL. c. INCREASE ROAD BASE THICKNESS.
- C. PROVIDE 1 MOISTURE DENSITY COMPACTION TESTS FOR EVERY 1000 L.F. OF ROAD LENGTH. COMPACTED SUBGRADE MUST BE COMPACTED TO A MINIMUM OF 95% MODIFIED PROCTOR MAXIMUM DRY DENSITY AT ±3% OF OPTIMUM MOISTURE CONTENT FOR GRANULAR SOILS AND AT -1 TO +3% OF OPTIMUM MOISTURE CONTENT FOR COHESIVE SOILS.
- 3. AGGREGATE BASE:

CLA

- A. AGGREGATE BASE SHALL BE PROOF-ROLLED OVER THE ENTIRE LENGTH. PROVIDE 1 SIEVE ANALYSIS PER 2500 CY OF ROAD BASE PLACED.
- a. IF PROOF ROLLING DETERMINES THAT THE ROAD IS UNSTABLE, ADDITIONAL AGGREGATE SHALL BE ADDED UNTIL THE UNSTABLE SECTION IS ABLE TO PASS A PROOF ROLL.

TABLE 1: TESTING SCHEDULE SUMMARY				
LOCATION	TEST	FREQUENCY		
STRUCTURAL FILL	GRAIN SIZE ANALYSIS, MOISTURE CONTENT, ATTERBERG LIMITS ON FINES CONTENT, AND PROCTOR	1 PER MAJOR SOIL TYPE		
	MOISTURE DENSITY	1 PER 2,000 CY OR MIN. 1 PER LIFT		
COMPACTED	PROOF-ROLL	ENTIRE LENGTH		
SUBGRADE	MOISTURE DENSITY TEST (NUCLEAR DENSITY)	1 PER 1,000 FT OR MIN. 5 FOR THE SITE		
AGGREGATE BASE	PROOF-ROLL	ENTIRE LENGTH		
	SIEVE ANALYSIS	1 PER 2,500 CY		

GENERAL NOTES:

- THE PLANS.
- BEFORE EXCAVATION ACTIVITIES COMMENCE.
- SURVEYING AND FLAGGED BY HIGHLANDS SOILS.

SLOPE STABILIZATION:

ALL AREAS DESIGNATED ON THE PLAN FOR SLOPE STABILIZATION SHALL BE GRADED AND COMPACTED, SMOOTH AND CLEAN TO THE FINISH CONTOURS SHOWN ON THE PLAN, WITH A MINIMUM OF 4 INCHES OF TOPSOIL PLACED ON THE AREA. STABILIZATION SHALL BE ACHIEVED IN ONE OF TWO MANNERS:

- EITHER: 1) HAND-PLACED RIPRAP OR:
- 1. PLACEMENT OF RIP-RAP

RIPRAP HAND PLACED. HAND-PLACED RIPRAP SHALL CONSIST OF ROUGH UNHEWN QUARRY STONES, APPROXIMATELY RECTANGULAR, PLACED DIRECTLY ON THE SPECIFIED SLOPES OR SURFACES. IT SHALL BE SO LAID THAT THE WEIGHT OF THE LARGE STONES IS CARRIED BY THE SOIL RATHER THAN BY ADJACENT STONES. STONES SHALL WEIGH BETWEEN 50 AND 150 LB. EACH AND AT LEAST 60 % OF THEM SHALL WEIGH MORE THAN 100 LB. EACH WHEN USED ON EMBANKMENT CONSTRUCTION. RIP RAP FOR BMPS SHALL BE 6"-8" DIA. PREPARATION FOR HAND-PLACED RIP RAP. BEFORE ANY RIP RAP IS PLACED, THE SURFACE TO BE COVERED SHALL BE FULLY COMPACTED AND GRADED TO THE REQUIRED SLOPE. PLACE MIRAFITM8 OR APPROVED EQUAL GEOTEXTILE ON SLOPE. RIP RAP ON SLOPES SHALL COMMENCE COMMENCE IN A TRENCH BELOW THE TOW OF THE SLOPE AND SHALL PROGRESS UPWARD, EACH STONE BEING LAID BY HAND PERPENDICULAR TO THE SLOPE WITH THE LONG DIMENSION VERTICAL, FIRMLY BEDDED AGAINST THE SLOPE AND AGAINST THE ADJOINING STONE, WITH ENDS IN CONTACT, AND WITH WELL-BROKEN JOINTS. SIMILAR METHODS SHALL BE USED WHEN LAYING RIPRAP ON STREAM BEDS, IN DITCHES, AND ON LEVEL SURFACES.

THE FINISHED SURFACE OF THE RIPRAP SHALL PRESENT AN EVEN, TIGHT SURFACE, NOT LESS THAN 12 INCHES THICK, MEASURED PERPENDICULAR TO THE SLOPE.

THE STONES WEIGHING MORE THAN 100 LB. SHALL BE WELL DISPERSED THROUGHOUT THE AREA WITH THE 50-100 LB. STONES LAID BETWEEN THEM IN SUCH A MANNER THAT ALL STONES WILL BE IN CLOSE CONTACT. THE REMAINING VOIDS SHALL BE FILLED WITH SPALLS OF SUITABLE SIZE AND WELL TAMPED TO PRODUCE A FIRM AND COMPACT REVETMENT.

2. STABILIZATION WITH EROSION CONTROL AND REVEGITATION MAT (ECRM) 1) AREA MUST BE GRADED SMOOTH AND CLEAN TO FINISH GRADES, AND COMPACTED

2) SEED AND MULCH AREA. USE SEED MIX APPROVED BY THE ENGINEER.

3) INSTALL ECRM PER MANUFACTURER'S INSTRUCTIONS, HOWEVER THESE MUST INCLUDE THE FOLLOWING MINIMUM REQUIREMENTS:

A) GRADE GROUND TO FINISH CONTOURS. REMOVE ALL ROCKS, DIRT CLODS, STUMPS, ROOTS, TRASH, AND OTHER OBSTRUCTIONS LYING IN DIRECT CONTACT WITH THE SOIL SURFACE.

B) DIG MAT ANCHOR TRENCHES (MINIMUM 12"DEEP, 6" WIDE) AT TERMINAL ENDS AND PERIMETER SIDES WHERE MAT IS TO BE INSTALLED.

C) INSTALL MAT BY ROLLING UPHILL PARALLEL TO WATER FLOW, STARTING AT TRENCH. OVERLAP ROLLS BY MINIMUM OF 3". FASTEN TO GROUND WITH 18" PINS AND 1 1/2" WASHERS, OR EQUIVALENT. PIN MAT AT ENDS. AND EVERY 3' TO 5' ALONG OVERLAPS. DO NO STRETCH MAT. SPLICING ROLLS SHOULD BE DONE IN A CHECK SLOT. BACKFILL TO COVER ENDS AND FASTENERS, ROLLING MAT ACROSS BACKFILL AND PIN AGAIN.

FOR MAT USE NORTH AMERICAN GREEN S-150.

SEEDING:

- AND REMULCH/RESEEDED.

INVASIVE SPECIES:

1. THE PLANIMETRIC FEATURES, GROUND SURFACE CONTOURS ON A LIDAR SURFACE PROVIDED

2. NO GRADING OR SOIL DISTURBANCE IS PERMITTED OUTSIDE OF THE GRADING LIMITS IDENTIFIED ON

3. GRADE ALL PROPOSED ROADS TO THE SLOPES PROPOSED ON THE PLANS. 4. THE CONTRACTOR IS RESPONSIBLE FOR MAINTAINING DRAINAGE THROUGHOUT THE CONSTRUCTION OF THIS PROJECT. CONSTRUCTION ACTIVITIES SHALL NOT BLOCK THE NATURAL OR MANMADE DRAINAGE SWALES CAUSING RAINWATER TO POND. ADDITIONAL CULVERTS IN EXCESS OF THOSE ON THE PLANS MAY BE REQUIRED AS APPROVED BY THE ENGINEER. 5. THE CONTRACTOR SHALL NOTIFY CONNECTICUT CALL BEFORE YOU DIG (811) AT LEAST 48 HOURS

6. WETLAND INFORMATION SHOWN ON THE PLAN WAS PROVIDED BY ROB HELLSTROM LAND

7. ELECTRICAL COLLECTION SYSTEM SHOWN ON THE PLAN SHALL BE CONSIDERED PRELIMINARY. CONTRACTOR SHALL REFER TO FINAL ELECTRICAL DESIGN PLANS FOR ACTUAL DESIGN LOCATIONS.

2) SEED WITH EROSION CONTROL AND REVEGITATION MAT (ECRM)

COMPOSITION OF SEED MIX CHANGES YEARLY. SEED SPECIFICATIONS MUST BE SUBMITTED TO ENGINEER 2 WEEKS PRIOR TO INSTALLATION. ALL SPECIES MUST BE NATIVE TO WINDHAM COUNTY.

2. RESTORED AREAS TO BE SEEDED WITH ABOVE MIX OR EQUAL (SUBJECT TO ENGINEERS APPROVAL). SEED TO BE LIGHTLY RAKED TO ALLOW FOR PROPER SEED/SOIL CONTACT.

3. CONTRACTOR SHALL OVERSEED AND/OR RE-MULCH AS NECESSARY TO ESTABLISH A GOOD COVER OF VEGETATION, WHETHER DUE TO POOR INITIAL COVER, INCLEMENT WEATHER BEFORE/DURING/AFTER SEEDING, OR THE ONSET OF WINTER.

4. RILLING, GULLIES, OR OTHER EROSION DUE TO POOR COVER SHALL BE RAKED AND/OR REFILLED

5. CONTRACTOR SHALL WARRANTEE SEEDING, MULCHING AND EROSION CONTROL FABRIC FOR ONE YEAR FROM THE SUBSTANTIAL COMPLETION OF THE RELEVANT AREA OF WORK.

1. ALL EQUIPMENT SHALL BE INSPECTED UPON ARRIVAL. EQUIPMENT ARRIVING WITH OBSERVABLE SOIL OR PLANT FRAGMENTS WILL BE REMOVED AND CLEANED.

2. HAY BALES ARE NOT BE USED ON SITE; ONLY WEED-FREE STRAW BALES ARE APPROVED. OFF-SITE TOPSOIL MUST BE FREE OF INVASIVE SPECIES. THE ENGINEER SHALL BE NOTIFIED OF THE TOPSOIL SOURCE 6 WEEKS BEFORE DELIVERY.

SEDIMENTATION AND EROSION CONTROL PLAN

CONTACT: STEVE BROYER ECOS ENERGY 222 SOUTH 9TH STREET SUITE 1600 MINNEAPOLIS MN 55402

THE PURPOSE OF THIS PROJECT IS TO INSTALL APPROXIMATELY 24,000 SOLAR MODULES AND ASSOCIATED ELECTRICAL EQUIPMENT FOR POWER GENERATION.

THE TOTAL AREA OF THE PROJECT SITE IS APPROXIMATELY 99.29 ACRES AND THE TOTAL AREAS OF THE SITE THAT IS EXPECTED TO BE DISTURBED BY CONSTRUCTION ACTIVITIES IS 35.4 ACRES

THE EROSION & SEDIMENTATION CONTROL PLAN AND DETAILS HAVE BEEN DEVELOPED AS A STRATEGY TO CONTROL SOIL EROSION AND SEDIMENTATION DURING AND AFTER CONSTRUCTION. THIS PLAN IS BASED ON THE "2002 CONNECTICUT GUIDELINES FOR SOIL EROSION AND SEDIMENT CONTROL" BY THE CONNECTICUT COUNCIL ON SOIL AND WATER CONSERVATION IN COOPERATION WITH THE CONNECTICUT DEEP.

IN THE AREAS OF SOLAR PANEL INSTALLATION, THERE ARE SEVERAL ACTIVITIES (SITE GRADING, FOOTING INSTALLATION, PANEL INSTALLATION, AND ELECTRICAL TRENCH WORK) THAT WILL DISTURB SOIL. ON SITE SOIL IS FINE TEXTURED, EROSIVE, MUST BE PROMPTLY STABILIZED AFTER EACH ACTIVITY.

THIS PROJECT WILL NOT BE PHASED. THE CONTRACTOR WILL LIMIT THE EXPOSED AREA OF UNSTABLIZED SOIL AND DISTURBANCE PER THE CONSTRUCTION SEQUENCE PROVIDED ON THIS PLAN.

THE PROPOSED LOCATIONS OF SILTATION AND EROSION CONTROL MEASURES ARE SHOWN ON THE PLANS. THE CONTRACTOR SHALL PROVIDE SILT FENCE, HAY BALES, EROSION MAT, STONE CHECK DAMS, A CONSTRUCTION ENTRANCE, AND/OR OTHER EROSION CONTROL MEASURES AS NEEDED OR DIRECTED BY THE ENGINEER OR TOWN STAFF TO ADEQUATELY PREVENT SEDIMENT TRANSPORT.

EROSION AND SEDIMENTATION CONTROL MEASURES SHALL BE INSTALLED PRIOR TO SITE DISTURBANCE.

THE CONTRACTOR SHALL INSPECT, REPAIR AND/OR REPLACE EROSION CONTROL MEASURES EVERY 7 DAYS AND IMMEDIATELY FOLLOWING ANY SIGNIFICANT RAINFALL OR SNOW MELT. SEDIMENT DEPOSITS MUST BE REMOVED BEFORE DEPOSITS REACH APPROXIMATELY ONE HALF THE HEIGHT OF THE BARRIER. SEDIMENT CONTROL DEVICES SHALL REMAIN IN PLACE AND BE MAINTAINED BY THE CONTRACTOR UNTIL AREAS UPSLOPE ARE PERMANENTLY STABILIZED.

STAKED HAY BALE SILT BARRIERS OR SILT FENCE SHALL BE INSTALLED AROUND ANY TEMPORARY STOCKPILE AREAS. TEMPORARY VEGETATIVE COVER MAY BE REQUIRED (SEE NOTE).

CONTINUOUS DUST CONTROL USING WATER OR APPROVED EQUAL SHALL BE PROVIDED FOR ALL EARTH STOCKPILES, EARTH PILED ALONG EXCAVATIONS, SURFACES OF BACKFILLED TRENCHES AND GRAVELED ROADWAY SURFACES. THE USE OF CALCIUM CHLORIDE FOR DUST CONTROL SHALL NOT BE ALLOWED.

IF DEWATERING IS NECESSARY DURING ANY TIME OF CONSTRUCTION A CLEAR WATER DISCHARGE SHALL BE PROVIDED AS SHOWN IN THE HAY-BALE BARRIER DEWATERING DETAIL OR ALTERNATE METHOD PROPOSED BY THE CONTRACTOR AND APPROVED BY THE ENGINEER.

ALL DISTURBED AREAS SHALL BE RESTORED PER THE SLOPE STABILIZATION AND PERMANENT VEGETATION DETAILS. ALL DISTURBED AREAS THAT ARE SLOPED LESS THAN THREE HORIZONTAL TO ONE VERTICAL (3:1) SLOPE SHALL BE LOAMED, SEEDED, FERTILIZED AND MULCHED PER THE PERMANENT VEGETATIVE COVER SPECIFICATIONS. EROSION CONTROL MATTIN PROVIDED ON ALL DISTURBED AREAS THAT ARE SLOPED MORE THAN THREE F VERTICAL (3:1).

IF FINAL SEEDING OF DISTURBED AREAS IS NOT TO BE COMPLETED BEFORE OCTOBER 15, THE CONTRACTOR SHALL PROVIDE TEMPORARY MULCHING (DORMANT SEEDING MAY BE ATTEMPTED AS WELL) TO PROTECT THE SITE AND DELAY PERMANENT SEEDING.

WHEN FEASIBLE, TEMPORARY SEEDING OF DISTURBED AREAS THAT HAVE NOT BEEN FINISHED GRADED SHALL BE COMPLETED PRIOR TO OCTOBER 15.

ON EACH FRIDAY AND ALSO ON THE DAY BEFORE ANY RAIN FORECAST OF 0.5 INCHES OR MORE, THE CONTRACTOR SHALL HAY MULCH ALL EXPOSED SOIL

ANY EROSION WHICH OCCURS WITHIN THE DISTURBED AREAS SHALL BE IMMEDIATELY REPAIRED AND STABILIZED. DURING THE CONSTRUCTION PHASE, INTERCEPTED SEDIMENT SHALL BE RETURNED TO THE SITE. POST SEEDING, INTERCEPTED SEDIMENT, IF ANY, SHALL BE DISPOSED OF IN A MANNER APPROVED BY THE TOWN AND ENGINEER.

EROSION AND SEDIMENTATION CONTROL MEASURES SHALL REMAIN IN PLACE UNTIL VEGETATION IS RE-ESTABLISHED OR SLOPES ARE STABILIZED AND REMOVAL IS APPROVED BY THE TOWN.

UNFORESEEN PROBLEMS WHICH ARE ENCOUNTERED IN THE FIELD SHALL BE SOLVED ACCORDING TO THE "2002 CONNECTICUT GUIDELINES FOR SOIL EROSION AND SEDIMENT CONTROL" BY THE CONNECTICUT COUNCIL ON SOIL AND WATER CONSERVATION IN COOPERATION WITH THE CONNECTICUT DEEP.

THE CONTRACTOR SHALL PROVIDE THE NAME AND EMERGENCY CONTACT INFORMATION FOR THE PROJECT PERSONNEL RESPONSIBLE FOR EROSION AND SEDIMENTATION CONTROLS PRIOR TO THE START OF CONSTRUCTION.

THE OWNER WILL EMPLOY A CERTIFIED SOIL SCIENTIST TO PERFORM WEEKLY EROSION & SEDIMENTATION CONTROL INSPECTION.

ROUTINE REPAIRS OR MODIFICATIONS SHALL BE COMPLETED BY THE CONTRACTOR Δ WITHIN 48 HOURS AFTER DIRECTION BY THE INSPECTOR. EMERGENCY REPAIRS SHALL BE COMPLETED IMMEDIATELY UPON DIRECTION BY THE INSPECTOR.

THE WETLANDS ENFORCEMENT OFFICER SHALL BE NOTIFIED AT LEAST 2 BUSIN CONSTRUCTION TO INSPECT EROSION CONTROLS.

THE WETLAND ENFORCEMENT OFFICER SHALL BE NOTIFIED AT THE COMPLETION OF WORK FOR FINAL INSPECTION AND SIGN OFF OF PERMIT COMPLIANCE.

LOCAL STATE AND FEDERAL PERMITS REQUIRED: THIS PROJECT REQUIRES A PERMIT FROM THE STATE OF CONNECTICUT SITING COUNCIL.

THE FOLLOWING DOCUMENTS ARE CONSIDERED TO BE PART OF THIS EROSION AND SEDIMENTATION CONTROL PLAN: THE COMPLETE SITE PLANS, THE DRAINAGE NARRATIVE PREPARED BY CLA ENGINEERS, AND THE CTDEEP 2002 MANUAL.

