Metro Consulting Associates
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February 3, 2025

Members of the Planning Commission
Saline Township
Washtenaw County, MI

RE: Civil Engineering Memorandum for Jupiter Power's Voyager BESS Project Site Plan Application – Development Standards

Dear Commissioners:

Metro Consulting Associates, LLC (MCA) has been hired by Jupiter Power to provide Civil Engineering Services for a proposed Battery Energy Storage System (BESS) Facility Project in Saline Township. The project Site Plan displays a project consisting of battery storage enclosures and transformers, electrical generation tie-in (Gen-Tie) wiring to an existing substation, as well as a gravel access drive and pad, security fencing and lighting, landscaping for screening, a privately owned and maintained dry-watermain and dry-fire hydrant system, a 32,000-gallon on-site water tank to provide fire water storage, a new groundwater well and pump used to fill the water storage tank, and a new stormwater management system.

1. BACKGROUND

This memorandum has been compiled to address all of the Zoning-specific Development Standards contained within Saline Township's BESS Ordinance, or to add further context for requirements in the table outlining requirements for Site Plan submissions. This memorandum is intended to serve as an appendix document that may be referenced either as a whole, or may be selectively quoted by Jupiter Power in their submission to preemptively answer reviewers' questions regarding if all requirements have been met.

1.1 SETBACKS

All proposed BESS project equipment is located >300 feet from the nearest property line or right-of-way.

1.2 HEIGHT

All proposed "Outdoor Installation" BESS enclosures and other associated and auxiliary electrical enclosures comply with the height limitations for principal structures of the agricultural zoning district. Each BESS unit will be ~10 feet tall once installed. The single 32,000 gallon fire water storage tank being proposed will be slightly taller, at ~11 feet tall and will have a permanent perimeter safety railing approximately 14 feet above proposed grade. The height of light poles will not exceed Township-defined standards. Within the project substation, the height of utility poles and other electrical equipment will be dictated by NEC safety standards and the Licensed Electrical Engineer of Record designing the substation.

1.3 LIGHTING

Lighting of the battery energy storage systems will be limited to what is required for safety and operational purposes. They will turn on based on sensing motion within the perimeter fence. Light pole lighting fixtures will also be reasonably shielded to minimize visibility from neighboring properties.

1.4 SIGNS

Signs will be placed as required by the BESS ordinance. All signs will comply with ANSI Z535 and will display information as shown on Sheet 20 of the Site Plan.

1.5 FENCING

Proposed perimeter fence is to be an up to 7-foot tall chain link security fence with 1-foot-high barbed wire installed along the top of the fence. The Saline Township BESS Ordinance states that a minimum of 24-feet of clearance shall be maintained on both sides the perimeter fence, which has been provided.

1.6 CONTAINMENT – INTRODUCTION TO ENGINEER OF RECORD CONCLUSIONS

Section 3 of this memorandum provides detailed information regarding the site's existing natural (in-situ) soils and the surface water infiltration considerations. The proposed subgrade and aggregate surface grading design for the BESS yard and project substation are both intentionally designed with a modest slope that enables future runoff to flow in the same directions as existing surface waters run off, which are to the West and North. The NW corner of the site is the proposed location of the stormwater pond, which is where the vast majority of precipitation will end up being stored before being released in a rate-controlled way. Since the pond area has been tested and directly observed by soil infiltration experts, compelling datapoints suggest that dense naturally occurring layers of clayey soils underly the proposed area being developed. To this day, engineers still specify layers of clay when designing a landfill because clay can contain potential sources of contamination. Similarly, the clay found on this site forms a natural layer of protection for deeper groundwater aquifers.

1.7 VEGETATION AND TREE CUTTING

All existing forested areas on the property and the perimeter of the property will be preserved as-is. The distance of proposed vegetation from each side of Type 2 Battery Energy Storage Systems will exceed the 50-foot minimum. Green grass and other ground cover plants in the proposed seed mix will be more than 50-feet, and proposed trees also far exceed that minimum as shown on Site Plan Sheet 15, Landscape Plan.

