

March 5, 2021

Mr. George Barrett, Chair Wareham Planning Board c/o Mr. Kenneth Buckland, Town Planner 54 Marion Road Wareham, Massachusetts 02571

Via: Email to <a href="mailto:kbuckland@wareham.ma.us">kbuckland@wareham.ma.us</a> and <a href="mailto:sraposo@wareham.ma.us">sraposo@wareham.ma.us</a>

Reference: Response to Peer Review Comments

Application for Site Plan Review, Case #8-20

140 Tihonet Road PV+ES Project

Wareham, Massachusetts B+T Project No. 1833.112

#### Dear Planning Board Members:

On behalf of the Applicant, Borrego Solar Systems, Inc. (BSSI), Beals and Thomas, Inc. (B+T) respectfully submits the enclosed decommissioning plan and revised plans for the above-referenced project in response to peer review comments by Charles L. Rowley, PE, PLS in a letter dated February 16, 2021.

In response to Mr. Rowley's comments the plans were revised as follows:

- Solar panels have been removed from Basin 6
- Clearer access has been provided to Basin 1
- Notes were clarified regarding loaming and seeding
- Recommended construction sequence notes have been added

We have received a letter dated March 5, 2021 indicating that no further plan revisions are necessary. Therefore, enclosed are eight hard copies of this letter with full size plans (a copy was previously provided to Mr. Rowley). Separate copies of the letter and plans have been submitted directly to Wareham Fire and the Conservation Commission.

Mr. George Barrett, Chair Wareham Planning Board March 5, 2021 Page 2

We trust that the information provided herein satisfies the comments on the Project. Please do not hesitate to contact us should you have any questions.

Very truly yours,

BEALS AND THOMAS, INC.

Stary H. Minihane

Stacy H. Minihane, PWS Senior Associate

Enclosures: Decommissioning Estimate dated February 19, 2021

Revised Plans dated February 19, 2021 in 15 sheets

cc: Wareham Conservation Commission (via email to: <a href="mailto:dpichette@wareham.ma.us">dpichette@wareham.ma.us</a> and 2 hard copies via FedEx)

Wareham Fire Department (via Certified Mail)

MassDEP Southeast Regional Office (via email: <a href="mailto:SERO NOI@mass.gov">SERO NOI@mass.gov</a>)

Borrego Solar Systems, Inc. (via email)

A.D. Makepeace Company, James Kane (email and hard copy via US Mail with reduced plans)

Charles L. Rowley PE, PLS (via email to: <a href="mailto:crsr63@verizon.net">crsr63@verizon.net</a>, hard copy of letter only)

SHM/aak/1833112LT008





140 Tihonet Road Wareham, MA



Date: 02/19/21

This Decommissioning Estimate has been prepared by Borrego Solar in an attempt to predict the cost associated with the removal of the proposed solar facility. Key assumptions used include the fact that the fencing, electrical cabinetry, solar racks, solar panels, wiring and all other equipment are all one hundred percent recyclable, therefore, the primary cost of decommissioning is the labor to dismantle and load as well as the cost of trucking. No salvage values have been assumed in these calculations. The concrete pads will be broken up at the site and hauled to the nearest transfer station where it will be accepted without a charge.

The following values were used in this Decommissioning Estimate:

System Specifications	
Number of Modules	47,544
Number of Racks	1,981
Number of Inverters	5
Number of Transformers	10
Electrical Wiring Length (ft)	9,920
Number of Foundation Screws	7,924
Length of Perimeter Fence (ft)	7,369
Number of Power Poles	10
Access Rd Material Volume (YD)	4,652
Total Disturbed Area (SF)	1,122,661
Total Fence Weight (lbs)	5,232
Total Racking Weight (lbs)	1,683,850
Total Foundation Screw Weight (lbs)	316,960

Labor and Equipment Costs	
Labor Rate (\$/hr)	\$ 25.00
Bobcat Cost (\$/hr)	\$ 50.00
Front End Loader Cost (\$/Day)	\$ 1,000.00
Excavator Cost (\$/Day)	\$ 1,000.00
Trucking Cost (\$/hr)	\$ 120.00
Backhoe Cost (\$/hr)	\$ 245.00
Power Pole Removal Cost (\$/pole)	\$ 1,500.00
Grader Cost (\$/day)	\$ 1,800.00
Gravel Export Cost (\$/YD)	\$ 10.00
Loam Import Cost (\$/YD)	\$ 25.00
Seeding Cost (\$/SF)	\$ 0.08
Fuel Cost (\$/mile)	\$ 0.25

Equipment & Material Removal Rates	
Module Removal Rate (min/module)	1
Rack Wiring Rem. Rate (min/mod)	0.5
Racking Dismantling Rate (min/rack)	30
Inverter Removal Rate (units/hr)	1
Transformer Removal Rate (units/hr)	0.5
Rack Loading Rate (min/Rack)	15
Elect. Wiring Removal Rate (min/LF)	0.5
Screw Rem. Rate (screws/day)	500
Fence Removal Rate (min/LF)	0.5
Days req. to break up concrete pads	6
Days req. with Rough Grader	13
Days req. with Fine Grader	26
Total Truckloads Required	124
Round-Trip Dist. to Trans. Sta.(miles)	56
Round-Trip Time to Trans. Sta. (hr)	1

<b>Energy Storage Decommissioning</b>	ıg	
Number of Energy Storage Units		5
Battery Disposal Fee	\$	2,000.00
Battery Loading Prep Time (hr)		32
Battery Loading Time (hr)		8
Battery Disposal Fee Battery Loading Prep Time (hr)	\$	2,000.00



#### Labor, Material, and Equipment Costs

#### 1. Remove Modules

The solar modules are fastened to racking with clamps. They slide in a track. A laborer needs only unclamp the module and reach over and slide the module out of the track.

Module Removal Rate • Total Number of Solar Modules • Labor Rate = Module Removal Cost

Total = \$ 19,810.00

#### 2. Remove Rack Wiring

The modules are plugged together in the same manner as an electrical cord from a light is plugged into a wall socket. The string wires are in a tray. A laborer needs only unplug the module, reach into the tray and remove the strands of wire.

Wire Removal Rate • Total Number of Solar Modules • Labor Rate = Rack Wiring Removal Cost

Total = \$9,905.00

#### 3. Dismantle Racks

The racking is supported by screw foundations. The racking will be disconnected from the foundation and removed seperately.

Number of Racks • Rack Dismantling Rate • Labor Rate = Rack Dismantling Cost

Total = \$24,762.50

#### 4. Remove and Load Electrical Equipment

Electrical equipment includes transformers and inverters.

(Number of Inverters • Inverter Removal Rate + Number of Transformers • Transformer Removal Rate) • (Labor Rate + Bobcat Cost) = Electrical Equipment Removal Cost

Total = \$ 750.00

#### 5. Break Up Concrete Pads

Concrede pads are broken up using an excavator and jackhammer.

Number of Demolition Days • (Excavator Cost + Labor Cost) = Total Concrete Pad Removal

Total = \$7,200.00



#### 6. Load Racks

Once the racks have been dismantled, they will be loaded onto trucks for removal from the site. The trucking cost associated with this line item represents the additional time a truck will be needed during loading. Please see item # 13 for additional trucking costs.

Number of Racks • Rack Loading Rate • (Labor Cost + Front End Loader Cost + Trucking Cost) =

Total Rack Removal Cost

Total = \$96,573.75

#### 7. Remove Electrical Wiring

Electrical wiring will be removed from all underground conduits.

Cable Length • Cable Removal Rate • (Labor Cost + Backhoe Cost) =

Total Cable Removal Cost

Total = \$ 22,320.00

#### 8. Remove Foundation Screws

Foundation screws will be backed out of the ground and loaded onto a truck to be removed from site.

(Total Number of Screws / Daily Screw Removal Rate) • (Labor Rate + Excavator Cost) = Total Screw Removal Cost

Total = \$19,017.60

#### 9. Remove Fencing

Fencing posts, mesh, and foundations will be loaded onto a truck and removed from site. Trucking costs included in this line item are for the removal process. Trucking to a recycling facility are included in item #13.

(Total Length of Fence • Fence Removal Rate) • (Labor Rate + Bobcat Cost + Trucking Cost) =

Total = \$11,974.63

#### 10. Remove Power Poles

Power poles will be removed and shipped off site.