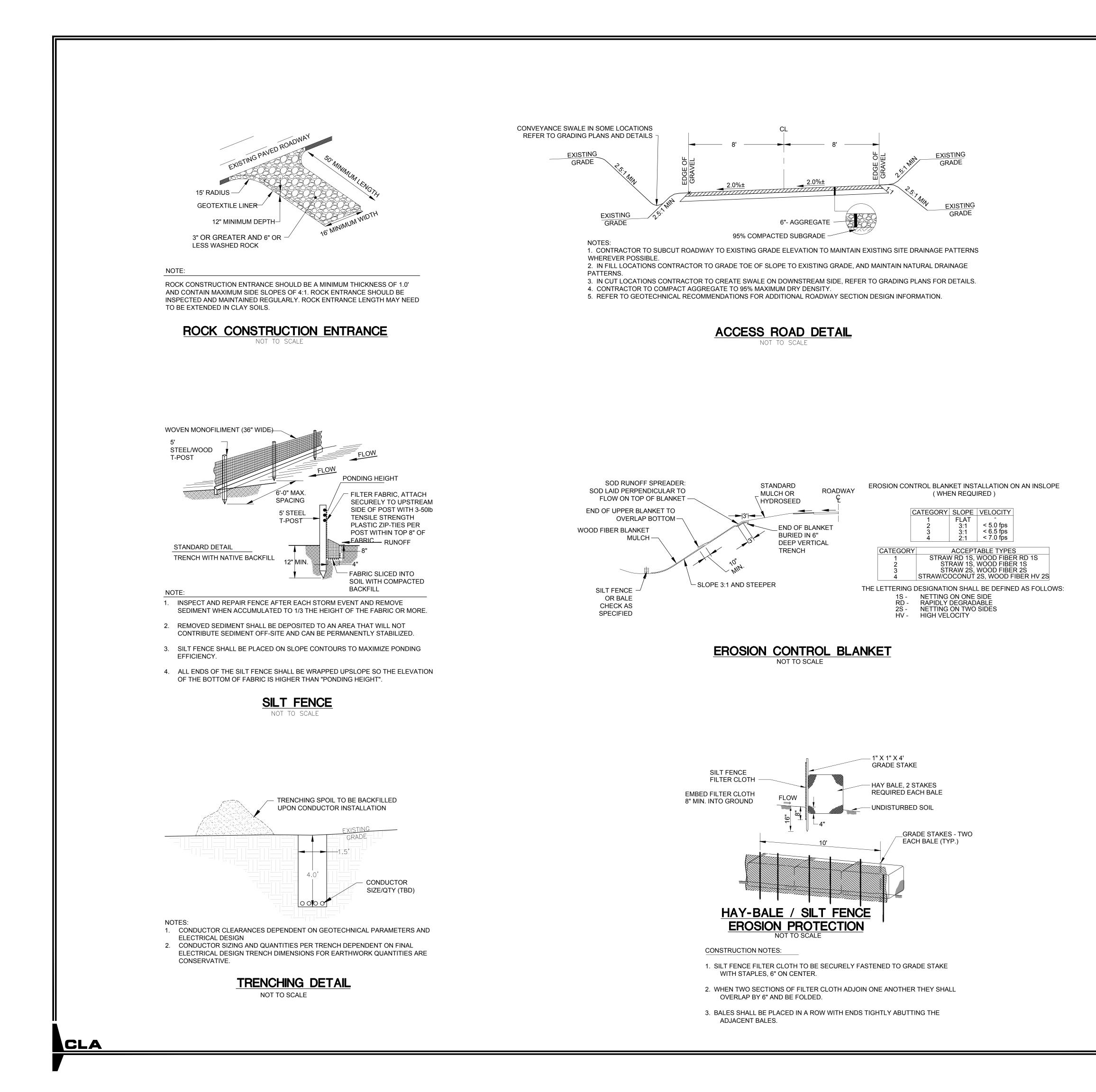
EROSION AND SEDIMENTATION CONTROL SEQUENCE

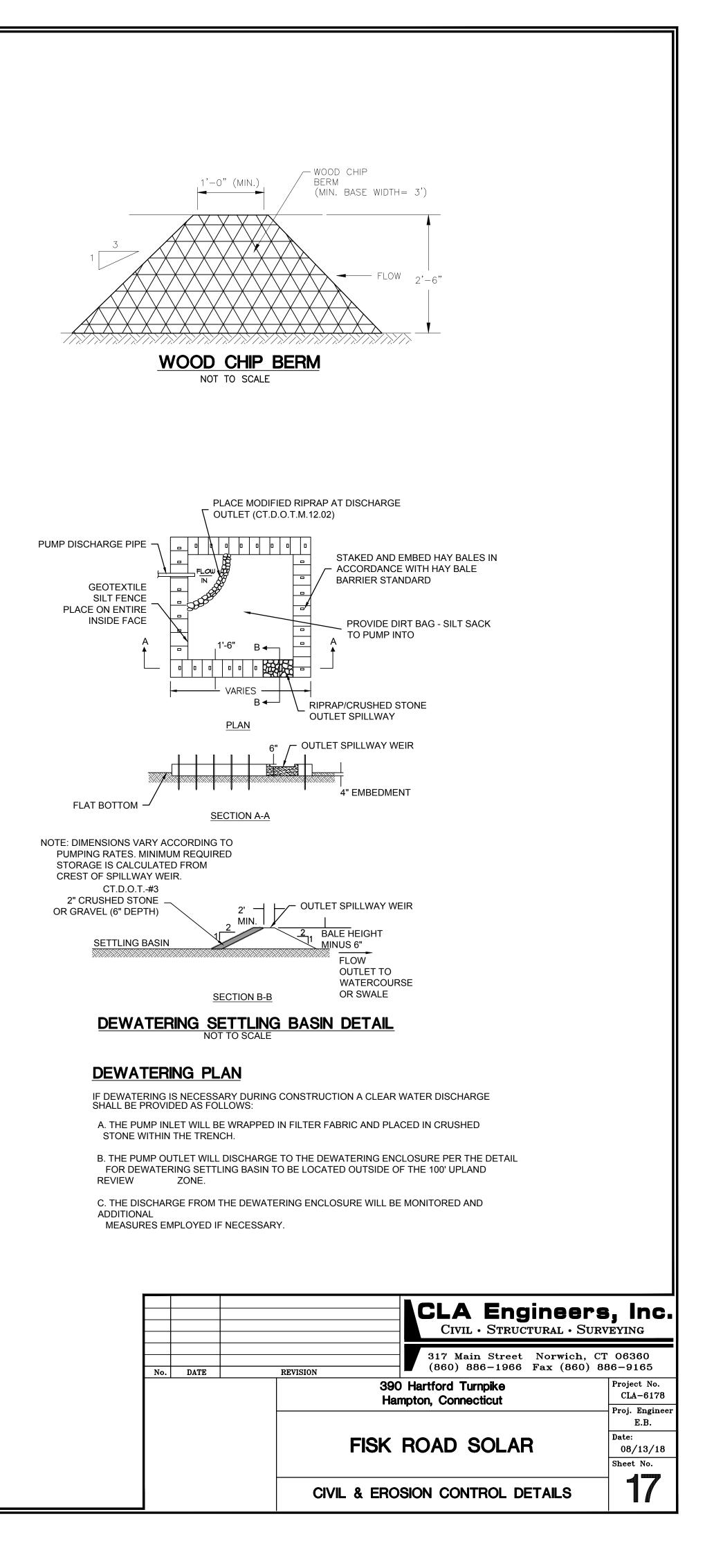
- 1. BEFORE ANY WORK TAKES PLACE CONTACT CALL BEFORE YOU DIG 1-800-922- 4455 TO MARK UTILITIES.
- 2. NOTIFY THE TOWN OF HAMPTON ZONING AND INLAND WETLANDS AGENTS OF START OF CONSTRUCTION A MINIMUM OF 48 HOURS IN ADVANCE.
- 3. HAVE LICENSED SURVEYOR STAKE OUT THE CLEARING LIMITS
- 4. CUT TREES BUT DO NOT GRUB.
- 5. INSTALL CONSTRUCTION ENTRANCE
- 6. INSTALL PERIMETER EROSION AND SEDIMENTATION CONTROLS (PERIMETER SILT FENCE AND WOOD CHIP BERM) AND HAVE INSPECTED BY SITE INSPECTOR.
- 7. INSTALL CHAIN LINK FENCE AND HAYBALES AROUND PERIMETER.
- 8. INSTALL ADDITIONAL E&S AS SHOWN ON PLANS INCLUDING TEMPORARY VEGETATED SWALES AND TEMPORARY VEGETATED SEDIMENT TRAPS AND HAVE THEM INSPECTED BY THE SITE INSPECTOR.
- 9. ANY DEWATERING WILL BE MONITORED BY A QUALIFIED ENVIRONMENTAL PROFESSIONAL TO MAINTAIN SUITABLE QUALITY OF DISCHARGE FROM THE DEWATERING AND TO ENSURE REMOVAL OF ACCUMULATED SEDIMENTS AT APPROPRIATE INTERVALS. SEDIMENTS WILL BE DISPOSED OF AT AN APPROPRIATE ON-SITE LOCATION. DEWATERING WILL DISCHARGE INTO TEMPORARY SEDIMENT TRAPS.
- 10. ROUGH GRADE SITE WILL PROCEEED, WORKING FROM NORTH TO SOUTH. GRADING SHALL NOT EXPOSE MORE THAN 5 ACRES OF SOIL
- 11. INSTALL SOLAR PANELS IN PHASES, HYDROSEED OR SEED AND MULCH AROUND PANELS AND HYDROSEED OR MULCH AND SEED ANY EXPOSED SOIL AT THE END OF EACH WEEK AND BEFORE EVERY RAINFALL PREDICTED FOR 0.5 INCHES OR MORE.
- 12. TRENCH FOR AND INSTALL ELECTRIC LINES AND AT THE END OF EACH WEEK HYDROSEED OR MULCH AND SEED ANY EXPOSED SOIL AT THE END OF EACH WEEK AND BEFORE EVERY RAINFALL PREDICTED FOR 0.5 INCHES OR MORE.
- 13. INSTALL REMAINING ELECTRIC INFRASTRUCTURE AND AT THE END OF EACH WEEK HYDROSEED OR MULCH AND SEED ANY EXPOSED SOIL AT THE END OF EACH WEEK AND BEFORE EVERY RAINFALL PREDICTED FOR 0.5 INCHES OR MORE.
- 14. OVERSEED DISTURBED SOILS WHEN ALL SOLAR PANEL INSTALLTION IS COMPLETE.
- 15. CLEAN SEDIMENTS BASINS AND GRADE AND RE-SEED FOR USE AS STORMWATER BASINS WHEN SITE INSPECTOR DEEMS SOILS ARE STABILIZED.
- 16. INSTALL PLANTINGS

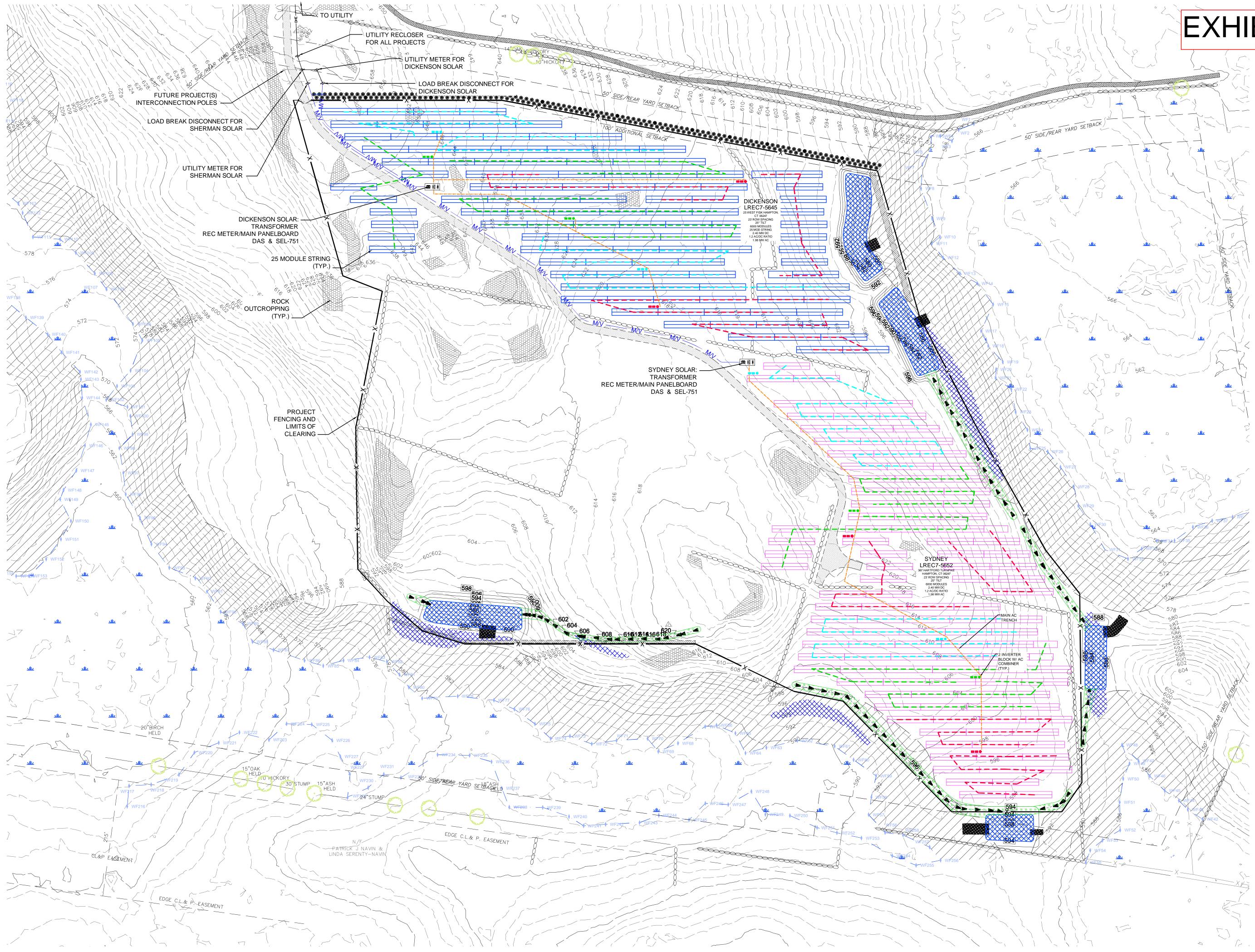
17. MAINTAIN E&S AND PROVIDE REPORTS TO TOWNS AND CTDEEP

NG SHALL BE
IORIZONTAL TO ONE

			CIVIL · STRUCTURAL · SURV	
No.	DATE	REVISION	317 Main Street Norwich, CT (860) 886-1966 Fax (860) 88	
			390 Hartford Turnpike Hampton, Connecticut	Project No. CLA-6178 Proj. Engineer
		FIS	SK ROAD SOLAR	E.B. Date: 08/13/18
		CIVIL &	EROSION CONTROL NOTES	Sheet No.

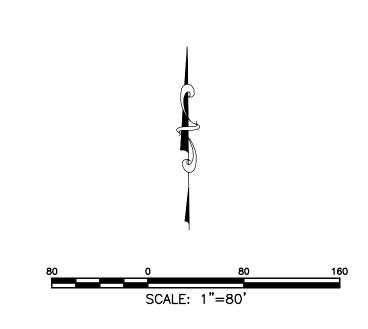








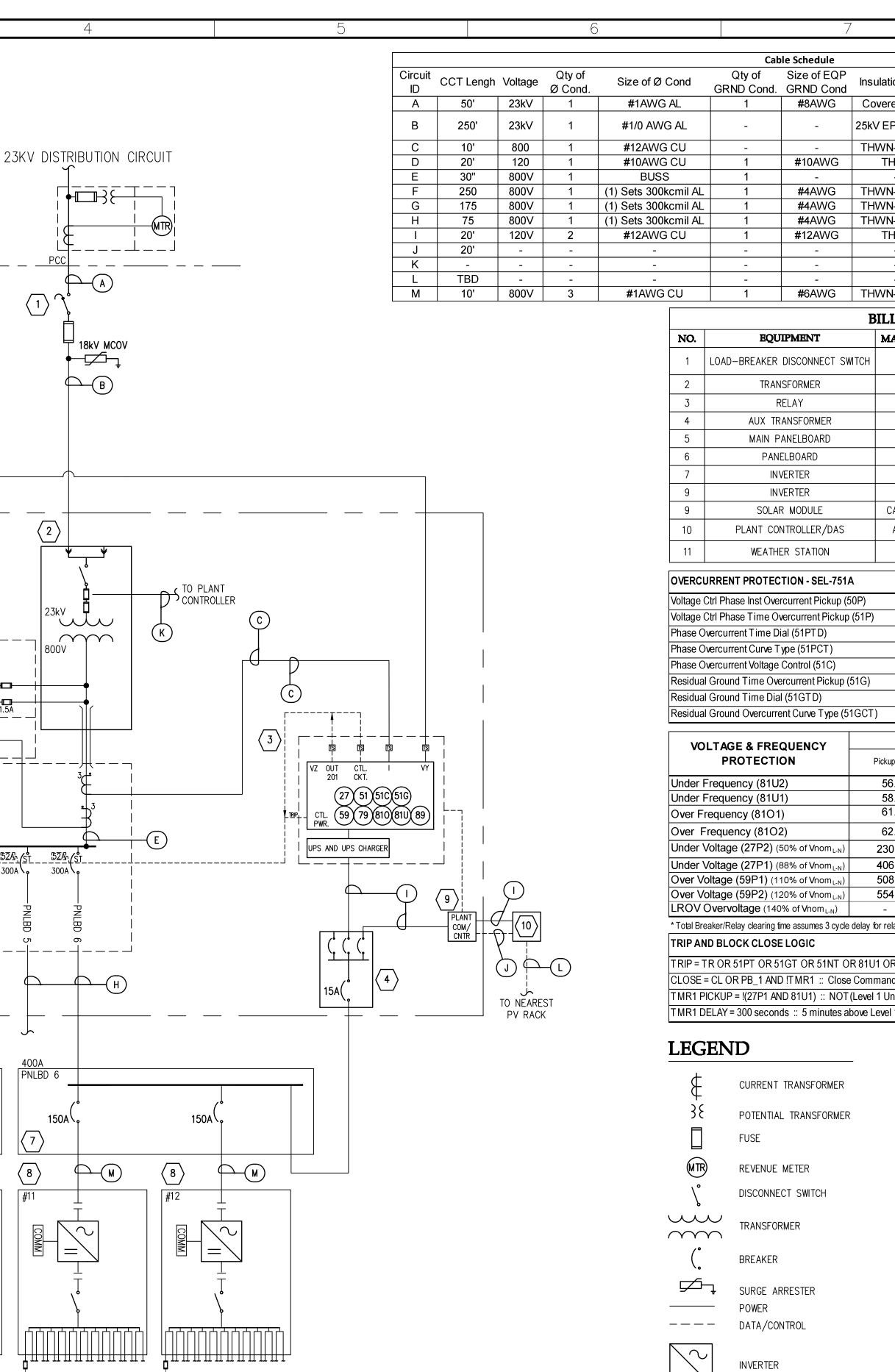




FISK SOLAR 4-15-19

ELECTRICAL DESIGN SITE PLAN

(© 2019 WESTWOOD PROFESSIONAL SERVICES, INC. NOTES		
А	 SYSTEM SPECIFICATIONS: AC TOTAL NAMEPLATE: 1998kW DC TOTAL NAMEPLATE: 2494.8kW UTILITY EQUIPMENT IS SHOW FOR REPRESENTATION PURPOSE ONLY. ACTUAL EQUIPMENT TO BE DESIGNED, SIZED AND SPECIFIED BY THE UTILITY. UTILITY INTERCONNECTION PCC EQUIPMENT & LABOR DIVISION TO BE CONFIRMED BY CONTRACTOR WITH UTILITY. ACTUAL EQUIPMENT AND CONFIGURATION SHALL BE VERIFIED BY UTILITY. 		CP&L 23KV DIS
B	 CONTROLLERS SHALL BE SEL-751R. CONTROLLERS SHALL BE EQUIPPED WITH FRONT RS-232 PORT AND CAPABLE OF COMMUNICATING IN DNP PROTOCOL. ALL SECONDARY CONDUCTORS FROM TRANSFORMER TO SWITCHBOARDS ARE DESIGNED BY OTHERS. CONTRACTOR SHALL VERIFY EXACT INSTALLATION REQUIREMENTS WITH LOW VOLTAGE ENGINEER. CONTROLLER SHALL BE EQUIPPED WITH TEST SWITCHES FOR ALL VOLTAGE AND CURRENTS INPUTS. GROUNDING SHALL BE COORDINATED AND VERIFIED WITH THE LOW VOLTAGE DRAWINGS. CONTRACTOR TO PROVIDE TELECOMMUNICATION LINE, SPECIFIC REQUIREMENTS SHALL BE COORDINATED WITH UTILITY. THIS IS A CONCEPTUAL ONE-LINE DESIGN FOR TYPICAL DISTRIBUTED GENERATION FACILITY. ACTUAL EQUIPMENT MAY VARY BASED ON FINAL DESIGN PARAMETERS. PART NUMBERS ARE FOR REFERENCE AND CONCEPTUAL DESIGN ONLY. 	UTILITY OWNER	
С	 ENGINEERED EQUALS SHALL BE SUBMITTED TO BE APPROVED. COMBINERS ARE INTEGRAL TO INVERTERS LOCATED THROUGHOUT THE ARRAY. WHERE POSSIBLE COMBINE TWO STRINGS USING Y-SPLICE AND SINGLE HOMERUN HARNESS FUSED AT 30A. SEE HARNESS DETAIL. MODULE: CANADIAN SOLAR CS3U-385MS, 1500V, 385W 15.1. MODULES ARE WIRED IN SERIES STRINGS OF 27 MODULES. 15.2. Isc: 10.09A, Voc: 48.0V, Imp: 9.58A, Vmp: 40.2V 15.3. TOTAL MODULES: 6,480 CERTIFIED TO UL 1703. UTILITY METERING AND PRIMARY CIRCUIT PROTECTION BY UTILITY. ECOS TO PROVIDE REQUIRED EQUIPMENT. CONTRACTOR IS RESPONSIBLE FOR CONFIRMING UTILITY PROVIDED EQUIPMENT AND CONTRACTOR PROVIDED EQUIPMENT. KEY NOTES S&C OMNI-RUPTER GANG OPERATED LOAD BREAK DISCONNECT MANUALLY OPERATED (147442R4-A1P1-S1) 25kV, 150kV BIL, 800A CONTINUOUS, 65KA 	XFMR_MPB01 & MBP02_PAD	
D	 24/7 UTILITY ACCESS, VISIBLE BREAK, AND UTILITY LOCKABLE STEP-UP TRANSFORMER 2200 kVA 23 kV G-WYE: 800V G-WYE 3ø, 4W, 125kV BIL, Z=6.0%. TO BE CLOSE COUPLED TO MAIN AC COMBINER OR WITHIN 30 INCHES. SEL-751R W/UPS SEL-751R W/UPS 7.5kVA MINI SUB, 800V: 120 TRANSFORMER 1ø, 10KAIC EATON DRY TYPE (OR EQUIVALENT) 6 CKT BREAKER PANEL 	6	RATIO: 2.3/1 ACCURACY: W0.3
E	 MAIN PANELBOARD: BACKFEED RATED 800V, 2500A, 3Ø, 4W (USE ABB 800V BREAKERS) REC METER: POWERLOGIC ION8650 CT: GE MODEL 125–102, RATIO: 1000/5, ACCURACY: B0.3 PT: RATIO 2.3:1 PANELBOARD: BACKFEED RATED TYPICAL, 800V, 400A (USE ABB 800V BREAKERS) INVERTER: ABB PVS–166–TL–US (166.5kW) 3Ø, 4W, 800V OUTPUT, 1500V DC INPUT. RATED CONTINUOUS OUTPUT: 134A CSA TO UL 1741SA & IEEE1547 CERTIFIED TOTAL (2) 27 MODULE STRING/INVERTER 	$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	
F	 NOR-CAL DAS WEATHER STATION: (2) POA PYRANOMETERS (2) BACK OF MODULE TEMP SENSORS (1) ANEMOMETER (1) AMBIENT TEMP SENSOR COMPLETE STATION PER OWNER REQUIREMENTS 		
G			PNLBD 6
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RISER POLE TEST SWITCH

