Jason Grimshaw, Chair Leicester Planning Board 3 Washburn Square Leicester, Massachusetts 01524

November 15, 2021

RE:

Site Plan Review-Peer Review

#1355 Main Street Energy Storage System (ESS)

ZP Battery Devco, LLC Map 26/Parcel A1

Dear Mr. Grimshaw,

Hannigan Engineering is in receipt of comments from Quinn Engineering, Inc. regarding the project submitted by this office for a Solar Energy Storage System (ESS) in Leicester, Massachusetts. We have reviewed the comments and offer our responses below. We have left the same format of their letter for ease of review. These responses have been incorporated into the updated plans for final review and approval by the Board.

General Comments:

Comment #1: No landscaping or plantings are proposed. Hannigan Engineering, Inc. has indicated that they anticipate that the ESS will not be visible from the roadway or from residential properties due to the topography and due to the existing vegetation, that will remain. The Applicant should clarify to the Board how the landscaping requirements are met or should request a waiver with justification if the landscaping requirements are not met. (Zoning Bylaw 5.5.02.2, 5.14.6.4, SPRR II.F.6, SPRR II.K.1.c and Landscaping Regulations)

Comment #1 10/28/21: This office defers to the Board. Hannigan Engineering, Inc. has requested several waivers related to the landscaping requirements. No landscaping or plantings are proposed. A profile has been submitted depicting the elevation relief and layout of the system.

Under §5.5.02.2.A, a 20 foot landscape buffer is required along the roadway frontage.

Under §5.5.02.2.B and C, a 50 foot landscape buffer is required where a non-residential use abuts a residential use and a 100 foot buffer is required where the HB-1 district boundary abuts a residential district boundary. The Board may reduce these buffers to 20 feet and 50 feet, respectively, where site constraints do not allow for the full buffer and an opaque fence and/or other comparable method is provided to adequately buffer the residential property.

The Board's Landscaping Regulations state that the Board may allow or require the use of an opaque fence in addition to or in lieu of planted areas where the nature of a site or site development would not provide adequate screening.

This office defers to the Board if screening is required or if the requested waivers should be granted based on the existing vegetation and the existing topography providing a sufficient buffer. Also, the Board may request that the proposed security fence be

equipped with slats to decrease visibility of the proposed equipment in addition to any other required screening.

A waiver/relief from the landscape and screening requirements in §5.14.6 may also be required.

Response: Acknowledged, Landscaping requirements are being reviewed with the board.

- Comment #2: Driveway slopes in the HB-1 district are limited to 5% under the Zoning Bylaw 5.5.02.1.C.3. The proposed driveway slopes at approximately 7.5% from Main Street. It appears that the proposed 7.5% slope is reasonable given that the driveway is expected to see minimal use and is not open to the public. This office defers to the Board if the 5% slope requirement can be waived by the Board or if a variance is required.
- Comment #2 10/28/21: This office defers to the Board. Hannigan Engineering, Inc. has requested a waiver from the 5% driveway limit specified in $\S5.5.02.1.C.3$. The proposed 7.5% slope is reasonable; however, this office defers to the Board if a waver can be granted or if a variance is required.
- **Response:** Acknowledged, the driveway requirements are being reviewed with the board.
- Comment #6: Post Construction View Representations are required under SPRR II.K.2. The conceptual renderings provided in the application generally depict the proposed ESS components but do not appear to represent the specific configuration at this site. This office defers to the Board if the conceptual renderings are sufficient or if the renderings must be updated.
- Comment #6 10/28/21: This office defers to the Board. Hannigan Engineering, Inc. has indicated that a profile depicting the elevation relief and layout of the system has been provided to aid in review. This office defers to the Board if the conceptual renderings are sufficient or if the renderings must be updated

Response: Acknowledged.

- Comment #7: An operation and maintenance plan for the site must be submitted. The plan should include requirements for maintenance of the driveway, plowing, mowing outside of the basin, equipment maintenance, etc. (SPRR II.K.5)
- Comment #7 10/28/21: Operation and maintenance requirements for the site have been included in this submission. It is recommended that the Fire Department review and comment the proposed snow plowing routine to ensure that the Department is comfortable with the proposal.
- Response: The updated Operation and Maintenance has been reviewed with the Fire Department.

- Comment #8: A specific form of decommissioning surety has not been identified. This office defers to the Board regarding the form of surety and mechanism for accounting for inflation that is to be provided. (SPRR II.K.7)
- Comment #8 10/28/21: This office defers to the Board. Hannigan Engineering, Inc. has indicated that the specific type of surety will be determined prior to the issuance of a building permit.

Response: Acknowledged

- Comment #11: Based on the proposed grading, it appears that runoff from the easterly equipment pads may not flow to the basin as intended. The grading should be revised to ensure that the intended runoff reaches the basin.
- Comment #8 10/28/21: The grading has been revised to depict a shallow swale at the end west end of the equipment pads, however based on the revised grading, the runoff in the swale will flow towards the proposed access gate and does not appear to flow into the basin. The plan should be revised to depict a more defined channel directing runoff into the basin in order to ensure that the intended runoff reaches the basin
- The driveway has been pitched as to create a channelized flow from the pad area to Response: the detention basin.
- Comment #15: Check dams are recommended along the flow path of the existing discharge from the catch basin in Main Street to minimize erosion potential along the toe of the proposed slopes.
- Comment #8 10/28/21: Check dams and a defined rip rap channel have been proposed along the flow path from the existing culvert. The Applicant should confirm that channelizing the flow does not increase flows to the downstream property.
- **Response:** The HydroCAD model has been updated to depict the channelized nature of the flow relative to the peak rate impacts to the design point.

WAIVER REQUESTS - AMENDED

Per the Leicester Planning Board Site Plan Review Rules and Regulations, the Planning Board may waive any of the requirements upon submittal of information by the applicant that substantiates the waiver request. As required by the Zoning Bylaw several of the aspects of site plan review are not applicable to a project of this type specifically, traffic and water/sewer availability.

Due to the nature of this project, portions of this Site Plan Application are not applicable and waivers to these sections are requested as follows:

SPRR II.D: Traffic Study

- Due to the nature of the project, it is not anticipated that the project would have an adverse affect on traffic surrounding the site. Specifically, vehicular traffic for the project is not anticipated with the exception of the occasional maintenance and inspection. During construction, construction vehicles and equipment will be accessing the site by a proposed gravel drive off of Main Street. Additional signage will be placed along the roadway in this area to alert drivers of construction activity. Upon the completion of the project, the only traffic for the project would be for inspection and maintenance.

The applicant, therefore, requests a waiver to II.D: Traffic Study of the Bylaw.

SPRR II.I: Availability of Water and/or Sewer

-Due to the nature of the project, the project will not require any connections to the public water supply or any sewerage connections.

The applicant, therefore, requests a waiver to II.I: Availability of Water and/or Sewer of the Bylaw.

Zoning Bylaw 5.5.02.1.C.3: The Slope of Driveways shall be no greater than five percent (5%)

-It is the intent that the access drive from Main Street is approximately 7.5%, in excess of the maximum allowed of 5% per the Zoning By-Law. As the final project is not to be open to the general public and access upon the completion of construction is going to be intended only for general maintenance purposes, it is anticipated that the steeper access way will not negatively impact access to the site.

The applicant, therefore, requests a waiver to 5.5.02.1.C.3.

Zoning Bylaw 5.5.02.2.C: A landscaped buffer of at least 100 feet shall be provided where an HB-1 district boundary abuts a Residential District (R1, R2, SA)

-It is requested that the required landscaped buffer along the rear portion of the property be reduced to at minimum 20-feet abutting a Residential District (R1). The rear portion of the property abuts an existing residential property, where the existing dwelling is located immediately along Rawson Street, approximately 400-feet away, as shown on the Locus Plan. Due to the excessive distance and generally wooded characteristic and presence of jurisdictional areas of the Wetlands protection Act of the area abutting the locus property, it is anticipated that the view of the ESS system will not negatively impact the view from the dwelling.

The applicant, therefore, requests a waiver to 5.5.02.2.C.

SPRR II.F.6: Proposed landscaping, including size and type of plant material.

- The proposed Energy Storage Systems (ESS) are located on the property such that the units are located well below the abutting roadway elevation. The elevation relief from the roadway to concrete pads vary approximately 12-feet to 18-feet along the length of the project, with an average height of approximately 8-feet per ESS, the top of the units are still approximately 4-feet to 6-feet below the existing grade of the roadway. This in combination with the woodland and brush that is intended to remain it is anticipated to shield the ESS units from the abutting roadway as well as the residential properties located along the opposite side of Main Street. In addition, the abutting properties to the south of the locus property, is extensively wooded with the nearest

residential dwelling be in excess of 400-feet from the property line. This in combination with jurisdictional areas of the Wetlands protection Act and woodland, to provide adequate vegetated buffer to the abutting properties.

As such it is proposed that there not be a requirement to include additional plantings within the projects limits as the project is anticipated to be adequately shielded from the road and the abutting properties by the topographical relief between the road and the site as well as the general Landscaping Requirements.

The applicant, therefore, requests a waiver to SPRR II.F.6

SPRR II.K.1.c: Proposed screening/buffering in conformance with Zoning Bylaw requirements.

- The proposed Energy Storage Systems (ESS) are located on the property such that the units are located well below the abutting roadway elevation. The elevation relief from the roadway to concrete pads vary approximately 12-feet to 18-feet along the length of the project, with an average height of approximately 8-feet per ESS, the top of the units are still approximately 4-feet to 6-feet below the existing grade of the roadway. This in combination with the woodland and brush that is intended to remain it is anticipated to shield the ESS units from the abutting roadway as well as the residential properties located along the opposite side of Main Street. Reference is also made to the included sightline profile from the roadway to the ESS System to document the extent of the elevation relief.

