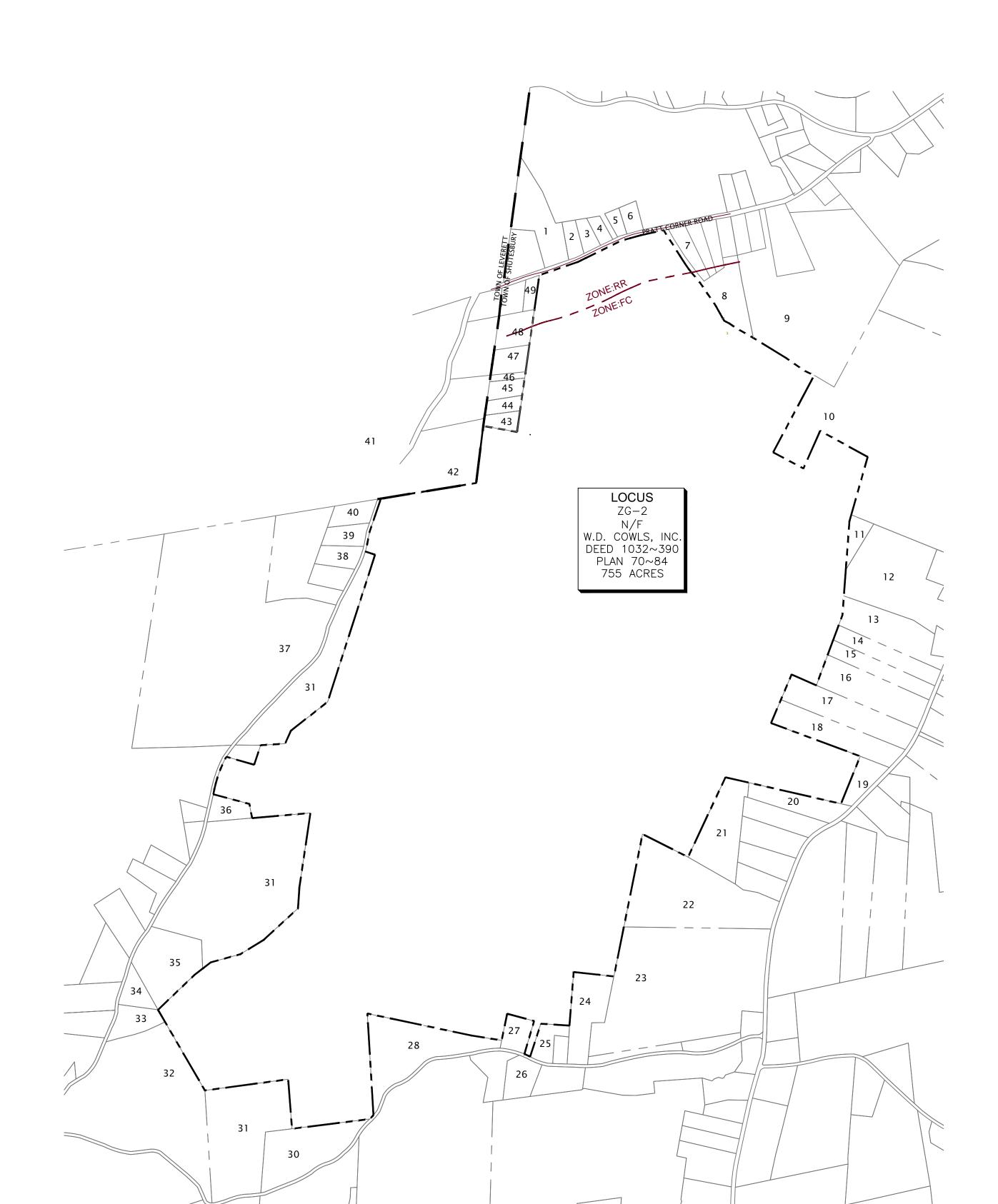
SOLAR DEVELOPMENT, PARCEL ZG-2 BUILDING PERMIT APPLICATION SITE/CIVIL DRAWINGS

TOWN OF SHUTESBURY, MASSACHUSETTS
DECEMBER 2, 2016 (REVISED FEBRUARY 11, 2017)



PARCEL MAP

G// G// G// G// T// T// T// T// T// T//	G//20// G//21// G//22// G//23// G//24// T//48// T//47//	CLARK THOMAS		i		
G// G// G// G// G// T// T// T// T// T//	G//21// G//22// G//23// G//24// T//134// T//48//		141 PRATT CORNER ROAD	SHUTESBURY	MA	1072
G// G// G// G// T// T// T// T// T// T//	G//21// G//22// G//23// G//24// T//134// T//48//	CLARK THOMAS	141 PRATT CORNER ROAD	SHUTESBURY	MA	1072
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T//	T// 47//	DZIADZIO, ANJALI B.	109 PRATT CORNER RD	SHUTESBURY	MA	1072
T//	T/ / 48/ / T/ / 47/ /		20 BASS DR	GROTON	CT	
T//	Τ/ / 47/ /	REICHSMAN FRIEDA				6340
T//		COTE NORMAN R	338 LEVERETT ROAD	SHUTESBURY	MA	1072
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T//	T/ / 39/ /	TRUST	339 RUSSELL ST	SUNDERLAND SHELBURNE	MA	1375
T//	T/ / 59/ /	RUGGERI SEBASTIAN J	58 ASHFIELD ST	FALLS	MA	1370
T//	T/ / 34/ /	RICE STEPHEN L.	243 WEST PELHAM RD	SHUTESBURY	MA	1072
T//	T/ / 33/ /	LEVINE, ROBERT P. WARING NATHANIEL N	263 WEST PELHAM RD	SHUTESBURY	MA	1072
T//	//121//	TRUSTEE	PO BOX 2561	WEST	VT	5303
T//	// 120//	TINTO, PAMELA J.	271 WEST PELHAM RD 277 WEST PELHAM	SHUTESBURY	MA	1072
T//		WEBER RICHARD A	ROAD	SHUTESBURY	MA	
T//	T/ / 25/ /	SPRY BRADFORD B.	297 WEST PELHAM RD	SHUTESBURY	MA	1072
T//	T/ / 99/ /	GIBSON, SCOTT A.	305 WEST PELHAM RD	SHUTESBURY	MA	1072
T//	T/ / 40/ /	O'NEIL CHRISTOPHER M	P O BOX 215	SHUTESBURY	MA	1072
T//	T//21//	DONNELLY GARY J	343 WEST PELHAM RD	SHUTESBURY	MA	1072
T//	T/ / 22/ /	WELLS JUDITH & WILLIAM	371 WEST PELHAM RD	SHUTESBURY	MA	1072
T//	T/ / 20/ /	VINSKEY MICHAEL A.	391 WEST PELHAM RD	SHUTESBURY	MA	1072
T//	T/ / 19/ /	WEAVER ELAINE J	409 WEST PELHAM ROAD	AMHERST	MA	1002
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T//	J/ / 42/ /	SYLVESTER CLARK L	102 SAND HILL ROAD	SHUTESBURY	MA	1072
T// T// T// T// T// T// W// 8-0	//169//	FEYRE FEBONIO VICTORIA A	105 SAND HILL RD	SHUTESBURY	MA	1072
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W// W// 8-0	11.1.10011	W D COWLS INC	P O BOX 9677	NORTH AMHERST	MA	1059
W// W// 8-0	/// 106//	KOHLER, RALF R.	305 PRATT CORNER RD	LEVERETT	MA	1054
8-0 8-0	V/ / 105/ /	KOHLER RALF R	305 PRATT CORNER RD	LEVERETT	MA	1054
8-0	V/ / 104/ /	FITZGIBBON PAUL D SCHEFFEY HESTON C + ANNA	50 KNIGHTLY RD	HADLEY	MA	
8-0	8-0-152	MARIA	36 BROAD HILL RD	LEVERETT	MA	1054
T//	8-0-156	COWLS W D INC	P O BOX 9677 238 PRATT CORNER	NORTH AMHERST	MA	
I	// 156//	CLARK H. NICHOLS B.	ROAD	LEVERETT	MA	1054
	/ / 155/ /	BROOKS ROBERT A TRAMAZZO FAMILY REALTY	230 PRATT CORNER RD 220 PRATT CORNER	LEVERETT	MA	1054
	//112//	TRUST	RD	LEVERETT	MA	1054
	. , . 14//	BOZARTH, CATHERINE A., TRUSTEE	68 COLES MEADOW RD	NORTHAMPTON	MA	1060
T//	7/ 112//	GOVONI, DENISE M.	68 COLE MEADOW RD	NORTHAMPTON	MA	1060
T//		ASHCRAFT JOHN	196 PRATT CORNER RD	LEVERETT	MA	1054

PARCEL MAP KEY

Prepared by:

New England Environmental,
a Division of SWCA Environmental
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A DIVISION OF
SWCA
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THE CONTI GROUP
2045 LINCOLN HIGHWAY

EDISON NJ 08817





CONSTRUCTION DRAWINGS
(ISSUED FOR BID AND
BUILDING PERMIT APPLICATION)
ORIGINAL PLAN SIZE 24"X36"

roject Title:

WHEELOCK TRACT
SOLAR DEVELOPMENT
OWNER W.D. COWLS, INC.