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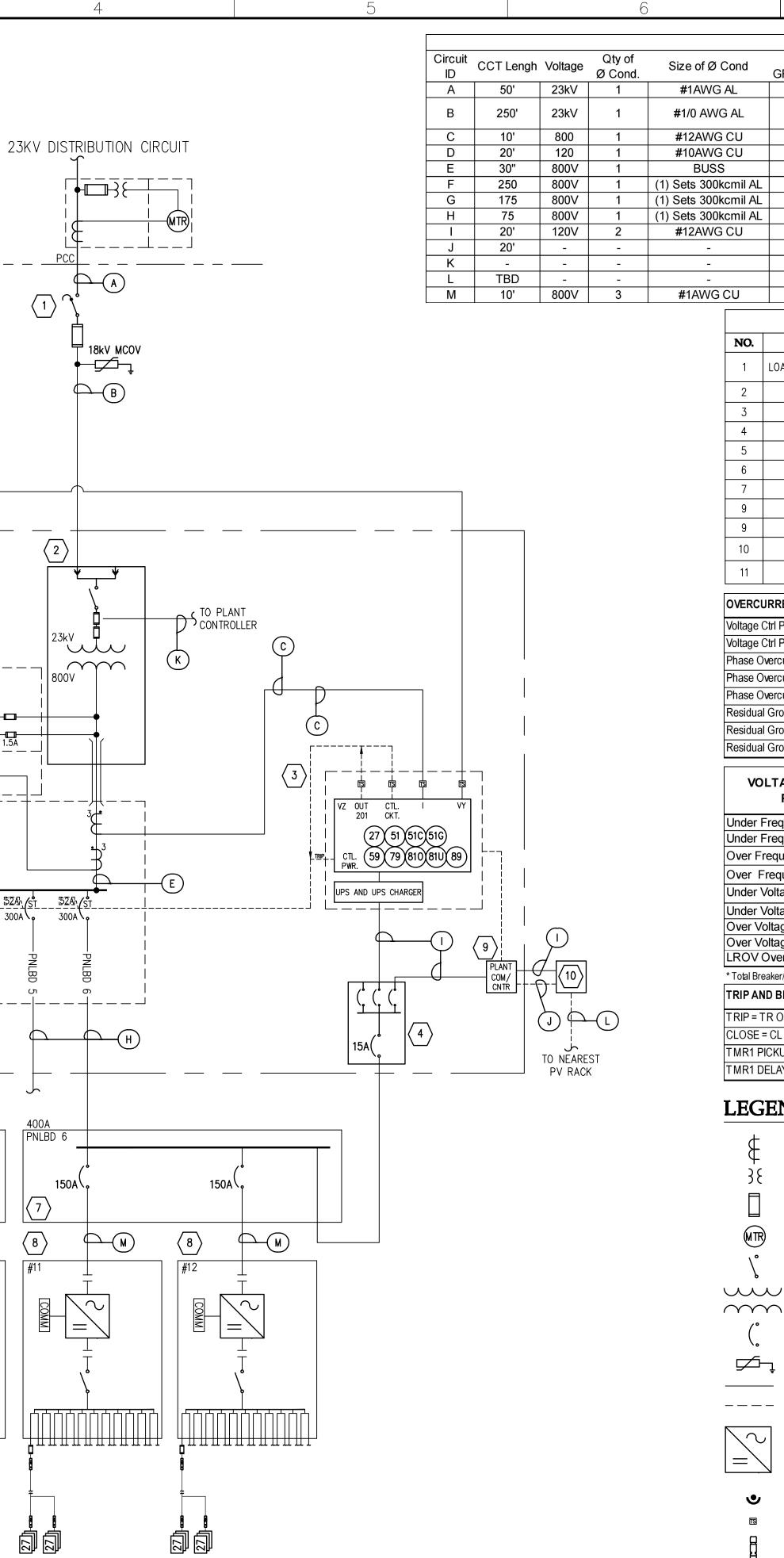
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MC4 TYPE CONNECTOR

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Insi	ulation Type	Qty o Condu			nduit ype	Notes	Phone (952) 937-5150 12701 Whitewater Drive, Suite #300
Со	vered Wire				-		Fax (952) 937-5822 Minnetonka, MN 55343 Toll Free (888) 937-5150 westwoodps.com Westwood Professional Services, Inc.
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	62.0 Hz	0.110	0.160	61.2 Hz 62.0 Hz			
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Comr .evel	1 OR 81U2 O nand OR Fro 1 Undervoltag	DR 27P1 OF nt Panel Pu ge AND Lev	- on. Inverter poo R 27P2 OR 59 Jsh Button AN rel 1 Underfree O Underfreque	wer electronic OP1 OR 59P D NOT (Tim quency) ency thresho	s have neglible op 2 er 1)	Fis	Iampton, CT ONE LINE
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Comr .evel	1 OR 81U2 O nand OR Fro 1 Undervoltag evel 1 Underv	PR 27P1 OF nt Panel Pu ge AND Lev voltage AND	- on. Inverter por R 27P2 OR 59 Ish Button AN rel 1 Underfreque O Underfreque INVERTER	wer electronic PP1 OR 59P D NOT (Tim quency) ency thresho	s have neglible op 2 er 1) olds	Fis	Iampton, CT ONE LINE
Comr .evel	1 OR 81U2 O nand OR Fro 1 Undervoltag evel 1 Underv	PR 27P1 OF nt Panel Pu ge AND Lev voltage AND	- on. Inverter por R 27P2 OR 59 Ish Button AN rel 1 Underfreque O Underfreque INVERTER	wer electronic PP1 OR 59P D NOT (Tim quency) ency thresho	s have neglible op 2 er 1) olds	Fis	Iampton, CT ONE LINE
Comr .evel	1 OR 81U2 O nand OR Fro 1 Undervoltag evel 1 Underv	PR 27P1 OF nt Panel Pu ge AND Lev voltage AND	- on. Inverter por R 27P2 OR 59 Ish Button AN rel 1 Underfreque O Underfreque INVERTER	wer electronic PP1 OR 59P D NOT (Tim quency) ency thresho	s have neglible op 2 er 1) olds	Fis	Iampton, CT ONE LINE NOT FOR CONSTRUCTION
Comr .evel	1 OR 81U2 O nand OR Fro 1 Undervoltag evel 1 Underv	PR 27P1 OF nt Panel Pu ge AND Lev voltage AND	- on. Inverter por R 27P2 OR 59 Ish Button AN rel 1 Underfreque O Underfreque INVERTER	wer electronic PP1 OR 59P D NOT (Tim quency) ency thresho	s have neglible op 2 er 1) olds	Fis	Iampton, CT ONE LINE

08/19/15 Sheet: **2** OF **2**

	3	
2019 WESTWOOD PROFESSIONAL SERVICES, INC.		
SYSTEM SPECIFICATIONS: 1. AC TOTAL NAMEPLATE: 1998kW		
2. DC TOTAL NAMEPLATE: 2494.8kW 3. UTILITY EQUIPMENT IS SHOW FOR REPRESENTATION PURPOSE ONLY. ACTUAL		
EQUIPMENT TO BE DESIGNED, SIZED AND SPECIFIED BY THE UTILITY. 4. UTILITY INTERCONNECTION PCC EQUIPMENT & LABOR DIVISION TO BE CONFIRMED BY CONTRACTOR WITH UTILITY ACTUAL FOUNDMENT AND		°&L 2.
CONFIRMED BY CONTRACTOR WITH UTILITY. ACTUAL EQUIPMENT AND CONFIGURATION SHALL BE VERIFIED BY UTILITY. 5. CONTROLLERS SHALL BE SEL-751R.	UL.	QL Z
 CONTROLLERS SHALL BE EQUIPPED WITH FRONT RS-232 PORT AND CAPABLE OF COMMUNICATING IN DNP PROTOCOL. 		
7. ALL SECONDARY CONDUCTORS FROM TRANSFORMER TO SWITCHBOARDS ARE DESIGNED BY OTHERS. CONTRACTOR SHALL VERIFY EXACT INSTALLATION		
REQUIREMENTS WITH LOW VOLTAGE ENGINEER. 3. CONTROLLER SHALL BE EQUIPPED WITH TEST SWITCHES FOR ALL VOLTAGE AND CURRENTS INPUTS.		
 GROUNDING SHALL BE COORDINATED AND VERIFIED WITH THE LOW VOLTAGE DRAWINGS. 	OWNER	
 CONTRACTOR TO PROVIDE TELECOMMUNICATION LINE, SPECIFIC REQUIREMENTS SHALL BE COORDINATED WITH UTILITY. THIS IS A CONCEPTUAL ONE-LINE DESIGN FOR TYPICAL DISTRIBUTED 		
GENERATION FACILITY. ACTUAL EQUIPMENT MAY VARY BASED ON FINAL DESIGN PARAMETERS.		
12. PART NUMBERS ARE FOR REFERENCE AND CONCEPTUAL DESIGN ONLY. ENGINEERED EQUALS SHALL BE SUBMITTED TO BE APPROVED.		
 COMBINERS ARE INTEGRAL TO INVERTERS LOCATED THROUGHOUT THE ARRAY. WHERE POSSIBLE COMBINE TWO STRINGS USING Y-SPLICE AND SINGLE HOMERUN HARNESS FUSED AT 30A. SEE HARNESS DETAIL. 		
 MODULE: CANADIAN SOLAR CS3U-385MS, 1500V, 385W 15.1. MODULES ARE WIRED IN SERIES STRINGS OF 27 MODULES. 		
 15.2. Isc: 10.09A, Voc: 48.0V, Imp: 9.58A, Vmp: 40.2V 15.3. TOTAL MODULES: 6,480 CERTIFIED TO UL 1703. 16. UTILITY METERING AND PRIMARY CIRCUIT PROTECTION BY UTILITY. ECOS TO 		
PROVIDE REQUIRED EQUIPMENT. CONTRACTOR IS RESPONSIBLE FOR CONFIRMING UTILITY PROVIDED EQUIPMENT AND CONTRACTOR PROVIDED EQUIPMENT.		
KEY NOTES	XFMR MPB01 & MBP02 PAD	
$\overline{\langle 1 \rangle}$ s&c omni-rupter gang operated load break disconnect manually		
 OPERATED (147442R4-A1P1-S1) 25kV, 150kV BIL, 800A CONTINUOUS, 65KA 24/7 UTILITY ACCESS, VISIBLE BREAK, AND UTILITY LOCKABLE STEP-UP TRANSFORMER 2200 kVA 23 kV G-WYE: 800V G-WYE 		
7 3Ø, 4W, 125kV BIL, Z=6.0%. TO BE CLOSE COUPLED TO MAIN AC COMBINER OR WITHIN 30 INCHES.		
3 SEL-751R W/UPS 4 7.5kVA MINI SUB, 800V:120 TRANSFORMER 10, 10KAIC		2.3/1 Y: W0.3
EATON DRY TYPE (OR EQUIVALENT) 6 CKT BREAKER PANEL		
5 MAIN PANELBOARD: BACKFEED RATED		<u>-3 1.5A</u>
800V, 2500A, 3ø, 4W (USE ABB 800V BREAKERS)	MPB01	
6 REC METER: POWERLOGIC ION8650 CT: GE MODEL 125–102, RATIO: 1000/5, ACCURACY: B0.3	$5 \begin{bmatrix} 2500A \\ 800V \end{bmatrix}$	
PT: RATIO 2.3:1 7 PANELBOARD:		
BACKFEED RATED TYPICAL, 800V, 400A (USE ABB 800V BREAKERS)		
8 INVERTER: ABB PVS-166-TL-US (166.5kW)	$\begin{bmatrix} 52A_1 \begin{pmatrix} s_1 \\ 0 \end{pmatrix} \\ 300A \begin{pmatrix} s$	
3ø, 4W, 800V OUTPUT, 1500V DC INPUT. RATED CONTINUOUS OUTPUT: 134A CSA TO UL 1741SA & IEEE1547 CERTIFIED		
TOTAL (2) 27 MODULE STRING/INVERTER	PNLBD PNLBD	י ב כ
9 NOR-CAL DAS		►
(10) WEATHER STATION: (2)POA PYRANOMETERS)
(2)BACK OF MODULE TEMP SENSORS (1) ANEMOMETER		
(1) AMBIENT TEMP SENSOR COMPLETE STATION PER OWNER REQUIREMENTS		~
	400A PNLBD 1	
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		le Schedule							vve	stwood
Cond	Qty of GRND Cond.	Size of EQP GRND Cond	Insulation Type	Qty of Conduits	Conduit Size	Conduit Type	1	Notes		37-5150 12701 Whitewater Drive, Suite #300
) AL	1	#8AWG	Covered Wire	-	-	-		ОН	To ll Free (888) 9	37-5822Minnetonka, MN 5534337-5150westwoodps.com
g al	-	-	25kV EPR/133%	2	4"	PVC		N, MV-105. pole to UG	Westwood Profession	onal Services, Inc.
GCU	-	-	THWN-2 (2kV)	1	3/4"	EMT		CT cqts.		
G CU	1	#10AWG	THHN	1	3/4"	EMT		-		A CONTRACTOR OF CONTRACTOR
S kcmil AL	1	- #4AWG	- THWN-2 (2kV)	- 1	- 3"	- PVC		- UG		MUT OF CONNECTING
kcmil AL	1	#4AWG	THWN-2 (2kV)	1	3"	PVC		UG		
kcmil AL GCU	1	#4AWG #12AWG	THWN-2 (2kV) THHN	1	3" 3/4"	PVC EMT		UG		0029077
	-	-	-	1	3/4"	EMT	(CAT6		So, JOENSCO JUL
	-	-	-	-	-	-		-	Vorg	COUNT ONAL STATISTICS
CU	- 1	- #6AWG	- THWN-2 (2kV)	1	3/4" 2"	PVC EMT	Sens	or Wires		05/16/2019
	· ·									
	FOI	IPMENT	BILL OF 1		AL ART#/CATA			OMMENTS	Designed:	МРМ
NO.			MANUFAC		OMNI RUPTE	-			Checked:	DAM
	LOAD-BREAKER	DISCONNECT SV	ITCH S&C	1	47442R4-A1F		1		Drawn:	TCR
2		SFORMER	COOPE	R	2200kVA		1		Record Drawin	g by/date:
3		ELAY	SEL		SEL-751R		1		Revisions:	v - ℓ [∴]
4			ABB		7.5kVA		1		# DATE _	DESCRIPTION
5		ANELBOARD	TBD				1 6		<u>1</u> <u>03/19/2019</u>	INVERTER UPDATE
7		/ERTER	ABB		 166.5kW		2			INVERTER UPDATE
9		/ERTER	ABB		185kW		0			
9		R MODULE	CANADIAN	SOLAR	CS3U-385M		480			
10	PLANT CON	NTROLLER/DAS	ABB/NOR-	-CAL			1	PER OWNER	Prepared for	•
11	WFATHF	ER STATION	TBD					SPEC PER OWNER		
								SPEC		
	IRRENT PROTEC									2020
•	Ctrl Phase Inst Over	1 1	,	5.3 A, sec	•	ormal load curre	,			
•	Ctrl Phase Time Ov vercurrent Time Di	•	(51P)	2.66 A, sec 4.8		ormal load curre c clearing time fo	,			ENERGY
	vercurrent Curve T			U4		tremely Inverse)	i oi i i i duitj			
	vercurrent Voltage	· · ·		05.7 V, sec	(88% of	Vnom L-N; Level	1 Undervolta	ge)		
	Ground Time Ove		51G)	1.32 A, sec		f phase time ove	-	up)		
	Ground Time Dial Ground Overcurre	· /	1607)	4.8 U4	•	c clearing time fo	r SLG fault)			
Residual		ant ourve i ype (o	•		(U.S. EX	tremely Inverse)				
VOI	LTAGE & FRE	QUENCY		Relay	al Clearing		verter	Total Clearing		
	PROTECTIO	ON	Pickup	-	ne* (sec)	ICKUD I	er Time (sec)	Total Clearing Time* (sec)		
	requency (81U2	,	56.5 Hz	0.110		6.5 Hz	0.160	0.160		
	requency (81U					8.5 Hz	300.0	300.0		
	equency (8101) requency (8102		62.0 Hz	299.97 0.110		51.2 Hz 52.0 Hz	300.0 0.160	300.0 0.160		
	/oltage (27P2) (5		230.94V	1.050		30.94V	1.10	1.10		
10. 00 ED E	/oltage (27P1) (8		406.45V	1.950	100 IO 100 IO 100	06.45V	2.00	2.00		
	oltage (59P1) (11	=,	508.07V	1.950		08.07V	1.00	2.00		
	oltage (59P2) (12 Dvervoltage (140		554.26V	0.110		54.26V 16.63V -	0.160	0.160 1 ms	1	
			delay for relay and brea	aker operation.			eglible opera			
	D BLOCK CLOSE		,,							
TRIP = T	R OR 51PT OR 5'	1GT OR 51NT O	R 81U1 OR 81U2 OF	R 27P1 OR 27	7P2 OR 59P1 (OR 59P2		_		
			Command OR Fron						1	
	•		(Level 1 Undervoltage							
TMR1 DE	ELAY = 300 second	ds :: 5 minutes a	bove Level 1 Undervo	Itage AND U	nderfrequency	thresholds				
IFC	END									
			-						1	
¢	CURRENT	TRANSFORMER								
Ψ ΣC										
יג ב	POTENTIAL	_ TRANSFORMER						Fie	sk - Sy	dnov
	FUSE				INVERTER			1.12	n - Jy	uncy
MTR	REVENUE	METFR		-	φ($\overline{\mathbf{X}}$				
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ľ	DISCONNE	CT SWITCH							r····/ \	-
		RMER			Å					
\sim					H					
°	BREAKER				Ĩ	1			1	
									1	
	↓ SURGE AF — POWER	KESIER								NTE
	– POWER – DATA/COM	NTROI							ONE LI	
	2,	· · · · 			11					
N	7					5			NOT FO	JR CONSTRUCTION
\bigtriangledown	INVERTER		Тур	pical S	B String	Harne	SS			OR CONSTRUCTION

6

	CURRENT TRANSFORMER
	POTENTIAL TRANSFORMER FUSE
3	REVENUE METER
	DISCONNECT SWITCH
\sim	TRANSFORMER
	BREAKER
	SURGE ARRESTER POWER DATA/CONTROL
	INVERTER
,	RISER POLE TEST SWITCH

MC4 TYPE CONNECTOR

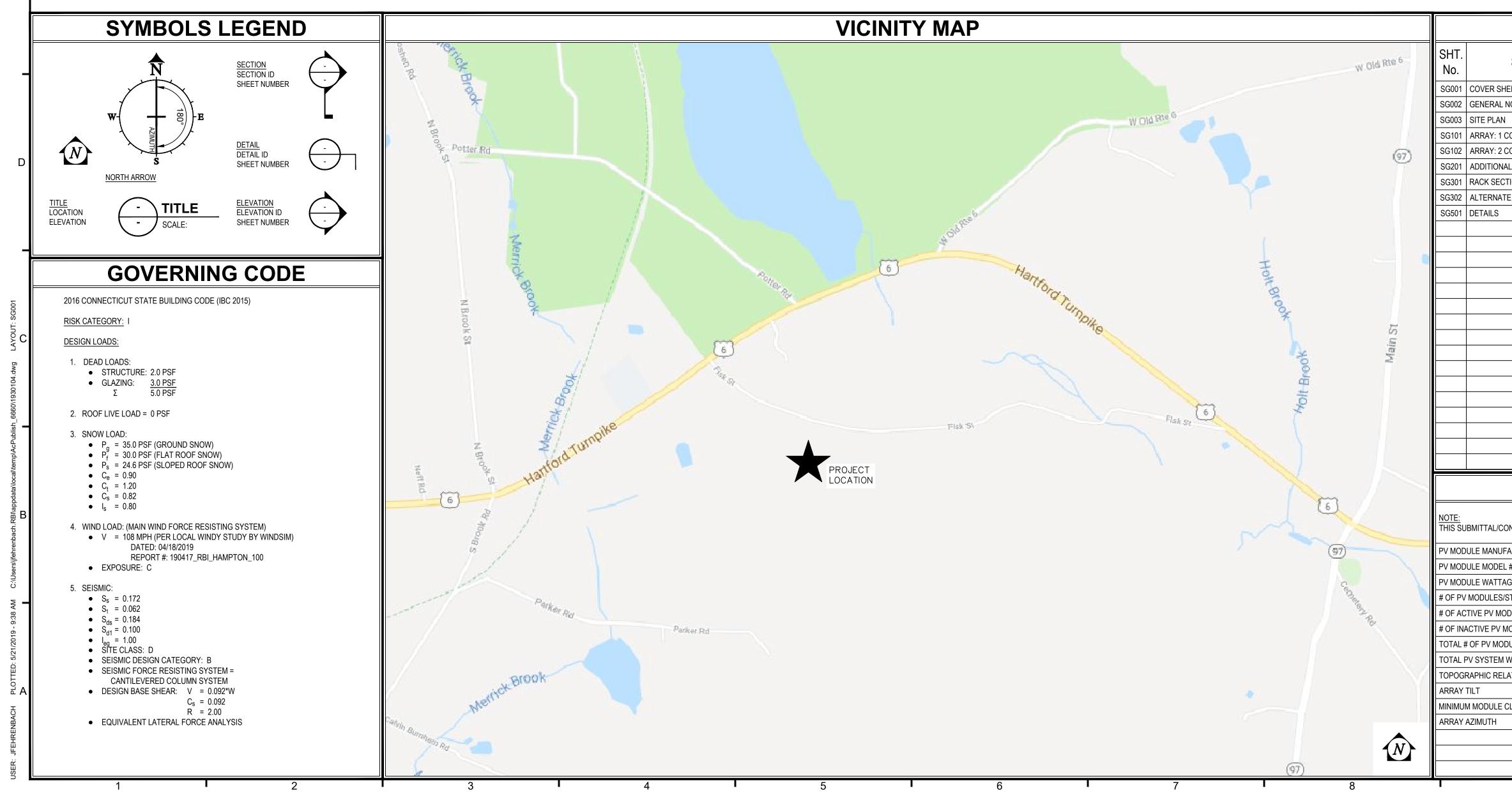






Date: 08/19/15 Sheet: **2** OF **2**

PHOTOVOLTAIC MODULE GROUND MOUNT SYSTEM RBI SOLAR RACK MODEL: GM-2 FOR



ECOS ENERGY

AT **FISK 45 WEST FISK ROAD HAMPTON, CT 06247**

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9		1	10		11	H	RBISOLA	Design * Fabrication * Repair Service STREET , OH 45217 2.2051 242.0816 SEAL PPLIES TO DESIGN MPONENTS ONLY FOR UCTION
SHEET DESCRIPTION		EET REL. No.	INDE SHT. No.	X SHEET DES	CRIPTION	F REL. No.	RESPONS CONSTRUCT BUILT FROM S "NOT FOR COM NOT FOR COM	IBLE FOR ION THAT IS SET LABELED
EET NOTES/MODULE SPECIFICATION COMPONENT LAYOUT COMPONENT LAYOUT AL POSTS SECTIONS & ELEVATIO TION & BAY PLAN VIEWS E FOUNDATIONS DETAILS & SCH	INS	2 2 2 2 2 2 2 2 2 2 2 2 2 2 2						ш
CUSTC	OMEF	R SP						REVIEW
DNSTRUCTION SET WAS PRODUC ACTURER # GE STRING DULES DULES WATTS	CED FROM DO LG LG400N2W- 400 25 12000 6 12006 4.8 MW	DCUMENTS /5				B	TITLE & ADDRESS: FISK 45 WEST FISK HAMPTON, CT RBI SOLAR PROJEC 1930104 DRAWN BY: REV JMF AI	ROAD 06247
ATIONSHIP	FOLLOW GF 25° ±2° 3'-0" 180° (NOT A		OR MAGNETIC I	DECLINATION)		A	SHEET TITLE: COVER SHEE SHEET No.: SG	