The applicant, therefore, requests a waiver to SPRR II.K.1.c

This information is being provided as part of the review of the proposed Energy Storage Systems (ESS) submitted to the Town of Leicester. As discussed above, additional modifications and revisions to the plans were required based upon the Peer Review by the peer reviewer Quinn Engineering, Inc. The plans have been updated to reflect these modifications and revisions and are submitted herewith for final review. We look forward to the Board's anticipated approval of this project.

Hannigan Engineering, Inc. would like to thank the Town and its staff for its assistance and continued cooperation regarding this project.

Sincerely.

HANNIGAN ENGINEERING, INC.

Christopher Anderson, PE

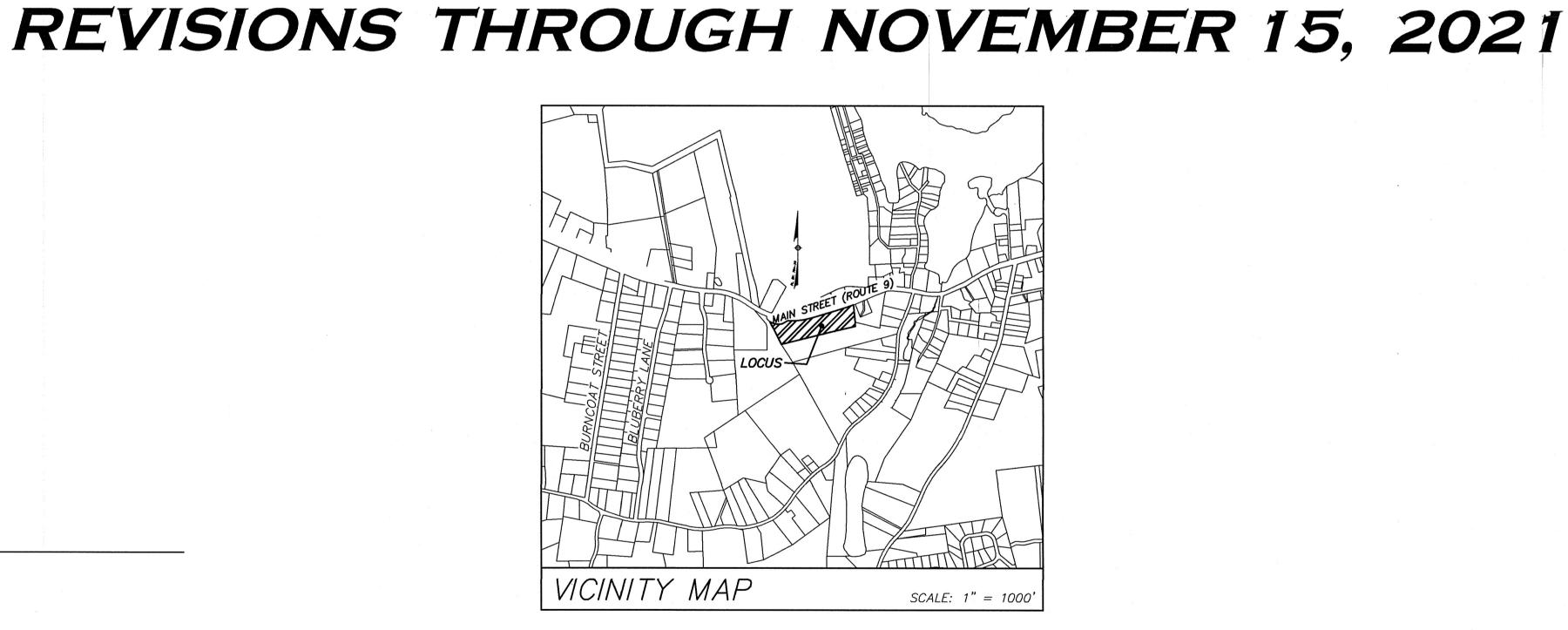
Project Engineer

pc:

Brendan Gove - ZP Battery DevCo, LLC Pete Forte–ZP Battery DevCo, LLC Tom Corbett-ZP Battery DevCo, LLC

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SITE DEVELOPMENT PLAN SOLAR ENERGY STORAGE SYSTEM (ESS) 1355 MAIN STREET IN LEICESTER, MASSACHUSETTS SEPTEMBER 21, 2021



APPLICANT:

ZP BATTERY DEVCO, LLC BRENDON GOVE 10 E. WORCESTER STREET, SUITE 3A WORCESTER, MASSACHUSETTS 01604

OWNER:

WR ENTERPRISES, LLC 1323 MAIN STREET LEICESTER, MASSACHUSETTS 01420

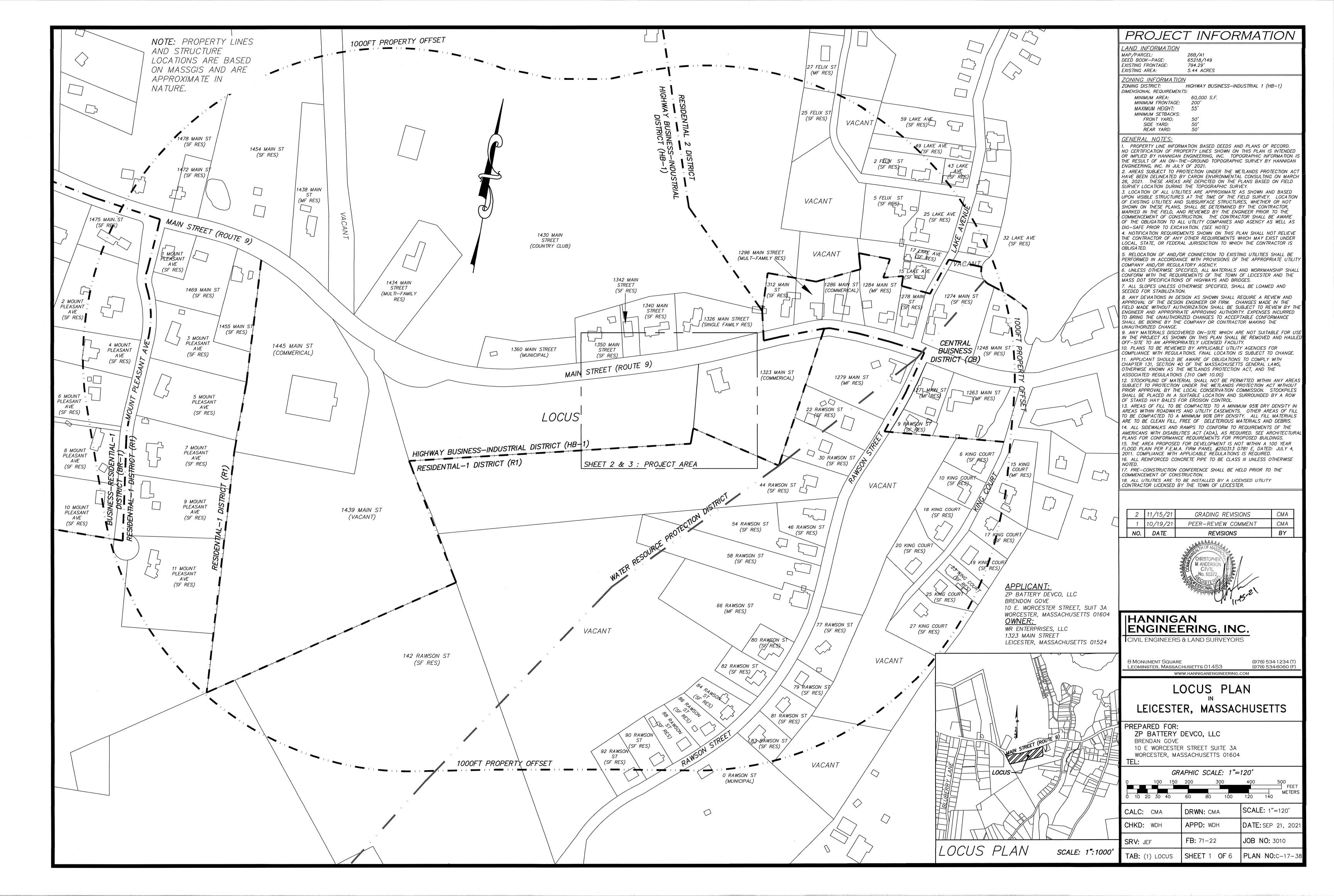
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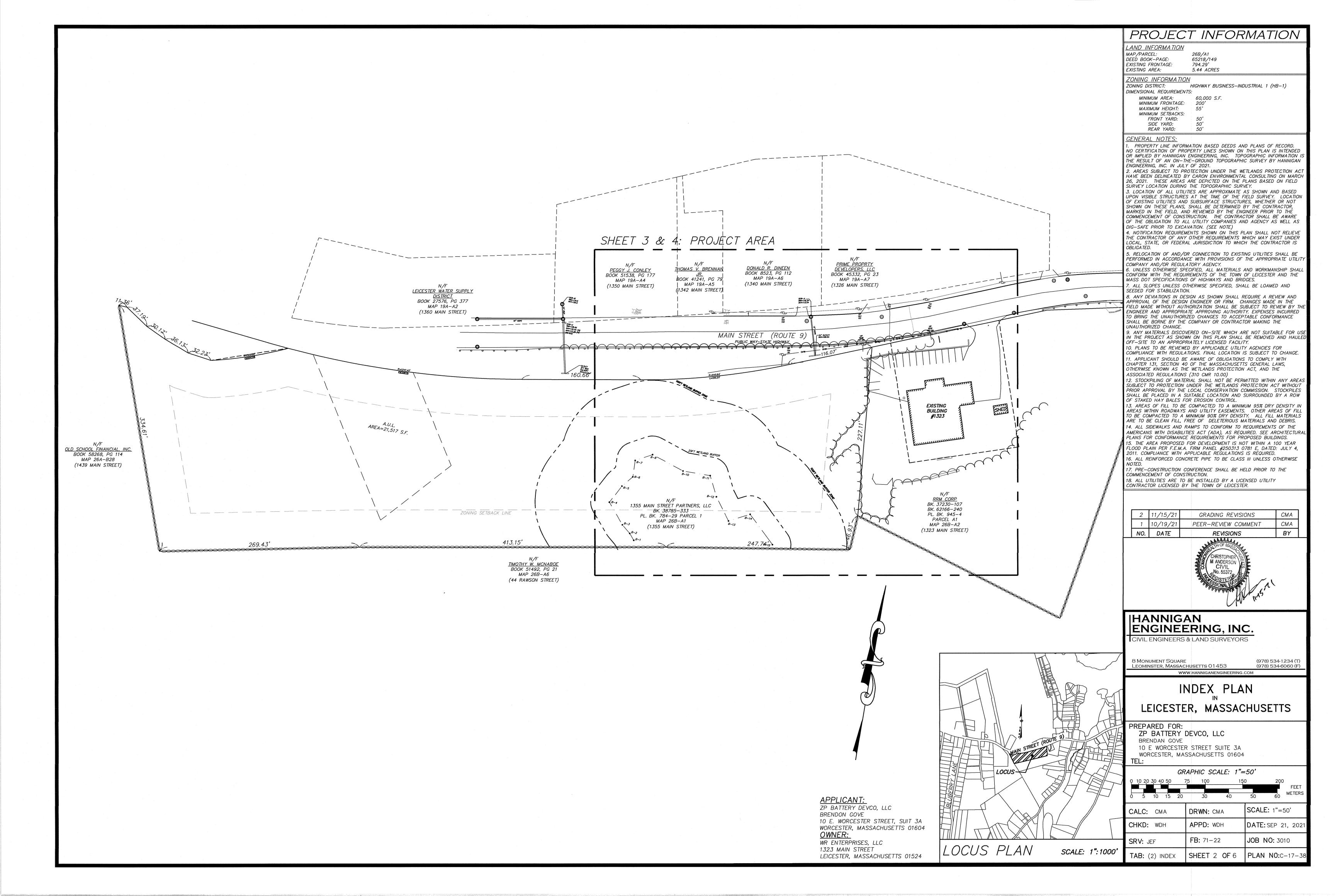
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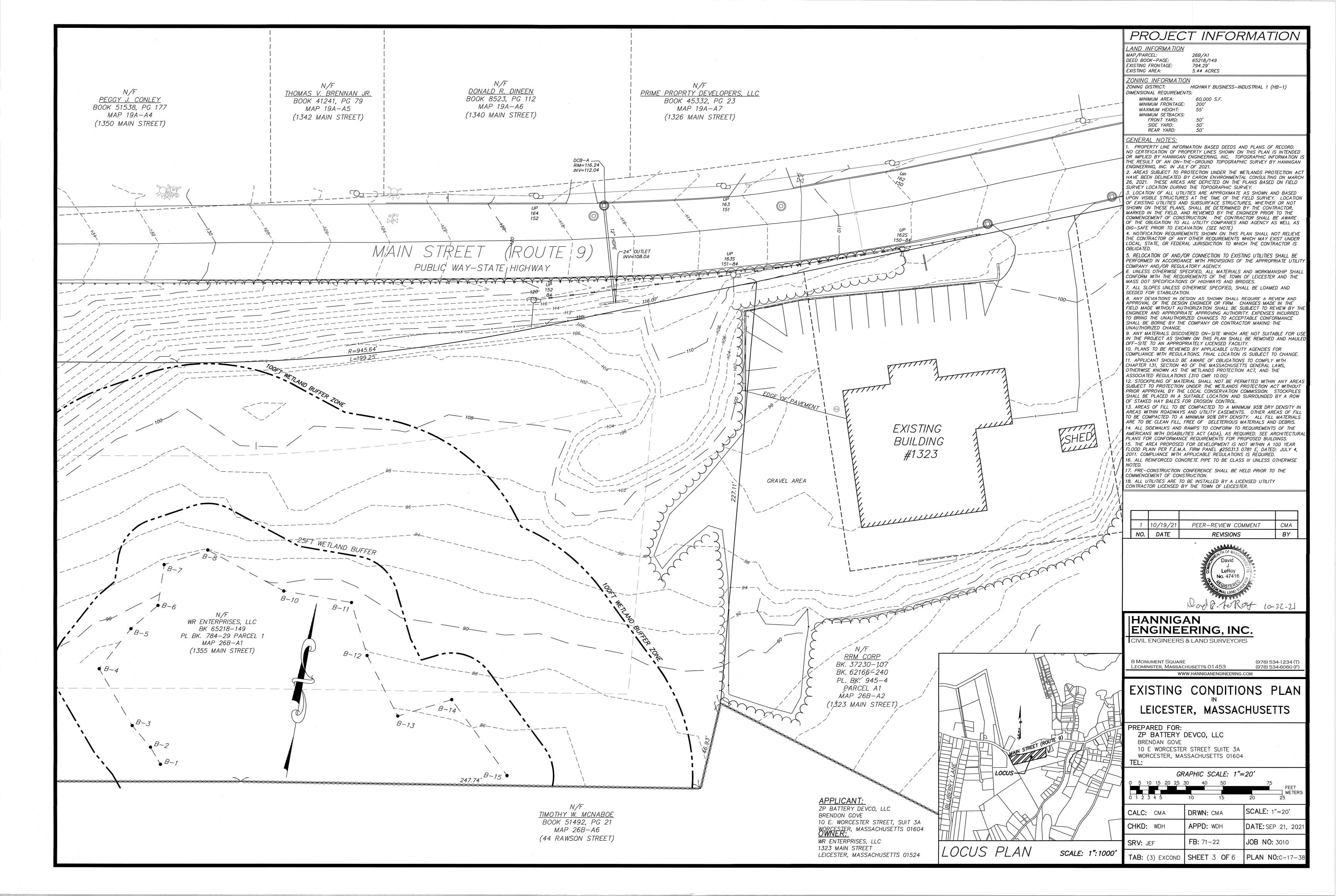
PLAN INDEX

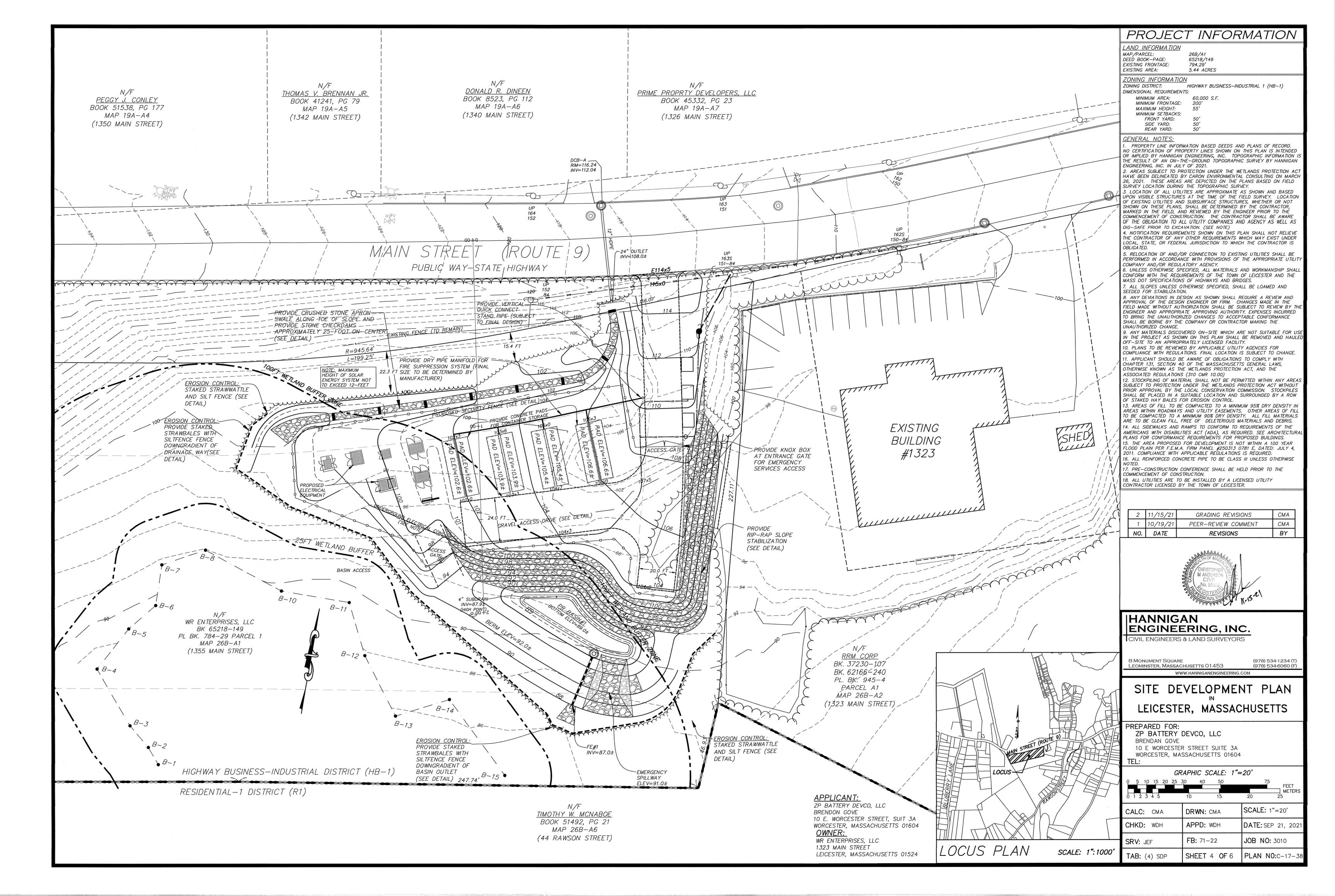
SHEET	1	LOCUS PLAN
SHEET	2	INDEX PLAN
SHEET	3	EXISTING CONDITIONS PLAN
SHEET	4	SITE DEVELOPMENT PLAN
SHEETS	5-6	CONSTRUCTION DETAILS