1.8 SCREENING AND NOISE BARRIERS

The Landscape Plan, Sheet 15, depicts the locations of the tree and shrub plant species proposed for visual screening and also provides a detailed plant list at the bottom of the sheet. Additional visual screening is provided by the berm located west and north of the BESS yard. This berm also provides a noise barrier.

1.9 UTILITY CONNECTIONS & PRIVATE ON-SITE WATER INFRASTRUCTURE

A Gen-Tie connection is proposed to connect the project substation with the existing Transmission-connected substation to the northeast of the project. This is shown on Sheet 19. This Proposed Site Plan does not include any telecommunications or lower-voltage distribution grid utility connections.

The proposed site plan includes privately-owned and operated on-site utilities that include a groundwater well and well pump, a 32,000-gallon fire water storage tank, and a private dry-hydrant watermain system with hydrants and gate valves that enable fire-water flow to hydrants within range of all proposed Outdoor Installation electrical or controls infrastructure.

1.10 MAXIMUM GROUND COVERAGE RATIO REQUIREMENTS

The table within the Site Plan simply states this coverage ratio is Not Applicable. This is because the entire project consists of what are considered "Outdoor Installations" and there are zero Dedicated-Use Buildings proposed. These Outdoor Installations are exempt from such calculations, as stated in the BESS ordinance.

2. BASIS OF PRIVATE ACCESS DRIVE DESIGNATION

We propose that the Access Drive remain 100% private. We recommend this because we assume that maintaining clear and obstacle-free EMS site access is paramount, which to us means that members of the public should not be provided public road right-of-way that puts them in closer proximity to the facility than necessary. By keeping the access drive private, we reduce the likelihood of members of the public delaying EMS response.

3. BASIS OF CONCLUSIONS REGARDING DESIGN PROVIDING REQUIRED CONTAINMENT

On behalf of Jupiter Power, MCA obtained on-site soil infiltration testing services from a reputable third-party Geotechnical Engineering firm for the project in Saline Township.

In brief, the soils investigation found Stiff to Hard Brown and Gray Silty Clay in all eight of the tests pits dug from the bottom of the topsoil layer to the depths of excavation (generally 7.5' to 9.5'). Generally speaking, the test water levels did not drop over the two-hour infiltration test period meaning the site soils have an infiltration rate near zero.

This testing was completed by FK Engineering (FKE) back in the summer of 2022 using the type of infiltration testing equipment and the corresponding procedures required by Washtenaw County Water Resources Commission (WCWRC). A Geotechnical Investigation Data Report was provided and reviewed by MCA prior to being delivered in its entirety to Jupiter Power. FKE's report can be provided to Saline Township upon request.

3.1 EXISTING SITE SOILS AND PROPERTIES ANTICIPATED

The test pits dug during the soil investigation and infiltration testing can be compared with publicly available sources of county-wide soil survey records. According to the United States Department of Agriculture's Natural Resources Conservation Service, the soils found on site were expected to be as follows:

- *loam* (a mixture of sand, silt, and clay soils) for the top ~9 inches of soil
- clay or loamy clay soils from a depth of 10 inches to ~79 inches
- the depth to a *restrictive* feature (a soil layer that significantly impedes root growth and/or water and air movement) is likely to be found at a depth of between 26 and 45 inches
- The restrictive soil layer is likely to be *densic material* (relatively unaltered and compact, with a non-cemented rupture-resistant class)

According to the United States Department of Agriculture, a "*restrictive layer*" is a nearly continuous layer [of soil] that has one or more physical, chemical, or thermal properties that significantly impede the movement of water and air through the soil or that restrict roots or otherwise provide an unfavorable root environment. Examples are bedrock, cemented layers, dense layers, and frozen layers.

Based on these existing soil properties, the in-situ clayey soils form a restrictive layer that significantly impedes absorption and vertical infiltration of surface water into the local aquifer. On sites with clayey soil layers like this, stormwater runoff surface drains across the site and simply flows off-site if it is not managed.