Number of Power Poles • Pole Removal cost = Total Power Pole Removal Cost

Total = \$ 15,000.00



#### 11. Seed Disturbed Areas

Seeding cost includes labor and materials for reseeding all disturbed areas including the reclaimed gravel road area, former electrical areas, and areas disturbed by racking foundation removal.

Seeding Cost • Disturbed Area = Total Seeding Cost

Total = \$ 89,812.88

#### 12. Truck to Transfer Station

All material will be trucked to the nearest Transfer station that accepts construction material. The nearest transfer station is Raynham Town Recycling

(Total Truckloads • Roundtrip Distance • Fuel Cost) + (Total Truckloads • Round Trip Time •

Trucking Cost) =

Total Trucking Cost to Transfer Station

Total = \$ 16,616.00

#### 13. Remove and Dispose of Energy Storage Equipment

The battery units will be prepared for shipment and loaded onto a truck. A disposal fee will also be required for the disposal company to accept the batteries.

Number of Battery Units • ((Loading Prep Time • Labor Cost) + Loading Time • (Labor Rate + Bobcat Cost + Trucking Cost) + Disposal Fee) =  $Total\ Energy\ Storage\ Removal\ and\ Disposal\ Cost$ 

Total = \$21,800.00



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## **Summary of Decommissioning Costs**

Line Item	Task		Cos	st
1	Module Removal		\$	19,810.00
2	Rack Wiring Removal		\$	9,905.00
3	Rack Dismantling		\$	24,762.50
4	Electrical Equipment Loading and Removal		\$	750.00
5	Break Up Concrete Pads		\$	7,200.00
6	Load Racks		\$	96,573.75
7	Electrical Wiring Removal		\$	22,320.00
8	Foundation Screw Removal		\$	19,017.60
9	Fence Removal		\$	11,974.63
10	Power Pole Removal		\$	15,000.00
11	Seed Disturbed Areas		\$	89,812.88
12	Trucking to Transfer Station		\$	16,616.00
13	Energy Storage System Removal		\$	21,800.00
		Subtotal =	\$ :	355,542.35

### Present Value Total with 1.25% Adder = \$ 444,427.94

Total after 20 years @ 1.5% Inflation

Present Value • (1+ Inflation Rate)^Number of Years = Future Value

Grand Total = \$598,580.00

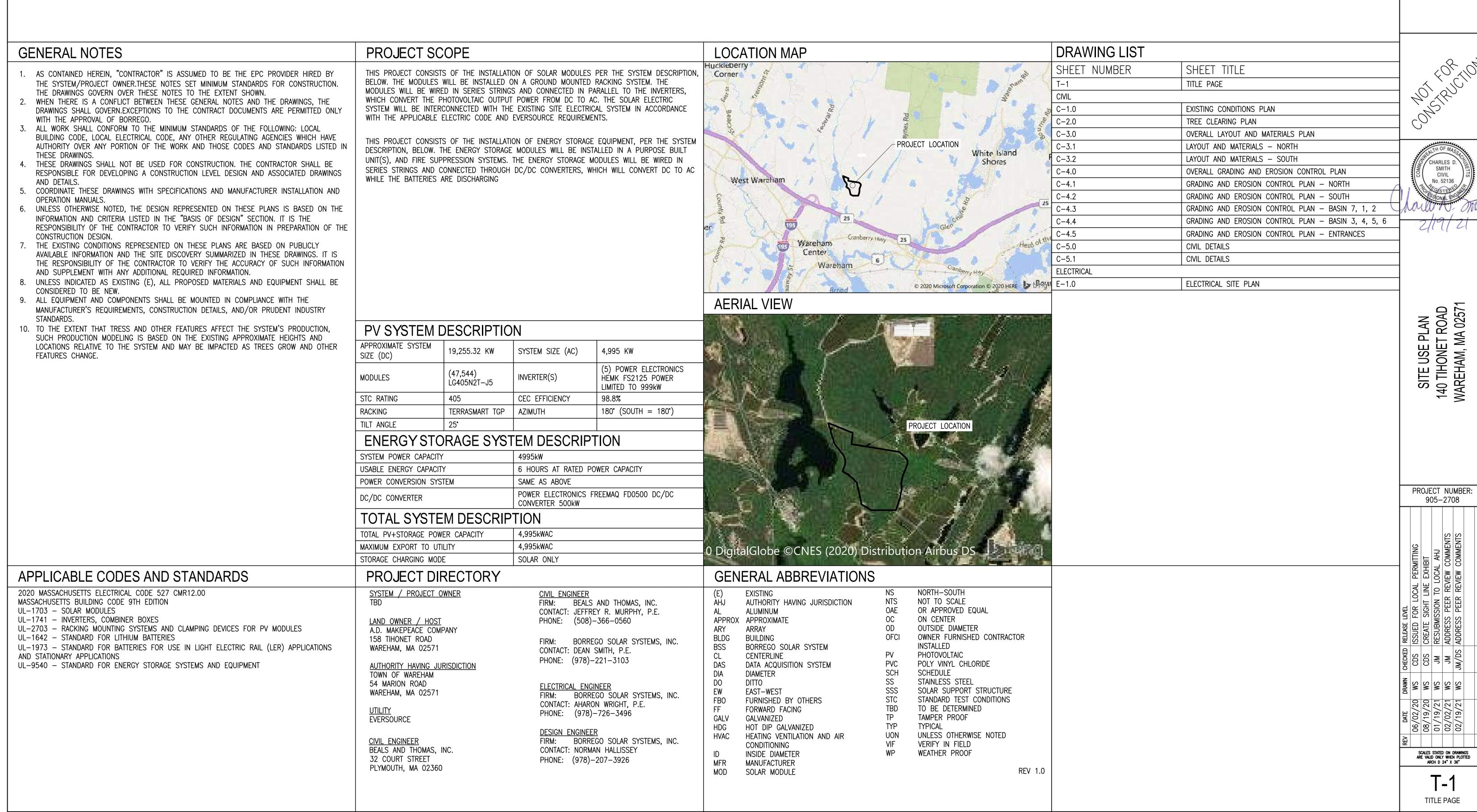
# SITE USE PLAN SUBMISSION

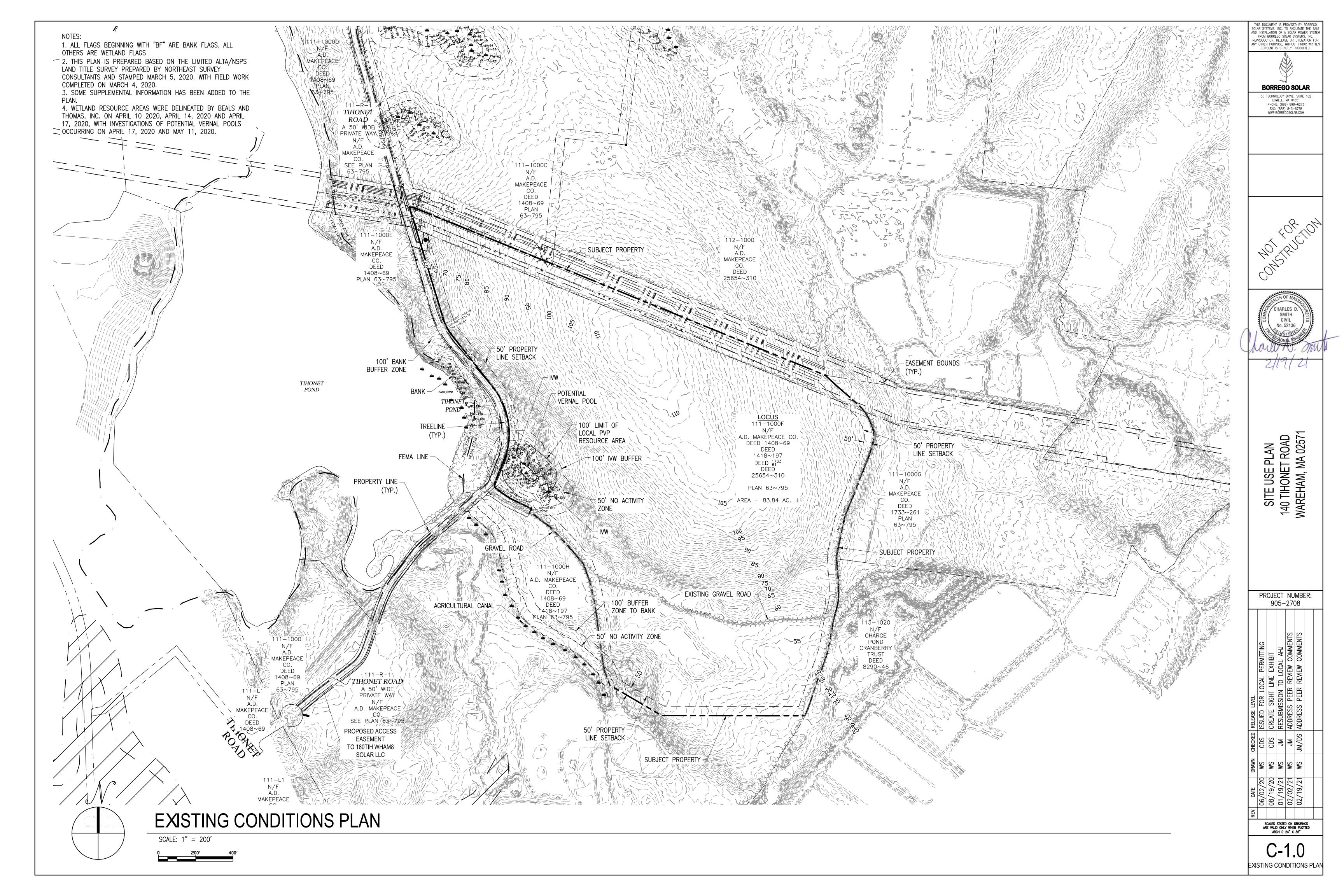
ND INSTALLATION OF A SOLAR POWER SYSTE FROM BORREGO SOLAR SYSTEMS, INC. REPRODUCTION, RELEASE OR UTILIZATION FOR NY OTHER PURPOSE, WITHOUT PRIOR WRITTE CONSENT IS STRICTLY PROHIBITED.