PERMITTING SET - NOT FOR CONSTRUCTION









EROSION & SEDIMENTATION CONTROL PLAN

THE PURPOSE OF THIS PLAN IS TO PRESENT A PREVENTIVE METHOD OF CONSTRUCTION TO MINIMIZE THE IMPACT OF THE CONSTRUCTION ACTIVITIES UPON WETLAND AND OTHER SENSITIVE AREAS. THE DATA CONTAINED ON THIS PLAN IS INTENDED TO SUPPLEMENT THE DEVELOPER OR CONTRACTORS' EXPERTISE AND IS NOT MEANT TO CIRCUMVENT LOGICAL DECISIONS REQUIRED BY A VARIETY OF FIELD CONDITIONS NCLUDING WEATHER AND THE TYPE OF EQUIPMENT AVAILABLE TO THE

THE CONTRACTOR IS TO BE AWARE OF THE REQUIREMENTS AND OBLIGATIONS TO COMPLY WITH CHAPTER 131, SECTION 40 OF THE MASSACHUSETTS GENERAL LAWS, OTHERWISE KNOWN AS THE WETLANDS PROTECTION ACT, AND ITS ASSOCIATED REGULATIONS (310 CMR 10.00). CERTAIN PERMITS IN THE FORM OF AN ORDER OF CONDITIONS, OR OTHER FORMAT, MAY BE REQUIRED FOR THE CONSTRUCTION AS DEPICTED ON THIS PLAN. THESE PERMITS SHALL BE REVIEWED AND ADHERED TO BY THE CONTRACTOR THROUGHOUT THE CONSTRUCTION PROCESS. THE CONTRACTOR SHALL ALSO MAINTAIN COPIES OF ALL PERMITS ON SITE

3. IF CHANGES IN THE PROJECT ARE REQUIRED DUE TO FIELD CONDITIONS THE DEVELOPER/CONTRACTOR SHALL PROMPTLY NOTIFY THE ENGINEER FOR REVIEW OF THESE CONDITIONS. UPON REVIEW, AND PRIOR O THE IMPLEMENTATION OF ANY CHANGE, THE CONTRACTOR AND THE NGINEER SHALL MEET WITH THE APPROPRIATE LOCAL AND/OR STATE OFFICIAL. OR ITS AGENT. TO DETERMINE IF THE CHANGE RÉQUIRES MODIFICATION TO EXISTING APPROVED PERMITS.

ALTERATION AND/OR DESTRUCTION OF WETLAND AREAS WITHOUT PRIOR CONSENT OF THE CONSERVATION COMMISSION IS PROHIBITED. SILTATION PLUMES, ILLICIT DISCHARGES, OR INADVERTANT ALTERATION SHALL BE CONSIDERED AS ACTIVITIES NOT PERMITTED BY THE ORDER AND SHALL BE REPORTED TO THE CONSERVATION COMMISSION ALONG WITH THE PROPOSED MITIGATIVE MEASURES.

PRIOR TO THE COMMENCEMENT OF CONSTRUCTION, THE EROSION AND SEDIMENT CONTROL BARRIER SHALL BE INSTALLED AS SHOWN ON THE PLANS. THE CONTRACTOR SHALL MAINTAIN THE EROSION CONTROL BARRIER UNTIL ALL WORK IS COMPLETE AND ALL AREAS HAVE BEEN STABILIZED. THE REMOVAL OF SEDIMENT CONTROL DEVICES SHALL BE ONLY UPON THE APPROVAL OF THE CONSERVATION COMMISSION.

S. EROSION AND SEDIMENTATION CONTROL DEVICES, SUCH AS CHECK DAMS, SEDIMENT BASINS, ETC. ARE TO BE INSTALLED AS SHOWN ON THE SITE DEVELOPMENT PLANS WITH ASSOCIATED DETAILS, AS APPROPRIATE.

CONSTRUCTION OPERATIONS SHALL NOT CAUSE NOTICEABLE SEDIMENTATION PLUMES TO OCCUR ON OR SURROUNDING THE PROJECT. SHOULD SEDIMENT EXTEND BEYOND THE EROSION CONTROL BARRIERS, THE CONTRACTOR SHALL STOP WORK AND INSTALL ADDITIONAL MITIGATION MEASURES TO PREVENT FURTHER SEDIMENTATION.

NO MATERIAL SUBJECT TO EROSION SHALL BE STOCKPILED OVERNIGHT WITHIN 100 FEET OF ANY WETLAND AREAS WITHOUT PROPER EROSION AND SEDIMENTATION DEVICES IN PLACE.

EQUIPMENT SHALL NOT BE PARKED WITHIN WETLAND OR BUFFER AREAS EXCEPT DURING ACTUAL OPERATIONS REQUIRING SAID EQUIPMENT. D. ACCUMULATED SEDIMENT ALONG EROSION CONTROL BARRIERS SHALL

BE PERIODICALLY REMOVED AND DISPOSED OF BY THE CONTRACTOR AS REQUIRED BY THE CONSERVATION COMMISSION OR AS DIRECTED BY THE

<u>EROSION CONTROL METHODS:</u>

IT IS OF GREAT IMPORTANCE THAT CONCENTRATION OF RUNOFF BE AVOIDED IN ORDER TO PREVENT THE TRANSPORT OF SEDIMENT. THE PRIMARY EROSION CONTROL METHOD TO BE UTILIZED IS TO LIMIT THE AREA OF DISTURBANCE DURING CONSTRUCTION ACTIVITIES. THIS IS ACCOMPLISHED BY PROMPT STABILIZATION OF DISTURBED AREAS UPON COMPLETION OF SEQUENCES OF CONSTRUCTION.

EROSION AND SEDIMENT CONTROL DEVICES SUCH AS HAY BALES, SILT FENCES, DIVERSION BERMS, ETC. SHALL BE UTILIZED FOR THE PROTECTION OF THE AREAS BEYOND THE LIMIT OF CONSTRUCTION.

<u>DEMARCATION OF SENSITIVE AREAS:</u>

IT IS RECOMMEND THAT BARRIERS BE PLACED ON THE SITE TO CONTROL THE LIMITS OF THE DISTURBANCE. AS AN EXAMPLE, HAY BALE BARRIERS PROVIDE SUCH DEMARCATION AND OTHER METHODS SUCH AS LOG BARRIERS, ROPE WITH FLAGGING, ETC. MAY BE UTILIZED. CARE SHOULD BE TAKEN IN THE OPERATION OF EQUIPMENT, SUCH HAT ONLY THE MINIMUM AREA NEEDED TO BE ALTERED IS DISTURBED.

ACCESS TO THE SITE SHALL BE MADE IN THE AREA OF A PERMANENT DRIVEWAY OR ROADWAY UNLESS DOING SO WOULD RESULT IN A TRAFFIC

2. AN AREA OF CRUSHED STONE SHALL BE PLACED AT THE DRIVEWAY ENTRANCE TO INSURE THAT MUD IS NOT TRACKED ONTO THE EXISTING ROAD (SEE CONSTRUCTION ENTRANCE DETAIL). IF MUD IS INADVERTENTLY TRACKED ONTO THE ROAD, IT SHOULD BE PROMPTLY REMOVED.

LABORERS VEHICLES SHALL BE PARKED IN A DESIGNATED AREA AS O MINIMIZE DISTURBED SURFACES AND TO INSURE THAT RUTS ARE NOT CREATED AND WHICH COULD CARRY WATER TO A WETLAND OR OTHER

SUITABLE MEASURES SHALL BE TAKEN TO INSURE THAT LARGE DELIVERY TRUCKS SERVICING THE SITE DO NOT DAMAGE TO AREAS OF EXISTING VEGETATION OR CAUSE DISTURBANCE TO STABILIZED AREAS.

ORDERLY CONSTRUCTION PROCEDURES:

THE CONTRACTOR SHALL PERFORM SITE CONSTRUCTION IN A MANNER WHICH WILL INSURE THE STABILIZATION OF AREAS IN PROXIMITY OF OR TRIBUTARY TO WETLAND AREAS AS SOON AS POSSIBLE.

2. EROSION CONTROL DEVICES SUCH AS HAY BALE BARRIERS, SILT FENCES AND MULCH SHALL BE BROUGHT TO THE SITE AND STOCKPILED PRIOR TO INITIATING CONSTRUCTION.

THE CONTRACTOR SHALL PROVIDE AREAS FOR THE TEMPORARY STORAGE OF CONSTRUCTION DEBRIS. CONSTRUCTION DEBRIS SHALL NOT BE ALLOWED TO ACCUMULATE FOR AN EXTENDED PERIOD OF TIME.

LAND CLEARING SHALL BE PERFORMED IN PHASES CONSISTENT WITH

ACTUAL CONSTRUCTION REQUIREMENTS. FINAL LAND CLEARING SHALL BE LIMITED TO RETURN TO GRADE SLOPES. . TREES SHALL BE CUT FOR ENTIRE SITE LEAVING SUMPS IN PLACE TO

MAINTAIN SOIL STABILIZATION. 3. STUMPS SHALL BE PULLED AND STOCKPILED FOR GRINDING. 1. BRUSH AND BRANCHES SHOULD BE CHIPPED AND UTILIZED FOR WOOD MULCH IF PRACTICAL.