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11

	MODULE SPEC	FICATION SHEETS
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<image/>	LG400N2W-V5	
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<text><image/><image/><image/><image/><image/><image/><image/><image/><image/><image/><image/><image/><image/></text>	powerful and versatile modules on the market today. Featu	uring LG's Cello
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<image/> <table-row> <table-row></table-row></table-row>	Features	
<image/> <image/> <image/> <image/> <image/> <image/> <image/> <ob> Free Constraints Image: Second se</ob>	LG NeON [®] 2 has an enhanced performance warranty. After 25 years, LG NeON [®] 2 is guar- anteed to perform at minimum 89.6% of initial	LG has extended the warranty of the NeON® 2 to 25 years, which is among the top of industry
<text><text><text><image/><image/><image/> Deferminential Deferminantial Deferminential Deferminential<!--</td--><td>LG NeON[®] 2 now performs better on sunny days, thanks to its improved temperature</td><td>LG NeON[®] 2 can reduce the total number of strings due to its high module efficiency</td></text></text></text>	LG NeON [®] 2 now performs better on sunny days, thanks to its improved temperature	LG NeON [®] 2 can reduce the total number of strings due to its high module efficiency
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	LG400N2W-V5	
 	Cell Properties (Material / Type) Monocrystalline / N-type Cell Maker LG Cell Configuration 72 Cells (6 x 12)	Model LG400N2W-V5 Maximum Power (Pmax) [W] 400 MPP Voltage (Vmpp) [V] 40.6
participation in the strength of the strength of	Module Dimensions (L × W × H) 2,024mm × 1,024mm × 40 mm Weight 20.3 kg Glass(Material) Tempered Glass with AR Coating	Open Circuit Voltage (Voc, ±5%) [V] 49.3 Short Circuit Current (Isc, ±5%) [A] 10.47 Module Efficiency [%] 19.3
Spring the spring the spring to sp	Frame(Material)Anodized AluminiumJunction Box(Protection Degree)IP 68Cables(Length)1,200 mm x 2EA	Operating Conditions
contraction boot boot contraction contraction	IEC 61215-1/-1-1/2:2016, IEC 61730-	Maximum Series Fuse Rating [A] 20 Mechanical Test Load (Front) [Pa / psf] 5,400 / 113 Mechanical Test Load (Rear) [Pa / psf] 3,000 / 63
phades frame profession in the second weight part of the second weight part of the second weight	Certifications ISO 9001, ISO 14001, ISO 50001 OHSAS 18001, PV CYCLE Salt Mist Corrosion Test IEC 61701 : 2012 Severity 6	Number of Modules per Pallet [EA] 25 Number of Modules per 40ft HQ Container [EA] 550
	Module Fire Performance Type 1 (UL 1703) Fire Rating Class C (UL 790, ULC/ORD C 1703) Solar Module Product Warranty 25 Years	Packaging Box Gross Weight [kg] 551
	* 1) First year : 98% 2) After 1st year : 0.35% annual degradation 3) 89.6% for 25 years Temperature Characteristics	
	Pmax [%/°C] -0.36 Voc [%/°C] -0.26 Isc [%/°C] 0.02	Bit-Bit Oct3, a00,1 Bit-Bit Oct3, a00,1 Bit-Bit Oct3, a00,1 40,021,57 Droin folios 12 vices) 125,076,9 [Unit::mm/inch] 40,021,57 Bit Oct Oct Oct Oct Oct Oct Oct Oct Oct Oc
		. (-) (+)
<figure><figure></figure></figure>	Model LG400N2W-V5	ABGEI2007,300,5 Monting Holes (X view]
$ \int_{0}^{0} \int_{0}^{0} \frac{100W}{60W} + \frac{100W}{60W} + \frac{100W}{20W} + \frac{100W}{100W} + \frac{100W}{10$	Model LG400N2W-V5 Maximum Power (Pmax) [W] 300 MPP Voltage (Vmpp) [V] 38.0 MPP Current (Impp) [A] 7.88 Open Circuit Voltage (Voc) [V] 46.5	i 200.0/47.2 Cable Length
4.0 20W 0.0 200W 0.0 10.0 20.0 30.0 40.0 50.0 Voltage[V] 0<	Model LG400N2W-V5 Maximum Power (Pmax) [W] 300 MPP Voltage (Vmpp) [V] 38.0 MPP Current (Impp) [A] 7.88 Open Circuit Voltage (Voc) [V] 46.5 Short Circuit Current (Isc) [A] 8.40	43.412.00,340.4 (X vie) 10/06
2.0 0.0 10.0 20.0 30.0 40.0 50.0 Voltage[V] Product specifications are subject to change without notice. LG400N2W-V5_US_Ver01 Solar Business Division 2000 Millbrook Drive Lincolnshire, IL 60069 www.lg-solar.com	Model LG400N2W-V5 Maximum Power (Pmax) [W] 300 MPP Voltage (Vmpp) [V] 38.0 MPP Current (Impp) [A] 7.88 Open Circuit Voltage (Voc) [V] 46.5 Short Circuit Current (Isc) [A] 8.40	43.412.00.047.2 (X vie) Cobie Length
LG Electronics Inc. Solar Business Division 2000 Millbrook Drive Licoloshire, IL 60069 www.lg-solar.com	Model LG400N2W-V5 Maximum Power (Pmax) [W] 300 MPP Voltage (Vmpp) [V] 38.0 MPP Current (Impp) [A] 7.88 Open Circuit Voltage (Voc) [V] 46.5 Short Circuit Current (Isc) [A] 8.40 I-V Curves 10.0 800W 8.0 600W 6.0 400W	Addet 12 402 400 400 400 400 400 400 400 400 40
Lincolnshire, IL 60069 www.lg-solar.com	Model LG400N2W-V5 Maximum Power (Pmax) [W] 300 MPP Voltage (Vmpp) [V] 38.0 MPP Current (Impp) [A] 7.88 Open Circuit Voltage (Voc) [V] 46.5 Short Circuit Current (Isc) [A] 8.40	Addet 12 402 400 400 400 400 400 400 400 400 40
	Model LG400N2W-VS Maximum Power (Pmax) [W] 300 MPP Voltage (Vmpp) [V] 38.0 MPP Current (Impp) [A] 7.88 Open Circuit Voltage (Voc) [V] 46.5 Short Circuit Current (Isc) [A] 8.40 Image: Comparison of the state of the sta	Product specifications are subject to change without notice.
2 3	Model LG400N2W-VS Maximum Power (Pmax) [W] 300 MPP Voltage (Vmp) [V] 38.0 MPP Current (Imp) [A] 7.88 Open Circuit Voltage (Voc) [V] 46.5 Short Circuit Current (Isc) [A] 8.40 I-V Curves Image: Construct Voltage (Voc) [V] 46.5 Short Circuit Current (Isc) [A] 8.40 Image: Construct Current (Isc) Image: Construct Current (Isc) [A] 8.40 Image: Construct Current (Isc) Image: Construct Current (Isc) [A] 8.40 Image: Construct Current (Isc) Image: Construct Current (Isc) [A] 8.40 Image: Construct Current (Isc) Image: Construct Current (Isc) [A] 8.00W Image: Construct Current (Isc) [A] 800W 0 Image: Construct Current (Isc) [A] 800W 0 0 Image: Construct Current (Isc) [A] 800W 0 0 0 Image: Construct Current (Isc) [A] 20.0 </td <td>Haddet 12 Model and 12 Model and 12 Model Job 00 Model and 12 Model and 12 Model Job 00 Model and 12 Model and 12 Model and 12 Model Job 00 Model and 12 Model</td>	Haddet 12 Model and 12 Model and 12 Model Job 00 Model and 12 Model and 12 Model Job 00 Model and 12 Model and 12 Model and 12 Model Job 00 Model and 12 Model

1				
	MODULE SPECIFICATION SHEETS	GENERA		
		GENERAL/CONSTRUCTION/SAFETY: 1. ALL WORK SHALL CONFORM TO THE REQUIREMENTS OF THE APPLICABLE CONSTRUCTION CODE AND THE PROJECT SPECIFICATIONS.	STRUCTURAL STEEL: 1. ALL STRUCTURAL STEEL SHALL BE DESIGNED, FABRICATED AND ERECTED IN ACCORDANCE WITH THE LATEST VERSION OF AISC "MANUAL OF STEEL CONSTRUCTION." LIGHT GAGE COLD-FORMED SECTIONS SHALL CONFORM TO LATEST VERSION OF AISI	RBI SOLAR
		2. LOCATION OF UNDERGROUND UTILITIES SHALL BE VERIFIED PRIOR TO COMMENCEMENT OF CONSTRUCTION.	 SPECIFICATIONS FOR COLD-FORMED STEEL STRUCTURAL MEMBERS. MATERIALS: 	Total Solar Service: Design * Fabrication Installation * Parts * Repair Service 5513 VINE STREET
	LG400N2W-V5	 DIMENSIONS SHOWN ON PLAN SHALL BE VERIFIED IN FIELD. LAYOUT IS SUBJECT TO CHANGE PER REQUEST AND/OR EXISTING CONDITIONS IN THE FIELD. 	A. ROLLED SHAPES: B. PLATES: ASTM A992 OR A572 GRADE 55, F _Y = 55 KSI MINIMUM ASTM A36	CINCINNATI, OH 45217 513.242.2051 FAX: 513.242.0816
	400W	 ENGINEER SHALL NOT BE RESPONSIBLE FOR THE MEANS, METHODS, TECHNIQUES, SEQUENCES OR PROCEDURES OF CONSTRUCTION SELECTED BY CONTRACTOR. 	C.TUBULAR SHAPES:ASTM A500 GRADE C, F _Y = 50 KSI MINIMUMD.FIELD BOLTS (TYP. U.N.O):SAE J429 GRADE 5	
		6. CONTRACTOR SHALL FIELD MEASURE AND VERIFY ALL EXISTING CONDITIONS AND DIMENSIONS. ANY UNEXPECTED	E.SCREWS:#12 TEKS - GALVANIZEDF.COLD-FORMED/LIGHT GAGEASTM A653 GRADE 55G.ANCHOR RODSASTM A307 (TYPICAL U.N.O.)	
	The LG NeON® 2 is LG's best selling solar module, and is one of the most powerful and versatile modules on the market today. Featuring LG's Cello Technology, the LG NeON® 2 increases power output. New updates include an extended performance warranty from 86% to 89.6% to give customers	CONDITIONS OR DISCREPANCIES WITH THE DESIGN DOCUMENTS SHALL BE REPORTED TO THE ENGINEER PRIOR TO INSTALLATION OR ERECTION OF MATERIALS.	3. TEK SCREWS ARE TO BE INSTALLED USING A 2500 RPM MAX. NON-IMPACTING VARIABLE SPEED DRILL WITH CLUTCH OUT.	ENGINEER'S SEAL APPLIES TO DESIGN OF STRUCTURAL COMPONENTS ONLY
	higher performance and reliability.	7. THE CONTRACTOR WILL BE SOLELY AND COMPLETELY RESPONSIBLE FOR 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. WHEN ON SITE, THE ENGINEER IS RESPONSIBLE FOR HIS OWN SAFETY BUT HAS NO RESPONSIBILITY FOR THE SAFETY OF OTHER PERSONNEL OR SAFETY CONDITIONS AT THE SITE.	 REFER TO THE LATEST RBI SOLAR MODEL GM-I OR GM-2 INSTALLATION GUIDE FOR STRUCTURAL CONNECTION TORQUE VALUES. ALL WELDING OF STEEL SHALL BE DONE IN ACCORDANCE WITH THE LATEST VERSION OF THE AMERICAN WELD SOCIETY'S SPECIFICATIONS - AWS D1.1. ELECTRODES SHALL BE E70 SERIES UNLESS NOTED OTHERWISE. 	G
	In progress	8. NO PERSONNEL SHALL STEP OR STAND ON PHOTOVOLTAIC (PV) MODULES (SOLAR PANELS) AT ANY TIME. RACK STRUCTURE AND PV MODULES ARE NOT DESIGNED FOR LIVE LOADS AND MAY VOID WARRANTY.	6. GALVANIZING SPECIFICATIONS	≧NOT FOR CONSTRUCTION
	Made in USA From Imported Parts	9. THIS RBI SOLAR CONSTRUCTION SET IS DESIGNED FROM PV MODULE DATA SHEET(S) PROVIDED BY THE CUSTOMER. CUSTOMER IS RESPONSIBLE FOR VERIFYING THAT THE PV MODULE(S) DELIVERED TO SITE MATCH DATA SHEET(S) PROVIDED TO RBI SOLAR. RBI SOLAR IS NOT RESPONSIBLE FOR PV MODULE DIMENSIONAL DISCREPANCIES DUE TO FURNISHED PV	 A. STRUCTURAL SHAPES: HOT-DIPPED GALVANIZING SHALL BE PER ASTM A123. B. PRE-GALVANIZED MATERIALS SHALL COMPLY WITH ASTM A653 - G90 MINIMUM. C. ALL STRUCTURAL HARDWARE (NOT MODULE MOUNTING HARDWARE): HOT-DIPPED GALVANIZING SHALL BE PER ASTM F2329 UNLESS NOTED OTHERWISE. 	
		MODULES NOT MATCHING CUSTOMER FURNISHED PV MODULE DATA SHEETS. SPECIAL FIELD INSPECTIONS:	MISCELLANEOUS FASTENERS:	RBI SOLAR IS NOT RESPONSIBLE FOR CONSTRUCTION THAT IS
		SPECIAL INSPECTION NOT REQUIRED BY RBI SOLAR. AS REQUIRED BY OWNER/CUSTOMER AND/OR AUTHORITY HAVING JURISDICTION, MINIMUM INSPECTION SHALL INCLUDE THE FOLLOWING NOTES AND TABLE:	 ALL BOLTS SHALL BE THE TYPE AND SIZE INDICATED ON DRAWINGS. ALL HARDWARE USED FOR MOUNTING PV MODULES SHALL BE STAINLESS STEEL UNLESS NOTED OTHERWISE. 	BUILT FROM SET LABELED "NOT FOR CONSTRUCTION"
		 ALL SPECIAL INSPECTORS SHALL BE RETAINED BY OWNER/CUSTOMER. THE EXTENT OF THE INSPECTION SHALL COMPLY WITH THE CONTRACT DOCUMENTS, THE BUILDING CODE REQUIREMENTS, AND LOCAL JURISDICTION. IT IS THE OWNER/CUSTOMER'S RESPONSIBILITY TO GIVE PROPER NOTIFICATION TO THE SPECIAL INSPECTOR AND PROCEED WITH THE 	3. ALL PV MODULE MOUNTING HARDWARE SHALL BE INSTALLED AND TORQUED PER THE LATEST RBI SOLAR MODEL GM-2 INSTALLATION GUIDE.	
		WORK ONLY AFTER THE SPECIAL INSPECTOR'S APPROVAL.2. FAILURE TO NOTIFY THE SPECIAL INSPECTOR MAY RESULT IN OWNER/CUSTOMER HAVING TO REMOVE WORK FOR THE	FOUNDATIONS/CONCRETE: 1. THE FOUNDATION DESIGN IS BASED ON ASSUMED MINIMUM CODE ALLOWABLE VALUES AND FIELD TESTS PERFORMED BY RBI 201 AD ON 45/07/42	
	Features	 PURPOSE OF INSPECTION AT THE OWNER'S/CUSTOMER'S EXPENSE. PREMATURE NOTIFICATION FOR INSPECTION WILL RESULT IN AN ADDITIONAL INSPECTION WITH ALL EXPENSES AND FEES 	SOLAR ON: 05/07/19 2. CONCRETE SPECIFICATIONS:	
	Enhanced Performance Warranty LG NeON® 2 has an enhanced performance warranty. After 25 years, LG NeON® 2 is guar- LG has extended the warranty of the NeON® 2 to 25 years, which is among the top of industry	PAID BY THE OWNER/CUSTOMER.	STRENGTH: 2500 PSI MINIMUM @ 28 DAYS FOR FOOTINGS OR 4000 PSI MINIMUM @ 28 DAYS FOR BALLASTS AIR CONTENT: 4-6% AGGREGATE SIZE: 3/4" MAXIMUM MINIMUM COVER: 3" UNLESS NOTED OTHERWISE	
	anteed to perform at minimum 89.6% of initial performance.	4. SPECIAL INSPECTORS SHALL KEEP RECORDS OF ALL INSPECTIONS. RECORDS SHALL BE FURNISHED TO THE OWNER, ENGINEER OF RECORD, AND LOCAL JURISDICTION AS REQUIRED. ANY AND ALL DISCREPANCIES SHALL IMMEDIATELY BE BROUGHT TO THE ATTENTION OF THE CONTRACTOR. CORRECTIONS SHALL BE MADE AND A FINAL REPORT OF INSPECTIONS	 GROUT SPECIFICATIONS: 8000 PSI MINIMUM, NON-SHRINK REINFORCING STEEL: ASTM A615 GRADE 60 BILLET STEEL 	
	Better Performance on a Sunny Day BOS (Balance Of System) Saving	SHALL BE PROVIDED NOTING COMPLETION OF INSPECTIONS AND CORRECTIONS OF DISCREPANCIES. FAILURE TO CORRECT DISCREPANCIES SHALL BE REPORTED TO THE ENGINEER OF RECORD AND THE LOCAL JURISDICTION AND MAY RESULT IN REMOVAL OF COMPLETED WORK AND ADDITIONAL WORK TO CORRECT DISCREPANCIES AT THE CONTRACTOR'S EXPENSE.	5. CUSTOMER IS RESPONSIBLE FOR VERIFYING FINAL SOIL CONDITIONS DURING CONSTRUCTION HAVE NOT BEEN PURPOSELY ALTERED IN ANY WAY TO ENSURE THE SOIL IS CONSISTENT WITH FINDINGS INCLUDED IN GEOTECHNICAL REPORT, IF APPLICABLE,	La consent of RB
	LG NeON® 2 now performs better on sunny days, thanks to its improved temperature coefficient. LG NeON® 2 can reduce the total number of strings due to its high module efficiency resulting in a more cost effective and efficient	IBC_TABLE_1705 STRUCTURAL STEEL/ALUMINUM FABRICATION CONTINUOUS PERIODIC	AND OR FIELD TESTS PERFORMED BY RBI SOLAR. VARIATIONS IN SOIL CONDITIONS SHALL BE REPORTED TO GEOTECHNICAL ENGINEER AND/OR ENGINEER OF RECORD RESPONSIBLE FOR FOUNDATION DESIGN PRIOR TO INSTALLATION OF ANY FOUNDATION MATERIALS.	
	solar power system.	MATERIAL IDENTIFICATION X HIGH STRENGTH BOLTS - MATERIAL IDENTIFICATION OF BOLTS, NUTS AND WASHERS X	6. CUSTOMER IS RESPONSIBLE FOR VERIFYING CORROSION COMPATIBILITY WITH FOUNDATIONS AND/OR DRIVEN POSTS.	
	About LG Electronics LG Electronics is a global leader in electronic products in the clean energy markets by offering solar PV panels and energy storage systems. The company first embarked on a solar energy source research program in 1985, supported by LG Group's vast experience in the semi-conductor, LCD, chemistry and materials industries. In 2010, LG Solar successfully released its first MonoX® series to the market, which is now available in 32 countries. The NeON® (previous. MonoX® NeON), NeON®2, NeON®2 Electronic production of the device difference of the market, which is now available in 32 countries. The NeON® (previous. MonoX® NeON), NeON®2, NeON®2	WELD FILLER MATERIALS - IDENTIFICATION AND CONFIRMATION OF COMPLIANCE WITH X DESIGN DOCUMENTS X	7. INSTALLER/CONTRACTOR SHALL COORDINATE PLACEMENT OF FOUNDATIONS AND/OR ANCHOR BOLTS PER DESIGN DRAWINGS AND/OR MANUFACTURER'S SPECIFICATIONS.	
	BiFacial won the "Intersolar AWARD" in 2013, 2015 and 2016, which demonstrates LG's leadership and innovation in the solar industry.	STRUCTURAL STEEL/ALUMINUM ERECTION X MATERIAL IDENTIFICATION X	8. RBI SOLAR, INC. DESIGNS DRIVEN-PILE AND ALTERNATIVE FOUNDATIONS BASED ON SOIL PROPERTIES OUTLINED IN CERTIFIED GEOTECHNICAL REPORTS AND/OR DATA FROM FIELD TESTING. ALL DESIGNS ASSUME UNDISTURBED SOIL CONDITIONS, AND DO NOT TAKE INTO ACCOUNT TRENCHING NEAR FOUNDATIONS. FOR CASES WHERE TRENCHING FOR ELECTRICAL WORK IS AT OR	
ſ		INSTALLATION OF HIGH STRENGTH BOLTS X WELDED CONNECTIONS X	NEAR A FOUNDATION, RBI SOLAR RECOMMENDS A MINIMUM OF 3'-0" CLEAR FROM THE EDGE OF THE TRENCH TO THE EDGE OF THE FOUNDATION FOR "NORMAL GOOD SOIL CONDITIONS." IN CASES OF "POOR SOIL" CONDITIONS, RBI SOLAR RECOMMENDS A MINIMUM CLEAR DISTANCE EQUAL TO OR GREATER THAN THE DEPTH OF THE FOUNDATION. IF IN DOUBT OF SOIL CONDITIONS,	
		MEMBER SIZES AND PLACEMENT X GENERAL CONFORMANCE WITH DESIGN DOCUMENTS X	RBI SOLAR RECOMMENDS CONSULTING A QUALIFIED GEOTECHNICAL ENGINEER TO ASSESS SOIL CONDITIONS AT THE SITE.	of be duplicated
	LG NeON [®] 2	CONCRETE CONSTRUCTION X MATERIAL IDENTIFICATION X	COMPACTION TO 95% STANDARD PROCTOR DENSITY. FOR FURTHER CLARIFICATION ON COMPACTION REQUIREMENTS, RBI SOLAR RECOMMENDS CONSULTING A QUALIFIED GEOTECHNICAL ENGINEER.	that it shall n
	LG400N2W-V5 General Data Electrical Properties (STC*)	MIX DESIGN VERIFICATION X SIZE AND PLACEMENT OF REINFORCING STEEL X	REFUSAL ON DRIVEN POST PROCEDURE:	and agrees
	Cell Properties (Material / Type)Monocrystalline / N-typeModelLG400N2W-V5Cell MakerLGMaximum Power (Pmax)[W]400Cell Configuration72 Cells (6 x 12)IVP Voltage (Vmpp)[V]40.6	PLACEMENT OF CONCRETE USING PROPER TECHNIQUES X CONCRETE SAMPLES FOR SLUMP, AIR CONTENT, TEMPERATURE, STRENGTH TESTS, ETC. IN X	WHEN DRIVEN POSTS DO NOT ACCOMPLISH MINIMUM DESIGN EMBEDMENT DEPTHS DURING POST DRIVING DUE TO REFUSAL, FOLLOW THIS PROCEDURE:	■ RELEASE RECORD
	Number of basisCircle	ACCORDANCE WITH ACI 318 PROPER MAINTENANCE OF SPECIFIED CURING TEMPERATURE AND TECHNIQUES X	 ATTEMPT TO DRIVE POST TO DEPTH SHOWN ON DESIGN DOCUMENTS - REFERENCE DETAIL A6/SG301. IF REFUSAL IS ENCOUNTERED, EFFORTS TO DRIVE THE POST FURTHER SHOULD BE STOPPED. 	ent does so
	Backsheet(Color) White Frame(Material) Anodized Aluminium Junction Box(Protection Degree) IP 68 Cables(Length) 1,200 mm x 2EA	FOUNDATIONS SIZE AND LOCATION OF FOUNDATION EXCAVATIONS	 IF REFUSAL IS ENCOUNTERED, EFFORTS TO DRIVE THE FOST FOR THER SHOULD BE STOFFED. DEPTH AND LOCATION OF ANY POST THAT DOES NOT MEET MINIMUM DESIGN EMBEDMENT SHALL BE RECORDED FOR ENGINEERING REVIEW AND RECORD DRAWINGS. POSTS SHALL BE FIELD TESTED FOR UPLIFT CAPACITY PROVIDED A MINIMUM EMBEDMENT OF 5.0 FT. IS ACHIEVED. EMBEDMENT 	g this docum
	Connector(Type / Maker) MC 4 / MC Operating Temperature [°C] -40 ~ +90 Maximum System Voltage [V] 1,500(UL), 1000(IEC) Maximum Series Fuse Rating [A] 20	PLACEMENT OF REINFORCING STEEL AS REQUIRED X	LESS THAN 5.0 FT. SHALL REQUIRE AN ALTERNATE FOUNDATION. 5. VERTICAL PULL TEST ON POSTS THAT DO NOT REACH MINIMUM DESIGN EMBEDMENT SHALL RESIST A MINIMUM UPLIFT FORCE OF	arty acceptir
	Mechanical Test Load (Front) [Pa / psf] 5,400 / 113 Mechanical Test Load (Front) [Pa / psf] 3,000 / 63 1/2:2016, ULL 1703 *Test Load - Design load X Safety Factor (1.5) *Test Load - Design load X Safety Factor (1.5) 1050 9001, ISO 14001, ISO 50001 Packaging Configuration Packaging Configuration	WORK BY OTHERS: 1. SITE WORK AND DEVELOPMENT.	 4000 LBS. IF POSTS DO NOT MEET THIS MINIMUM, AN ALTERNATE FOUNDATION IS REQUIRED. 6. LATERAL TEST ON POSTS THAT DO NOT REACH MINIMUM DESIGN EMBEDMENT SHALL RESIST A MINIMUM LATERAL FORCE OF 3250 LBS. & THE POST SHALL REBOUND WITHIN 1/4" OF ORIGINAL LOCATION. IF POSTS DO NOT MEET THIS MINIMUM REQUIREMENT AN 	C
	OHSAS 18001, PV CYCLENumber of Modules per Pallet[EA]25Salt Mist Corrosion TestIEC 61701:2012 Severity 6Number of Modules per 40ft HQ Containe[EA]550Ammonia Corrosion TestIEC 62716:2013Packaging Box Dimensions (L x W x H)[m]2,080 x 1,120 x 1,226Module Fire PerformanceType 1 (UL 1703)Packaging Box Gross Weight[kq]551	2. ALL ELECTRICAL WORK INCLUDING WIRING, CONDUIT, PANELS AND LIGHTS TO BE FURNISHED AND INSTALLED BY ELECTRICAL CONTRACTOR.	ALTERNATE FOUNDATION IS REQUIRED. 7. POSTS THAT PASS THE FIELD TESTS SHALL BE CUT DOWN TO APPROPRIATE HEIGHT AND HOLES FOR POST-TOP MOUNTING BRACKETS DRILLED IN THE TOP OF POST.	mati, Ohio, 4
	Fire Rating Class C (UL 790, ULC/ORD C 1703) Solar Module Product Warranty 25 Years Solar Module Output Warranty Linear Warranty* Dimensions (mm / inch)	3. GROUNDING REQUIREMENTS.	8. ALL CUT SURFACES SHALL BE PAINTED WITH BRUSH-ON GALVANIZING PAINT. RBI SOLAR DOES NOT RECOMMEND SPRAY GALVANIZING FOR REPAIR AND PAINTING OF CUT SURFACES.	s Street, Cinci
	* 1) First year: 98% 2) After 1st year: 0.35% annual degradation 3) 89.6% for 25 years Temperature Characteristics NMOT* [°C] 42 ± 3	4. ALL SHADING ANALYSIS AND/OR PRODUCTION ANALYSIS SHALL BE PERFORMED AND VERIFIED BY OTHERS. RBI SOLAR IS NOT RESPONSIBLE FOR PV SYSTEM DESIGN AS IT PERTAINS TO ELECTRICAL OR PV SYSTEM PRODUCTION.	FOR THE ALTERNATE PRE-DRILL & DRIVE FOUNDATION SOLUTION. REFER TO THE LATEST RBI SOLAR 'PRE-DRILL & DRIVE PROCEDURE' DOCUMENT FOR INSTALLATION INSTRUCTIONS. FOR INSTANCES WHERE IT IS DESIRED TO REDUCE THE POST EMBEDMENT BUT REFUSAL IS NOT ENCOUNTERED, PLEASE CONTACT THE RBI SOLAR ENGINEERING DEPARTMENT FOR RECOMMENDATIONS.	_2 05/21/19 90% REVIEW 50%
	Pmax [%/°C] -0.36 Voc [%/°C] -0.26 Isc [%/°C] 0.02	SURVEYING REQUIREMENTS: 1. ALL SURVEYING WORK MUST BE COMPLETED BY OTHERS PRIOR TO RBI SOLAR MOBILIZING ON-SITE UNLESS NOTED		MARK DATE DESCRIPTION
	* NMOT (Nominal Module Operating Temperature): Irradiance 800 W/m ² , Amblent temperature 20 °C, Wind speed 1 m/s, Spectrum AM 1.5 Electrical Properties (NMOT)	 ALL SURVEYING FOR THE RACKING MUST BE BASED OFF OF RBI SOLAR'S LATEST DOCUMENT SET. 		PROJECT INFORMATION
	Model LG400N2W-V5 Maximum Power (Pmax) [W] MPP Voltage (Vmpp) [V] MPP Current (Impp) [A] MP 7.88	 THE FIRST AND LAST RACKING POST IN EVERY ROW MUST HAVE THE CENTER POINTS SURVEYED AND MARKED. THERE MUST BE A FIVE FOOT OFFSET TO THE WEST OF THE WESTERNMOST POST LOCATION AND A FIVE FOOT OFFSET TO THE EAST OF 	RACK SYSTEM TOPOGRAPHIC RELATIONSHIP	B TITLE & ADDRESS:
	Open Circuit Voltage (Voc) [V] 46.5 Short Circuit Current (Isc) [A] 8.40	 4. FOR ROWS LONGER THAN 100 FEET. THE CENTERLINE LOCATION MUST BE MARKED WITHIN THE ROW AT EVERY 100 FEET. 		
		MAXIMUM. THESE ADDITIONAL MARKS SHOULD NOT BE AT A POST LOCATION. DO NOT MARK EACH INDIVIDUAL POST LOCATION WITHIN A ROW AS IT WILL NOT BE ACCURATE DUE TO TOPOGRAPHY.		45 WEST FISK ROAD HAMPTON, CT 06247
		5. EVERY INDIVIDUAL EQUIPMENT POST LOCATION MUST HAVE THE CENTER POINT SURVEYED AND MARKED.		RBI SOLAR PROJECT No.: 1930104
				DRAWN BY: REVIEWED BY: JMF AFB/BDS
	2.0 0.0 0.0 10.0 20.0 30.0 40.0 50.0 Voltage[V]	ETL CLASSIFIED: THIS PROJECT CONTAINS RACKING LABELED AS ETL CLASSIFIED UNDER UL SUBJECT 2703 OR UL STANDARD	KEY POINTS 1. RACK STRUCTURE IS PARALLEL TO SITE GRADE	A GENERAL NOTES/
	Image: Voltage v j Voltage v j Image: Voltage v j Product specifications are subject to change without notice. Solar Business Division LG400N2W-V5_US_Ver01	CLASSIFIED UNDER UL SUBJECT 2703 OR UL STANDARD 2703. LABELS ARE APPLIED AT THE FACTORY ON COMPONENTS THAT MAY BE ASSEMBLED AT THE FACTORY OR IN THE FIELD. SEE DETAIL SHEET IN THIS	 COLUMN LENGTHS ARE EQUAL THROUGHOUT TOPS OF PIERS FOLLOW SITE GRADE EXPOSED PIER HEIGHTS MAY VARY 	MODULE SPECIFICATION SHEETS
	2000 Millbrook Drive Lincolnshire, IL 60069 www.lg-solar.com 2000 Millbrook Drive Lincolnshire, IL 60069 www.lg-solar.com	DRAWING SET FOR MORE INFORMATION.	FOLLOW GRADE	SHEET No.: SG002
L	2 3 4 5	<u> </u>	9 10 11	