SHUTESBURY, MA

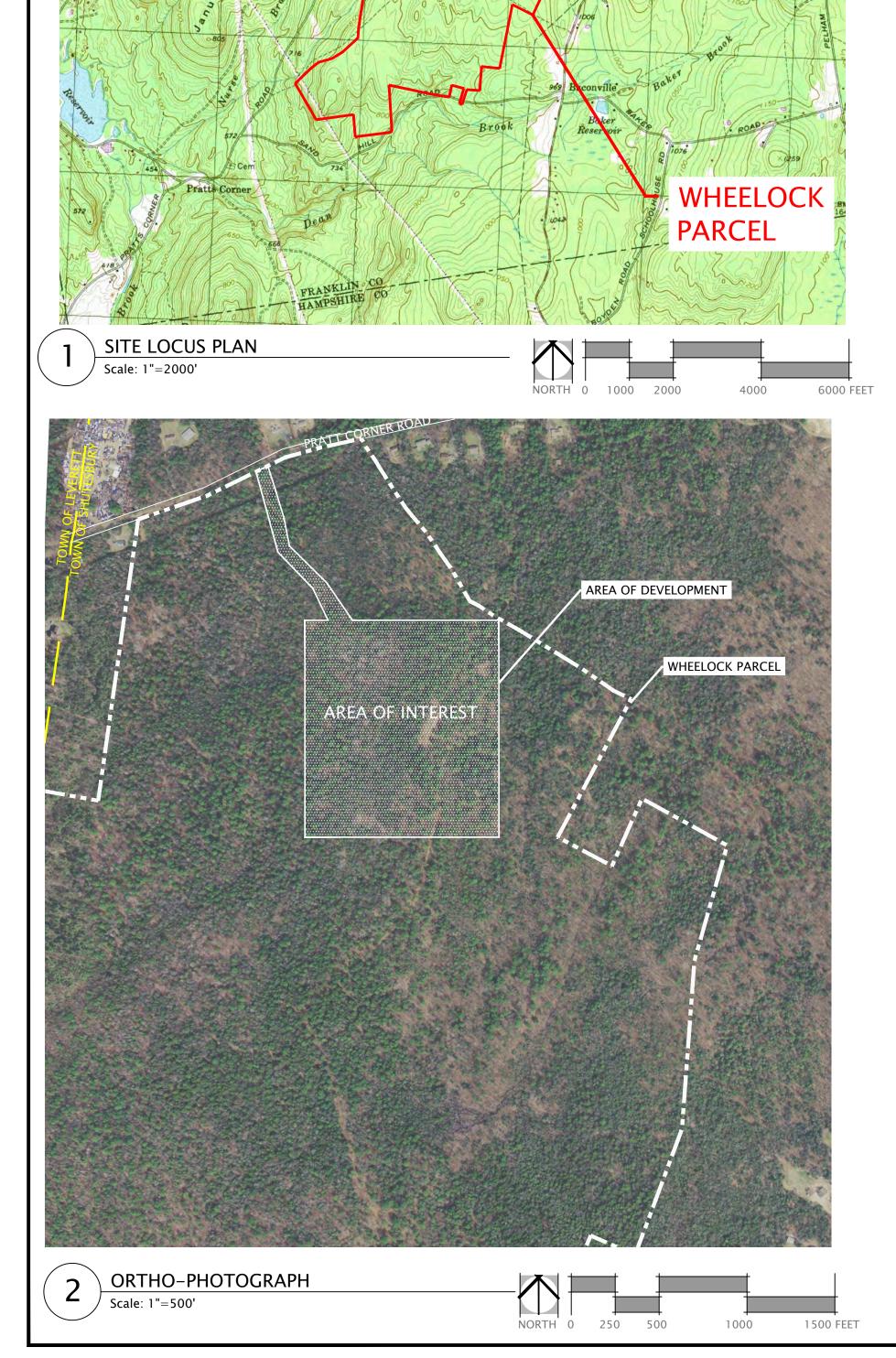
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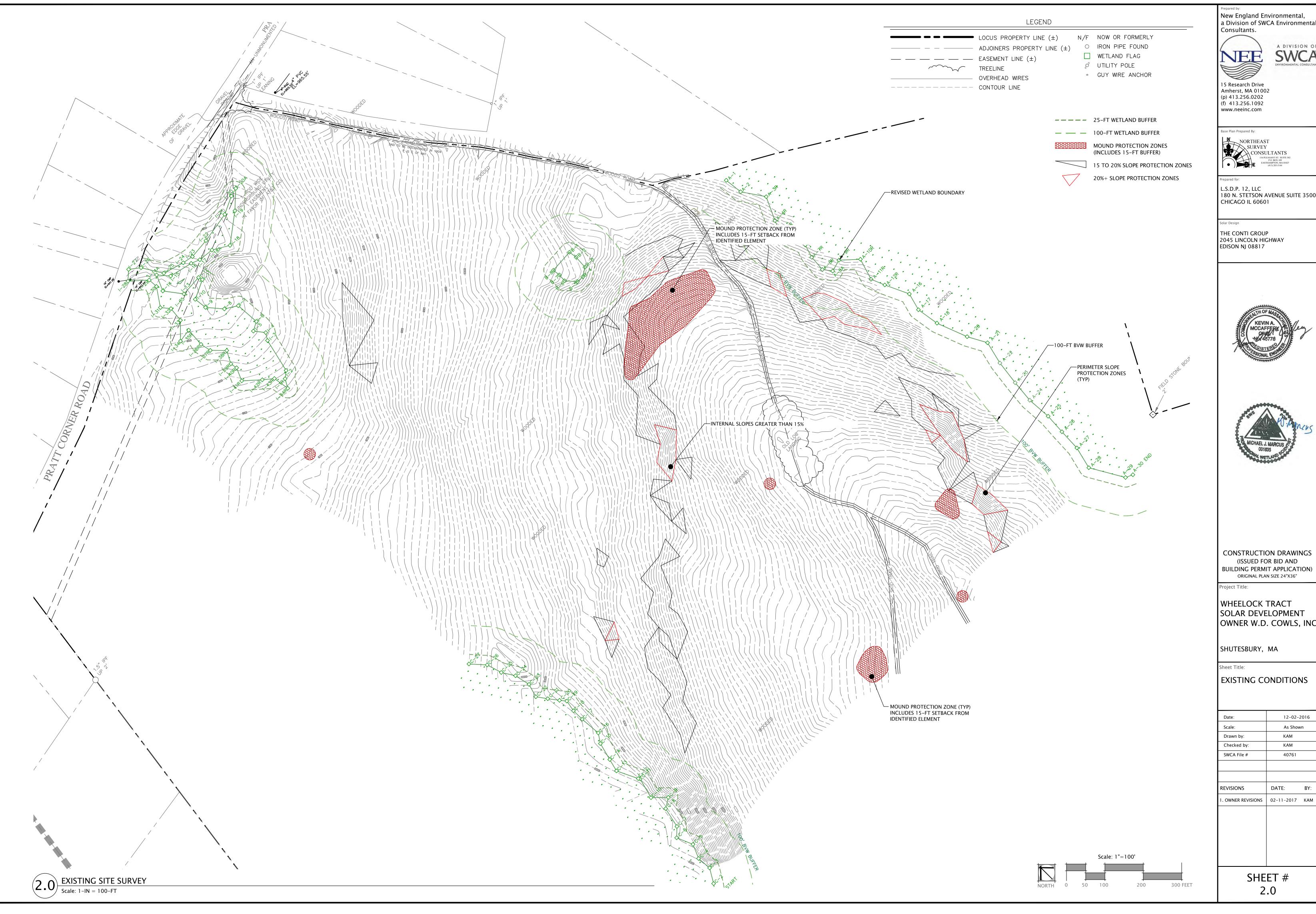
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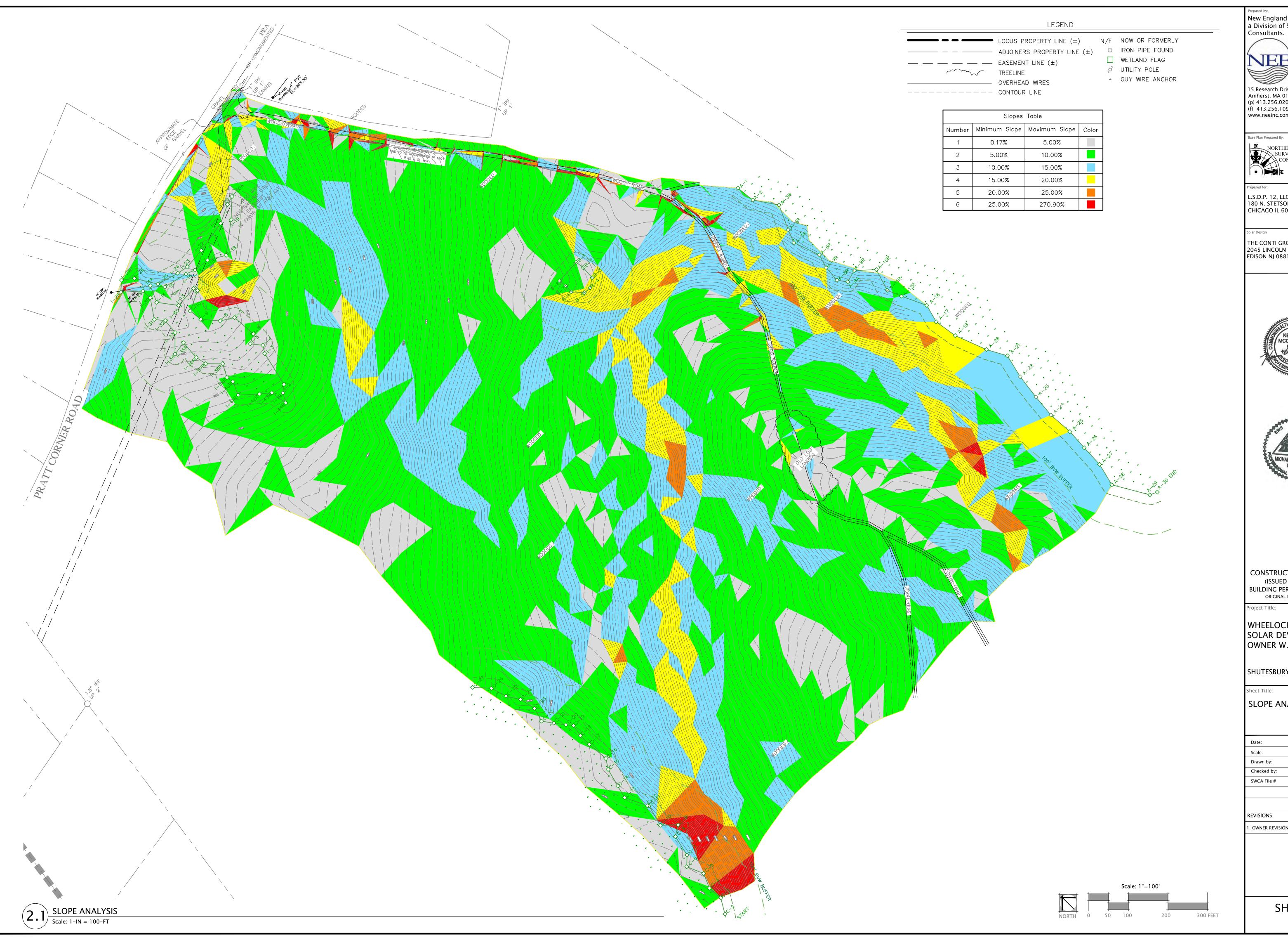




CONSTRUCTION DRAWINGS (ISSUED FOR BID AND

SOLAR DEVELOPMENT OWNER W.D. COWLS, INC.