5. VEHICLES UTILIZED IN THE CLEARING OPERATION SHOULD NOT TRAVERSE WETLANDS OR FLOWING BROOKS OR STREAMS WITHOUT PRIOR APPROVAL FROM THE LOCAL CONSERVATION COMMISSION OR AGENT.



PERIMETER SIGNAGE NO SCALE

12" x 9" SIGNS TO BE PLACED ALONG FENCELINE AT 50 FT INTERVALS

ROUGH GRADING:

. THE ROUGH GRADING OF THE SITE SHALL FOLLOW THE FILL AND EXCAVATION SEQUENCES AS DESCRIBED ON THE CONSTRUCTION PHASING PLANS. SLOPES SHALL BE MAINTAINED AWAY FROM WETLANDS AND

SENSITIVE AREAS AS MUCH IS PRACTICAL. 2. DURING THIS PROCESS THE EROSION POTENTIAL IS HIGH. SUFFICIENT EROSION CONTROL BARRIERS SHOULD BE KEPT IN PROXIMITY TO THE WORK AREA TO ALLOW QUICK ACTION SHOULD EROSION BECOME AN ISSUE AND TO INSURE THAT NO SEDIMENT REACHES WETLANDS OR

OTHER SENSITIVE AREAS. 3. IN AREAS OF CUT AND/OR FILL WHERE SLOPES COULD DIVERT WATER TOWARD WETLAND AREAS, DIVERSION TRENCHES AND/OR SWALES SHOULD BE CONSIDERED AND IMPLEMENTED TO DIVERT WATER AWAY

4. STEEP SIDE SLOPES IN EXCAVATION OR FILL SHOULD BE AVOIDED. DISTURBED AREAS SHALL BE STABILIZED BY LOAMING AND SEEDING OR RIPRAPPED IMMEDIATELY AFTER THE FINISH GRADE HAS BEEN MET. IF FINAL GRADING DOES NOT OCCUR DURING THE GROWING SEASON THESE AREAS SHALL BE MULCHED WITH HAY WITH A TACKIFIER, IF NECESSARY SLOPED AREAS MAY REQUIRE ADDITIONAL CONTROLS SUCH

6. A GROUND COVER SUFFICIENT TO RETAIN SOILS IN A STABILIZED CONDITION MUST BE PROVIDED WITHIN 14 WORKING DAYS, SEASON PERMITTING, ON ANY PORTION OF THE TRACT UPON WHICH FURTHER ACTIVE CONSTRUCTION IS NOT BEING UNDERTAKEN.

1. IF DRAINAGE PIPES OR SWALES ARE TO BE INSTALLED, THEY SHALL BE CONSTRUCTED FROM DOWNSTREAM UP AND CONSTRUCTION SHALL INCLUDE THE PLACEMENT OF OUTFALL RIPRAP AND OTHER MITIGATIVE MEASURES SHOWN ON THE PLAN.

2. PRIOR TO THE COMMENCEMENT OF CONSTRUCTION, HAY BALES OR OTHER SUITABLE METHODS TO ENTRAP SEDIMENT SHALL BE PLACED

3. THE TOE OF EMBANKMENTS SHALL BE STABILIZED IMMEDIATELY, MULCHED AND TACKED DOWN BY SUITABLE MEANS.

CREATION OF DETENTION BASIN:

AS EROSION CONTROL SOCKS OR HAYBALES.

. THE DETENTION BASIN HAS BEEN PLACED AS A SEPARATE ITEM TO EMPHASIZE THE IMPORTANCE OF EROSION CONTROL DURING ITS

THE PRIMARY EROSION CONTROL METHOD FOR BASIN CONSTRUCTION, AS WELL AS FOR THE SITE IS THE RAPID STABILIZATION OF ALL SURFACES. SECONDARY IN IMPORTANCE IS THE CONCENTRATION OF RUNOFF BE AVOIDED IN ORDER TO PREVENT THE TRANSPORT OF

CLEAN-

ACCUMULATED

REGULARLY

SILT AND DEBRIS

3. DURING CONSTRUCTION, THE FILL AND EXCAVATION SEQUENCES SHOWN ON THE CONSTRUCTION PHASING PLANS, ALONG WITH THE DETAILS PROVIDED IN THIS PLAN SET SHALL BE UTILIZED. THESE SEQUENCES REQUIRE THAT SLOPED AREAS LEFT FOR ANY PERIOD OF TIME NOT SLOPED TOWARDS THE WETLAND OR SENSITIVE AREA, BUT RATHER BACK INTO THE FILL MATERIAL.

4. THE BASIN BERM IS TO BE CONSTRUCTED BY EQUIPMENT WORKING ON STABLE MATERIAL ONLY. HAY BALES SHALL BE PLACED AT THE TOE OF SLOPE UNTIL SURFACES ARE STABILIZED.

5. NO EXCAVATION WITHIN THE BASIN SHALL COMMENCE UNTIL THE BERM IS IN PLACE.

CARE SHOULD BE TAKEN TO INSURE THAT ORGANIC MATERIAL REMOVED FROM THE BASIN AREA IS RESERVED FOR FINISH GRADING AND THE STABILIZATION OF DISTURBED AREAS.

7. IF DEWATERING IS NECESSARY, PUMPING TO A SETTLING BASIN SHALL BE PERMITTED IF SETTLING BASIN IS CONSTRUCTED, MAINTAINED AND

8. AT NO TIME SHALL RUNOFF CARRYING SEDIMENT BE ALLOWED TO FLOW TO THE WETLANDS OR SENSITIVE AREAS.

9. THE WORK AREA SHALL REMAIN FREE OF LITTER AND DEBRIS AT ALL TIMES AND MONITORED ON A DAILY BASIS TO ENSURE COMPLIANCE. 10. ALL MATERIALS STOCKPILED SHALL BE LOCATED, MULCHED OR OTHERWISE TREATED TO INSURE THAT MATERIALS CONTAINED, THEREIN, AREA NOT CARRIED INTO THE WETLANDS.

11. ANY MATERIALS BLOWN OR CARRIED BY WATER AWAY FROM THE CONSTRUCTION SITE OR INTO THE WETLAND AREAS SHALL BE PROMPTL) REMOVED AS REQUIRED BY THE LOCAL CONSERVATION COMMISSION. 12. A GEOTECHNICAL FILTER FABRIC SHALL BE PLACED OVER THE BASIN SUBDRAIN DURING CONSTRUCTION TO PREVENT SEDIMENT FROM ENTERING

AND CLOGGING THE DRAIN. THE FABRIC SHALL BE REMOVED FOR BASIN

PREPARATION FOR FINAL STABILIZATION. GRUBBING AND STRIPPING:

1. TOP SOIL SHALL BE RETAINED AND STOCKPILED FOR LANDSCAPING PURPOSES.

P. GRUBBING AND STRIPPING OF SLOPES LEADING TO WETLAND AREAS SHOULD NOT BE UNDERTAKEN DURING PERIODS OF INTENSE RAINFALL. 3. TOP SOIL STOCKPILE LOCATIONS ARE DEPICTED ON THE SITE DEVELOPMENT PLAN, THE EROSION CONTROL PLAN, AND/OR THE CONSTRUCTION PHASING PLAN AND SHALL BE ADHERED TO. 4. WHEN WORKING IN THE VICINITY OF WETLANDS, TOP SOIL SATURATED WITH WATER SHALL BE REMOVED, AND CONTAINED PRIOR TO BEING USED. 5. AREAS LEADING TO WETLANDS SHALL HAVE HAY BALE BARRIERS

INSTALLED ACROSS THEM IN ARCS POINTING DOWN THE HILL AT INTERVALS SUFFICIENT TO MITIGATE RUNOFF CARRYING SEDIMENT. 6. DURING PERIODS OF INTENSE RAINFALL, OR IF THE PROJECT IS TO BE LEFT FOR A PERIOD OF TIME, CONSIDERATION SHOULD BE GIVEN TO SUPPLEMENT HAY BALE BARRIERS WITH EITHER CRUSHED STONE OR ARMORED BARRIERS. CONSIDERATION MAY ALSO BE GIVEN TO DIVERTING