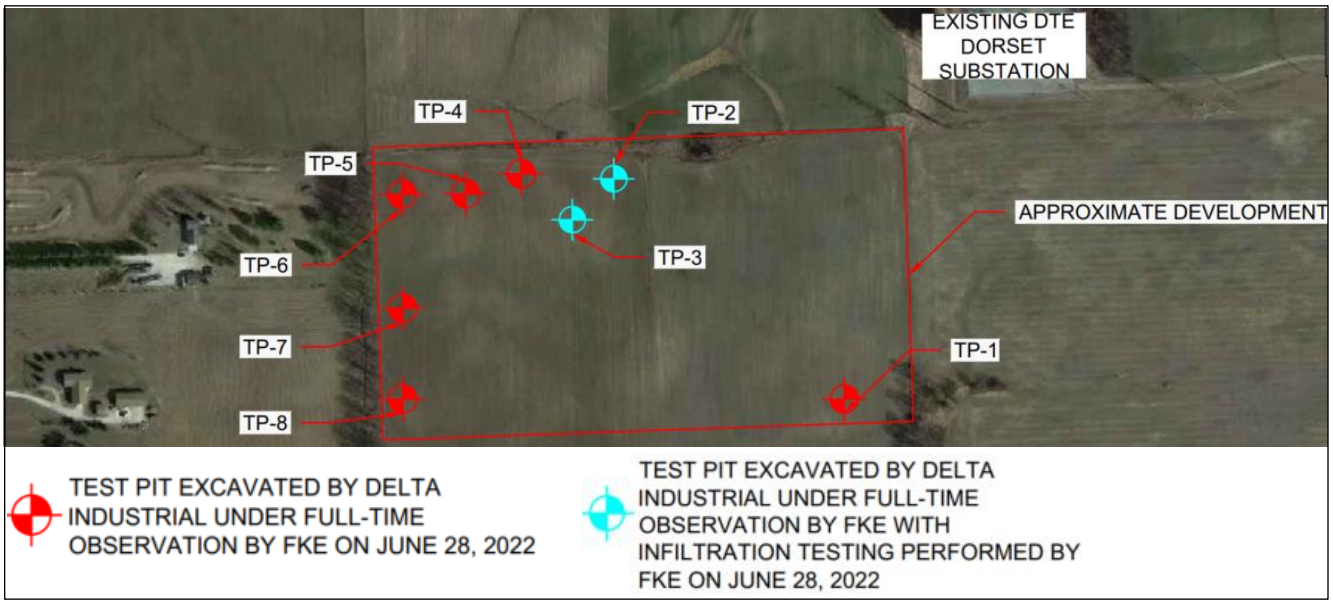
Additional research and explanation of the local soil permeability and groundwater table are provided on page 5.

3.2 EXISTING SITE SOILS OBSERVED AND TESTED FOR INFILTRATION

The test pits dug during the soil investigation and infiltration testing found *in-situ* ("in the original place", or "in the original position") soils consistent with those shown in publicly available sources of county-wide soil survey records.

Double-ring infiltration tests were performed in two of the eight test pits. Notably, the infiltration testing was completed on the two least-dense (*Stiff*, rather than *Very Stiff* or *Hard*) in-situ soils found among the test pits tested in the NW corner of the property. The stormwater pond on the preliminary site plan is also located in the NW corner of the property.

Figure 1: Locations of Test Pits Overseen by FKE (All pits contained Stiff to Hard SILTY CLAY)



Generally speaking, the test water levels did not drop over the two-hour infiltration test period meaning the site soils have an infiltration rate near zero.

These field verifications of very low permeability on this parcel are in line with what has been known and documented regarding Washtenaw County and Saline Township soils for many years. As depicted in Figure 2. Permeability of soils and glacial deposits (to a depth of 30 feet) from the USGS Open-File Report 80GHEPWCM page 4 of 8 displaying permeability (the state or quality of materials or soil that allows liquids to pass through them). These findings have been previously studied and documented by Veatch and others going back to 1930.