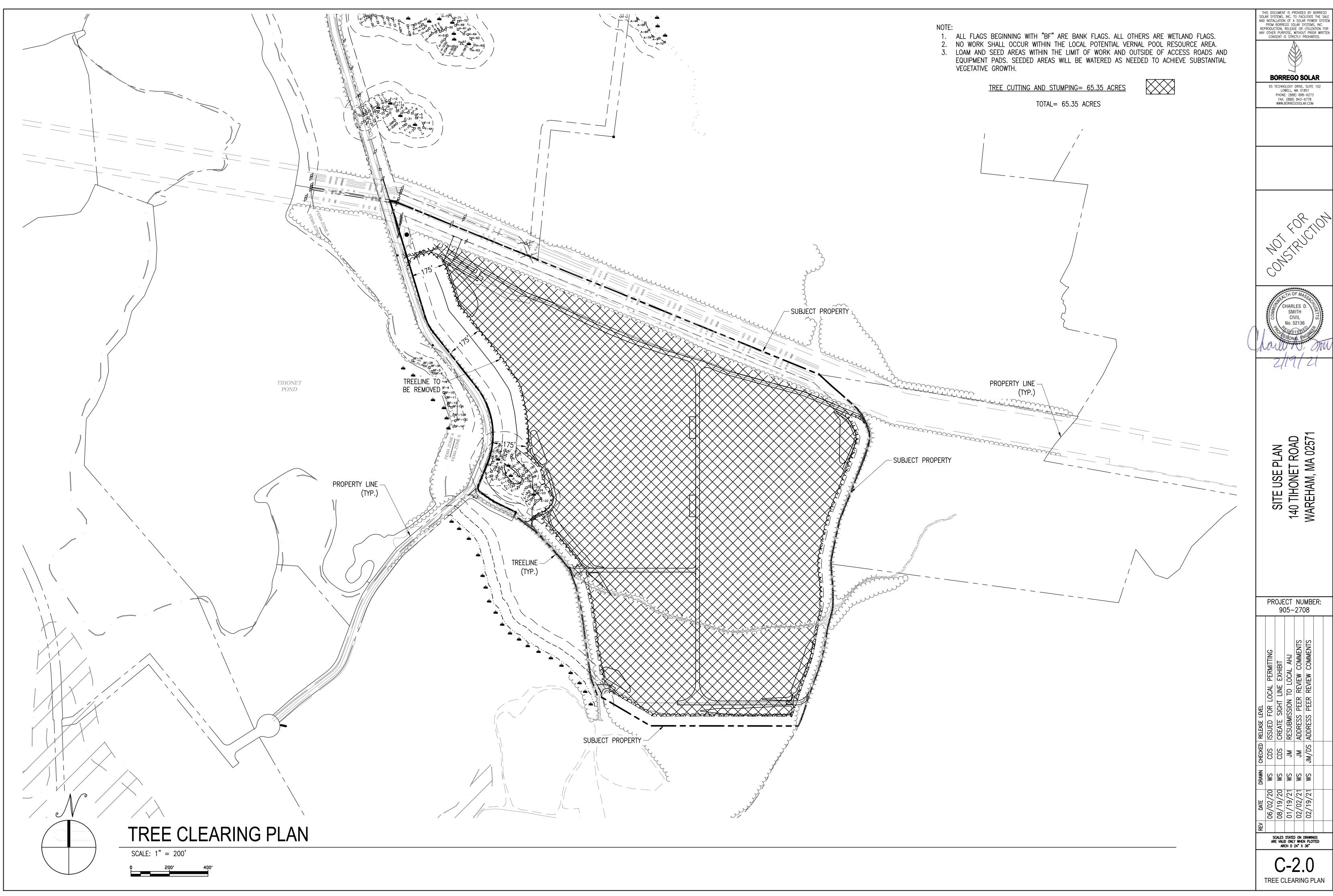
**BORREGO SOLAR** 

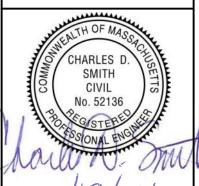
FAX: (888) 843-6778 WWW.BORREGOSOLAR.COM