7. WHENEVER PRACTICAL, NATURAL VEGETATION SHALL BE RETAINED, PROTECTED AND SUPPLEMENTED.

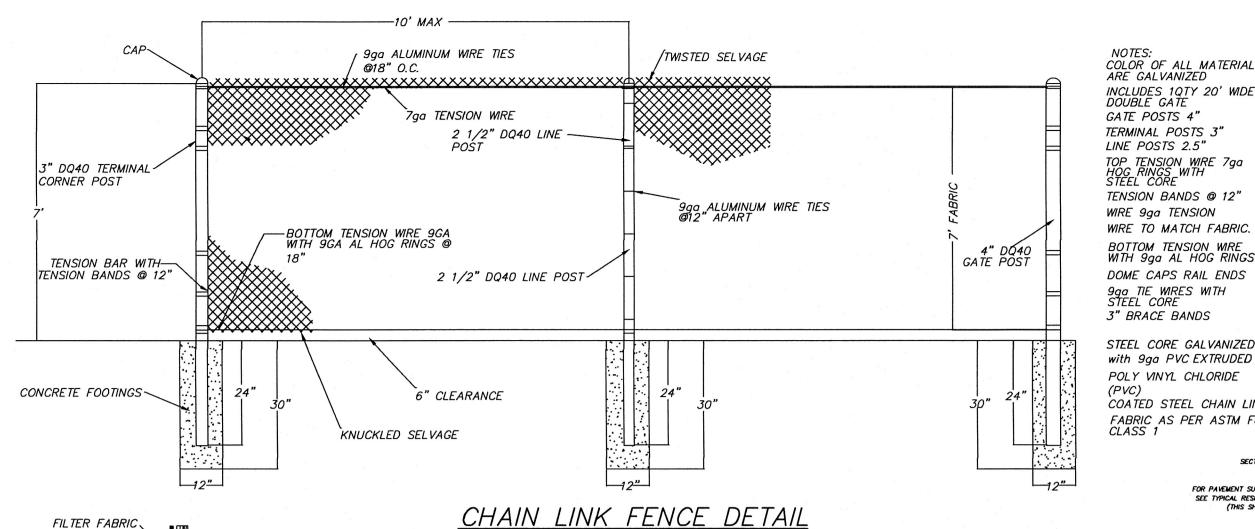
6' SPACING

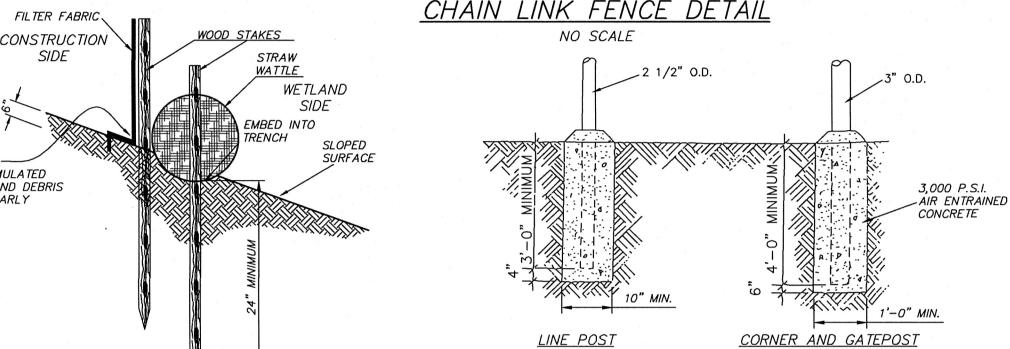
SPLICE

ANCHOR

PATTERN_

RUNOFF INTO TEMPORARY SEDIMENTATION CONTROL AREAS.





COMPACTED TO 95% DRY DENSITY

NO SCALE

FENCE POST DETAIL

NO SCALE

SECURE THE STRAW WATTLE WITH

FOR PAVEMENT SURFACE TREATMEN (SEE SPECIFICATIONS) (THIS SHEET) INSTALL WARNING AND TRACER WIRE 1. BELOW FINISH GRADE SAND BACKFILL MATERIAL HAND PLACED & COMPACTI IN 6" LIFTS TO 12" ABOVE IRECTLY ABOVE ELECTRICAL LINE FILTER CLOTH TO BE WITHIN 6" OF PIP (WHERE REQUIRED) TO BE PLACED AGAINST <u>CONDUIT TRENCH</u>

SECTION IN SHOULDER

EXCAVATION SEQUENCE PHASE PHASE II EXISTING GRADE WORKING FACE - LOAM AND SEED EXCAVATED AREAS - SHALL ALWAYS SLOPE AWAY FROM AS SOON AS POSSIBLE SENSITIVE AREA -EXISTING GRADE **** FINISH GRADE -- MAINTAIN EXCAVATED AREA EXCAVATE TOWARDS SLOPE AWAY FROM DISTURBED SHOULD BE AS REQUIRED TO INSURE ENTRAPMENT SENSITIVE AREA WITH FACE AS SHOWN IN PHASE 1 WITH FINISH OF WATER FROM DISTURBED BASE GRADES PHASE IV PHASE III - EXISTING GRADE **一种市市市市市市市市市** ******* FINISH GRADE-**EXCAVATE AS SHOWN IN PHASE 2** LEAVE 2 FOOT HIGH BERM UNTIL GRASS IS ESTABLISHED AT TOE OF BERM AREA IS STABILIZED LOAM AND SEED & MULCH FILL SEQUENCE NO SCALE PHASE II—A PHASE I PLACE MATERIAL WITH - SLOPE AWAY FROM SENSITIVE AREAS - EXCAVATE AREAS ONLY AS REQUIRED PRIOR TO PLACEMENT OF MATERIALS GRUB AND STRIP SITE LEAVING DIKES O UNDISTURBED MATERIAL PROXIMITY OF DISTURBANCE IF MATERIAL CANNOT BE PLACED AS IN PHASE 2-A PHASE II-B PHASE III O SENSITIVE AREA. BUT. FROM EROSION EROSION POTENTIAL I PRESENT, FORM DIKES DIVERT (NOT RETAIN) WATER TO SLOPES AND MULCH IF REQUIRED UNDISTURBED AREA CAPABLE SENSITIVE AREAS OF ALLOWING SEDIMENTATION DEVICE TO RETAIN _ IMMEDIATELY UPON

NO SCALE

CMA

CMA

BY

(978) 534-1234 (T

(978) 534-6060 (F

NO SCALE — WIDTH VARIES (SEE SITE PLAN) ——— 'FACILITY NAME" SUB-BASE MATERIAL, CLEAN FILL COMPACTED TO 95% DRY DENSITY OWNER CONTACT INFORMATION 🥆 UNDISTURBED EARTH OR SUITABLE MATERIAL 🖊 (###) ### — #### GRAVEL ACCESS LANE SECTION (FOR ACCESS TO SITE AND DETENTION BASIN) OPERATOR CONTACT INFORMATION

(###) ### — #### **EMERGENCY CONTACT INFORMATION** (###) ### - ####

STRAW WATTLE DETAIL

TYPICAL PROJECT SIGN 24" x 24"

SIGNS TO BE PLACED AT ENTRANCE OF PROJECT

DETAIL OF

ATERAL

SPLICE ANCHOR

PATTERN

BOTTOM TRENCH AND

AS TOP TRENCH)

ANCHORS (SAME SPACING

TOP TRENCH

PROVIDE MOISTURE TOLERANT GRASSES FENCE POST FOR SIDE SLOPES. TWO STAKES/BALE FILTER FABRIC STRAW CONSTRUCTION 12" COMPACTED GRANULAR BASE M1.03.0- TYPE A ANGULAR STONES (50 LB. - 125 LB.) (MHD SPEC. M2.02.3) PLACED TO WETLAND SIDE FORM A COMPACT, STABLE CHANNEL 6" MINIMUM EDGE OF FABRIC TO STAKE PENETRATION BE SECURED IN 6" DEEP TRENCH STRAW BALE WITH SILT FENCE DETAIL

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COLOR OF ALL MATERIALS

INCLUDES 1QTY 20' WIDE DOUBLE GATE

ARE GALVANIZED

GATE POSTS 4"

LINE POSTS 2.5"

TERMINAL POSTS 3"

TENSION BANDS @ 12"

WIRE TO MATCH FABRIC.

BOTTOM TENSION WIRE WITH 9ga AL HOG RINGS

DOME CAPS RAIL ENDS

with 9ga PVC EXTRUDED

COATED STEEL CHAIN LINK

FABRIC AS PER ASTM F668

POLY VINYL CHLORIDE

9ga TIE WIRES WITH STEEL CORE

WIRE 9ga TENSION

STONED BOTTOM DRAINAGE SWALE DETAIL GRADING REVISIONS 2 11/15/21

PEER-REVIEW COMMENT

REVISIONS

1 10/19/2

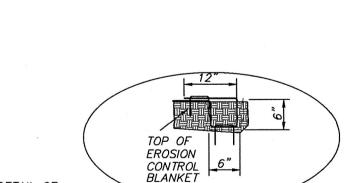
|HANNIGAN

8 Monument Square

NO. DATE

SWALE DEPTH

(2' AVERAGE)



AND ANCHORS PROCEDURES FOR INSTALLATION OF EROSION CONTROL BLANKET: PREPARE SLOPES WITH FINAL GRADING AND LOAM PLACEMENT. RAKE AND ŚMOOTH FINAL SURFACE, APPLY <u>APPLICABLE SEED MIX</u>. 2) START AT THE TOP OF SLOPE BY ANCHORING BLANKETS IN A 6" DEEP x 6"

> COMPACT WITH FABRIC OVERLAP OF 12". 3) ROLL BLANKETS DOWN THE SLOPE. STAPLE THE OPEN BLANKET EDGE USING ONE ROW OF STAPLES AT 2' INTERVALS. THE INTERIOR OF THE BLANKET SHOULD BE STAPLED USING A 2' WIDE x 3' HIGH STAPLE PATTERN. BE SURE TO LAY BLANKETS LOOSLY ON THE GROUND ALLOWING A GOOD CONTACT BETWEEN SOIL