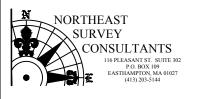
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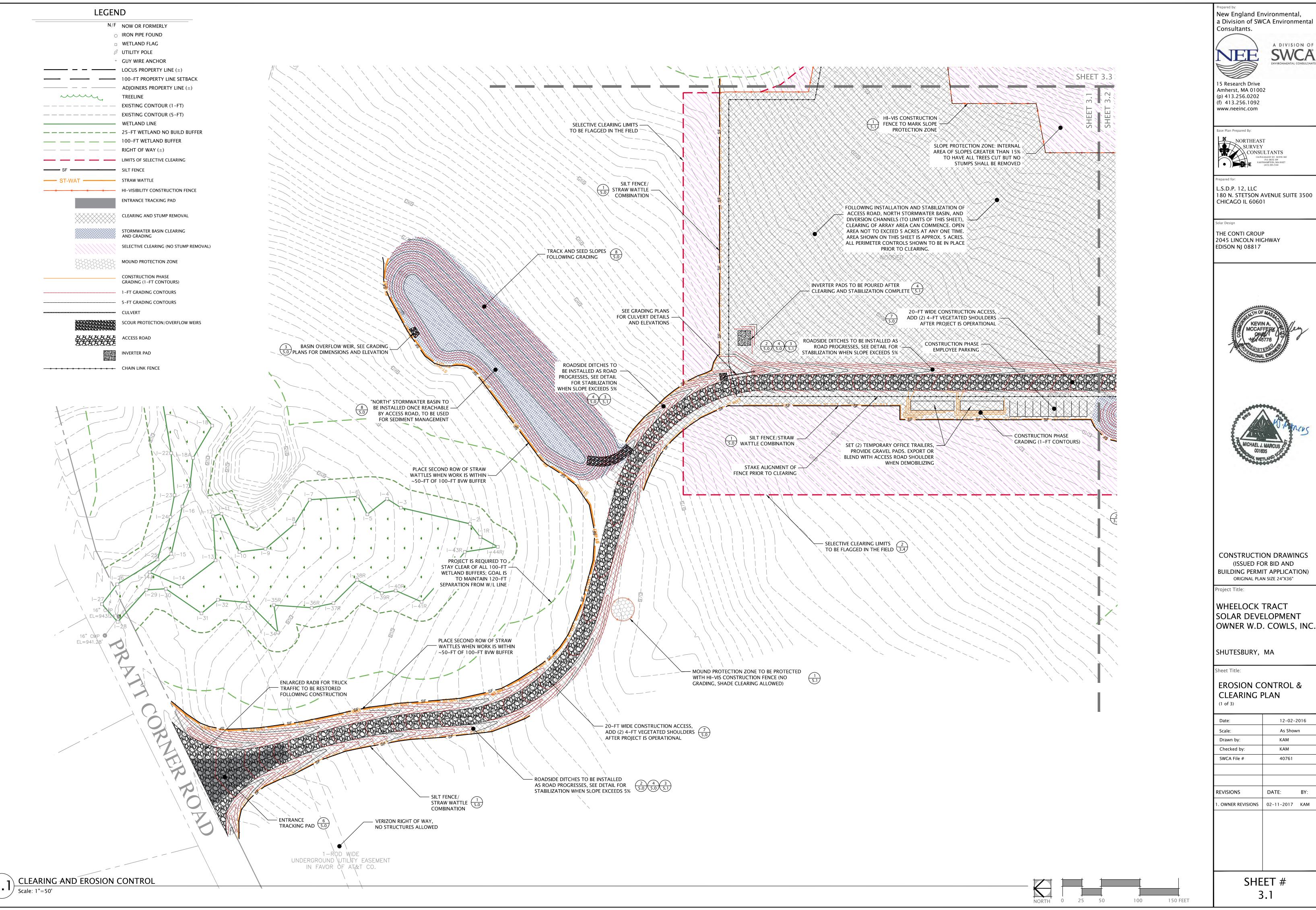
WHEELOCK TRACT SOLAR DEVELOPMENT OWNER W.D. COWLS, INC.

SHUTESBURY, MA

SLOPE ANALYSIS

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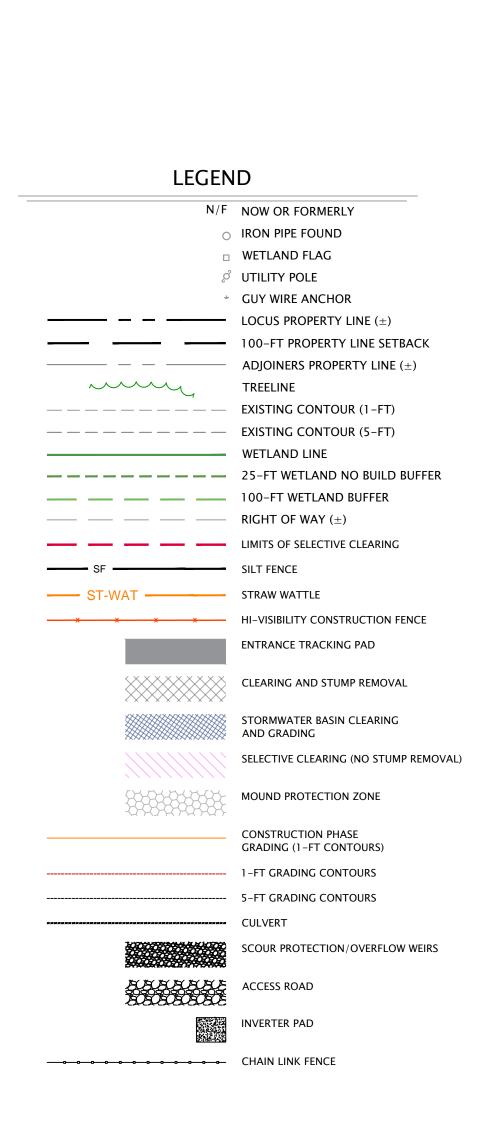
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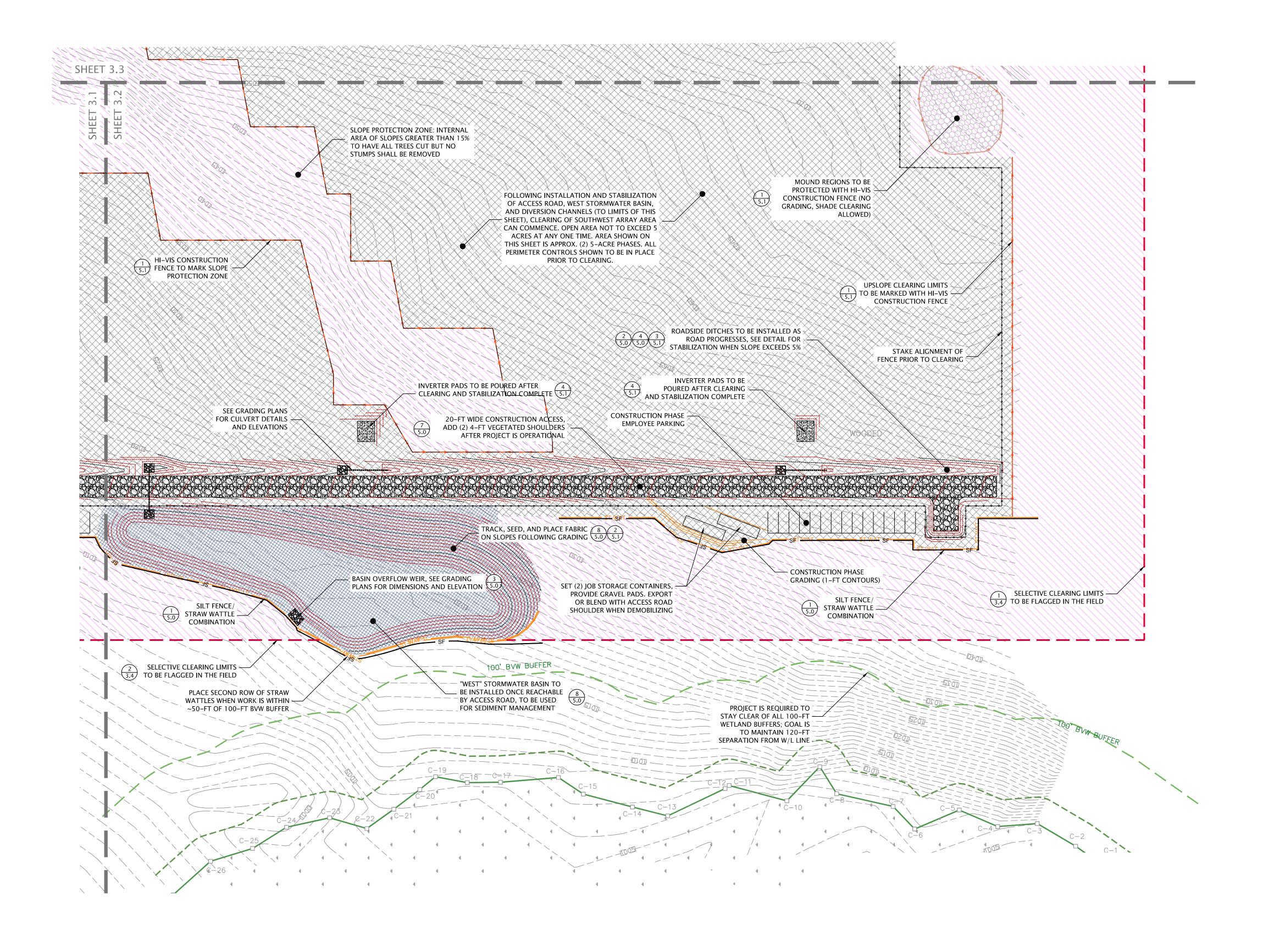






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CONSTRUCTION DRAWINGS (ISSUED FOR BID AND BUILDING PERMIT APPLICATION)

ORIGINAL PLAN SIZE 24"X36"

WHEELOCK TRACT SOLAR DEVELOPMENT OWNER W.D. COWLS, INC.