# 140 TIHONET ROAD, WAREHAM, MA 02571 SOLAR PHOTOVOLTAIC AND ENERGY STORAGE ELECTRIC SYSTEM

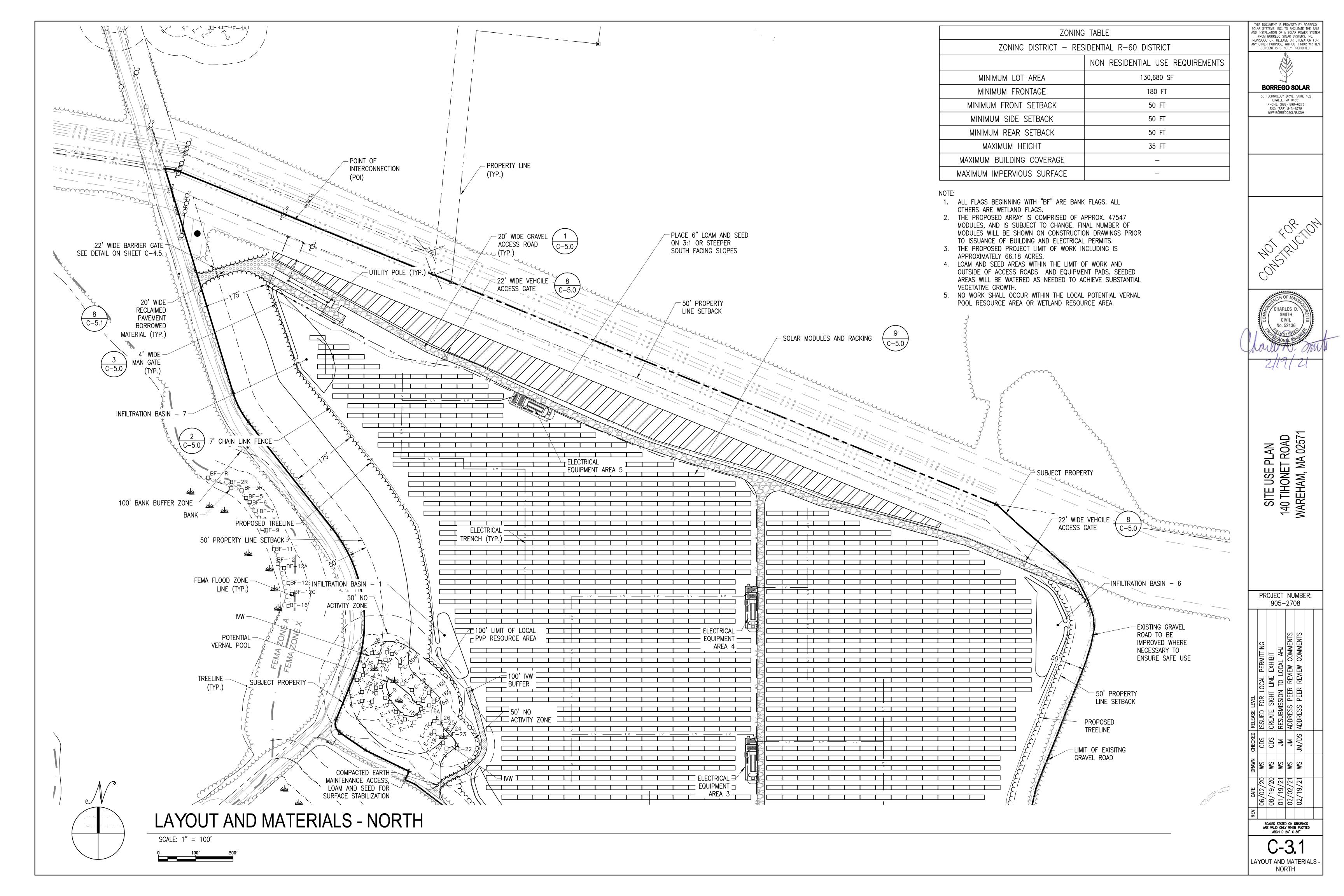


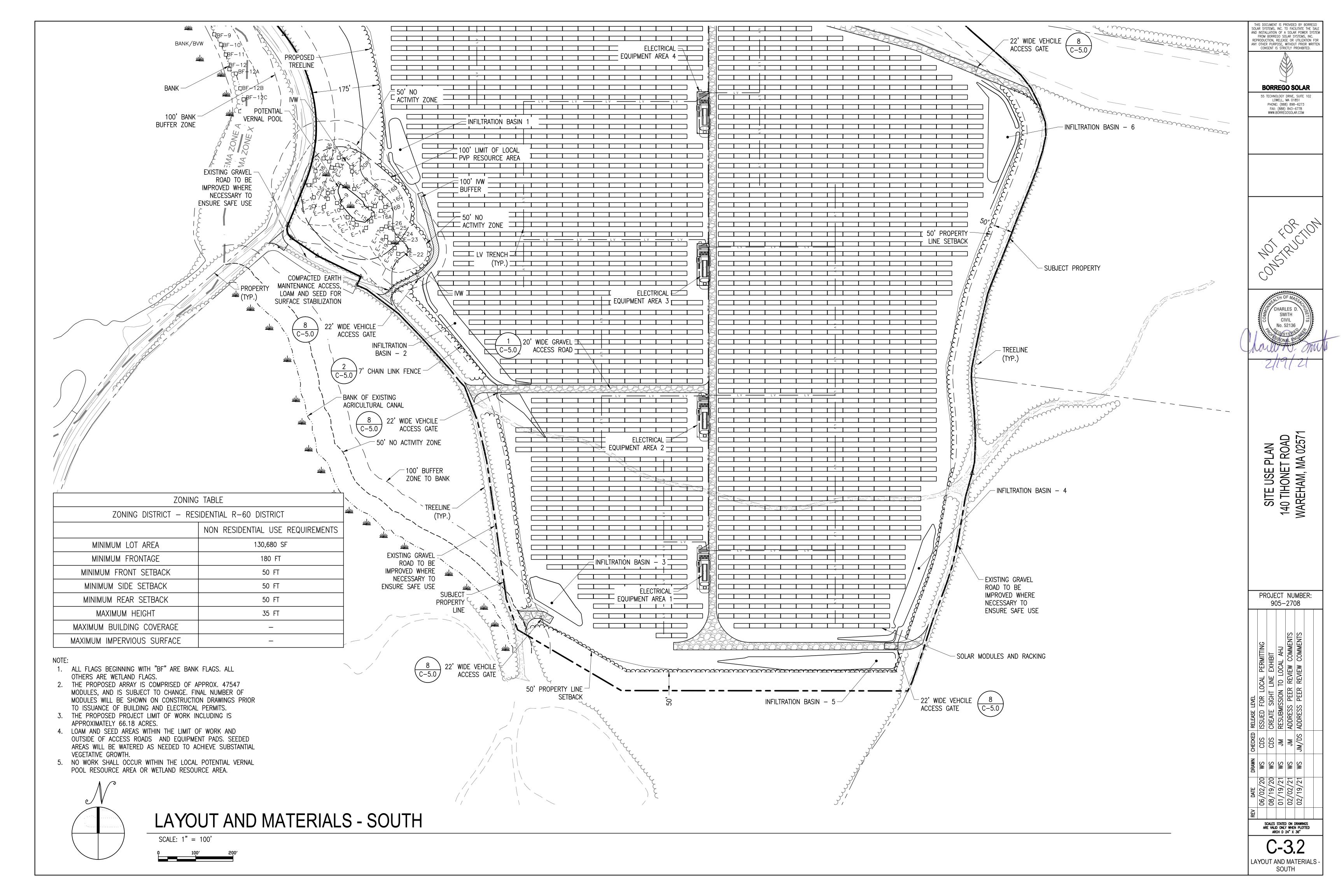


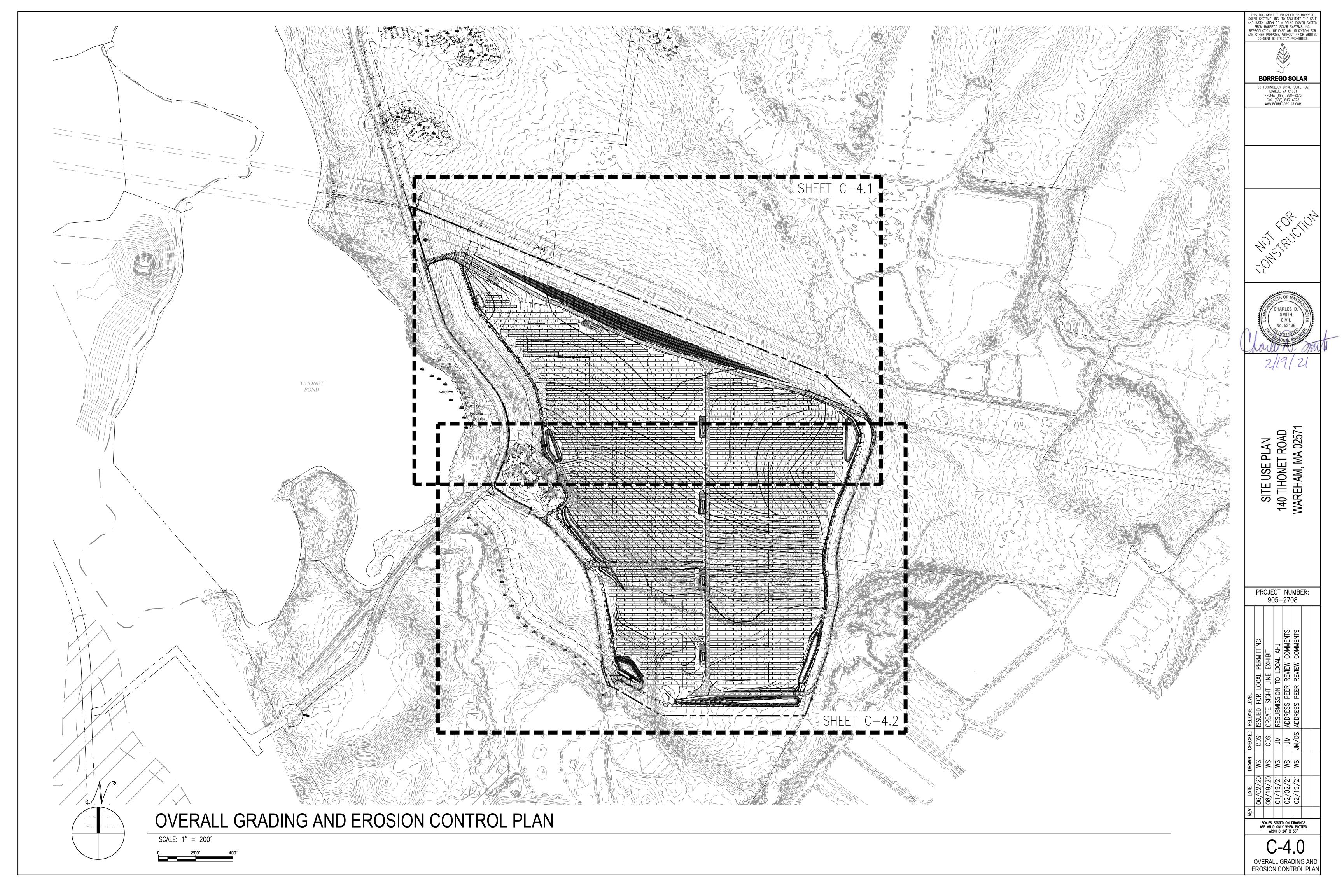


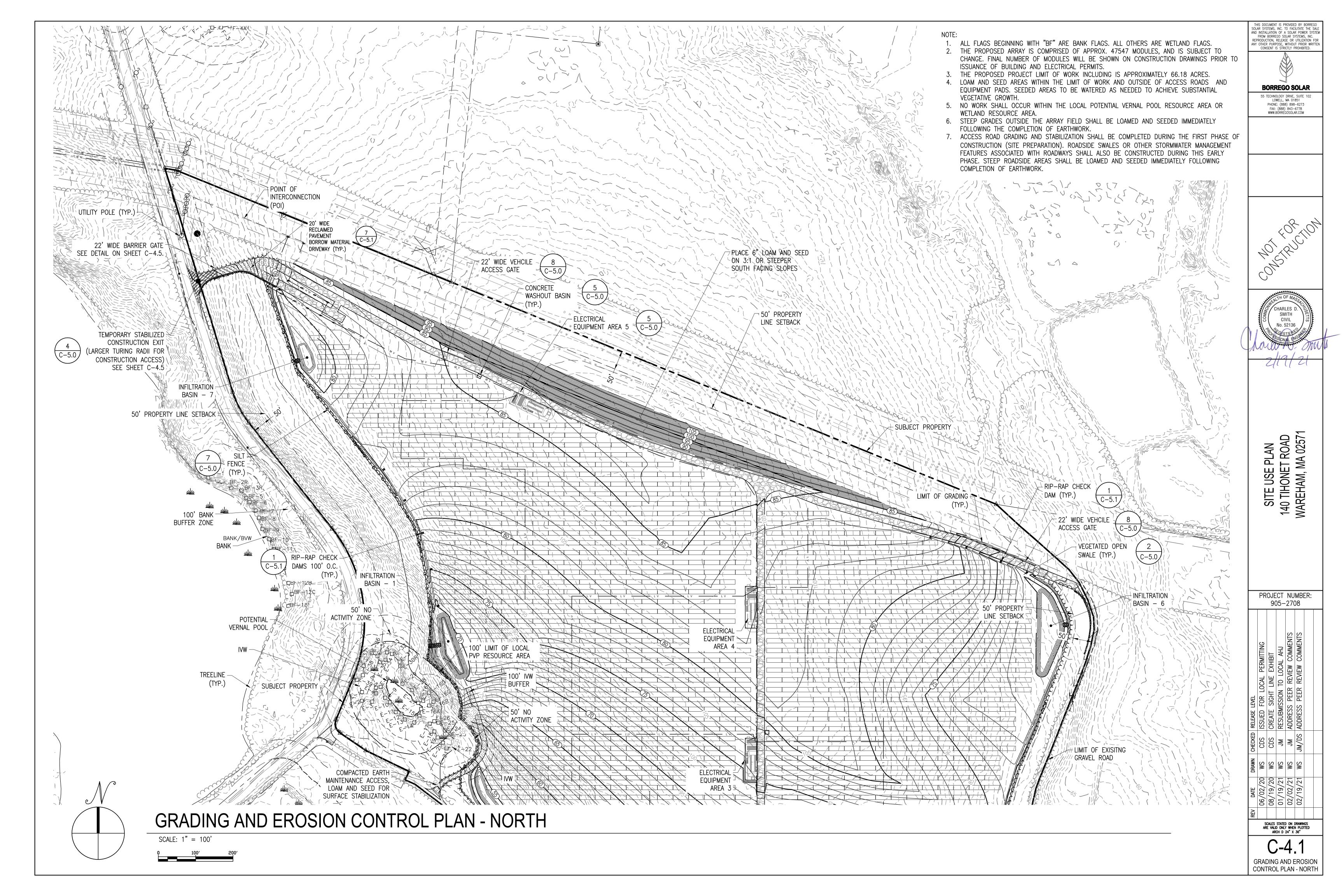


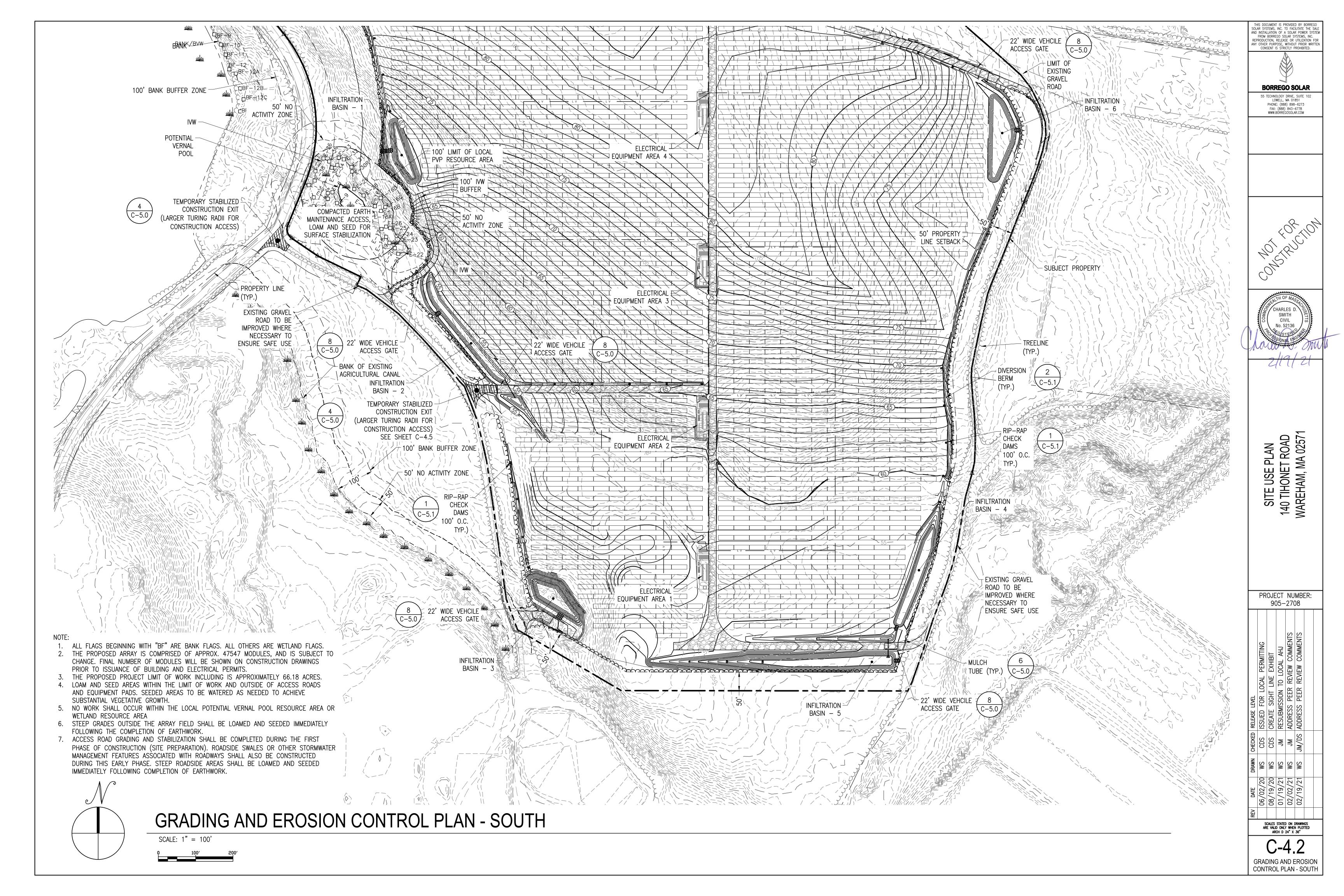


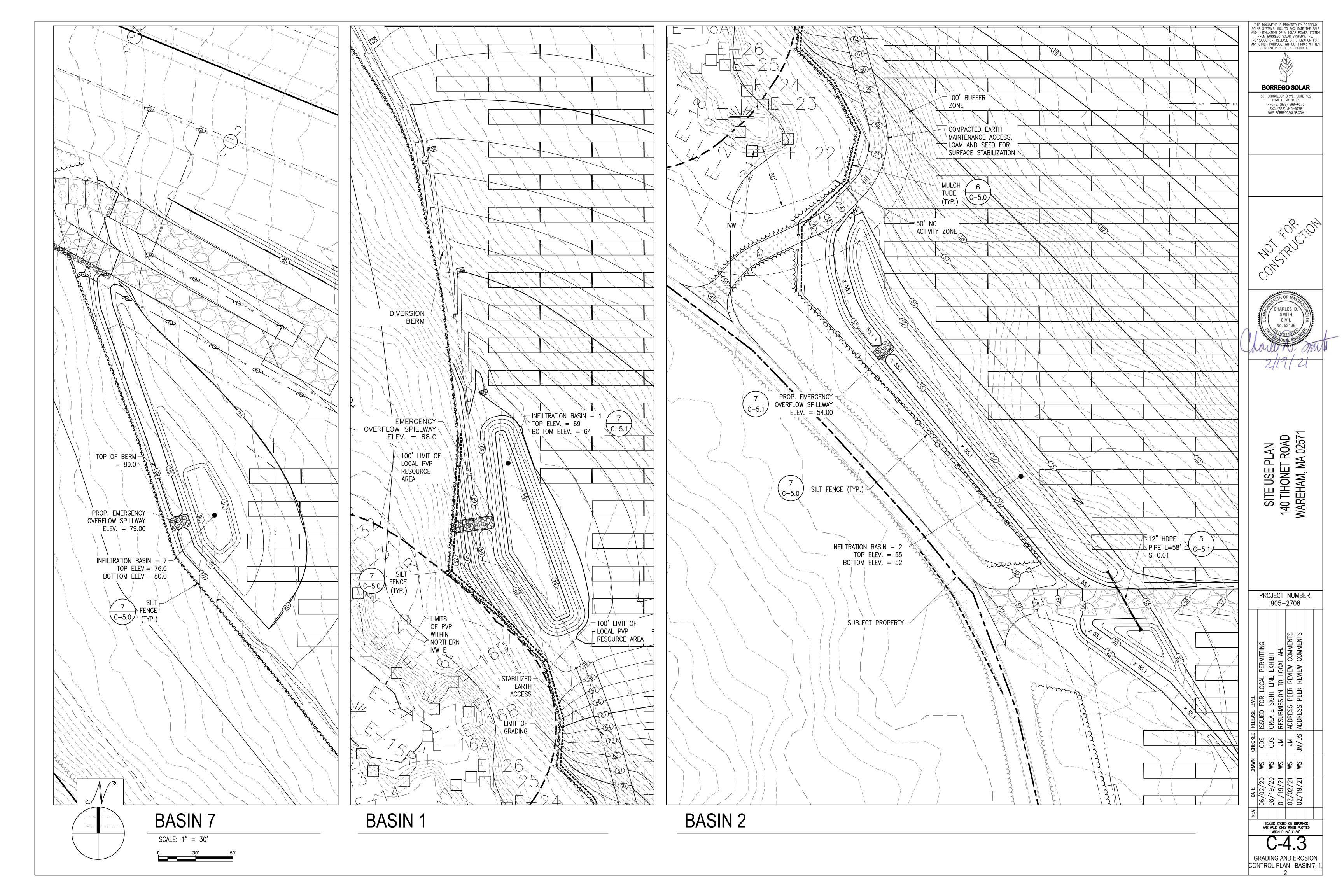


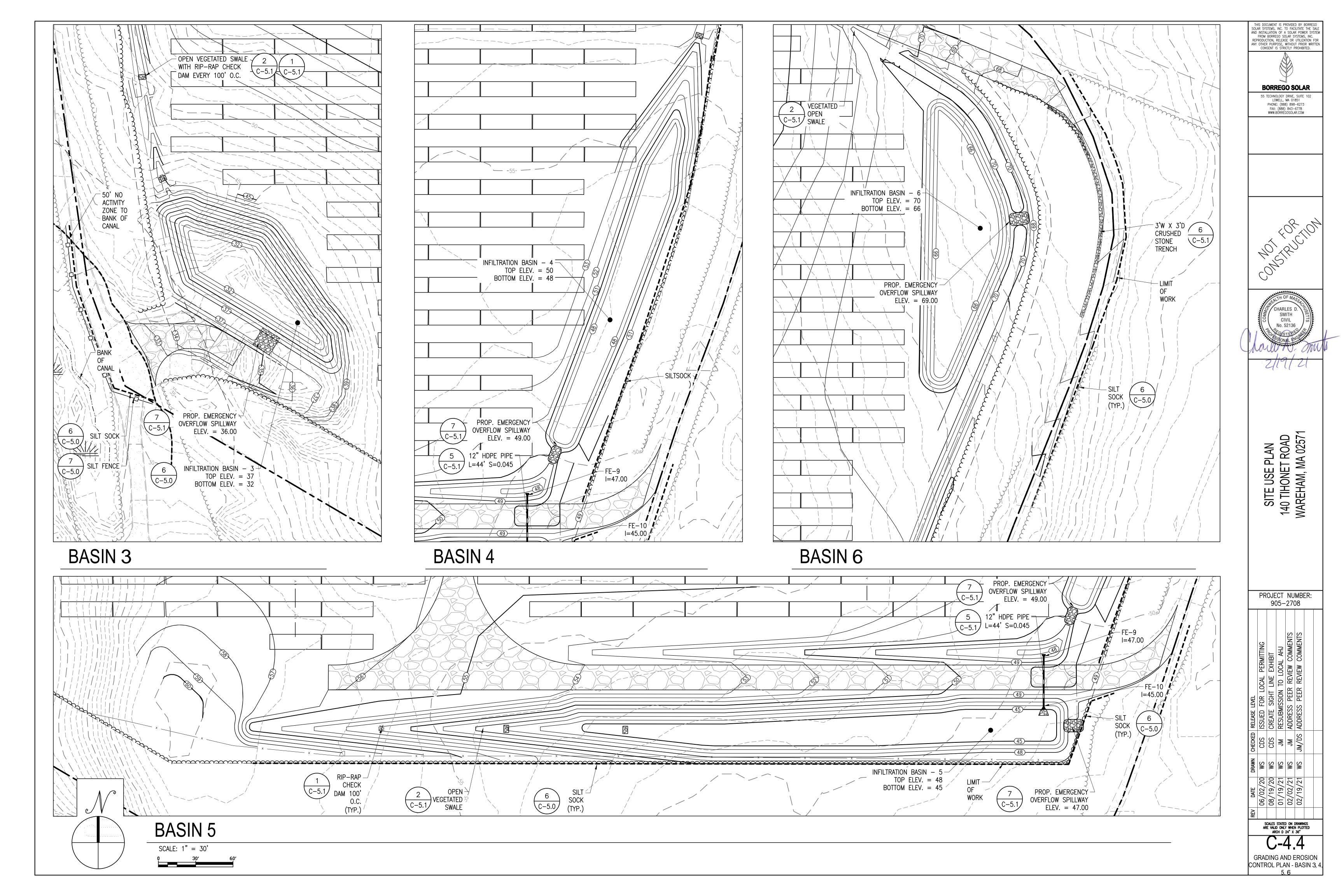


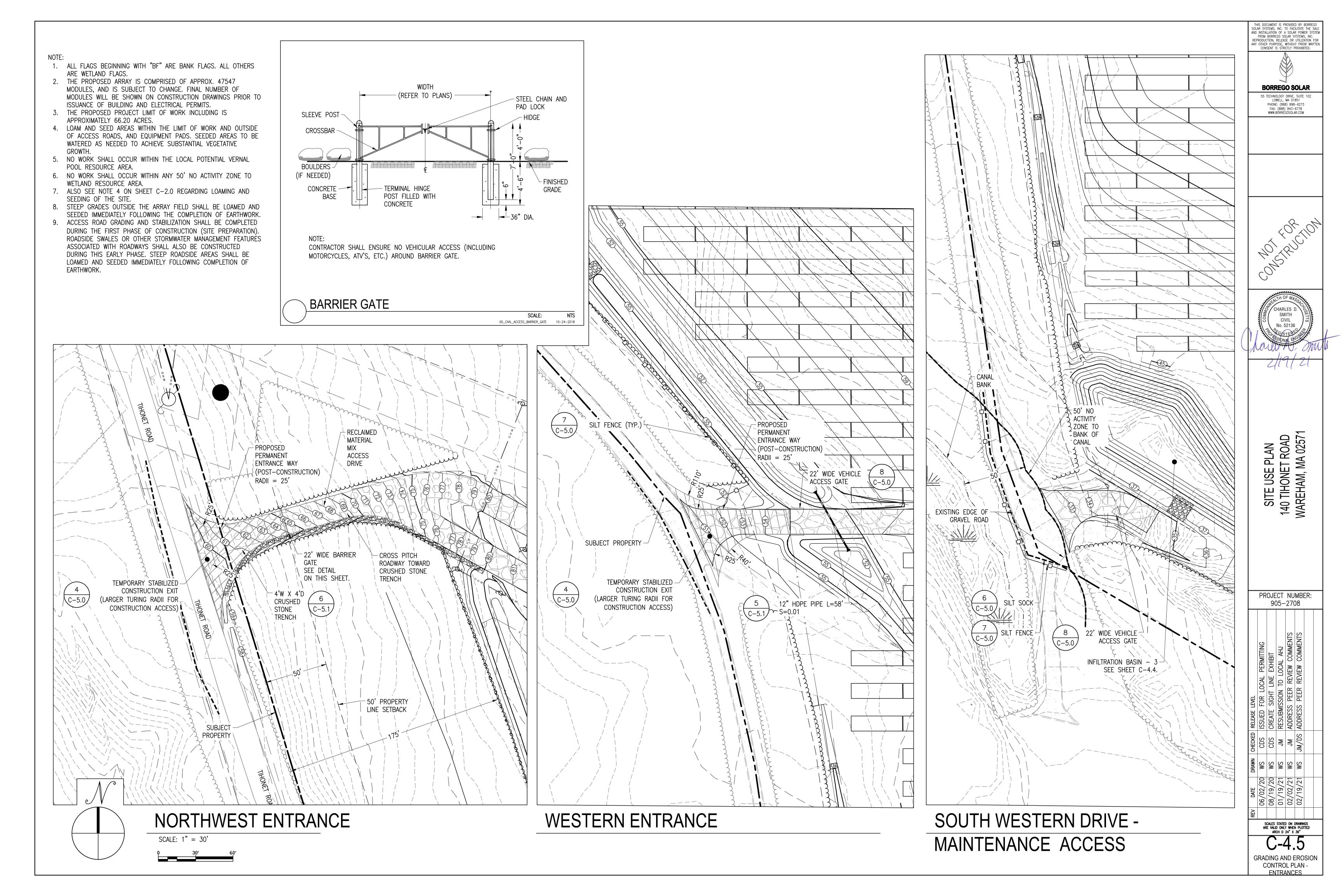


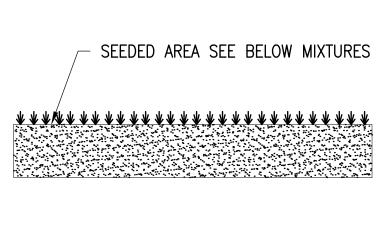












# ADM SANDY MIXTURE

CONTAINS	PURE SEED	GERM	ORIGIN
HARD FESCUE*	24.64%	85.00%	OREGON
PENNLAWN CREEPING RED FESCUE	24.61%	85.00%	OREGON
BOREAL CREEPING RED FESCUE	24.51%	85.00%	CANADA
AZURE SHEEPS FESCUE	24.50%	85.00%	OREGON

OTHER CROP SEEDS: 0.16% **INERT MATTER:** 1.49% WEED SEEDS: 0.09%