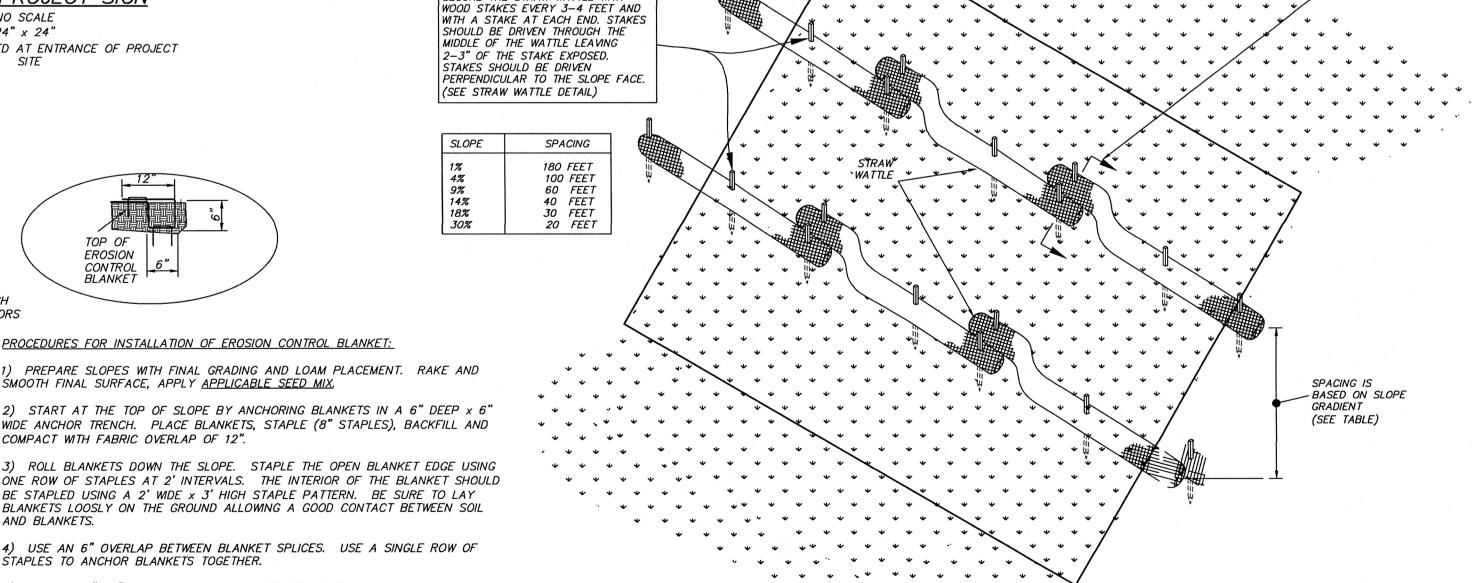
4) USE AN 6" OVERLAP BETWEEN BLANKET SPLICES. USE A SINGLE ROW OF STAPLES TO ANCHOR BLANKETS TOGETHER.

5) PROVIDE 6"x 6" ANCHOR TRENCH AT TOE OF SLOPE. 6) EROSION CONTROL BLANKET TYPE SHALL BE PROPERLY SELECTED FOR SOIL CONDITIONS AND MAXIMUM ALLOWABLE SLOPE.

VEGETATIVE COVER HAS BEEN ESTABLISHED. 8) GRASS SEED VARIETY SHALL BE PROPERLY CHOSEN FOR SPECIFIC SITE CONDITIONS (SHADE OR SUN, ETC.)

7) ANY/ALL METALLIC ANCHORS SHALL BE PROMPTLY REMOVED ONCE THE

EROSION CONTROL BANKET PLACEMENT NO SCALE



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EROSION CONTROL SLOPE DETAIL

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APPLICANT: ZP BATTERY DEVCO, LLC BRENDON GOVE 10 E. WORCESTER STREET, SUIT 3A WORCESTER, MASSACHUSETTS 01604 <u>OWNER:</u> WR ENTERPRISES, LLC

LEICESTER, MASSACHUSETTS 01524

1323 MAIN STREET

ADJACENT STRAW

TIGHTLY OVERLAP

CONSTRUCTION DETAILS LEICESTER, MASSACHUSETTS PREPARED FOR: ZP BATTERY DEVCO, LLC BRENDAN GOVE 10 E WORCESTER STREET SUITE 3A WORCESTER, MASSACHUSETTS 01604

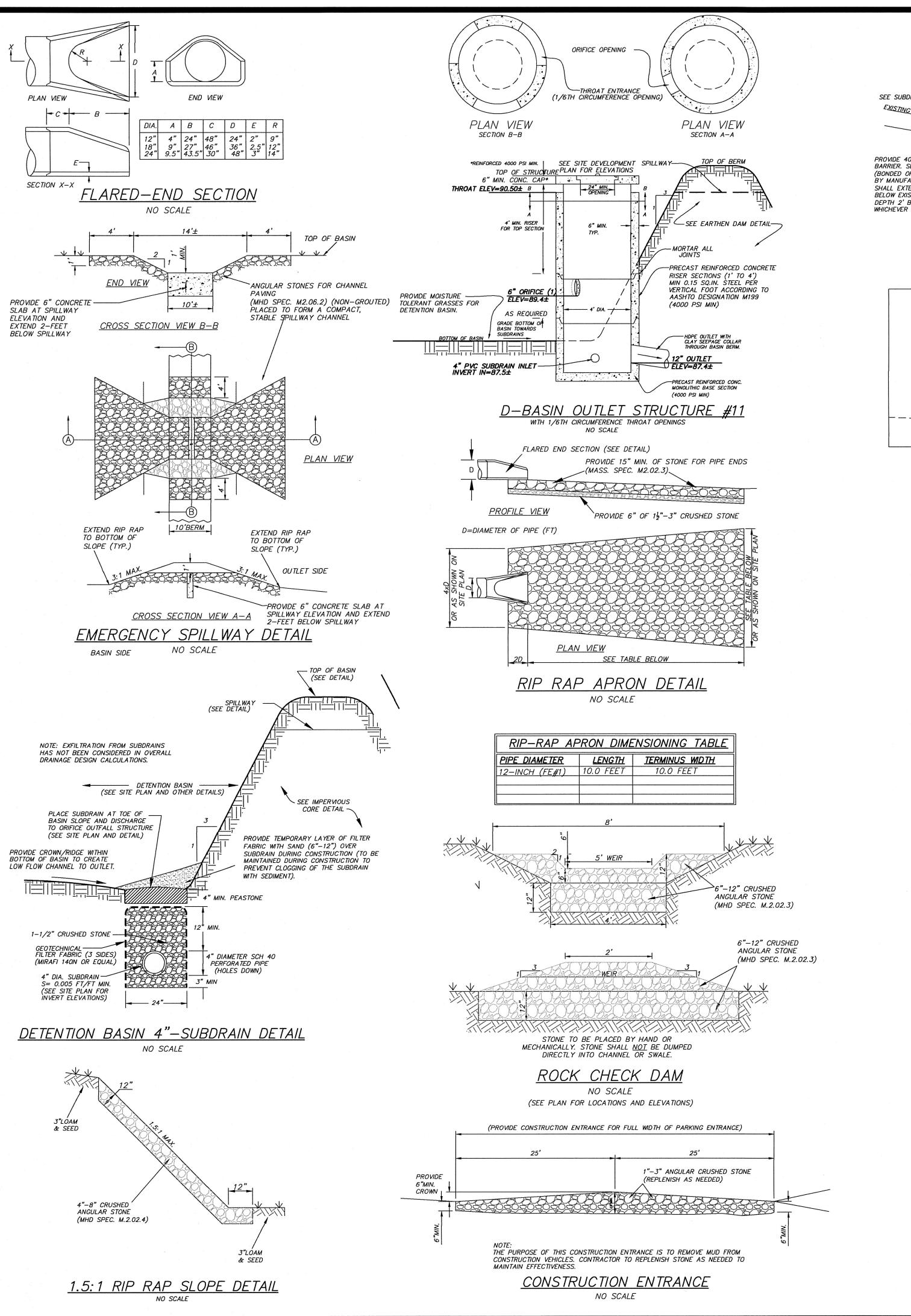
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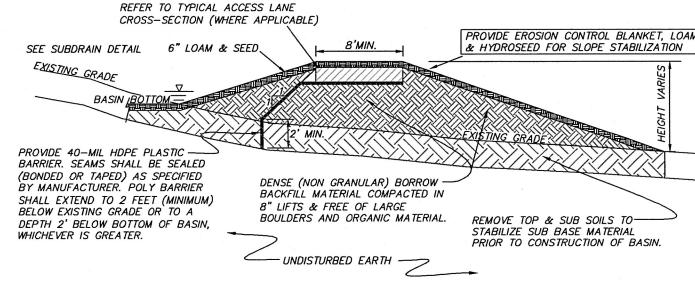
CIVIL ENGINEERS & LAND SURVEYORS

LEOMINSTER, MASSACHUSETTS 01453

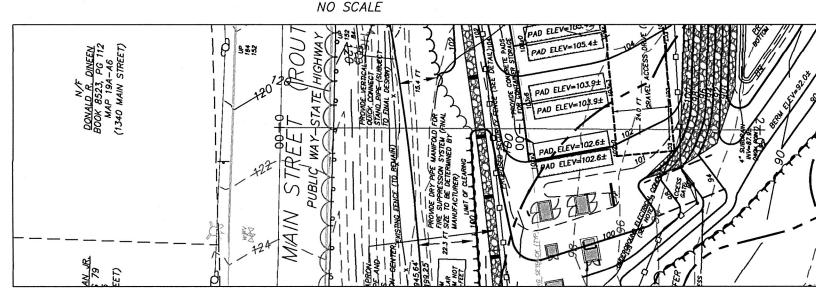
21					
	CALC: CMA	DRWN: CMA	SCALE: NA		
	CHKD: WDH	APPD: WDH	DATE: SEP 21, 2021		
	SRV: JEF	FB: 71–22	JOB NO: 3010		
	TAB: (5-6)DET	SHEET 5 OF 6	PLAN N0:C-17-38		