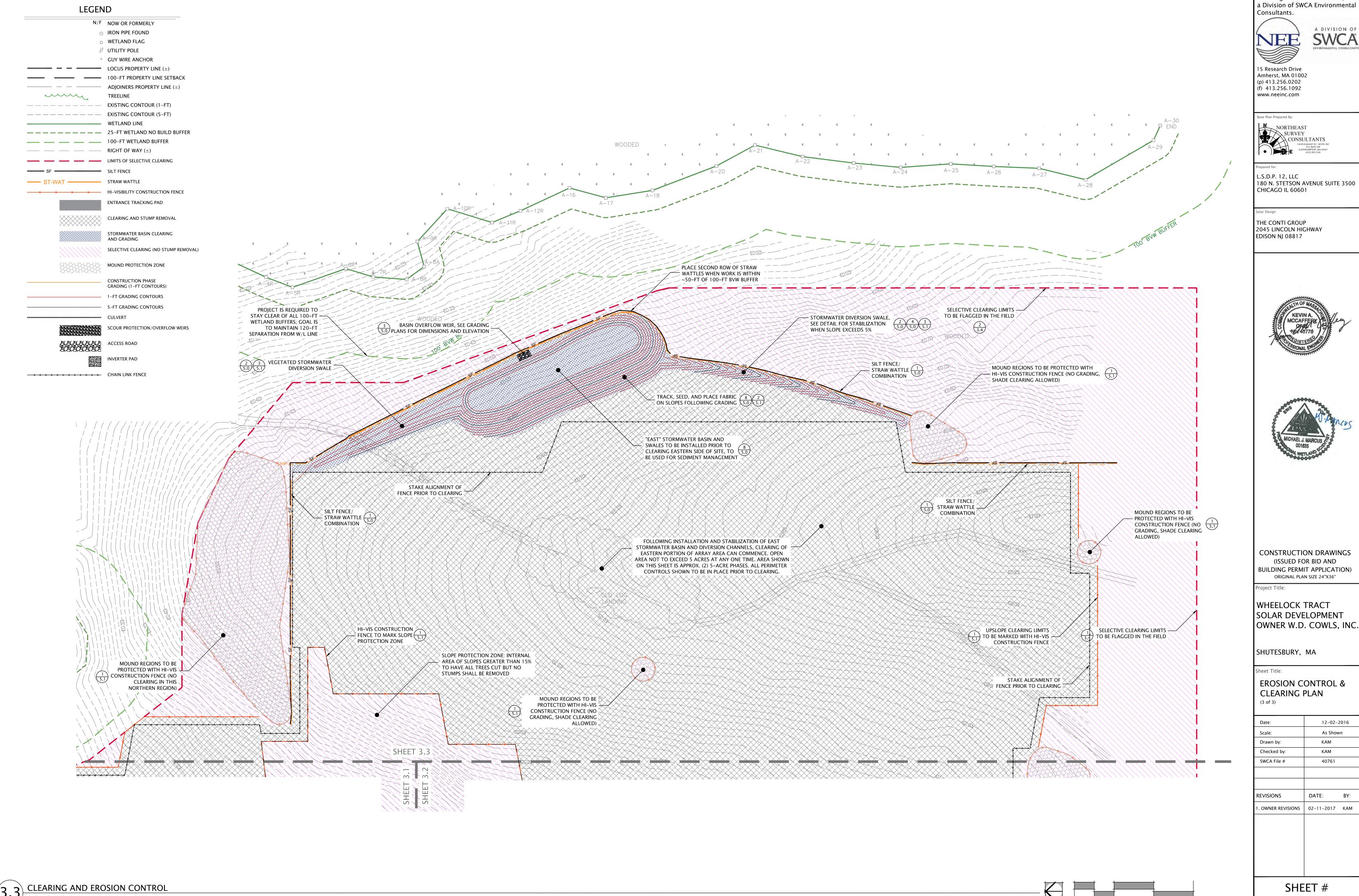
SHUTESBURY, MA

Sheet Title:

EROSION CONTROL & CLEARING PLAN (2 of 3)

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SHEET # 3.2



New England Environmental,

180 N. STETSON AVENUE SUITE 3500

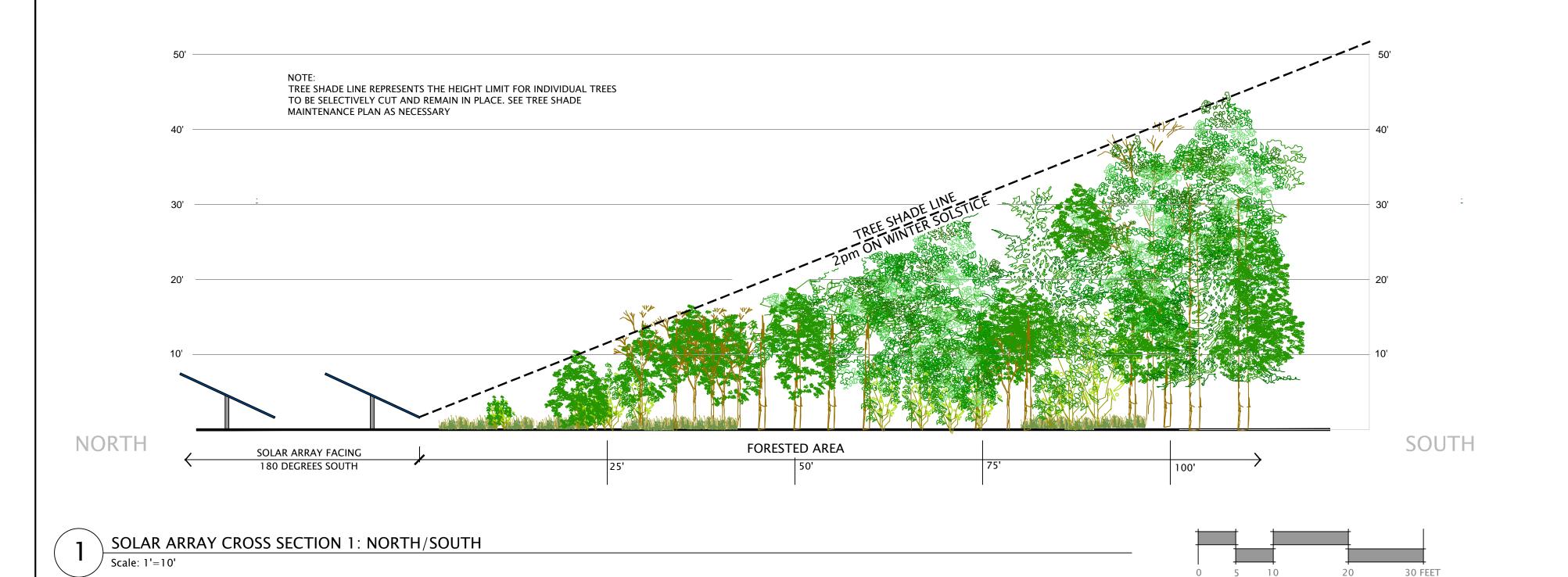


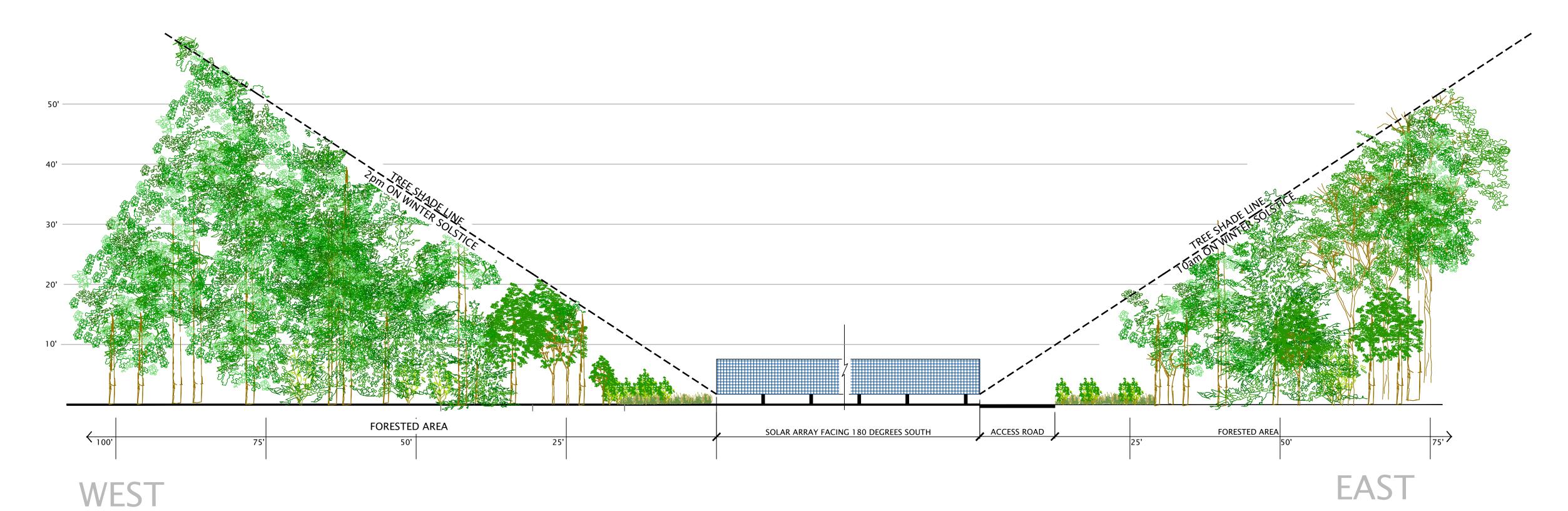


OWNER W.D. COWLS, INC.

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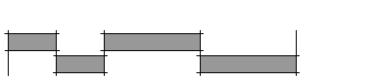
3.3





Solar Array Cross Section 2: EAST/WEST

Scale: 1'=10'



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Prepared for:

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CONSTRUCTION DRAWINGS
(ISSUED FOR BID AND
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ORIGINAL PLAN SIZE 24"X36"

Project Title

WHEELOCK TRACT SOLAR DEVELOPMENT OWNER W.D. COWLS, INC.