NOXIOUS WEED SEEDS NONE FOUND \* VARIETY NOT STATED

SEED DETAIL

PROVIDED BY: VALLEY GREEN, 14 COPPERBEECH DR., KINGSTON, MA 02364

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**VEHICLE GATE - WILDLIFE GAP** 

— 1-1/2" SQUARE WOOD POST 4 MAX ALLOWABLE SLOPE LENGTH ON CENTER **STEEPNESS** STAPLE OR WIRE FILTER FABRIC TO POSTS ON THE UPSLOPE SIDE -FINISH GRADE 2:1 25 3:1 50 75 4:1 18" MAX 100 5+:1 PROTECTED AREA DRIVEN POST A MIN. OF 30" INTO THE GROUND

1. MAX DRAINAGE AREA FOR OVERLAND FLOW SHALL NOT EXCEED 1/4 ACRE-FOOT PER 100

2. FILTER FABRIC TO BE FASTENED SECURELY TO FENCE POST WITH WIRE TIES OR STAPLES. POST SHALL BE STEEL EITHER "T" OR "U" SHAPED OR HARDWOOD.

3. FILTER CLOTH SHALL BE FASTENED SECURELY WITH TIES SPACED EVERY 24" AT TOP AND MID-SECTION.

4. WHEN TWO SECTIONS OF FILTER CLOTH ADJOIN EACH OTHER THEY SHALL BE OVERLAPPED BY 6 INCHES AND FOLDED. FILTER CLOTH SHALL BE FILTER X. MIRAFI 100X. STABILENKA T140N. OR APPROVED EQUAL.

- FULLY WELD TOP RAIL TO

GATE POSTS

-9 GAUGE/2" MESH CHAIN LINK FENCE

BOULEVARD CLIPS

FABRIC ENDS

-STRETCHER BAR WHEREVER

6" WILDLIFE GAP

CONCRETE FOOTING AT

TERMINAL POST

SCALE:

XD\_CIVIL\_EROSION\_SILT\_FENCE\_P 2014-10-17

SCALE:

XD\_CIVIL\_FENCE\_VEHICLE GATE\_7' 10-23-2018

SCALE:

5. PREFABRICATED UNITS SHALL BE GEOFAB, ENVIROFENCE, OR APPROVED EQUAL.

SILT FENCE

SCALE:

-DOUBLE GATE PANEL - 22'-0"

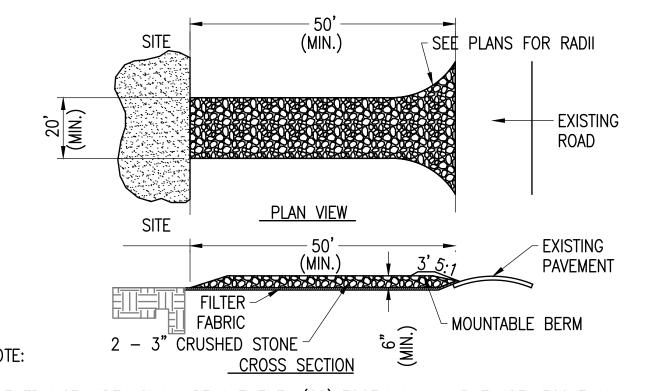
OWNER AND EMERGENCY CONTACT

- FINISH GRADE

1. FENCE GATE SHALL BE EQUIPPED WITH FIRE DEPARTMENT KNOX BOX FOR EMERGENCY ACCESS.

INFORMATION PLACARD/SIGNAGE

6. MAINTENANCE SHALL BE PERFORMED AS NEEDED AND MATERIAL REMOVED WHEN "BULGES" DEVELOP IN THE SEDIMENT FENCE.



1. ENTRANCE WIDTH SHALL BE A TWENTY (20) FOOT MINIMUM, BUT NOT LESS THAN THE FULL WIDTH AT POINTS WHERE INGRESS OR EGRESS OCCURS.

STABILIZED CONSTRUCTION EXIT

2. THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION WHICH SHALL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHTS-OF-WAY. THIS MAY REQUIRE PERIODIC TOP DRESSING WITH ADDITIONAL STONE AS CONDITIONS DEMAND AND REPAIR OR CLEANOUT OF ANY MEASURES USED TO TRAP SEDIMENT. ALL SEDIMENT SPILLED, DROPPED. WASHED OR TRACKED ONTO PUBLIC RIGHTS-OF-WAY MUST BE REMOVED IMMEDIATELY. BERM SHALL BE PERMITTED. PERIODIC INSPECTION AND MAINTENANCE SHALL BE PROVIDED AS NEEDED.