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1011		
SITE NOTES		
1. TOPOGRAPHY PROVIDED BY ECOS ENERGY ON 04/12/2019. DIMENSIONS SHO	OWN FOR	
REFERENCE ONLY. PRESUMPTIVE OR INADEQUATE TOPOGRAPHY USED FOR MAY REQUIRE ADDITIONAL MATERIALS. ACTUAL ON-SITE CONDITIONS SHALL	R THIS DESIGN	
VERIFIED AND RBI SOLAR SHALL BE NOTIFIED IF ON-SITE CONDITIONS ARE D		RBI SOLAR
THAN SHOWN OR PRESUMED.		Total Solar Service: Design * Fabrication Installation * Parts * Repair Service
BAY INFORMATION		5513 VINE STREET
ТҮРЕ	QTY.	CINCINNATI, OH 45217 513.242.2051
BAY TYPE 3EP2	5	FAX: 513.242.0816
BAY TYPE 3WP2	9	
BAY TYPE 4EP2	139	PROFESSIONAL SEAL
BAY TYPE 4P2	153	ENGINEER'S SEAL APPLIES TO DESIGN OF STRUCTURAL COMPONENTS ONLY
BAY TYPE 4WP2 BAY TYPE 5P2	135 793	
TOTAL # OF BAYS	1234	
		G
		NOT FOR
		CONSTRUCTION
		RBI SOLAR IS NOT RESPONSIBLE FOR
		CONSTRUCTION THAT IS BUILT FROM SET LABELED
BILL OF MATERIALS		"NOT FOR CONSTRUCTION"
ITEM	QTY.	
RACKING POST TYPE A	1378	_
TOTAL # OF RACKING POSTS	1378	
EQUIPMENT POST TYPE -	12	
TOTAL # OF EQUIPMENT POSTS	12	
PURLINS: PURLIN MARK Z3E	20	
PURLIN MARK Z3W	36	
PURLIN MARK Z4E	556	GY UNT GY
PURLIN MARK Z4	612	
PURLIN MARK Z4W	540	M MOI
PURLIN MARK Z5 TOTAL # OF PURLINS	3172 4936	
TOTAL # OF TOP CHORD ASSEMBLIES	1378	
TOTAL # OF STANDARD POST TOP ASSEMBLIES	1090	
TOTAL # OF EXTENDED POST TOP ASSEMBLIES	288	
46 15/16" x 2" SQ. 15 GA. GALVANIZED KNEE BRACES	1378	S S
76 1/8" x 2" SQ. 15 GA. GALVANIZED KNEE BRACES KNEE BRACE CLIPS	1378 5512	
3/4" X 5" MAGNI BOLT WITH NUT	2756	U U
3/8" X 1 1/4" GALV. BOLT WITH NUT	13780	
1/2" x 3" GALV. BOLT WITH NUT	2756	D H
3/8" X 3/4" GALV. BOLT WITH NUT	22048	
3/8" X 5" GALV. BOLT WITH NUT 3/8" GALV. WASHER	1378 5512	D
#12 X 1 1/4" HEX HEAD TEK SCREW	3332	
MODULE S.S. HARDWARE STACK (BOLT, 2 WASHER, FLANGE NUT)	48024	
		RELEASE RECORD
		
		
		C
		<u>2</u> <u>05/21/19</u> <u>90% REVIEW</u>
		2 05/21/19 90% REVIEW 1 04/16/19 50% REVIEW
		<u>1</u> 04/16/19 50% REVIEW MARK DATE DESCRIPTION
		1 04/16/19 50% REVIEW MARK DATE DESCRIPTION □ PROJECT INFORMATION
		<u>1</u> 04/16/19 50% REVIEW MARK DATE DESCRIPTION
		1 04/16/19 50% REVIEW MARK DATE DESCRIPTION □ PROJECT INFORMATION B TITLE & ADDRESS:
		1 04/16/19 50% REVIEW MARK DATE DESCRIPTION PROJECT INFORMATION TITLE & ADDRESS: FISK
		1 04/16/19 50% REVIEW MARK DATE DESCRIPTION □ PROJECT INFORMATION TITLE & ADDRESS: FISK 45 WEST FISK ROAD
		1 04/16/19 50% REVIEW MARK DATE DESCRIPTION PROJECT INFORMATION TITLE & ADDRESS: FISK
		1 04/16/19 50% REVIEW MARK DATE DESCRIPTION PROJECT INFORMATION TITLE & ADDRESS: FISK 45 WEST FISK ROAD HAMPTON, CT 06247 RBI SOLAR PROJECT No.:
		1 04/16/19 50% REVIEW MARK DATE DESCRIPTION PROJECT INFORMATION TITLE & ADDRESS: FISK 45 WEST FISK ROAD HAMPTON, CT 06247 RBI SOLAR PROJECT No.: 1930104
		1 04/16/19 50% REVIEW MARK DATE DESCRIPTION PROJECT INFORMATION TITLE & ADDRESS: FISK 45 WEST FISK ROAD HAMPTON, CT 06247 RBI SOLAR PROJECT No.:
		1 04/16/19 50% REVIEW MARK DATE DESCRIPTION PROJECT INFORMATION TITLE & ADDRESS: FISK 45 WEST FISK ROAD HAMPTON, CT 06247 RBI SOLAR PROJECT No.: 1930104 DRAWN BY:
		1 04/16/19 50% REVIEW MARK DATE DESCRIPTION PROJECT INFORMATION TITLE & ADDRESS: FISK 45 WEST FISK ROAD HAMPTON, CT 06247 RBI SOLAR PROJECT No.: 1930104 DRAWN BY: JMF AFB/BDS
		1 04/16/19 50% REVIEW MARK DATE DESCRIPTION PROJECT INFORMATION TITLE & ADDRESS: FISK 45 WEST FISK ROAD HAMPTON, CT 06247 RBI SOLAR PROJECT No.: 1930104 DRAWN BY: JMF REVIEWED BY: AFB/BDS
		1 04/16/19 50% REVIEW MARK DATE DESCRIPTION PROJECT INFORMATION TITLE & ADDRESS: FISK 45 WEST FISK ROAD HAMPTON, CT 06247 RBI SOLAR PROJECT No.: 1930104 DRAWN BY: JMF AFB/BDS
		1 04/16/19 50% REVIEW MARK DATE DESCRIPTION □ PROJECT INFORMATION □ TITLE & ADDRESS: FISK 45 WEST FISK ROAD 45 WEST FISK ROAD HAMPTON, CT 06247 RBI SOLAR PROJECT No.: 1930104 DRAWN BY: REVIEWED BY: JMF AFB/BDS SHEET TITLE: SITE PLAN SHEET No.: SHEET No.:
		1 04/16/19 50% REVIEW MARK DATE DESCRIPTION PROJECT INFORMATION TITLE & ADDRESS: FISK 45 WEST FISK ROAD HAMPTON, CT 06247 RBI SOLAR PROJECT No.: 1930104 DRAWN BY: IMF AFB/BDS SHEET TITLE: SITE PLAN

		$ - \frac{A^{1}}{4WP2} + \frac{A^{2}}{5P2} + \frac{A^{3}}{5P2} + \frac{A^{4}}{5P2} + \frac{A^{5}}{5P2} + \frac{A^{6}}{5P2} + \frac{A^{7}}{5P2} + \frac{A^{8}}{5P2} + \frac{A^{9}}{5P2} + \frac{A^{9}}$	1)200 ACTIVE MODULES 23'-0" TYP UNO
		$ \underbrace{\begin{array}{c}$	23'-0" TYP. U.N.O. 2 300 ACTIVE MODULES
	9 A10 A11 A12 A13 A14 A 5P2 5P2 5P2 5P2 5P2 5P2 5P2 5P2 5P2 5P2	<u>32'-7 1/2"</u>	
	3 A 7 A 8 A 9 A 10 A 11 A 12 A 13 A 14 A 12 A 13 A 15 A 14 A 15 A 16 A 7 A 15 A 16 A 7 A 16 A 17 A 16 A 17 A 16 A 17 A 16 A 17 A 1	36'-3 15/16"	5) ^{350 ACTIVE MODULES}
15/16	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	3WP2 4P2 36'-3 15/1	425 ACTIVE MODULES
	i4WP2i 4P2 i 4P2 i 4P2 i 4P2 j 4P2 → 178'-5 15/16"	132'-8 3/16" 	1 INACTIVE MODULE 7 400 ACTIVE MODULES
A10	89'-6 5/16" A8 A9 A [4WP2] 4P2	$ \begin{array}{c} 4WP2 4P2 4P$	8 400 ACTIVE MODULES
	89'-5 3/8"	=	9 400 ACTIVE MODULES
"	123'-6 7/16"	$ \begin{array}{c} 2'-2 7/8'' \\ - 2'-2 7/8'' \\ - 4'1 \\ - 4'1 \\ - 4WP2' \\ - 5P2 \\ $	10 400 ACTIVE MODULES
20		<u>5'-11 11/16"</u> <u>A1 A2 A3 A4</u> <u>4WP2</u> 5P2 5P2 5P2	11) <u>350 ACTIVE MODULES</u>
199	· · ·	<u>2'-3 7/8"</u> A1 A2 A3 A4 4WP2 4P2 4P2 4P2 4P2	12 350 ACTIVE MODULES
15/16'			13 250 ACTIVE MODULES
			14 <u>275 ACTIVE MODULES</u> — –
			15 300 ACTIVE MODULES
			16 300 ACTIVE MODULES
			17 250 ACTIVE MODULES
		·	18 200 ACTIVE MODULES
			19 150 ACTIVE MODULES
			20 100 ACTIVE MODULES
			30'-3 15/16" 21 50 ACTIVE MODULES
			22 100 ACTIVE MODULES

SCALE: 1" = 40'-0" COMPONENT LAYOUT

2

LEGEND				POST SCHEDULE			
X" SYMBOL REPRESENTS X" WIDE ROW BREAK		SYMBOL	MARK	DESCRIPTION	LENGTH	PIECES	DETAI
	PER DETAIL G9/SG301	'X' # 'X' #	A	W6x9	11'-2"	712	A6/SG30
\square	M DENOTES BLANK SPACE		-	W6x9 EQUIPMENT POST (FIELD LOCATE)	11'-2"	12	A1/SG20
Ľ	OR INACTIVE MODULE	PER PLAN					
POST SETTING NOTES: 1. ALL POST DIMENSIONS SHOWN ARE CENTERLINE TO CENTERLINE OF POST WEB. 2. REFERENCE DETAIL A6/SG301 AND SHEET SG201 FOR ADDITIONAL INFORMATION ON REQUIRED POST EM 3. POST LENGTH INCLUDES ADDITIONAL MATERIAL TO ALLOW FOR TOPOGRAPHICAL VARIANCE.				ED POST EMB	ED DEPTH		

			BAY SCH					
			BAYS					
TYPE	QTY.	POST-POST	DESCRIPTIC					
3EP2	4	SEE BAY PLAN	LG LG400N2W-V5 PORTRAIT MODULES CANTILEVER EAST SIDE AND 25.0° TILT					
3WP2	6	SEE BAY PLAN	LG LG400N2W-V5 PORTRAIT MODULES CANTILEVER WEST SIDE AND 25.0° TIL					
4EP2	70	SEE BAY PLAN	LG LG400N2W-V5 PORTRAIT MODULES CANTILEVER EAST SIDE AND 25.0° TILT					
4P2	104	SEE BAY PLAN	LG LG400N2W-V5 PORTRAIT MODULES 25.0° TILT					
4WP2	68	SEE BAY PLAN	LG LG400N2W-V5 PORTRAIT MODULES CANTILEVER WEST SIDE AND 25.0° TIL					
5P2	386	SEE BAY PLAN	LG LG400N2W-V5 PORTRAIT MODULES 25.0° TILT					
NOTES '	THIS BAY							
1. PURL	1. PURLINS ARE 2 1/2" x 7" x 2 1/2" ZEE 16 GA. GALVANIZED UNLESS NOTED							
2. TOP (CHORDS	ARE 142 3/4" x 4" x	4 3/4" CEE 14 GA. GALVANIZED UNLESS					
3. LOWE	R KNEE	BRACES ARE 46 1	5/16" x 2" SQ. 15 GA. GALVANIZED UNLES					
4. UPPE	R KNEE E	BRACES ARE 76 1/	8" x 2" SQ. 15 GA. GALVANIZED UNLESS					
5. INSTA	ALL EXTE	NDED POST TOP A	ASSEMBLY AT EACH ROW END UNDER C					

19 A20 A21 A22 5P2 5P2 4EP2

19 A 20 A 21 A 22 A 23 A 24 A 25 A 26 A 27 A 28 5P2 5P2 5P2 5P2 5P2 5P2 5P2 5P2 5P2 4EP2

.1⁸ A 19 A 20 A 21 A 22 A 23 A 24 A 25 A 26 A 27 A 28 A 29 A 30 A 31 A 32 A 33 A 34 A 35 2 4 4 4 4 5 A 26 A 27 A 28 A 29 A 30 A 31 A 32 A 33 A 34 A 35 2 4 4 4 4 5 A 26 A 27 A 28 A 29 A 30 A 31 A 32 A 33 A 34 A 35 A 34 A 35