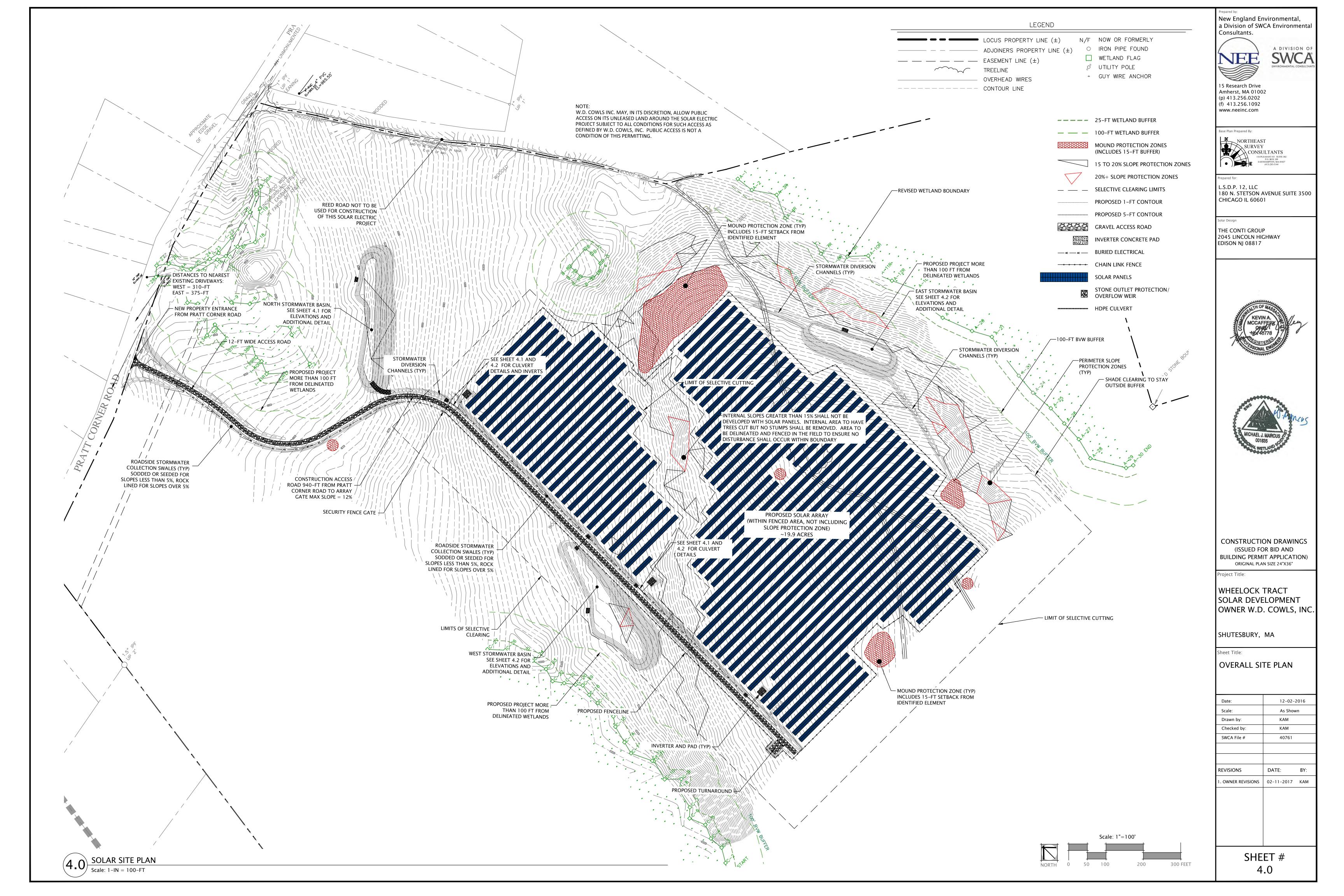
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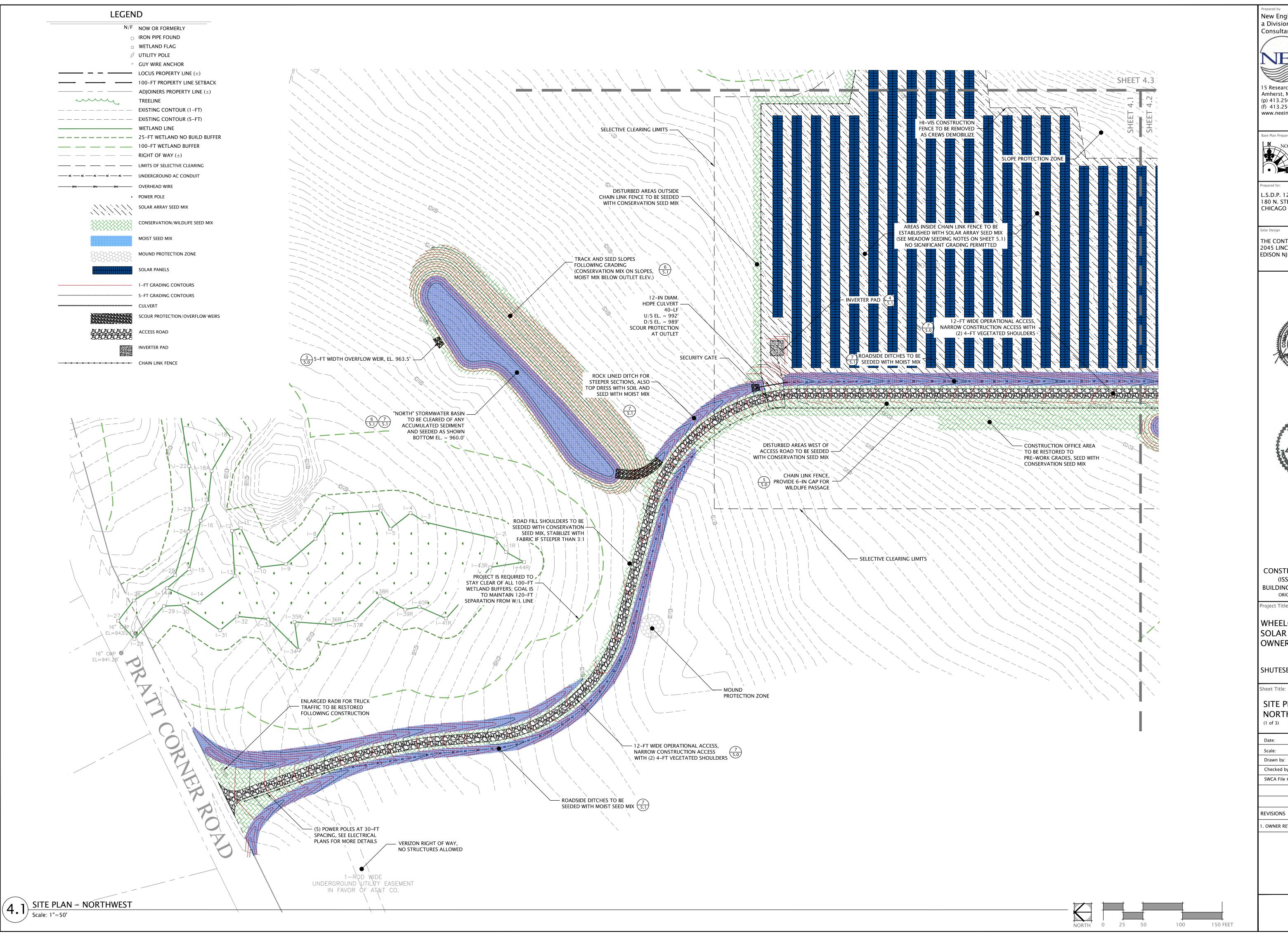
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TREE SHADE CROSS SECTION

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CONSTRUCTION DRAWINGS (ISSUED FOR BID AND BUILDING PERMIT APPLICATION) ORIGINAL PLAN SIZE 24"X36"

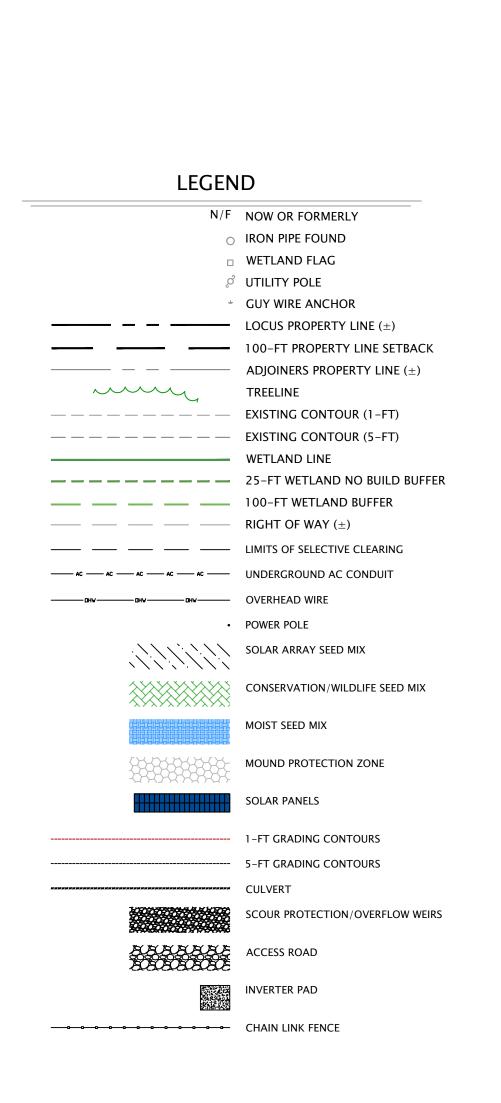
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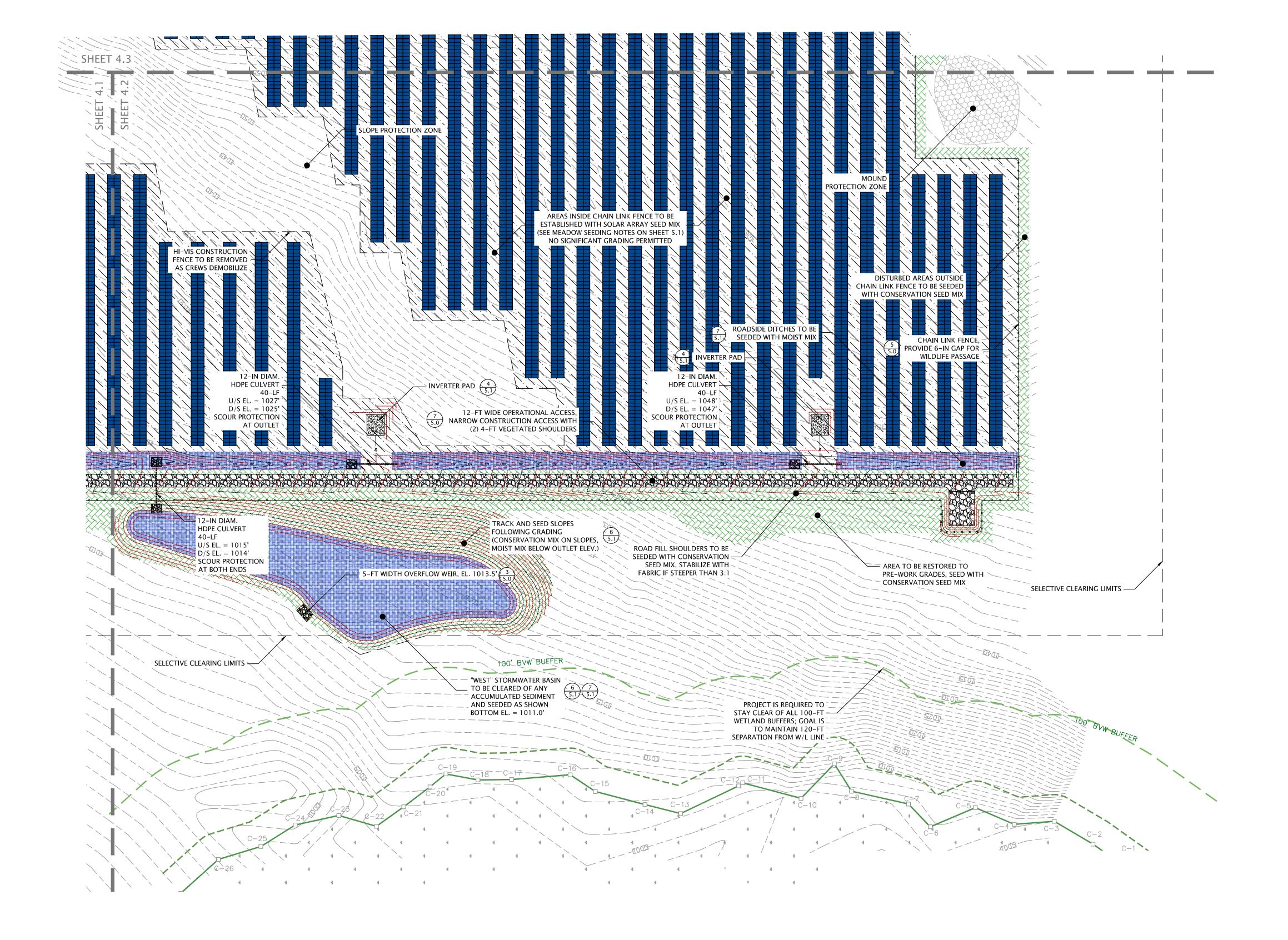
SHUTESBURY, MA