4 MIL PLASTIC SHEETING

BALED STRAW (BALED WITH TWINE)

8' TO 10' SQUARE →

WASHWATER FROM WASHOUT BASIN SHALL EVAPORATE OR BE VACUUMED OUT. REMOVE REMAINING

WRAP PLASTIC SHEETING

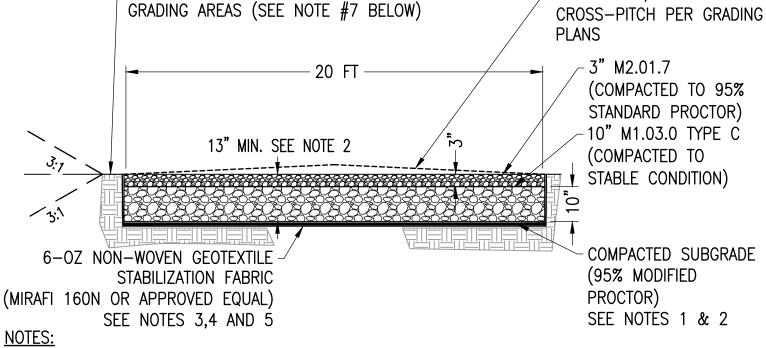
UNDER 1/2 WIDE OF

NOTE: PLASTIC SHEETING SHALL BE FREE OF TEARS OR HOLES. AFTER BASIN IS USED,

STRAW BALE

HARDENED SOLIDS. REPLACE PLASTIC SHEETING AND STRAWBALES AS REQUIRED.

**CONCRETE WASHOUT BASINS** 



SUBCONTRACTOR SHALL EXCAVATE TO SUITABLE MATERIAL FOR SUBGRADE.

- NOTE: LOAM AND SEED SHOULDERS AND OFF

2. SUBCONTRACTOR SHALL COMPACT SUBGRADE TO PROVIDE SUITABLE SURFACE TO PLACE ROAD. SUBCONTRACTOR SHALL FOLLOW MANUFACTURER INSTALLATION PROCEDURES.

3. WHERE OVERLAPPING OF GEOTEXTILE FABRIC IS REQUIRED, SUBCONTRACTOR SHALL OVERLAP A

MINIMUM OF 24". SUBCONTRACTOR SHALL REMOVE TEMPORARY CONSTRUCTION ACCESS ROADS. AND RESTORE TO PRE-CONSTRUCTION CONDITIONS TO THE SATISFACTION OF THE CEOR AND THE GOVERNING

AGENCIES. SUBCONTRACTOR SHALL INSTALL CONDUITS FOR ALL ELECTRICAL CONDUIT CROSSINGS PRIOR TO INSTALLATION OF THE GEOGRID MATERIAL. THE GEOGRID SHALL NOT BE HORIZONTALLY CUT ONCE INSTALLED.

6. SEE NOTE #4 ON SHEETS C-3.1, 3.2, 4.1, 4.2, 4.5, AND NOTE #3 ON SHEET C-2.0

REGARDING LOAMING AND SEEDING OF SITE.

**GRAVEL ACCESS ROAD** 

NTS XD\_CIVIL\_GRAVEL\_ROAD\_MA 09-28-2020

- POST CAP

-0.2' CROWN, 2%

. CONSTRUCTION

THIS DOCUMENT IS PROVIDED BY BORREGO SOLAR SYSTEMS, INC. TO FACILITATE THE SALE AND INSTALLATION OF A SOLAR POWER SYSTEM FROM BORREGO SOLAR SYSTEMS, INC. REPRODUCTION, RELEASE OR UTILIZATION FOR ANY OTHER PURPOSE, WITHOUT PRIOR WRITTEN CONSENT IS STRICTLY PROHIBITED.

**BORREGO SOLAR** 

55 TECHNOLOGY DRIVE, SUITE 102 LOWELL, MA 01851

PHONE: (888) 898-6273

FAX: (888) 843-6778 WWW.BORREGOSOLAR.COM

CHARLES D. SMITH CIVIL No. 52136

41114

ROAD A 0257 PLAN SITE USE F 140 TIHONET WAREHAM, M

CORNER OR END POST BRACE RAIL (SEE NOTE 4) TENSION WIRE TRUSS ROD (SEE NOTE 4) DRIVEN POST OR  $-\!\!\!/$ FOUNDATION PER **CLFMI GUIDELINES** NOTES:

FABRIC TIE, TYP.

WIRE MESH

(9 GAUGE/2" MESH)

HORIZONTAL RAIL

1. THE FENCE SHALL MEET OR EXCEED THE CHAIN LINK FENCE MANUFACTURER INSTITUTE (CLFMI) GUIDELINES AND RELATED FEDERAL SPECIFICATIONS FOR SECURITY CHAIN LINK FENCE MATERIALS AND INSTALLATION.

2. FENCE MATERIAL AND COMPONENTS SHALL BE GALVANIZED, UNLESS OTHERWISE NOTED. 3. THIS DETAIL NOT APPLICABLE FOR PRIVACY FENCE OR FENCE WITH SLATS.

4. ADJUSTABLE TRUSS ROD AND BRACE RAIL AT CORNER OR END POSTS ONLY, IF REQUIRED BY CLFMI GUIDELINES.

CHAIN LINK FENCE - WILDLIFE GAP

PROJECT NUMBER: 905-2708 WS WS WS 06/

NOTE: THE "TERRAFARM" RACKING AND GROUND SCREW FOUNDATIONS ARE DESIGNED BY TERRASMART AND WILL BE A SUBMITTAL TO BORREGO. THE INFORMATION SHOWN HERE IS FOR GENERAL REFERENCE ONLY. 2x10 RACKING CONFIGURATION SHOWN IN THIS DETAIL AS REFERENCE. ACTUAL RACK SIZE FOR THIS PROJECT MAY VARY - REAR EDGE HEIGHT (SEE "S-0.0") PV MODULE PV MODULE CEE PURLIN TILT ANGLE (SEE "S-0.0") RAFTER CEE PURLIN NORTH LEG **TELESCOPING** LATERAL BRACE LEADING EDGE HEIGHT NORTH LEG (SEE "S-0.0") SOUTH GROUND -**GROUND SCREW** WIRE ROPE SEISMIC **SCREW** GROUND SCREW BRACING BETWEEN NORTH DEPTH OF GROUND FOUNDATION (TYP.), NORTH GROUND LEGS SCREW FOUNDATION DESIGN BY TÈRRASMART SCREW PER TERRASMART REFER TO PLANS & TERRASMART DRAWINGS REFER TO PLANS & TERRASMART DRAWINGS —

ŞGATE LATCH WITH

PROVISION FOR

PADLOCK

SCALE: XD\_CIVIL\_CONCRETE WASHOUT BASINS 07-24-2017 STAKE ON 10' LINEAL SPACING AREA TO BE PROTECTED WATER FLOW - COMPOST MULCH WORK AREA 2" X 2" WOODEN STAKE COMPOST MULCH TUBE (12" MIN.) AREA TO BE PROTECTED WORK AREA NOTE: MAY BE USED WHEREVER EROSION CONTROL IS SPECIFIED AT THE DISCRETION OF THE CONTRACTOR.

**MULCH TUBE** 

NTS SCALE: XD\_CIVIL\_FILTREXX\_FILTER\_SOCK 03-29-2016

SCALE:

EMBED BALES 4" INTO

GRADE STOCKPILE

REMOVED SOIL

XD\_CIVIL\_TEMPORARY CONSTRUCTION\_STABILIZED CONSTRUCTION EXIT 06-10-2016

NOTE: FABRIC SHALL BE GALVANIZED 4' MAN GATE - WILDLIFE GAP

FINISH GRADE

SCALE: NTS XD\_CIVIL\_SITE CONSTRUCTION\_4' WALK THROUGH GATE 07-25-2017

TYPICAL RACK SECTION & REAR ELEVATION TERRASMART TF2P

<u>SECTION</u>

XD\_STRUC\_TERRASMART\_TF2P\_RACK SECT & REAR ELEV 2017-12-04

**REAR ELEVATION** 

XD\_CIVIL\_FENCE\_7'\_CHAIN\_LINK\_WILDLIFE\_GAP 06-27-2016  $^{\circ}$ SINGLE GATE PANEL - 4'-0" $^{\circ}$ -FULLY WELD TOP RAIL TO GATE **POSTS** TENSION BAND -9 GAUGE/2" WIRE MESH

GATE LATCH WITH PROVISION FOR HORIZONTAL PADLOCK BOULEVARD CLIPS STRETCHER BAR WHEREVER FABRIC ENDS 6" WILDLIFE GAP CONCRETE FOOTING PER

> CHAIN LINK FENCE SCALES STATED ON DRAWINGS ARE VALID ONLY WHEN PLOTTED ARCH D 24" X 36" MANUFACTURER INSTITUTE (CLFMI) GUIDELINES

C-5.0CIVIL DETAILS