 $\begin{array}{c} 6^{0} \\ 6^{1} \\ 5^{0} \\$ A'7 A'8 A'9 A'10 A'11 A'12 A'13 A'14 A'15 A'16 A'17 A'18 A'19 A'20 A'21 A'22 A 23 A'24 A'25 A'26 A'27 A'28 A'29 A'30 A'31 A'32 A'33 A'34 A'35 A'36 A'37 A'38 A'39 |4WP2| 4P2 | 4P2 | 4P2 | 4P2 | 4P2 | 5P2 | 5P2

20'-3 5/16"

19'-1 5/8"

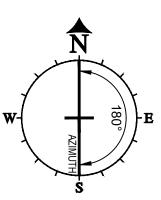
92'-11 13/16"

4P2 4P2 4P2 95'-11 7/16"

A 42 A 43 A 44 A 45 A 46 A 47 4WP2 5P2 5P2 5P2 4EP2 69'-0 7/16" A 40 A 41 A 42 A 43 A 44 A 45 4WP2 5P2 5P2 5P2 4EP2 38'-8 7/8" A'40 A'41 A'42 A'43 A'44 A'4 [4WP2] 5P2 5P2 5P2 4EP2] 48'-11 11/16" A'34 A'35 A'36 A'37 A'38 A'39 [4WP2] 5P2 5P2 5P2 4EP2] 49'-6 5/16" A 36 A 37 A 38 A 39 A 40 A 41 [4WP2] 5P2 5P2 5P2 4EP2 60'-11 9/16" A 23 A 24 4WP2 5P2 A 24 A 25 A 26 4WP2 5P2 5P 118'-4 3/8" 124'-11 9/16" A1 A2 A3 A4 A 4WP2 4P2 4P2 4P2 4P2 60'-7 1/4" A1 A2 A3 A4 4WP2 5P2 5P2 5P2 5P <u>30'-1 7/16"</u> <u>A</u>1 A2 A3 A4 A5 A6 A7 A8 A9 A <u>3WP2 4P2 4P2 4P2 4P2 4P2 4P2 4P2 4P2 5P2</u>

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	9	10			11					
		BAY SCHEDULE					1		FTT-	H
		BAYS		PURLINS		DETAIL				
Y.	POST-POST	DESCRIPTION LG LG400N2W-V5 PORTRAIT MODULES 3 WIDE x 2 HIGH WITH	MARK	#/BAY	PCS.			RBI	SC	LAF
_	SEE BAY PLAN	CANTILEVER EAST SIDE AND 25.0° TILT LG LG400N2W-V5 PORTRAIT MODULES 3 WIDE x 2 HIGH WITH	Z3E	4	16 24	A3/SG301 C3/SG301	H	Installatio	on * Parts * F	sign * Fabricatior Repair Service
	SEE BAY PLAN	CANTILEVER WEST SIDE AND 25.0° TILT LG LG400N2W-V5 PORTRAIT MODULES 4 WIDE x 2 HIGH WITH CANTILEVER EAST SIDE AND 25.0° TILT		4	24	E3/SG301		CINCI	3 VINE S INNATI, C 513.242.2	DH 45217
ļ	SEE BAY PLAN	LG LG400N2W-V5 PORTRAIT MODULES 4 WIDE x 2 HIGH AND 25.0° TILT	Z4	4	416	G3/SG301			X: 513.24	
	SEE BAY PLAN	LG LG400N2W-V5 PORTRAIT MODULES 4 WIDE x 2 HIGH WITH CANTILEVER WEST SIDE AND 25.0° TILT LG LG400N2W-V5 PORTRAIT MODULES 5 WIDE x 2 HIGH AND	¹ Z4W	4	272	A1/SG301			ONAL SE	AL
BAY:	SEE BAY PLAN	25.0° TILT	Z5	4	1544	C1/SG301				IES TO DESIGN PONENTS ONLY
DS A Ee e Ee b	ARE 142 3/4" x 4" x BRACES ARE 46 1 BRACES ARE 76 1/	ZEE 16 GA. GALVANIZED UNLESS NOTED OTHERWISE. 4 3/4" CEE 14 GA. GALVANIZED UNLESS NOTED OTHERWISE. 5/16" x 2" SQ. 15 GA. GALVANIZED UNLESS NOTED OTHERWISE. 8" x 2" SQ. 15 GA. GALVANIZED UNLESS NOTED OTHERWISE. ASSEMBLY AT EACH ROW END UNDER CANTILEVER BAY TYPES					G		,///////,	11/1/1/
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38	A 39 P2	A40 A41 A42 A43 A44 A45 4WP2 5P2 5P2 5P2 4EP2							L	ш
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A 33 2	49'-6 5/16"	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$						D		0
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07	//8"	A23 A24 A25 A26 A27 A28 4WP2 5P2 5P2 5P2 4EP2						Ū		Ш
9/ [.]	16" A23 A2 4WP2	24 A 25 A 26 A 27 A 28 A 29 A 30 A 31 5P2 5P2 5P2 5P2 5P2 4P2 4P2 4EP2 X								
A	20'-5 5/8"									
	21'-10 9/16"	- 5 A 27 A 28 A 29 A 30 A 31 A 32 A 33 A 34 5P2 5P2 5P2 5P2 5P2 5P2 5P2 5P2 5P2 4EP2						RELEASE F	RECORD	
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F	5"	6 A 17 A 18 A 19 A 20 A 21 A 22 A 23 A 24 5P2 5P2 5P2 5P2 5P2 5P2 5P2 5P2 5P2 4EP2								
		3 A 9 A 10 A 11 A 12 A 13 A 14 A 15 A 16 A 17 WP2 4P2 4P2 4P2 4P2 4P2 4P2 5P2 5P2 5P2 5P2	A18 A19 2 4EP2				С			
	24'-11 9/16" 	A1 A2 A3 A4 A5 A6 A7 A8 AWP2 4P2 4P2 4P2 4P2 4P2 4P2 4P2 4P2 4P2 4	A9 A10 A 2 4P2 4P2	A11 A12 4P2 4E	A13 P2					
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\2 2 4	A3 A4 A5 P2 4P2 4P2	A6 A7 A8 A9 A10 A11 A12 A13 4P2 4EP2 4WP2 5P2 5P2 5P2 4EP2						<u>2</u> 03/21/13 MARK DATE	_	RIPTION
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DRAWN BY:

SHEET TITLE

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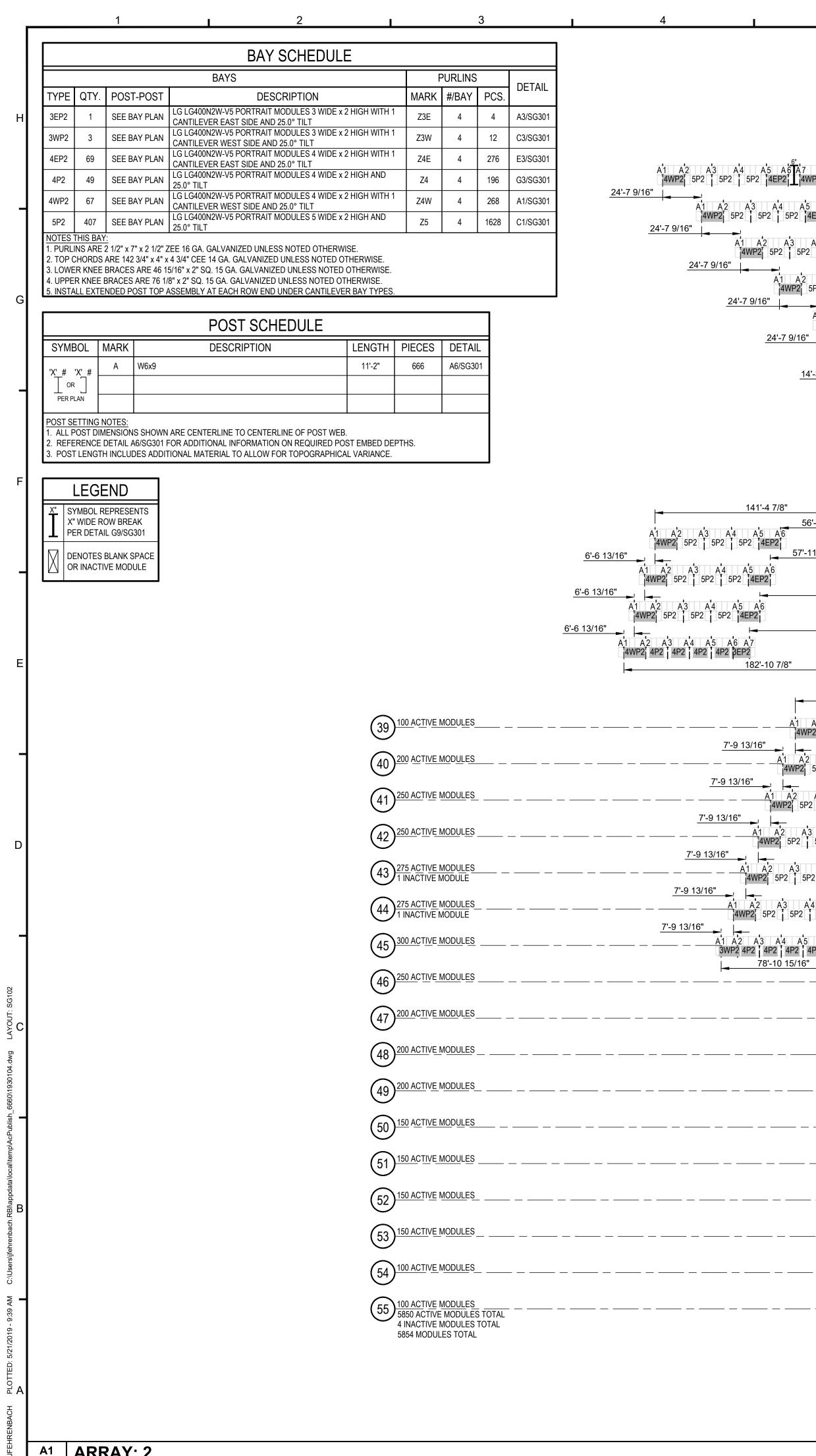
COMPONENT LAYOUT

SG101

JMF

REVIEWED BY: AFB/BDS

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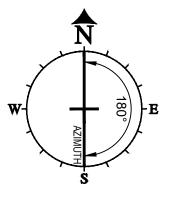
A1 ARRAY: 2 SCALE: 1" = 40'-0" COMPONENT LAYOUT

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A'1 A'2 A'3 A'4 A'5 A'6 A'7 A'8 A'9 A'10 A'11 A'12 A'13 A'14 A'15 A'16 A'17 |4WP2| 5P2 | 5P2 | 5P2 | 4EP2 | 4WP2| 5P2 | 4EP2 | A15 A16 A<u>17</u> P2 5P2 4EP2 A 8 5P2 4EP2 4WP2 5P2 5P2 5P2 5P2 5P2 5P2 5P2 5P2 A7 A8 A9 4WP2 5P2 A16 A17 5P2 5P2 5P2 A1 A2 A 4WP2 5P2 4 A 5 A 6 A 7 A 8 A 5P2 4EP2 4WP2 5P2 A16 A<u>17</u> A14 A14 A15 A16 A<u>17</u> 2 5P2 5P2 4EP2 4 A 5 A 6 A 7 A 8 A 5P2 4EP2 4WP2 5P2 A10 5P2 5P2 A<u>9</u> A11 A12 4WP2 5P2 24'-7 9/16" 4WP2 14'-3 11/16" 4WP2 5P2 4'-11 5/8" A1 A2 A3 A4 A5 A6 A7 A8 A9 A 4WP2 5P2 5P2 5P2 5P2 4EP2 4WP2 5P2 5P2 5P2 5P2 6 13/16" 4 A5 A6**T**A7 A8 5P2 4EP2 4WP2 4 4WP2 5P2 5'-3 5/16" 56'-7 11/16" 24 A 25 A 26 A 27 5P2 5P2 4EP2 4WP2 5F 57'-11 3/16" A'7 A'8 A'9 A'10 A'11 A'12 A'13 3WP2 4P2 4P2 4P2 4P2 4P2 4EP2 A 14 A 15 A 16 A 17 A 4WP2 5P2 5P2 5P2 5P2 A23 A24 62'-1 7/16" 97'-6 7/8" A 7 A 8 A 9 A 10 A 11 A 12 4WP2 5P2 5P2 5P2 5P2 4EP2 62'-1 7/16" 115'-4" A 14 A 15 A 16 A 17 A 18 A 19 A 20 A 21 A 22 |4WP2| 5P2 | 5P2 A 8 A 9 A 10 A 11 A 12 A 13 [4WP2] 5P2 5P2 5P2 4EP2 22 A23 A24 5P2 4EP2 90'-1 1/8" A1 A2 A3 A4 A5 A6 4WP2 5P2 5P2 5P2 5P2 4EP2 74'-5 3/8" 134'-2 7/8" A3 A4 A5 A6 A7 A8 A9 5P2 5P2 5P2 5P2 4P2 4P2 4EP2 X _A'1 A'2 A'3 _4WP2_ 5P2 5P <u>A</u>1 A2 A |4WP2| 5P2 5P2 5P2 5P2 5P2 5P2 5P2 5P2 5P2 4EP2 4'-10 13/16" $\frac{6^{-1}}{10}$ $\frac{6^{-1}}$ 4WP2 5P2 A1 A2 A3 A4 A5 A 4WP2 5P2 5P2 5P2 5P2 5P2 5P2 A 21 A 22 A 23 A 24 A 25 A 26 A 27 A 28 2 4 4 E 2 4 4 E 2 4 5 2 5 2 5 2 4 E 2 4 E 2 4 E 2 4 E 2 4 E 2 4 E 2 4 E 2 4 E 2 4 E 2 4 E 2 4 E 2 4 E 2 4 E 2 4 Α9 A10 A11 A12 A13 A14 A15 A16 22 4EP2 4WP2 5P2 5P2 5P2 5P2 5 A 20 A14 A 21 A 22 A 23 A 24 A 25 A 26 ? 4EP2 4WP2 4P2 4P2 50 A11 A12 A13 9 A 30 A 31 5P2 4EP2 🗙 A 20 20 A 21 A 22 A 23 A 24 A 25 A 26 A 27 5P2 4EP2 4WP2 4P2 4P2 5P2 5F 27 A 28 A 29 A 30 A 31 5P2 5P2 5P2 5P2 4EP2 X 30 A 31 A 32 A 33 A 34 A 35 5P2 5P2 5P2 5P2 5P2 4EP2 5P2 5P2 5 A 6 A 7 A 8 A 9 A 10 A 11 A 12 A 13 A 14 A 15 A 16 A 17 A 18 A 19 A 20 A 21 A 22 5P2 5P2 5P2 5P2 5P2 5P2 4EP2 4EP2 4WP2 5P2 5P2 5P2 5P2 5P2 5P2 5P2 5P2 5P2 4EP2 1 A2 A3 4WP2 5P2 5P2 17'-4 3/4" 19 A 20 A 21 A 22 5P2 5P2 4EP2 A1 A2 A3 A4 4WP2 5P2 5P2 9 A10 A11 A12 A13 A14 A15 A16 A17 A18 A1 5P2 4EP2 4WP2 5P2 5P2 5P2 5P2 5P2 5P2 5P2 5P2 23'-3 15/16" 1 A 2 A 3 A 4 A 5 4WP2 4P2 4P2 4P2 4P2 4F A11 A12 A13 A14 4EP2 4WP2 5F 60'-1 7/8" 4WP2 5P2 11'-0 11/16" A1 A2 A3 A 4WP2 5P2 5P2 7'-9 7/8" A1 A2 A3 A4 4WP2 5P2 5P2 A14 A15 A16 2 5P2 4EP2 6 A7 5P2 5P2 5P2 5'-7 3/16" A1 A2 / 4WP2 5P2 A11 A12 A13 A14 A15 A16 A17 2 4P2 4P2 4P2 4P2 4P2 4P2 4P2 24'-0 7/8" A1 A2 A3 A4 A5 A6 A7 A8 A 4WP2 5P2 5P2 5P2 5P2 5P2 5P2 5P2 5P2 5P2 9 A10 A1 5P2 4EP2 24'-0 7/8"

H Total Solar Service: Design * Fabrication Installation * Parts * Repair Service 5513 VINE STREET					
	Total Solar Service: Design * Fabrication				
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150 ACTIVE MODULES 23 23'-0" TYP. U.N.O. 150 ACTIVE MODULES (24) 150 ACTIVE MODULES 25 150 ACTIVE MODULES 150 ACTIVE MODULES 150 ACTIVE MODULES (28) 150 ACTIVE MODULES (29) 150 ACTIVE MODULES 30 150 ACTIVE MODULES (31) 150 ACTIVE MODULES 225 ACTIVE MODULES 1 INACTIVE MODULE 33 _200 ACTIVE MODULES 200 ACTIVE MODULES 35 200 ACTIVE MODULES (36) 150 ACTIVE MODULES 37 _75 ACTIVE MODULES 38