SITE PLAN NORTHWEST PORTION

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SHEET # 4.1





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CONSTRUCTION DRAWINGS (ISSUED FOR BID AND BUILDING PERMIT APPLICATION)

ORIGINAL PLAN SIZE 24"X36"

WHEELOCK TRACT SOLAR DEVELOPMENT OWNER W.D. COWLS, INC.

SHUTESBURY, MA

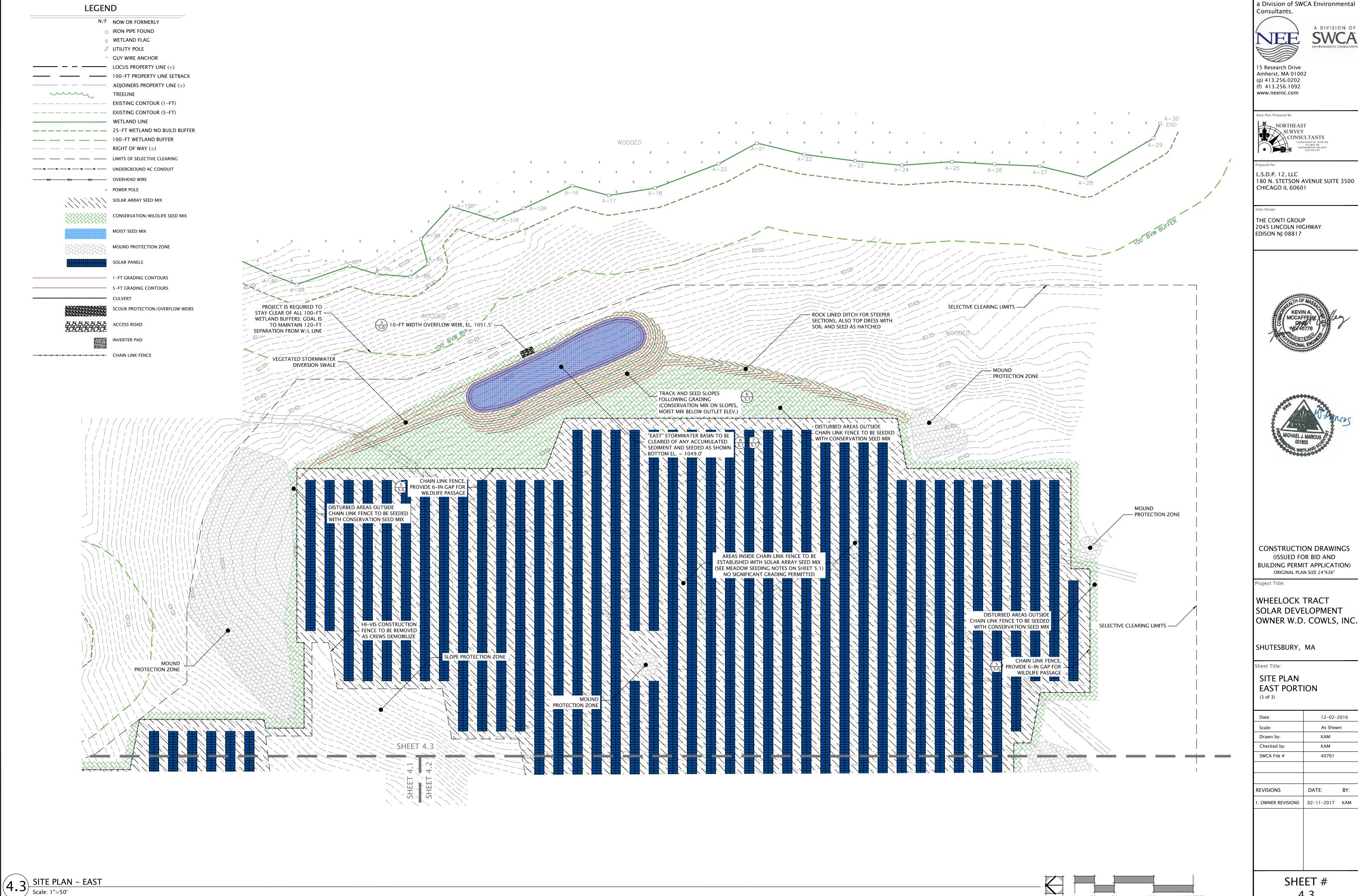
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SITE PLAN SOUTHWEST PORTION (2 of 3)

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4.2 SITE PLAN - SOUTHWEST Scale: 1"=50'



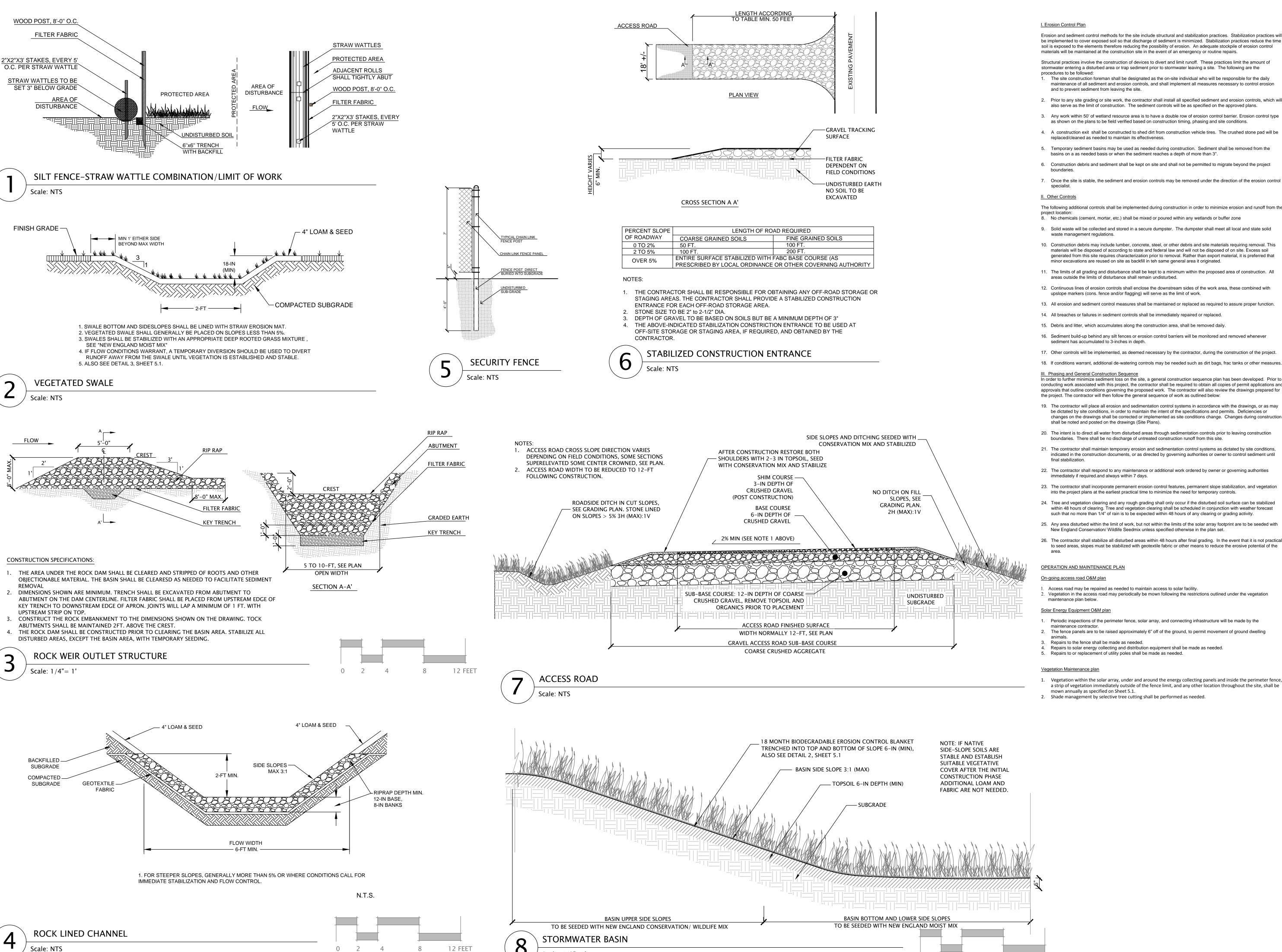


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4.3



Scale: 1/2"=1'

I. Erosion Control Plan

Erosion and sediment control methods for the site include structural and stabilization practices. Stabilization practices will be implemented to cover exposed soil so that discharge of sediment is minimized. Stabilization practices reduce the time soil is exposed to the elements therefore reducing the possibility of erosion. An adequate stockpile of erosion control materials will be maintained at the construction site in the event of an emergency or routine repairs.