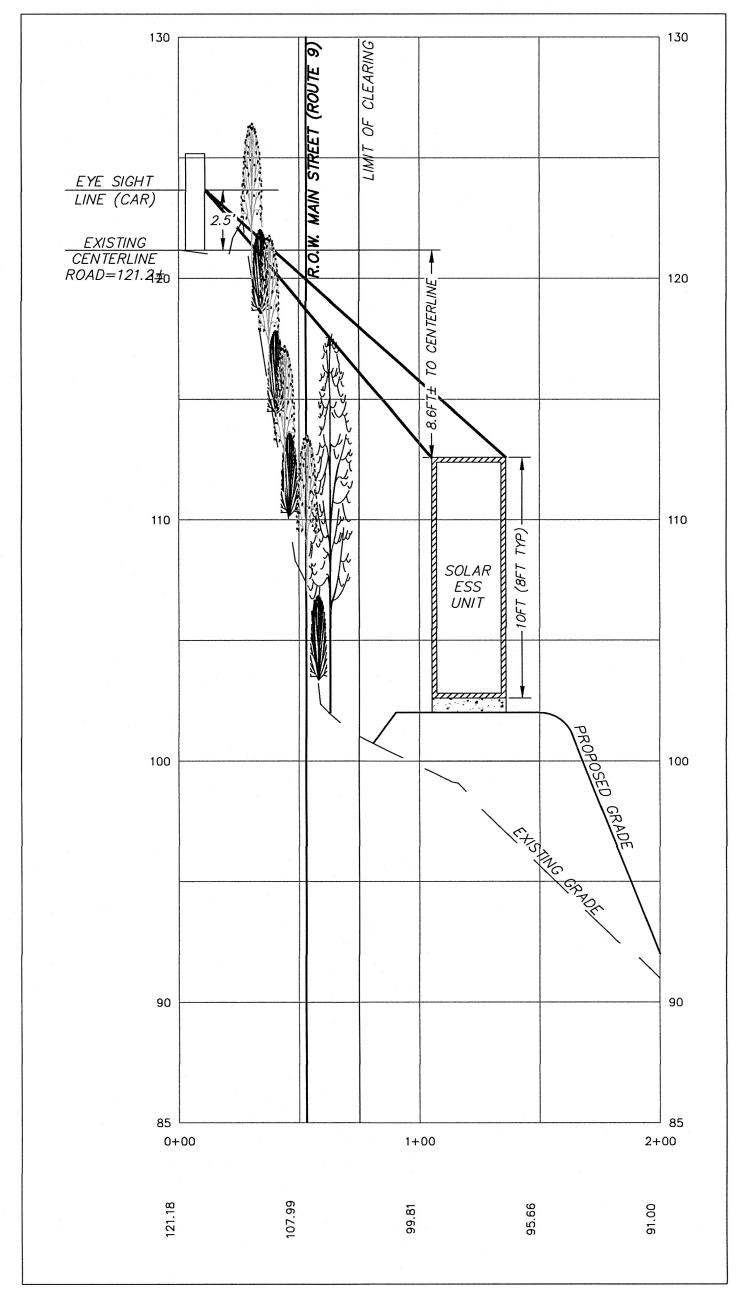


NOTE: FOUNDATION FOR BERM CONSTRUCTION SHALL BE CLEARED OF ALL TOP SOIL, ROCKS, DEBRIS, STUMPS, ETC. TO A FIRM SURFACE. IN NO CASE SHALL THIS EXCAVATION BE LESS THAN 12 INCHES SUBGRADE SHALL BE SCARIFIED AND MOISTENED TO A DEPTH OF 3 INCHES PRIOR TO PLACEMENT OF FILL.



DETENTION BASIN BERM (REQUIRED FOR DETENTION BASIN CONSTRUCTION)





PROJECT SIGHT LINE

HORIZONTAL SCALE=1": 40' VERTICAL SCALE=1": 4'

STORMWATER OPERATION AND MAINTENANCE PLAN

THE FOLLOWING SHALL BE CONSIDERED THE OPERATION & MAINTENANCE PLAN (OMP) FOR THE STORMWATER COLLECTION FACILITY FOR THIS DEVELOPMENT. THIS OMP HAS BEEN PREPARED IN ACCORDANCE WITH THE STORMWATER MANAGEMENT POLICY AS ISSUED BY THE DEPARTMENT OF ENVIRONMENTAL PROTECTION.

SYSTEM OWNERSHIP THE SYSTEM SHALL INCLUDE THE DRAINAGE INFRASTRUCTURE AND ALL OF ITS COMPONENTS AS SHOWN ON THE SITE DEVELOPMENT PLANS, INCLUDING THE DETENTION FACILITIES AND OUTFALL AREAS OF THE DRAINAGE SYSTEM. THE STRUCTURES OF THE SYSTEM SHALL INCLUDE THE DRAINAGE SWALES AND THE OUTFALL & CAPPONED STRUCTURES. THE SYSTEM SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE CONSTRUCTION DETAILS AND THE APPROVED PLANS.

UPON THE COMPLETION OF CONSTRUCTION THE DRAINAGE SYSTEM DESCRIBED ABOVE AND AS DEPICTED ON THE SITE PLANS SHALL BECOME PROPERTY OF THE LAND OWNER, WITH SPECIFIC EASEMENT RIGHTS TO THE OPERATOR OF THE SOLAR SYSTEM TO MAINTAIN THE DRAINAGE SYSTEM AS DEPICTED ON THE APPROVED PLANS. SAID EASEMENT RIGHTS SHALL BE SPECIFICALLY DESCRIBED IN LEASE DOCUMENTS FOR THE PROJECT.

RESPONSIBLE PARTIES THE OPERATOR OF THE SOLAR SYSTEM SHALL BE CONSIDERED THE RESPONSIBLE PARTY FOR THE OPERATION AND MAINTENANCE OF THE STORMWATER MANAGEMENT SYSTEM. THE SYSTEM SHALL INCLUDE THE DRAINAGE INFRASTRUCTURE AND ALL OF ITS COMPONENTS AS SHOWN ON THE APPROVED PLANS. THE SYSTEM SHALL ALSO INCLUDE THE DETENTION FACILITIES AND THE OUTFALL AREAS OF THE DRAINAGE SYSTEM.

III. INSPECTION & MAINTENANCE SCHEDULE THE FOLLOWING MAINTENANCE SCHEDULE SHALL BE FOLLOWED IN ORDER TO MAINTAIN THE EFFECTIVENESS OF THE STORMWATER MANAGEMENT SYSTEM.

STRUCTURE TYPE TWICE A YEAR REMOVE DEBRIS & ADD STONE RIP/RAP APRONS EVERY 10 YEARS SUBDRAINS TWICE A YEAR EVERY 4 YEARS REPLACE PEASTONE MONTHLY (MAY-OCT) MONTHLY (MAY-OCT) MOW GRASS AREAS & REMOVE DEBRIS DETENTION BASINS REMOVE SEDIMENT IF PRESENT **OUTFALL STRUCTURES:** EVERY 10 YEARS REMOVE DEBRIS & ADD STONE TWICE A YEAR

NOTE: THE DETENTION BASINS ON THIS PROJECT MAY GROW VEGETATION IN THE BOTTOM WHICH MAY INCLUDE SPECIES PART OF THE WETLAND PROTECTION ACT. THESE PLANTS SHALL NOT BE CONSTRUED AS HAVING PROTECTION UNDER THE ACT AND SHALL BE CONSIDERED OPPORTUNISTIC GROWTH PLANTS. ADDITIONALLY, THIS AREA SHALL NOT BE CONSIDERED A CONSTRUCTED WETLAND.

SEEDING OPERATION AND MAINTENANCE PLAN

THE OPERATOR OF THE SOLAR SYSTEM SHALL BE CONSIDERED THE RESPONSIBLE PARTY FOR THE OPERATION AND MAINTENANCE OF THE GRASS & VEGETATION. THE VEGETATION SHALL INCLUDE ALL OF ITS AREAS AS SHOWN ON THE APPROVED PLANS. THE SYSTEM SHALL ALSO INCLUDE THE GRASSED AREAS AROUND THE PANELS AND DRAINAGE

INSPECTION & MAINTENANCE SCHEDULE THE FOLLOWING MAINTENANCE SCHEDULE SHALL BE FOLLOWED IN ORDER TO MAINTAIN THE VEGETATED AREAS MAINTENANCE

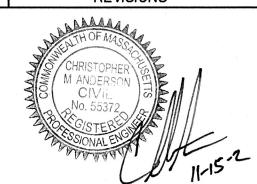
GRASS HEIGHT TO BE ALLOWED TO GROW TO A GRASS CUTTING MONTHLY HEIGHT OF NO MORE THAN 18 INCHES AND BE CUT TO A HEIGHT OF 4 TO 6 INCHES.

III. APPROPIATE SEED MIX AND APPLICATION RATES THE FOLLOWING SEED SCHEDULE SHALL BE FOLLOWED IN ORDER TO PROPERLY MAINTAIN VEGETATED AREAS APPLICATION RATE 5 TO 10 POUNDS PER ACRE WILDFLOWER SEED MIX 50% WHITE CLOVER SEED MIX 3 TO 5 POUNDS PER ACRE 10% KENTUCKY BLUEGRASS 80 TO 100 POUNDS PER ACRE 40%

IV. HERBICIDES & PESTICIDES

THERE WILL NO HERBICIDES OR PESTICIDES USED ON THIS PROJECT.

11/15/21 GRADING REVISIONS CMAPEER-REVIEW COMMENT 10/19/21 CMANO. DATE REVISIONS BY



|HANNIGAN ENGINEERING, INC.

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8 MONUMENT SQUARE (978) 534-1234 (T) LEOMINSTER, MASSACHUSETTS 01453 (978) 534-6060 (F) WWW.HANNIGANENGINEERING.COM

CONSTRUCTION DETAILS LEICESTER, MASSACHUSETTS

PREPARED FOR: ZP BATTERY DEVCO, LLC BRENDAN GOVE 10 E WORCESTER STREET SUITE 3A

WORCESTER, MASSACHUSETTS 01604

SCALE: NA DRWN: CMA CALC: CMA CHKD: WDH DATE: SEP 21, 202 **FB:** 71–22 JOB NO: 3010 SRV: JEF SHEET 6 OF 6 | PLAN NO:C-17-3 LEICESTER, MASSACHUSETTS 01524 **TAB:** (5-6) DET

APPLICANT: ZP BATTERY DEVCO, LLC BRENDON GOVE 10 E. WORCESTER STREET, SUIT 3A WORCESTER, MASSACHUSETTS 01604 **OWNER:** WR ENTERPRISES, LLC 1323 MAIN STREET