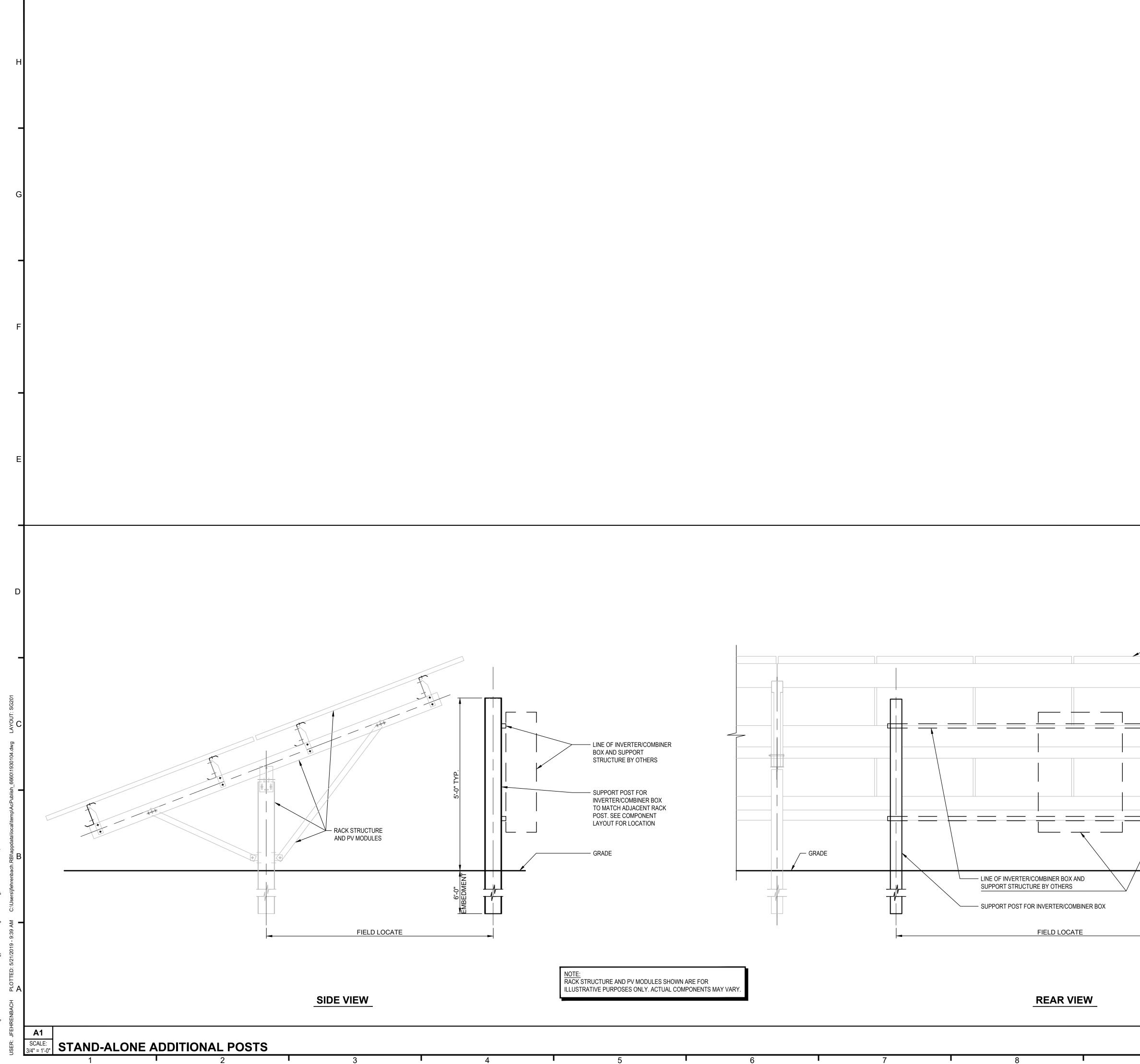


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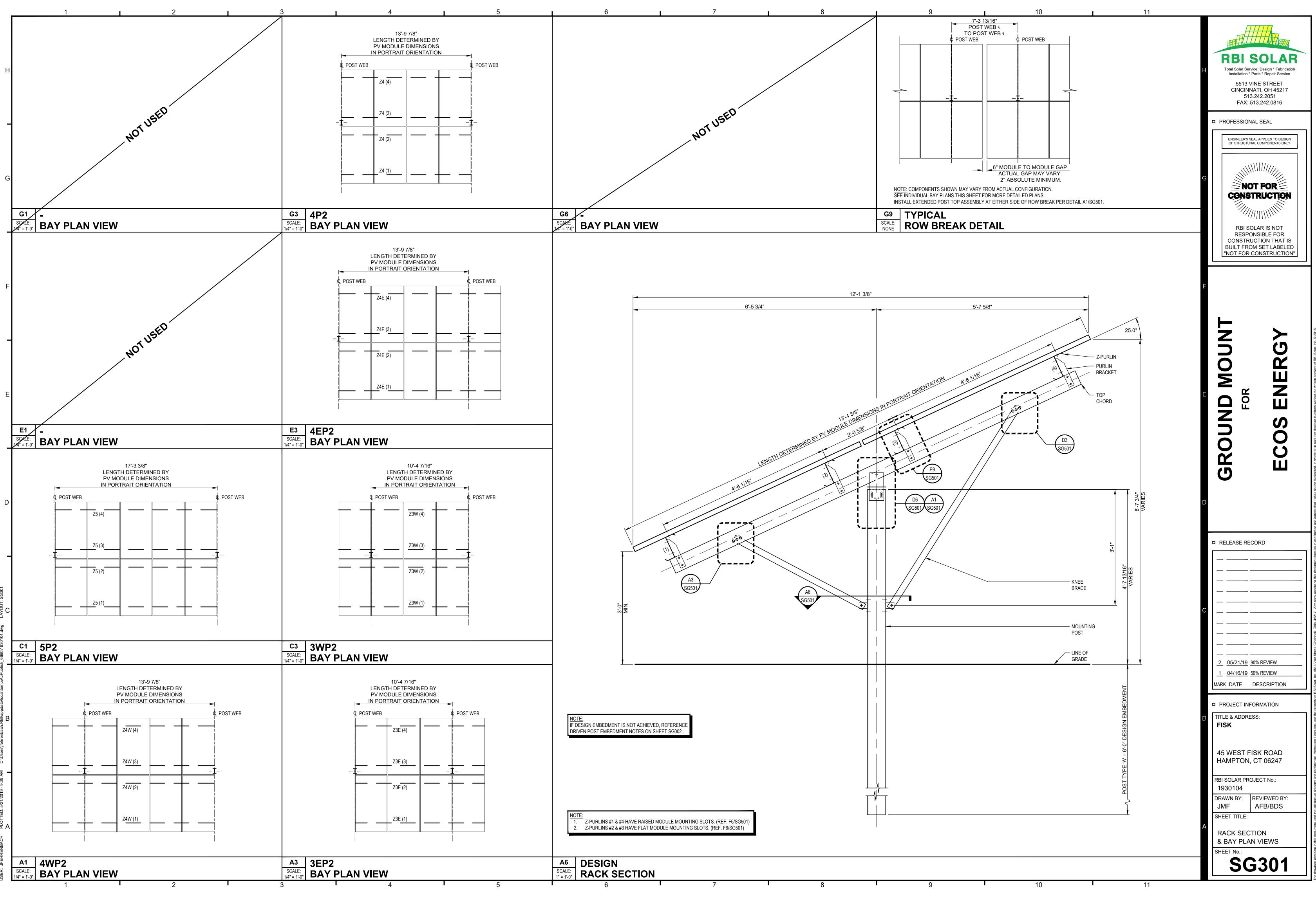
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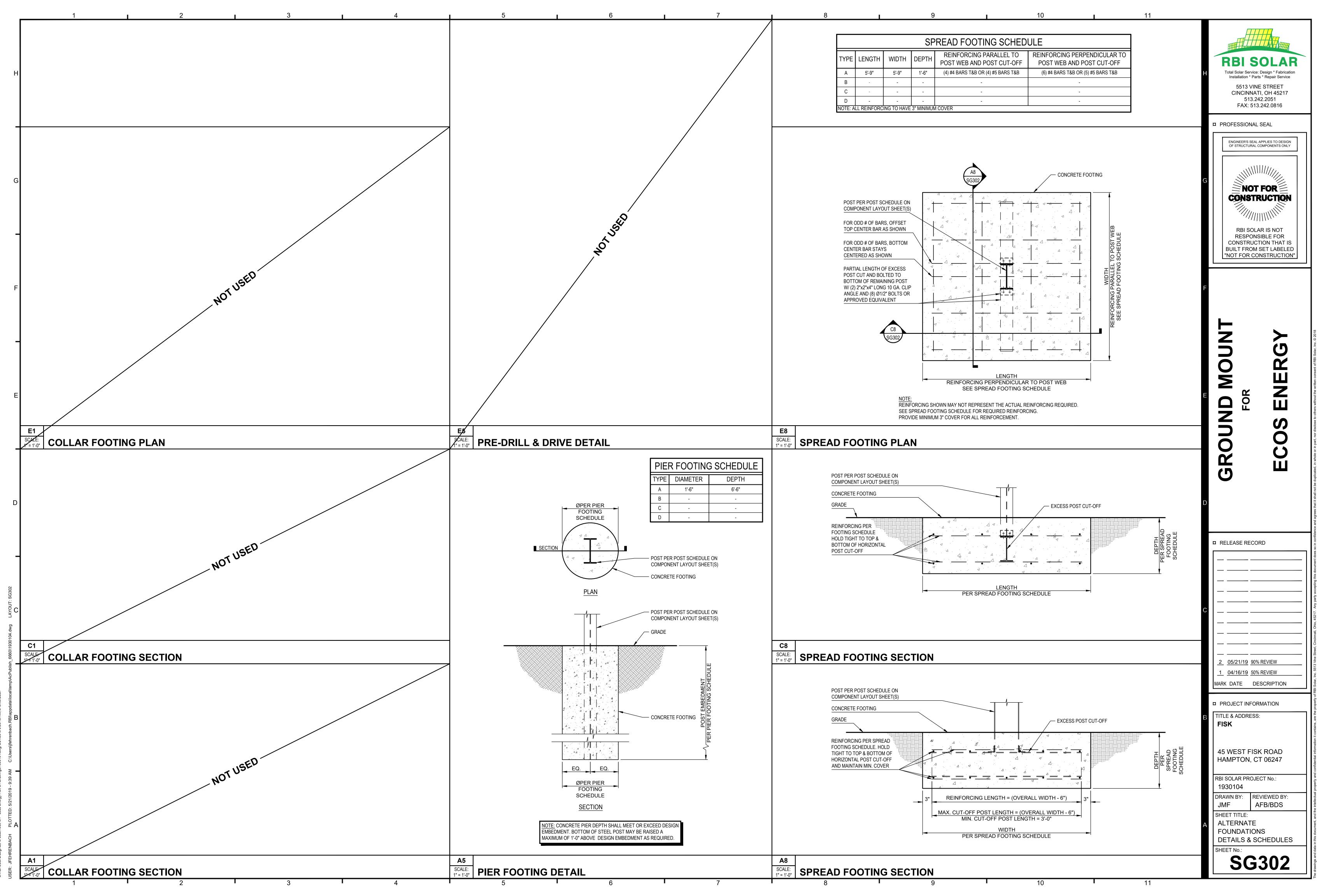
RBI SOLAR

Total Solar Service: Design * Fabrication Installation * Parts * Repair Service

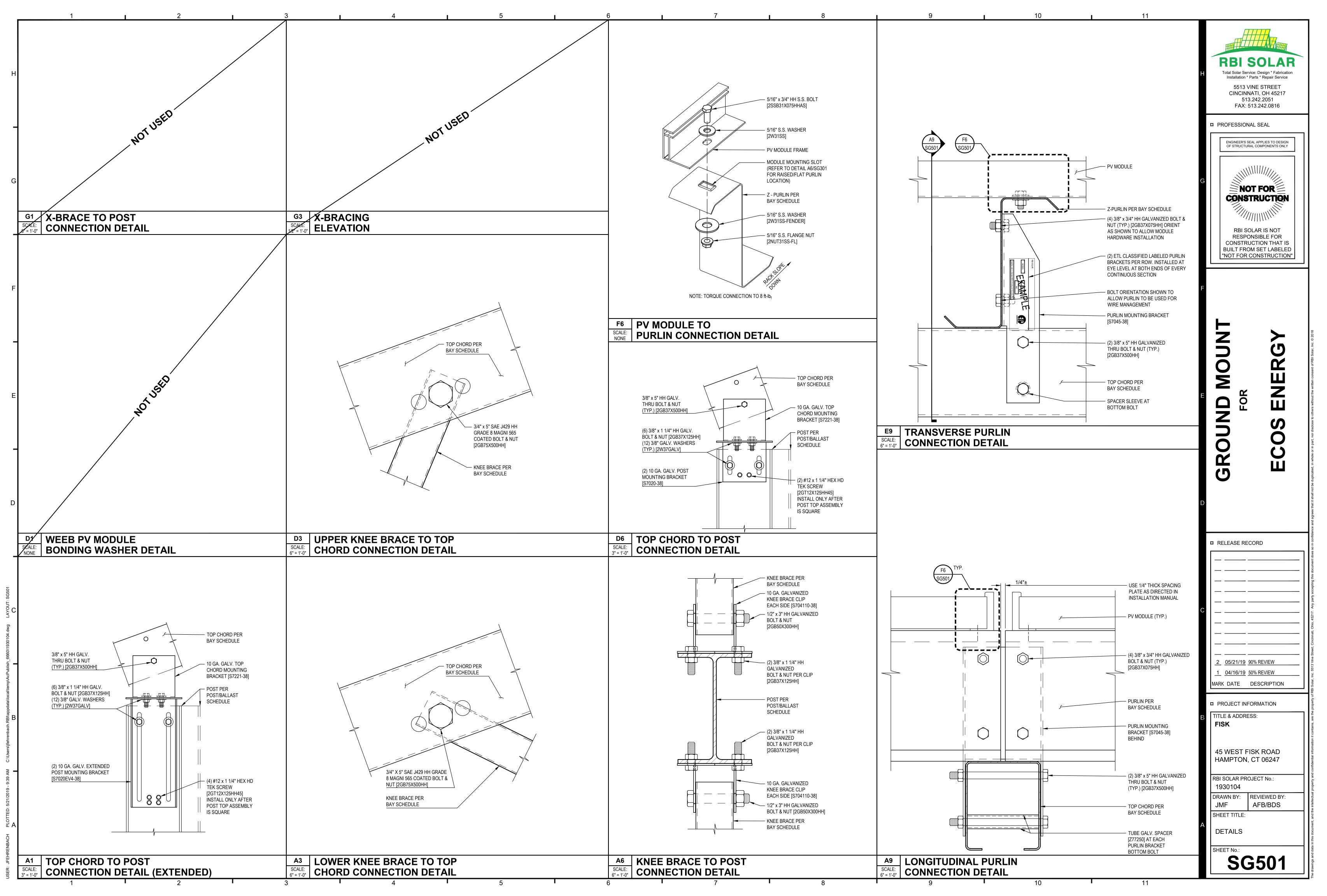
5513 VINE STREET

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CL

Robert C. Russo C.S.S.

Soil Scientist/Environmental Scientist

EDUCATION:

Wesleyan University B.A. Biology/Psychology 1982

Yale University M.E.S. Environmental Studies

REGISTRATION:

Certified Soil Scientist Society of Soil Scientists of Southern New England

BACKGROUND SUMMARY:

2002 - Present	Soil Scientist CLA Engineers, Inc.
1998 – 2002	Owner/Principal Scientist Environmental Planning & Soil Science
1993 – 1998	Senior Environmental Scientist VHB Inc.
1990 – 1993	Environmental Scientist Atlantic Environmental Services

GENERAL BACKGROUND:

Mr. Russo has been involved with wetland and environmental investigations and permitting throughout Connecticut. His experience includes utility, roadway, commercial and residential projects. He is familiar with permitting requirements on the local, State and Federal Levels.

SPECIFIC PROFESSIONAL EXPERIENCE:

* November 2002 - Present - CLA Engineers, Inc., - Mr. Russo is a soil and environmental scientist in the firm and has performed wetland delineation, environmental investigation, and permitting task on projects including relating to utilities, roadway reconstruction, residential subdivision, and commercial development.

* September 1998 – November 2002– Environmental Planning & Soil Science LLC, Ivoryton, CT. Mr. Russo specialized in wetland delineation and permitting and performed pre-design environmental constraints analysis, wetland permit preparation, layout of sedimentation and erosion control measures, wetland function evaluation, wetland mitigation design and monitoring, and on-site construction inspection. Work also included acting as liaison with local Inland Wetlands Agencies, CTDEP and the Army Corps of Engineers.

* December 1993 - August 1998 VHB Inc. Middletown, CT. responsibilities included both technical and managerial aspects of projects. Work included preparation of National Environmental Policy Act (NEPA) documents; local, State, and Federal environmental permit applications; project management; client liaison; staff supervision.

* September 1990 – December 1993 Atlantic Environmental Services, Inc, Colchester, CT. Responsibilities included both technical and managerial aspects of hazardous waste and ecological projects.

Robert C. Russo C.S.S.

Soil Scientist/Environmental Scientist

AREAS OF EXPERTISE:

- * Wetland Delineation per State of Connecticut and United States Army Corps of Engineers criteria
- * Sedimentation and erosion control planning and inspection
- * Storm water management planning and permitting
- * Pollutant and Water Quality Modeling
- * Connecticut tidal wetland delineation
- * Wetland functional assessment
- * Wetland mitigation, creation and restoration and monitoring/inspection
- * Vernal pool studies
- * Site wide vegetative inventories
- * Threatened, Endangered, and Special Concern Species investigations and targeted site searches
- * Soils investigation and mapping
- * Site constraints analysis
- * GIS site analysis
- * GPS wetland and resource mapping
- * Site reconnaissance survey and constraints analysis
- * Soils investigations for sand and gravel excavation
- * Soils investigation and permeability testing for septic systems
- * Environmental Impact Assessment

PERMITTING EXPERIENCE:

- * Local, State, and Federal wetland permit preparation
- * CTDEP Water Diversion
- * CTDEP Stream Channel Encroachment
- * CTDEP Stormwater permits for Commercial, Industrial, Construction sites
- * CTDEP Water Quality Certification
- * National Environmental Policy Act (NEPA) document preparation

CLA

- * Connecticut Environmental Policy Act (CEPA) documentation preparation
- * Coastal Management Consistency
- * Coastal Permitting
- * Compliance with Endangered Species Act

CLA Engineers, Inc.

Civil • Structural • Survey

317 MAIN STREET • NORWICH, CT 06360 • (860) 886-1966 • (860) 886-9165 FAX

June 28, 2019

Steve Broyer ECOS Energy 222 S. 9th Street Minneapolis, MN 55402

RE: Vernal Pool Management Plan CLA #6178

Dear Steve:

This document is intended to supplement the Wetland Report previously provided by Highland Soils and to provide recommendations to avoid, minimize and mitigate potential impacts to the two Vernal Pools and indicator species found in the pools. The Highland Soils report is appended to this document. The following descriptive information is contained in the original Wetland Report. Highland Soils is credited with the original draft of this Management Plan and performing the vernal field work on the site. CLA has made minor modification to Highland Soils work based on the final site plans and storm water management plan.

EXISTING CONDITIONS

The site contains just less than one hundred acres and is currently wooded. Three wetland areas were mapped on the site with the largest wetland area located in the southern and southwestern portion of the site. A small area of wetland extends onto the property in the southeastern corner of the site. Both of these systems drain toward Merrick Brook.

The third wetland system is located in the northeastern portion of the site and this system is in the Cedar Swamp Brook watershed. As stated earlier, all of the land is within the Shetucket River Region Basin.

The upland areas on the site extend from a high point along Fisk Road. The land slopes to the east, south and west toward the wetlands. The uplands are wooded with mixed hardwood species. The eastern half of the site was logged recently, and most of the mature species of oak were removed. The previous timber removal operation did not remove or reduce the slash and tree tops, and the material is scattered throughout the site. The upland areas are fairly typical of the area with an even-age mature forest consisting of mainly Oak, Hickory and Maple. The understory in the unlogged areas is open and contains saplings of the fore mentioned species. The composition of the forest changes as the soils transition from well-drained and moderately well-drained soils over a friable glacial till to the wetlands. The dominant soil types in the uplands are the well-drained Charlton and Chatfield Series, with smaller areas of the shallow to bedrock Hollis Series and the moderately well-drained Sudbury Series also present.

WETLAND RESOURCES

Three wetland areas were noted on the property and are identified based on the relative location on the property.

SOUTHEASTERN WETLAND

This is the smallest area of on-site wetlands and is in the southeastern corner of the property. The wetland continues off-site and drains into Merrick Brook. The wetland contains poorly drained soils of the Leicester series that grade to very poorly drained soils of the Whitman Series. The wetland is wooded with Red maple and Grey birch in the canopy. The understory is strikingly thick with Highbush blueberry, Sweet pepperbush and Winterberry as the dominant shrub species. The shrub layer is extremely dense and Cinnamon fern, Skunk cabbage and Sphagnum moss comprise the dominant species in the herbaceous layer.

In the interior of the on-site wetland, the soils are saturated to the ground surface but little to no surface water was present. Surface flow is very diffuse and no defined surface water flow patterns were discernible.

NORTHEASTERN WETLAND

This wetland system is larger and lies along the northeastern property line. At the time the wetland delineation was conducted the property line was not apparent. Upon completion of the boundary survey the property line was identified and areas of upland soils were noted, but not delineated. The area of upland is approximately one to two acres in size, is irregularly shaped, and appears to be within one hundred feet of the wetlands.

This system is also wooded with Red maple, and Grey birch is the dominant species in the canopy. Highbush blueberry and Sweet pepperbush are the dominant shrub species. The wetland contains poorly drained soils of the Leicester Series and very poorly drained soils of the Whitman Series. Both soils overlay a friable and coarse glacial till.

The interior of the wetland is saturated to the ground surface and the surface flow within the wetland is diffuse until nearer the property lines where more defined flow occurs. The wetland outlets in two locations, one outlet is to the north near Fisk Road and the other outlet is along the southern limits of the wetland. The southern outlet shows signs of channelization of the surface flow from human activity. This wetland drains to the north and east across Fisk Road and into the Cedar Swamp Brook watershed.

SOUTH-SOUTHWESTERN WETLAND

This is the largest of the three on-site wetland systems and contains the most diversity in vegetation and functions and values. The system contains three fingers that extend westerly, northerly and easterly from the main body of the wetlands. The main body of the wetland consists of an area of very poorly drained organic soils located at the deflection point in the southerly boundary line and where the three fingers of wetlands converge. This area of wetlands is permanently saturated and contains organic soils to a depth of over four feet. The canopy is open and the shrub layer is very thick. Red maple is the dominant tree species, but forms a very open canopy. Red elm saplings were noted and the shrub layer is dominated by Highbush blueberry and Sweet pepperbush. The ground surface contains many hummocks, which the trees and shrubs have colonized, and Cinnamon fern and Skunk cabbage were also present. Sphagnum moss dominates the ground cover in this portion of the wetland system.

Defined water course channels enter the main body of the wetland from the three fingers; however, the flow in the main body of the wetlands is diffuse and poorly defined. Small areas of shallow surface water are located throughout this portion of the wetland, and well defined surface flow paths could be distinguished.

The westerly finger of this wetland system extends towards Route 6. Nearest Route 6 the area is dominated by pole-sized Red maples with Highbush blueberry in the understory. This area appears to have been cleared in the not too distant past. A stone wall separates the upper part of the wetland finger from the remaining system and the soils get increasingly wetter as the finger transitions to the main body of the wetland. The vegetative community also changes with the canopy becoming sparser as the soils get wetter and the understory gets increasingly thicker with Sweet pepperbush being more dominant. Surface flow becomes less well defined and the soils start to transition from mineral to organic. Winterberry and Highbush blueberry become the dominant shrub species in the wetter areas where the organic soils are more prevalent.

The northerly finger of this wetland complex also extends out from the main wetland body. This finger of wetlands extends uphill toward the intersection of Fisk Road and Route 6 in a more northerly direction. This wooded wetland is dominated by Red maple and Grey birch and transitions to a pole-sized stand of young Red maple at its terminus. The surface flow is diffuse in the upper reaches of the wetland and becomes better defined as the topographic gradient increases. A defined water course channel flows through the wetland until the transition into the organic soils in the main wetland body. The vegetation also transitions and the transitions coincide with changes in hydrology.

The largest finger extends southerly from the main wetland body and parallels the property line. This wooded wetland contains a Red maple, Grey birch canopy and the understory contains Japanese barberry, which was noticeably absent in most of the other wetlands. Most of this portion of the wetland has been impacted by the previous logging operation, with some removal of trees along the perimeter and quite a bit of slash left within the wetlands. There is enough of a topographic gradient in the wetland finger to produce minor channelized flow, however, the soils are seasonally saturated and a fluctuating water table does not support long duration saturation of the soil surface. The accumulated slash from the logging operation has resulted in the formation of micro pools of shallow standing water where surface flows have been temporarily blocked.

The surface of the wetland is stony and there are areas where diffuse surface flows dominate. The poorly drained soils of the Leicester Series dominate the finger until the transition to the organic soils.

VERNAL POOL HABITAT

A field survey was conducted on March 23, 2016. The temperatures ranged from 45 degrees F. to 60 degrees F. Mostly cloudy skies gave way to mostly sunny by late afternoon. All wetland and upland areas were surveyed for breeding amphibians.

A second field survey was conducted on April 13, 2016. Temperatures ranged from 50 degrees F. to 60 degrees F. and skies were sunny.

No isolated Vernal Pools were noted on the property. However, breeding amphibians were noted within two areas of the wetlands and the likelihood of an additional breeding area occurs just off-site.

It should be noted that Vernal Pool Assessments (Assessment Sheets attached) were conducted in accordance with the methodology contained in the following publication, hereafter referred to as the BDP (Best Development Practices):

Calhoun, A. J. K. and M. W. Klemens. 2002. Best development practices: Conserving pool-breeding amphibians in residential and commercial developments in the northeastern United States. MCA Technical Paper No. 5, Metropolitan Conservation Alliance, Wildlife Conservation Society, Bronx, New York.

The first breeding area was encountered in the northern finger of wetlands that are part of the large wetland complex described in the South-Southwestern Wetland section of this report. Ten Spotted Salamander egg masses were noted thirty feet east of wetland flag #151. A large tree was blown down and a small pool of standing water has accumulated where the root ball of the downed tree has created a small depression. The water was one foot or less in depth and the total area of standing water was within a ten-foot circle. This breeding area is rated as Tier I according to the methodology. The hydrology of the breeding site appears to be marginal for life cycle completion and further study will be conducted.

The second breeding area was noted in the eastern finger of this same wetland complex. At wetland flag #75 a small pool of surface water has formed due to the blockage of surface water from slash that was left in the wetland from a previous logging operation. The surface flow has been partially blocked and a small area of surface water approximately 20 feet by 50 feet and up to twelve inches deep has formed. In this area three Wood Frog and one Spotted Salamander egg masses were found. Again, the hydrology appears marginal, as this may be a temporary condition due to the accumulated slash. Surface flow through the breeding area was noticed, so the location of the egg masses was a bit of a surprise. The area will be monitored further into the season. This breeding area is ranked as Tier I according to the methodology.