Structural practices involve the construction of devices to divert and limit runoff. These practices limit the amount of stormwater entering a disturbed area or trap sediment prior to stormwater leaving a site. The following are the procedures to be followed:

1. The site construction foreman shall be designated as the on-site individual who will be responsible for the daily maintenance of all sediment and erosion controls, and shall implement all measures necessary to control erosion

- 2. Prior to any site grading or site work, the contractor shall install all specified sediment and erosion controls, which will also serve as the limit of construction. The sediment controls will be as specified on the approved plans.
- 3. Any work within 50' of wetland resource area is to have a double row of erosion control barrier. Erosion control type
- 4. A construction exit shall be constructed to shed dirt from construction vehicle tires. The crushed stone pad will be
- 5. Temporary sediment basins may be used as needed during construction. Sediment shall be removed from the basins on a as needed basis or when the sediment reaches a depth of more than 3".
- 6. Construction debris and sediment shall be kept on site and shall not be permitted to migrate beyond the project

The following additional controls shall be implemented during construction in order to minimize erosion and runoff from the 8. No chemicals (cement, mortar, etc.) shall be mixed or poured within any wetlands or buffer zone

- 9. Solid waste will be collected and stored in a secure dumpster. The dumpster shall meet all local and state solid waste management regulations.
- 10. Construction debris may include lumber, concrete, steel, or other debris and site materials requiring removal. This materials will be disposed of according to state and federal law and will not be disposed of on site. Excess soil generated from this site requires characterization prior to removal. Rather than export material, it is preferred that
- 11. The limits of all grading and disturbance shall be kept to a minimum within the proposed area of construction. All areas outside the limits of disturbance shall remain undisturbed
- 12. Continuous lines of erosion controls shall enclose the downstream sides of the work area, these combined with
- upslope markers (cons. fence and/or flagging) will serve as the limit of work.
- 14. All breaches or failures in sediment controls shall be immediately repaired or replaced.
- 15. Debris and litter, which accumulates along the construction area, shall be removed daily.
- 16. Sediment build-up behind any silt fences or erosion control barriers will be monitored and removed whenever
- sediment has accumulated to 3-inches in depth.
- 18. If conditions warrant, additional de-watering controls may be needed such as dirt bags, frac tanks or other measures.
- III. Phasing and General Construction Sequence

In order to further minimize sediment loss on the site, a general construction sequence plan has been developed. Prior to conducting work associated with this project, the contractor shall be required to obtain all copies of permit applications and approvals that outline conditions governing the proposed work. The contractor will also review the drawings prepared for the project. The contractor will then follow the general sequence of work as outlined below:

- 19. The contractor will place all erosion and sedimentation control systems in accordance with the drawings, or as may be dictated by site conditions, in order to maintain the intent of the specifications and permits. Deficiencies or changes on the drawings shall be corrected or implemented as site conditions change. Changes during construction shall be noted and posted on the drawings (Site Plans).
- 20. The intent is to direct all water from disturbed areas through sedimentation controls prior to leaving construction boundaries. There shall be no discharge of untreated construction runoff from this site.
- 21. The contractor shall maintain temporary erosion and sedimentation control systems as dictated by site conditions, indicated in the construction documents, or as directed by governing authorities or owner to control sediment until
- 22. The contractor shall respond to any maintenance or additional work ordered by owner or governing authorities immediately if required and always within 7 days.
- 23. The contractor shall incorporate permanent erosion control features, permanent slope stabilization, and vegetation into the project plans at the earliest practical time to minimize the need for temporary controls.
- 24. Tree and vegetation clearing and any rough grading shall only occur if the disturbed soil surface can be stabil within 48 hours of clearing. Tree and vegetation clearing shall be scheduled in conjunction with weather forecast such that no more than 1/4" of rain is to be expected within 48 hours of any clearing or grading activity.
- 25. Any area disturbed within the limit of work, but not within the limits of the solar array footprint are to be seeded with New England Conservation/ Wildlife Seedmix unless specified otherwise in the plan set.
- 26. The contractor shall stabilize all disturbed areas within 48 hours after final grading. In the event that it is not practical to seed areas, slopes must be stabilized with geotextile fabric or other means to reduce the erosive potential of the

OPERATION AND MAINTENANCE PLAN

On-going access road O&M plan

Access road may be repaired as needed to maintain access to solar facility. Vegetation in the access road may periodically be mown following the restrictions outlined under the vegetation maintenance plan below.

Solar Energy Equipment O&M plan

- 1. Periodic inspections of the perimeter fence, solar array, and connecting infrastructure will be made by the maintenance contractor
- 2. The fence panels are to be raised approximately 6" off of the ground, to permit movement of ground dwelling
- 3. Repairs to the fence shall be made as needed.
- Repairs to solar energy collecting and distribution equipment shall be made as needed. 5. Repairs to or replacement of utility poles shall be made as needed.

Vegetation Maintenance plan

6 FEET

- 1. Vegetation within the solar array, under and around the energy collecting panels and inside the perimeter fence, a strip of vegetation immediately outside of the fence limit, and any other location throughout the site, shall be
- mown annually as specified on Sheet 5.1. 2. Shade management by selective tree cutting shall be performed as needed.

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THE CONTI GROUP 2045 LINCOLN HIGHWAY EDISON NJ 08817





CONSTRUCTION DRAWINGS (ISSUED FOR BID AND

BUILDING PERMIT APPLICATION)

ORIGINAL PLAN SIZE 24"X36"

roject Title:

WHEELOCK TRACT SOLAR DEVELOPMENT OWNER W.D. COWLS, INC

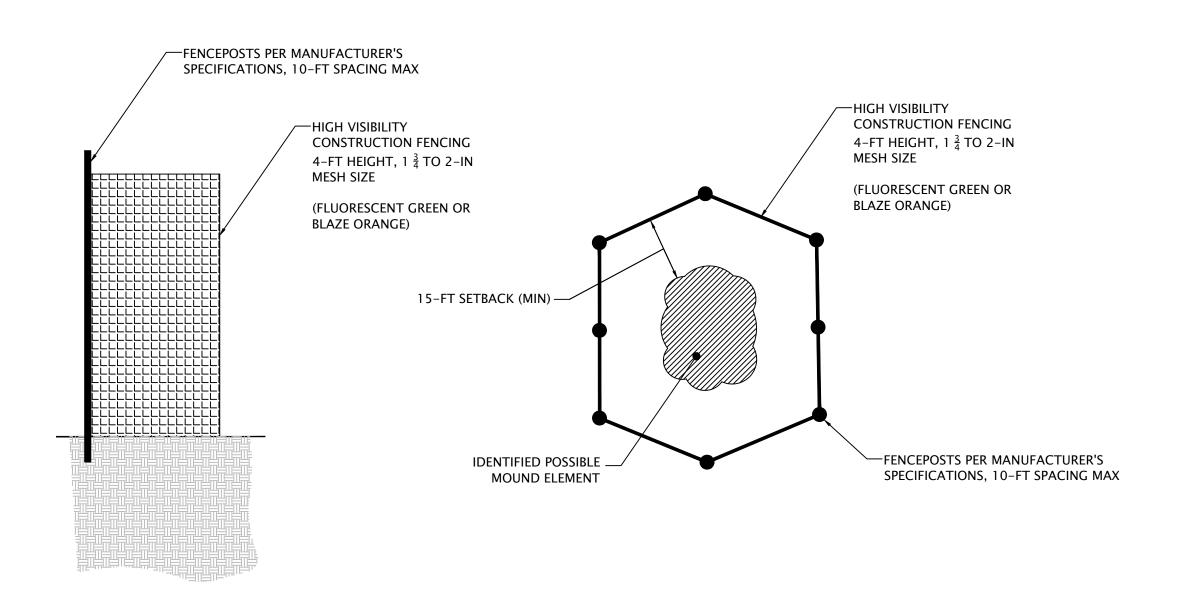
SHUTESBURY, MA

heet Title:

SITE DETAILS

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ELEVATION VIEW

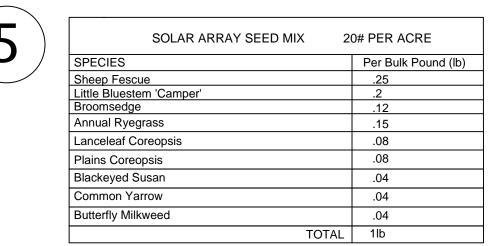
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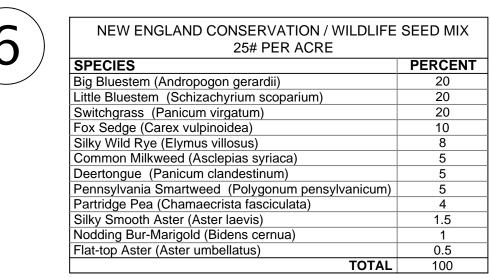
MOUND PROTECTION ZONES)

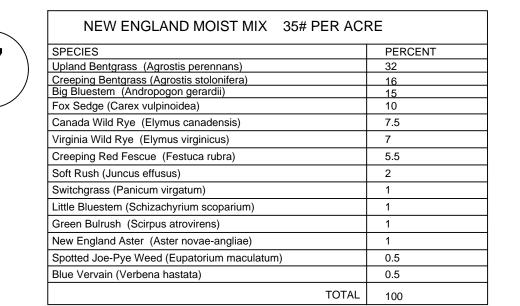


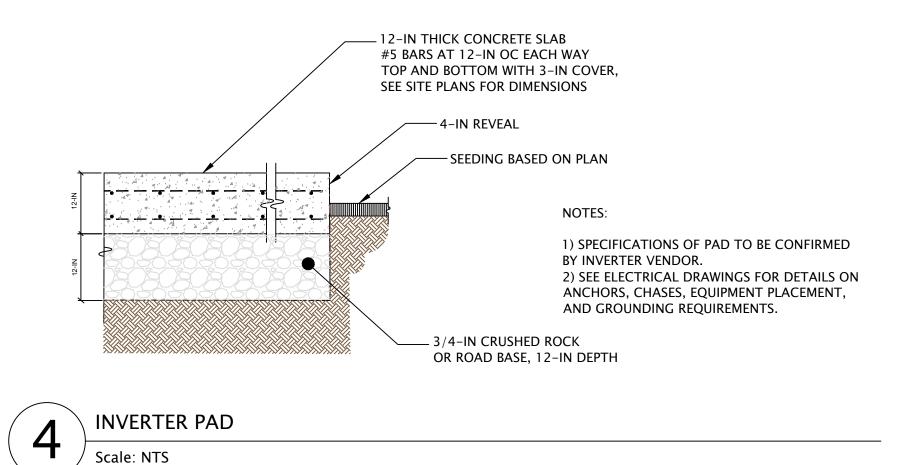


SOLAR FIELD IMAGE









MEADOW SEEDING NOTES:

General Notes

The following methodology is for establishing the Solar Array Seed Mix specified on the plan set titled *Solar* Development, Parcel ZG-2 and with a revised date of December 2, 2016. The Solar Array Seed Mix is specified on Sheet 5.2 reflects the characteristics of the site such as slope, topography, and soils and includes plant species native to the region. This seeding method is intended to establish a native grass and forb matrix on native existing soil types which are described in the Stormwater Management Report with a revised date of December 30, 2015. Meadows

A meadow is a landscape type that evolves over time as some grasses and forbs flower or reach maturity after 2 growing seasons while others may take 3 to 4 growing seasons to reach maturity. The species in this meadow mix should reach maturity in 2 to 3 growing seasons. Meadows, like all landscapes, require maintenance. This will come in the form of short and long term mowing in order to suppress competition from advantageous herbaceous weed species in the first two growing seasons and successional "woody" vegetation once the meadow reaches maturity.

Every effort should be made to use existing fine/ sandy soils as the growing medium for the meadow. The importation of topsoil should be a last resort as a soil amendment for the purpose of establishing the 'Solar Array Seed Mix.' This methodology is provided with the assumption that topsoil will NOT be spread across the entire project area, but that existing sandy fine soils can be used to amend localized areas that are dominated by coarse gravels at the soil surface.

Seed mix should be of highest available quality and comply with tolerance for purity and germination established by Official Seed Analysts of North America. Ernst Conservation Seeds is a reputable source for native seed mixes.

Seed Mix Selection

The following methodology provides sequencing for establishing the solar array seed mix as described above. This process should begin following final grading. This methodology does not specify a temporary cover crop. A cover crop may be needed to stabilize the site depending on weather conditions and construction timing relative to the seasons and the ideal time frame for establishing the meadow. The best time to seed for this project is in the spring when the soils are at a normal moisture content level (moist, not saturated) and no later than June 1. Weather forecasts should be monitored as occasional watering may be necessary if a dry spring season occurs. The meadow seeding sequence should begin no longer than 48 hours after final grading. Site stabilization techniques should be utilized in this 48 hour time period.

1. Soil Scarification/ Seed Bed Preparation Seed bed preparation is the process of scarifying and loosening the soil surface in order to create a loose, friable, soil surface. The soil surface should be a uniform planar surface that is flat and without excessive ridges, furrows, ruts or mounds and low spots where water can collect. Soil scarification should only when weather, soil conditions, and construction phasing allows for no longer than 48 hours between scarification (the beginning of the seeding process) and covering the seed with weed free straw mulch (not hay) or hydro-seed (the end of the seeding process). The soil should be scarified to maximum depth of 3 inches (see below). During this process, areas where coarse gravel dominates the soil surface should be identified and amended with fine sandy-soil common borrow generated from on-site earthwork. The importation of topsoil should be a last resort

and only used as an amendment for "localized" spots that lack the characteristics of a soil seed bed. • Soil: The soil types found in most of the project area specified to be seeded as meadow are typically not subject to excessive compaction as a result of construction activities. However, rutting, soil glazing, and excessive "tracking" caused by machinery is possible and must be alleviated at a depth necessary to provide friable soil and alleviating any excessive compaction.

A well prepared seed bed provides a loose friable soil surface for which the seed can be sown into. Seed application is a two part process: 1) seed application at proper rates per acre and 2) sow the seed into the soil ¼ to ½" depth maximum. A rate of 20lbs Pure Live Seed per Acre should be used for this seed mix. The best approach is to apply the seed using a drill seeder or slice seeder directly into the soil. These machines are designed to apply a variety of seed types and sizes to the soil and sow the seed in one step. These are specific machines and not always available thus, spreading the seed by hand is often the most economical and functional method.

• Seeding by Hand: The specified seed mix should be spread at three-fourth (3/4) of the specified rate directly onto the soil surface if hydro-mulching is the method used to cover the soil surface after seeding (the other 1/4) will be applied with the hydro-mulching slurry). The bulk bags of seed should be agitated by hand on site to redistribute the seeds in the matrix before spreading. If weed free straw mulch is used to cover the soil surface following the seed application, the seed should be applied at the full rate.

-BACKFILL AND COMPACT TRENCH AFTER INSTALLATION

4" MIN. DVERLAP

1. TRACK AND SEED SURFACE WITH EQUIPMENT PERPENDICULAR TO SLOPE PRIOR TO

2. BEGIN AT THE TOP OF BLANKET INSTALLATION AREA BY ANCHORING BLANKET IN A

5. THE SIDE EDGES OF BLANKETS MUST BE STAPLED WITH APPROX. 4 INCH OVERLAP

END WITH 6 INCH (MIN.) OVERLAP AND ANCHOR DOWN SLOPE BLANKET IN A 6

6. WHEN BLANKET ENDS MUST BE SPLICED MID SLOPE PLACE BLANKET END OVER

7. BLANKET SHALL BE NORTH AMERICAN GREEN SC-150 OR APPROVED EQUAL.

CENTER

6" DEEP TRENCH.

4. ROLL THE BLANKET DOWN SLOPE.

SLOPE STABILIZATION

Scale: NTS

3. BACKFILL AND COMPACT TRENCH AFTER STAPLING.

WHERE 2 OR MORE STRIP WIDTHS ARE REQUIRED.

- Sowing the Seed: Once the seed is spread the seed must be sown into the soil to the depth above in order to increase chances of germination by keeping soil moisture close to the seed. The seed can be sown by a number of ways including "tracked" in with a low PSI rubber tire or tracked machine, using a York landscape rake or similar, or the traditional means of using a metal leaf rake. Areas below the solar panels where a machine cannot be operated also need to be sown.
- Watering: Precipitation forecasts, seasonal conditions, and soil moisture should be monitored. If a slurry of hydro-mulch and the remaining seed is used to mulch the seeded area, watering should only be considered in dry conditions after the application of hydro-mulch. If weed free straw is used to mulch the seeded area, the activity of "watering in" the seed may be necessary before the application of straw mulch to provide ample soil moisture for seed germination. No tracking or rutting shall occur as a result of the application of straw mulch

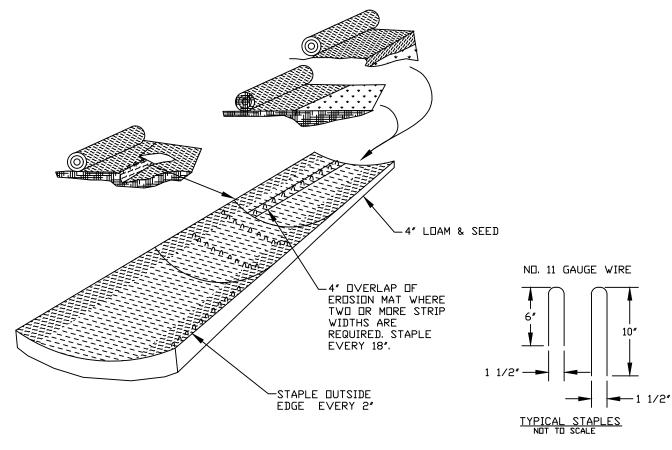
Moisture is an important component for seed germination. Mulching the soil surface retains soil moisture and prevents desiccation from the soil surface and seed sprouts. The best method for preventing dry soil conditions and desiccation is to apply water slurry of hydro-mulch at the rate specified by the mulch manufacturer or applicator. The remaining ¼ rate of specified seed should be applied with the hydro-mulch slurry.

4. Maintenance/ Mowing

- First Year: Initial mowing should begin when plant growth (including non-seeded/ annual plants such as crabgrass) reaches a height of 6 inches. The mowing height should be 4 inches to clip the growth and seed heads of the annual herbaceous plants. This reduces plant competition for water, light, and soil resources. The mowing should continue for the entire first year growing season every 3-4 weeks or as plant growth dictates.
- Long Term: The meadow should be managed by annual mowing with a brush hog or flail type mower. Mowing is necessary to prevent the establishment of woody plant species. The mowing should occur mid spring so that plant material persists over winter for visual interest and habitat diversity for insects, birds, and animals. If meadow species are actively growing and new growth is taller than 12", mowing should not occur that year.
- Monitoring for seed germination should begin two weeks after seeding and should continue to determine plant growth and watering requirements if needed. Regular monitoring will also help to identify areas to be reseeded in late summer. The monitoring should occur for 2 growing seasons minimum to ensure meadow establishment. If widespread areas are not establishing soil samples are to be collected and analyzed by a qualified laboratory to determine if nutrient, pH, or other amendments are necessary.
- Areas to be reseeded shall follow the same seeding sequence outlined above. It is expected that some seeded areas may not germinate, but that over time the meadow plants shall fill in through seed proliferation and growth habits. Areas large enough to be identified through monitoring as being dominated by weeds or other invasive species that have out-competed the meadow seeds or areas deemed unstable due to low plant growth shall be reseeded accordingly.

7. Meadow/ Plant Succession Notes

It is possible that over time some areas in the meadow might become dominated by native low growing plant species existing in the soil seed bank. One example of this is the likelihood that various types of native ferns could emerge in shaded areas created by the solar panels. No species of ferns are in the meadow seed mix, but are highly desirable low growing species that can exist and thrive in meadows adding to landscape diversity. Native low growing species such as ferns that emerge due to being in the soil seed bank should remain. Thorough and regular monitoring during the maturation of the meadow is a key component to balancing areas to be reseeded and areas where successional plant growth of low growing natives should be allowed to thrive.



- 1. BEGIN AT THE TOP OF BLANKET INSTALLATION AREA BY ANCHORING BLANKET IN A $6^{\prime\prime}$ DEEP TRENCH.
- 2. BACKFILL AND COMPACT TRENCH AFTER STAPLING.
- 3. ROLL THE BLANKET DOWN THE DITCH IN THE DIRECTION OF THE WATER
- 4. THE EDGES OF BLANKETS MUST BE STAPLED WITH APPROX. 4 INCH OVERLAP WHERE 2 OR MORE STRIP WIDTHS ARE REQUIRED.
- 5. BLANKET SHALL BE NORTH AMERICAN GREEN SC-150 OR APPROVED EQUAL





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CONSTRUCTION DRAWINGS (ISSUED FOR BID AND **BUILDING PERMIT APPLICATION)**

ORIGINAL PLAN SIZE 24"X36"

WHEELOCK TRACT SOLAR DEVELOPMENT OWNER W.D. COWLS, INC

SHUTESBURY, MA

Sheet Title:

SITE DETAILS

Date:	12-02-2016
Scale:	As Shown
Drawn by:	КАМ
Checked by:	КАМ
SWCA File #	40761
REVISIONS	DATE: RY:

. OWNER REVISIONS | 02-11-2017 KAM

SHEET # 5.1