The main body of the South-Southwestern wetland contains numerous pools of shallow standing water. Due to the thickness and complexity of the wetland it was not possible to visually search the entire area. Breeding activity cannot be ruled out in this portion of the wetland.

The following information is not contained within the Wetland Report and is submitted in response to the initial submission to the Siting council.

VERNAL POOL IMPACTS

VERNAL POOL DEPRESSION #1

As designed no activity is proposed with the Vernal Pool depression.

VERNAL POOL #1 ENVELOPE (VPE)

Vernal Pool	Envelope:	0.8 acres
Wetland	0.6 ac.,	75% of VPE
Upland	0.2 ac.,	25% of VPE
Developed	0.0 ac.,	0.0% of VPE

As designed there is no activity proposed within the VPE

VERNAL POOL DEPRESSION #2

As designed no activity is proposed with the Vernal Pool depression.

VERNAL POOL #2 ENVELOPE (VPE)

Vernal Pool	Envelope:	1.8 acres
Wetland	1.45 ac.,	80% of VPE
Upland	0.34 ac.,	20% of VPE
Developed	0.0 ac.,	0.0% of VPE

As designed there is no activity proposed within the VPE.

VERNAL POOL CRITICAL TERRRESTRIAL HABITAT (CTH)

The Critical Terrestrial Habitat for the two Vernal Pools overlap and the following figures are based on the total CTH for the two pools.

Existing Critical Terrestrial Habitat: 77.6 acres		
Wooded/Wetland:	65.8ac.,	84.7% of CTH
Impervious (exposed ledge stone):	0.8 ac.,	1.0% of CTH
Transmission Line (215' CL&P Easement):	11.0ac.,	14.2% of CTH
Developed area:	0.0ac.,	0.0% of CTH
Proposed Critical Terrestrial Habitat (Post Deve	elopment): 77.6	acres
Wooded/Wetland:	44.1ac.,	56.8% of CTH
Impervious:	1.3 ac.,	1.6% of CTH
(exposed stone/agg. Roads/Equipment Pads))	
Transmission Line (215' CL&P Easement):	11.0ac.,	14.2% of CTH
Developed area:	21.2 ac.,	27.2 % of CTH [1]

¹ As cited in the literature, less than 25 to 30% development within the CTH is desired to avoid diminution of amphibian populations. Alterations to surface and near surface hydrology are not anticipated due to the lack of grading or other soil disturbances that may impact the direction or quantities or runoff.

Best Management Practices and Recommendations

As proposed, no solar panels are within 100 feet of the Vernal Pools.

The CTH for both complexes is being reduced by the placement of the solar panels. However, the CTH for both Vernal Pool complexes are within thresholds of less than 25% of the CTH being developed, per the Calhoun and Klemens (2002) assessment methodology. Therefore based on the application of the BDP both vernal pool complexes would be conserved.

It should be noted that the reductions of CTH are based on considering solar panel array areas as "developed" land, which is unsuitable for amphibians. However, these areas will not be maintained as a typical lawn, which is excluded by the BDP as suitable habitat. They will be seeded to low or no-mow grasses and only mowed on an as needed basis to exclude woody species. Therefore, these areas will not prohibit movement of vernal pool amphibians as they move between habitats or disperse, as would a manicured lawn.

Erosion and Sedimentation Control

Seasonal restrictions will be required on the project to protect and accommodate migrating amphibians. An Environmental Monitor be used to implement and monitor the project with specific goals of protection of amphibian populations. The Environmental Monitor will inspect the site once per week during the period March 1 Through May 15th during construction to ensure that the proper measures for amphibian protection are in place and functioning as intended The Environmental Monitor will be responsible for the managing following aspects of erosion and sedimentation control measures.

a. Erosion control mattings have been specified for slopes greater than three to one and within swales. Plastic netting can trap and entangle wildlife, and erosion control blankets should be limited to those products that have biodegradable or woven fibers or mechanically bound fibers that do not include plastic nettings. The specified matting is a biodegradable product manufactured by North American Green (S150BN) which meets this criteria.

- b. The Environmental Monitor will inspect all E&S measures to ensure that they comply with the plans and modify as necessary to accommodate concerns for amphibian passage.
- c. Silt fencing is a barrier to amphibian movements and should only be used where exclusion of amphibian species is desired. As a result, the project plans employ woodchip berms for the entire perimeter of the site that faces the vernal pools. Silt fencing may be used to deflect migrating amphibians from active work zones. In particular, per the Environmental Monitor, silt fence will be installed around the sediment traps/storm water basins during the amphibian migratory period in order to exclude them.
- d. During March 1 to May 15, on mornings after a rainfall, the Environmental Monitor will perform sweeps of hard barriers and relocate any herpetofauna.
- e. No vehicles or construction activities are to occur outside of barriers. The monitor will conduct weekly inspections to ensure this.
- f. The monitor will also inspect to confirm that no Petroleum and Hazardous Materials storage occurs on site.
- g. The monitor will provide weekly reports to ECOS during the period from March 1 to May 15.

If you have any questions, or require additional information, please call me at (860) 886-1966.

Very truly yours,

BUTChord

Robert C. Russo. Soil Scientist

HIGHLAND SOILS LLC

WETLAND REPORT

FISK ROAD SOLAR HARTFORD TURNPIKE & FISK ROAD HAMPTON, CONNECTICUT

PREPARED FOR ECOS ENERGY, LLC

BY JOHN P. IANNI PROFESSIONAL SOIL SCIENTIST

APRIL 27, 2016

P.O Box 337, Storrs, CT 06268 · 860-742-5868 · Highlandsoils@aol.com

INTRODUCTION

The subject property is located on the south side of Hartford Turnpike, CT Route 6, and west of Fisk Road in Hampton, CT. The property is currently wooded and lies within two watersheds. The majority of the property is within the watershed of Merrick Brook which lies to the east of the site. The remainder of the site drains to the northeast toward the Cedar Swamp Brook. Both brook systems are within the Shetucket River regional drainage basin.

The inland wetland delineation on the subject property was completed on September 2, 2015. The wetlands were field delineated in accordance with the standards of the National Cooperative Soil Survey and the definition of wetlands as found in the Connecticut General Statutes, Chapter 440, Section 22A-38. I have reviewed the prepared plans have found the representation of the field delineated wetlands to be substantially correct.

Additionally, the wetland boundaries also conform to the jurisdictional wetlands definition (Federal or Army Corps wetlands) as based on:

Environmental Laboratory. 1987. "Corps of Engineers Wetlands Delineation Manual," Technical Report Y-87-1, US Army Engineer Waterways Experiment Station, Vicksburg, Miss.

Additional field data was collected on March 23 and April 13, 2016.

EXISTING CONDITIONS

The site contains just less than one hundred acres and is currently wooded. Three wetland areas were mapped on the site with the largest wetland area located in the southern and southwestern portion of the site. A small area of wetland extends onto the property in the southeastern corner of the site. Both of these systems drain toward Merrick Brook.

The third wetland system is located in the northeastern portion of the site and this system is in the Cedar Swamp Brook watershed. As stated earlier, all of the land is within the Shetucket River Region Basin.

The upland areas on the site extend from a high point along Fisk Road. The land slopes to the east, south and west toward the wetlands. The uplands are wooded with mixed hardwood species. The eastern half of the site was logged recently, and most of the mature species of oak were removed. The previous timber removal operation did not remove or reduce the slash, and tree tops and the material is scattered throughout the site.

The upland areas are fairly typical of the area with an even-age mature forest consisting of mainly Oak, Hickory and Maple. The understory in the unlogged areas is open and contains saplings of the fore mentioned species. The composition of the forest changes as the soils transition from well-drained and moderately well-drained soils over a friable glacial till to the wetlands. The dominant soil types in the uplands are the well-drained Charlton and Chatfield Series, with smaller areas of the shallow to bedrock Hollis Series and the moderately welldrained Sudbury Series also present.

WETLAND RESOURCES

Three wetland areas were noted on the property and are identified based on the relative location on the property.

SOUTHEASTERN WETLAND

This is the smallest area of on-site wetlands and is in the southeastern corner of the property. The wetland continues off-site and drains into Merrick Brook. The wetland contains poorly drained soils of the Leicester series that grade to very poorly drained soils of the Whitman Series. The wetland is wooded with Red maple and Grey birch in the canopy. The understory is strikingly thick with Highbush blueberry, Sweet pepperbush and Winterberry as the dominant shrub species. The shrub layer is extremely dense and Cinnamon fern, Skunk cabbage and Sphagnum moss comprise the dominant species in the herbaceous layer.

In the interior of the on-site wetland, the soils are saturated to the ground surface but little to no surface water was present. Surface flow is very diffuse and no defined surface water flow patterns were discernible.

NORTHEASTERN WETLAND

This wetland system is larger and lies along the northeastern property line. At the time the wetland delineation was conducted the property line was not apparent. Upon completion of the boundary survey the property line was identified and areas of upland soils were noted, but not delineated. The area of upland is approximately one to two acres in size, is irregularly shaped, and appears to be within one hundred feet of the wetlands.

This system is also wooded with Red maple, and Grey birch is the dominant species in the canopy. Highbush blueberry and Sweet pepperbush are the dominant shrub species. The wetland contains poorly drained soils of the Leicester Series and very poorly drained soils of the Whitman Series. Both soils overlay a friable and coarse glacial till.

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Defined water course channels enter the main body of the wetland from the three fingers; however, the flow in the main body of the wetlands is diffuse and poorly defined. Small areas of shallow surface water are located throughout this portion of the wetland, and well defined surface flow paths could be distinguished.

The westerly finger of this wetland system extends towards Route 6. Nearest Route 6 the area is dominated by pole-sized Red maples with Highbush blueberry in the understory. This area appears to have been cleared in the not too distant past. A stone wall separates the upper part of the wetland finger from the remaining system and the soils get increasingly wetter as the finger transitions to the main body of the wetland. The vegetative community also changes with the canopy becoming sparser as the soils get wetter and the understory gets increasingly thicker with Sweet pepperbush being more dominant. Surface flow becomes less well defined and the soils start to transition from mineral to organic. Winterberry and Highbush blueberry become the dominant shrub species in the wetter areas where the organic soils are more prevalent.

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WETLAND FUNCTIONS

The functions and values of the wetlands will be described in a qualitative manner modeled after the method used by the US Army Corps of Engineers. The information is from *The Highway Methodology Workbook Supplement*. This publication uses a descriptive approach to assessing functional values, versus the CT D.E.P. approach, which uses a quantitative or numerical approach to ranking wetland functions and values.

<u>Ground Water Recharge/Discharge</u> - This function considers the potential for a wetland to serve as a ground water recharge and/or discharge area. It refers to the fundamental interaction between wetlands and aquifers, regardless of the size or importance of either.

The wetland systems are underlain by glacial till, although not hardpan, the wetlands are not associated with stratified drift (sand and gravel). Seepage zones were apparent adjacent to all of the wetland systems and shallow ground water flows appear to be the main source of water for the wetlands. The on-site wetlands are discharge wetlands with recharge of shallow ground water and the maintenance of base flows also being present. This is a principle function of the on-site wetlands.

<u>Floodflow Alteration</u> - This function considers the effectiveness of the wetland in reducing flood damage by water retention for prolonged periods following precipitation events and the gradual release of flood waters. It adds to the stability of the wetland ecological system or its buffering characteristics and provides social or economic value relative to erosion and/or flood prone areas.

The on-site wetlands are at the upper portion of the individual watersheds and generally have diffuse surface flows except where topographic gradients allow for concentrated surface flows. Although not associated with constricted outlets, the presence of very poorly drained and/or organic soils within the wetlands allows for the accumulation of surface water for short periods. The wetlands are not associated with floodplains but the well-drained soils in the adjacent uplands contribute steady ground water flows to the wetlands. The most active area for this function occurs in areas where the topography is flat and the organic soils have developed. This function is well represented in the wetlands, but is not a principal function.

<u>Fish and Shellfish Habitat</u> - This function considers the effectiveness of seasonal or permanent watercourses associated with wetland in question for fish and shellfish habitat.

The on-site wetlands are not associated with a water course that is capable of supporting fish or shellfish habitat. This function is not present on-site.

<u>Sediment/Toxicant/Pathogen Retention</u> - This function reduces or prevents degradation of water quality. It relates to the effectiveness of the wetland as a trap for sediments, toxicants or pathogens in runoff water from surrounding uplands, or upstream eroding wetland areas.

The watershed of the on-site wetlands is mainly wooded and no signs of significant erosion were present. Route 6 is a potential sediment source and accumulations of road sand were noted near the headwaters for the wetland. The presence of deep organic soils in the South-Southwestern wetland produce diffuse flows capable of sediment retention. Flat topography and diffuse surface flows indicate this function is present in the wetlands, but with the lack of sediment and/or toxicant sources this function is underutilized. This function is present and is a principle function for the on-site wetlands.

<u>Nutrient Removal/Retention/Transformation</u> - This function considers the effectiveness of the wetland as a trap for nutrients in runoff water from surrounding uplands or contiguous wetlands, and the ability of the wetlands to process these nutrients into other forms or trophic levels. One aspect of this function is to prevent ill effects of nutrients entering aquifers or surface waters such as ponds, lakes, streams, rivers or estuaries.

The presence of sediment trapping functions and fine grained and organic soils are positive indicators for this function. Diffuse flows in much of wetlands also add to the ability of the wetlands to perform this function. The lack of deep water habitat limits the ability of the wetlands to perform the function and the lack of sources of excess nutrients also limit the ability of the wetlands to perform this function. The presence of thick woody vegetation and organic soils are positive qualifiers. Overall, this function is present in the on-site wetlands and is a principle function.

<u>Production Export</u> - This function relates to the effectiveness of the wetland to produce food or usable products for human, or other living organisms.

Portions of the wetlands are capable of producing large quantities of organic matter, however, flushing of the wetlands generally does not occur and the diffuse flows and presence of high organic matter soils indicates attenuation of organic matter. The wetlands lack diversity of cover but the density of cover is good. Overall this function is present but is not a principle function.

<u>Sediment/Shoreline Stabilization</u> - This function evaluates the effectiveness of a wetland to stabilize stream banks and shorelines against erosion.

The on-site wetlands are not associated with a shoreline or stretch of open water. The wetlands are all wooded with seasonal or intermittent water courses, or flat topography and organic soils, which promote sheet flow. This function is not present in the wetlands.

<u>Wildlife Habitat</u> - This function considers the effectiveness of the wetland to provide habitat for various types and populations of animals typically associated with wetlands and wetland edges. Both resident and/or migrating species are considered.

The wetlands have many positive indicators for this function including the dominant wetland type (wooded swamp), the lack of development near the wetlands, good water quality, high abundance of vegetation and connectivity to other wetlands. They generally lack: species diversity and the presence of marsh habitat, flowering plants and open water habitat. The subject property is contiguous with large tracts of undeveloped land and wildlife utilization of the property is typical for wooded habitat. For this to be a principle function the methodology indicates that greater diversity in plant species and cover types, along with deeper water habitats should be available. This function is present but it is not a principle function.

<u>Recreation</u> – (Consumptive and Non-Consumptive) This value considers the suitability of the wetland and associated watercourses to provide recreational opportunities such as hiking, canoeing, boating, fishing, hunting and other active or passive recreational activities.

This function is centered on water-based recreation such as fishing, canoeing and other activities. The property is not suitable for water-based recreation and consumptive values such as hunting are limited by private property rights. The lack of water-based recreational opportunities limits this value to passive recreation. This is not a primary value.

<u>Educational/Scientific Value</u> - This function considers the suitability of the wetland as an "outdoor classroom" or for scientific research.

The wetlands generally are a single cover class (wooded) that limits the potential for educational study. There are no good access points near the wetlands and there are no ponds or perennial water courses. The access to the property is controlled and the wetlands are typical for the area. The wetlands are not high quality wildlife habitat and viewing locations into the wetlands are limited. Overall, few positive qualifiers are present for this value.

<u>Uniqueness/Heritage</u> - This value considers the effectiveness of the wetland for special values such as archeological sites, rare and endangered species habitat or uniqueness for its location.

The on-site wetlands exhibit few of the qualifiers for this value. The wooded wetlands are very typical for the area and lack a perennial water course, open water or low growing vegetation. The absence of large flowering plants and wildlife habitat reduce the potential for this value. This value is not present on the site. <u>Visual Qualities/Aesthetics</u> - This value relates to the visual qualities of the wetlands.

The wetlands are within a large tract of relatively undisturbed land and do not show signs of pollution. However, the fact that the wetlands are a single cover class reduces the importance for this value. There are multiple viewing locations that afford relatively unobstructed views to the wetlands; however, the views are not present into the wetlands due to thick vegetation along the edges.

<u>Endangered Species Habitat</u> – This value considers the suitability of the wetland to support threatened or endangered species.

A letter has been issued for the project from the Connecticut Department of Energy and Environmental Protection. The letter indicated no adverse impacts from the project.

WETLAND IMPACTS

The project has been designed to avoid all direct wetland impacts. The 100-foot upland review area is to remain mostly intact with only minor clearing and no grading occurring. The perimeter fencing generally follows the URA and in many areas is well away from the wetlands and review area.

The two areas where breeding amphibians were found are well protected with no activity proposed near the Spotted Salamander breeding area near wetland flag #151 and no activity within the 100-foot envelope of the second breeding area near flag #75.

Additionally, all of the access roads are well away from the wetlands and upland review areas and no indirect wetland impacts are anticipated.

Fish Road Pool #1 Wetland Flag VERNAL POOL ASSESSMENT SHEET A. Biological Value of the Vernal Pool (1) Are there any state-listed species (Endangered, Threatened, or Special Concern) breeding in the pool? Yes No (2) Are there two or more vernal pool indicator species breeding (i.e., evidence of e spermatophores [sperm packets], mating, larvae) in the pool? Yes No (3) Are there 25 or more egg masses (regardless of species) present in the pool by the conclusion of the breeding season? Yes No B. Condition of the Critical Terrestrial Habitat (1) Is at least 75% of the vernal pool envelope (100 feet from pool) undeveloped? Yes No (2) Is at least 50% of the critical terrestrial habitat (100-750 feet) undeveloped? Yes No NOTE: For these purposes, "undeveloped" means open land largely free of road structures, and other infrastructure. It can be forested, partially forested, or open approximation.	i) prese egg ma
 (1) Are there <i>any</i> state-listed species (Endangered, Threatened, or Special Concern) breeding in the pool? YesNoX (2) Are there two or more vernal pool indicator species breeding (i.e., evidence of e spermatophores [sperm packets], mating, larvae) in the pool? Yes No (3) Are there 25 or more egg masses (regardless of species) present in the pool by the conclusion of the breeding season? Yes No B. Condition of the Critical Terrestrial Habitat (1) Is at least 75% of the vernal pool envelope (100 feet from pool) undeveloped? Yes No (2) Is at least 50% of the critical terrestrial habitat (100-750 feet) undeveloped? Yes No NOTE: For these purposes, "undeveloped" means open land largely free of road structures, and other infrastructure. It can be forested, partially forested or open 	egg ma
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 Spermatophores [sperm packets], mating, larvae) in the pool? Yes No (3) Are there 25 or more egg masses (regardless of species) present in the pool by the conclusion of the breeding season? Yes No B. Condition of the Critical Terrestrial Habitat (1) Is at least 75% of the vernal pool envelope (100 feet from pool) undeveloped? Yes No (2) Is at least 50% of the critical terrestrial habitat (100-750 feet) undeveloped? Yes No NOTE: For these purposes, "undeveloped" means open land largely free of road structures, and other infrastructure. It can be forested, partially forested, or open 	
 Condition of the breeding season? Yes No B. Condition of the Critical Terrestrial Habitat (1) Is at least 75% of the vernal pool envelope (100 feet from pool) undeveloped? Yes X No (2) Is at least 50% of the critical terrestrial habitat (100-750 feet) undeveloped? Yes X No (2) Is at least 50% of the critical terrestrial habitat (100-750 feet) undeveloped? Yes X No NOTE: For these purposes, "undeveloped" means open land largely free of road structures, and other infrastructure. It can be forested, partially forested or open 	he
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Cumulative Assessment Cumulative Assessment cool. It will enable	an offi
Number of questions answered YES in category ANumber of questions answered YES in category BTier Tier Ratingdetermine the relative ecological pools within your community. rating—which will most likely apply minority of sites—denotes exempla Management Recommendations sh applied at these sites. For pools rate	value A Tie y to onl ary poo should ted as T
1-3 2 Tier I II, proceed with care; you nee information! Tier II pools will	eed m
1-3 1 Tier II constitute the majority of your ver	ernal p
0 (1-2) (Tier III) resources; Management Recommendation should be applied at these sites	s to
1-3 0 Tier III maximum extent practicable. Tier might also be likely candidates for re efforts (e.g., reforestation of the	r II po

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Pool #2 Wetland Flay #75 FISK Road VERNAL POOL ASSESSMENT SHEET A. Biological Value of the Vernal Pool (1) Are there any state-listed species (Endangered, Threatened, or Special Concern) present or breeding in the pool? Yes____No (2) Are there two or more vernal pool indicator species breeding (i.e., evidence of egg masses, spermatophores [sperm packets], mating, larvae) in the pool? Yes X No (3) Are there 25 or more egg masses (regardless of species) present in the pool by the conclusion of the breeding season? Yes No X B. Condition of the Critical Terrestrial Habitat (1) Is at least 75% of the vernal pool envelope (100 feet from pool) undeveloped? Yes X No (2) Is at least 50% of the critical terrestrial habitat (100-750 feet) undeveloped? Yes X No NOTE: For these purposes, "undeveloped" means open land largely free of roads, structures, and other infrastructure. It can be forested, partially forested, or open agricultural land. CAUTION This rating system is designed strictly as a planning tool, not as an official **Cumulative Assessment** assessment tool. It will enable you to determine the relative ecological value of Number of Number of pools within your community. A Tier I questions questions rating-which will most likely apply to only a Tier answered answered minority of sites-denotes exemplary pools; Rating YES in YES in Management Recommendations should be category A category B applied at these sites. For pools rated as Tier II, proceed with care; you need more (2)1-3 Tier I) information! Tier II pools will probably constitute the majority of your vernal pool 1-3 1 Tier II resources; Management Recommendations 0 1-2 should be applied at these sites to the Tier III maximum extent practicable. Tier II pools 1-3 0 Tier III

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efforts (e.g.,

terrestrial habitat).

might also be likely candidates for restoration

reforestation of the critical