Figure 2: Permeability of soils & glacial deposits in Washtenaw County to a depth of 30 ft (with colorful lines added)

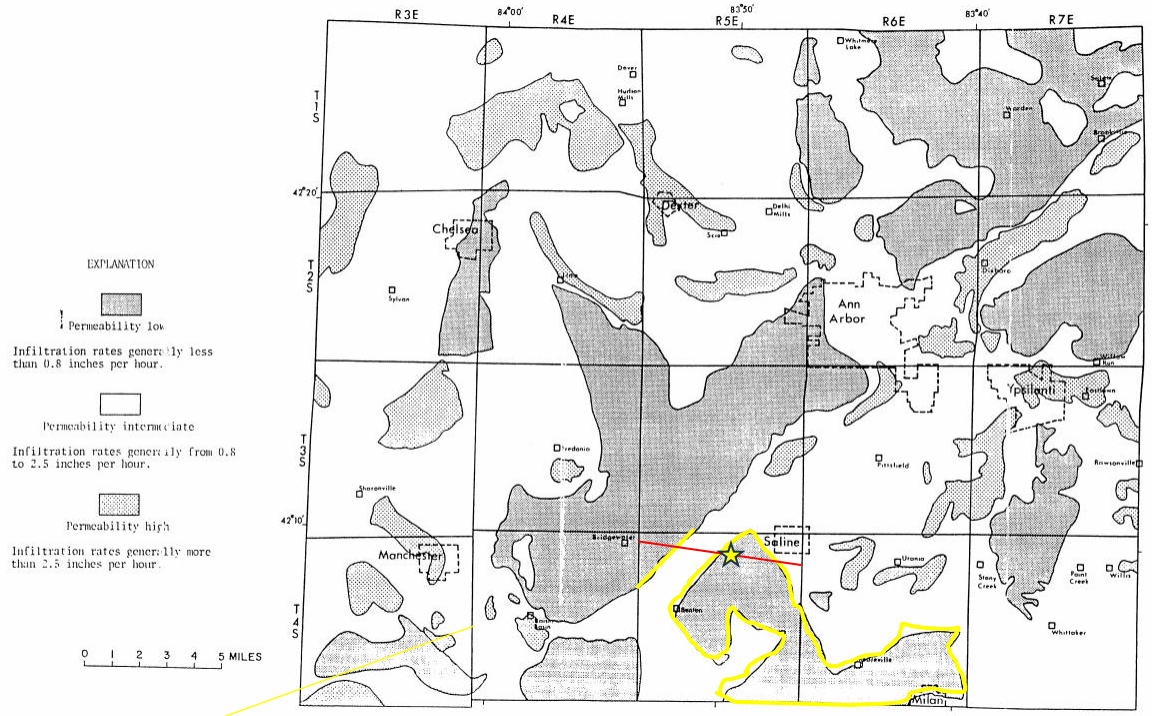
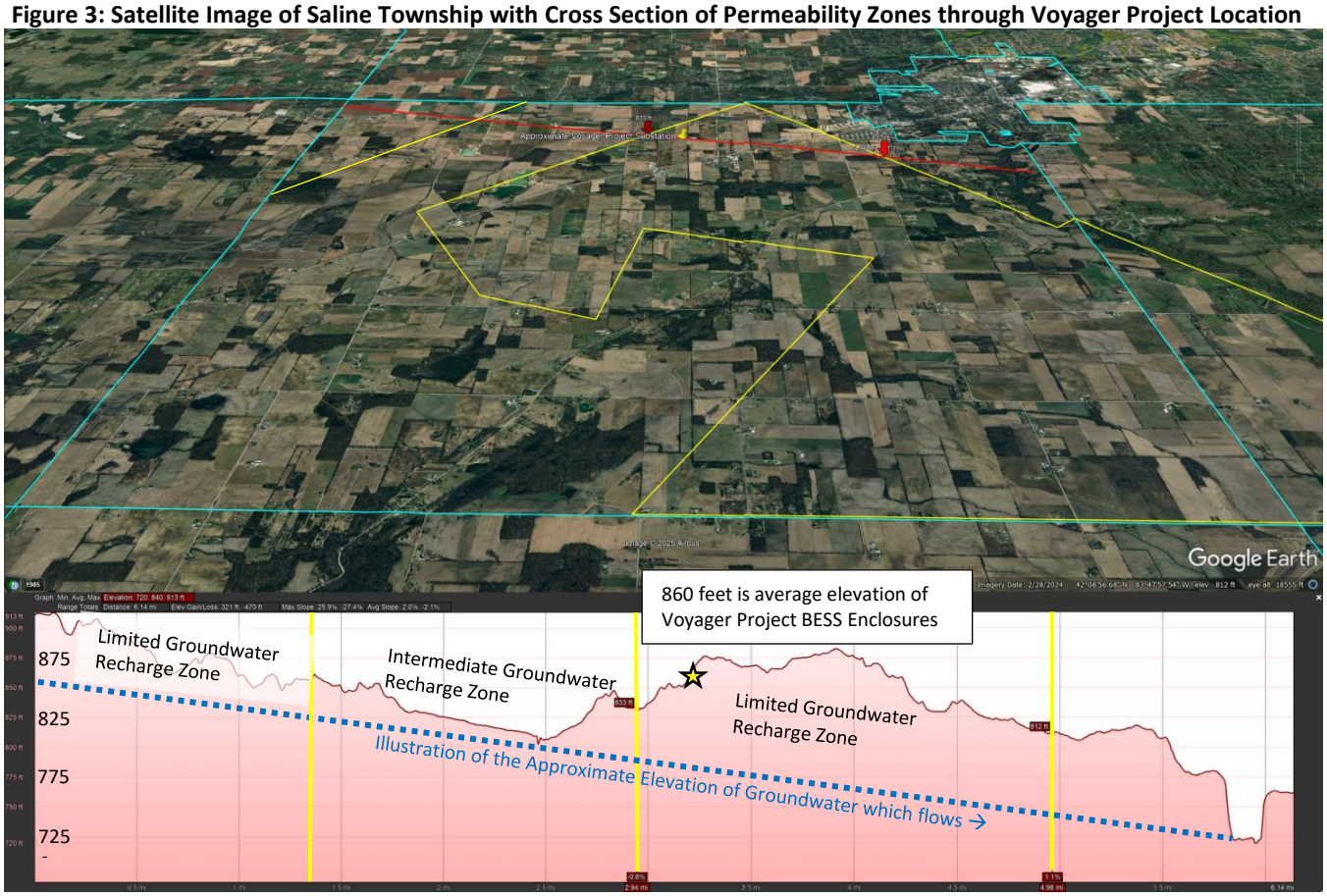


Figure 3: Satellite Image of Saline Township with Cross Section of Permeability Zones through Voyager Project Location



Based on the site-specific infiltration testing results from locations in Figure 1, we can confirm the in-situ soils are not expected to quickly infiltrate surface runoff directly into the local aquifer. The majority of rainfall will surface drain (run downhill) across the site, and engineered best management practices will be used to store stormwater and delay it from flowing off-site.

3.3 MCA's SURFACE WATER CONTAINMENT DESIGN CONSIDERATIONS

Site design principles for controlling stormwater will focus on quickly capturing and directly conveying stormwater to runoff via underdrain piping to two separate stormwater collection manhole structures that directly outlet to a partially lined stormwater pond. The two stormwater manhole structures will be located outside the SW and NW corners of the BESS Yard perimeter fence. These pre-cast concrete stormwater manholes will have multiple important characteristics.

1. The sides of each stormwater manhole will have openings and necessary fittings to accept flow directly from the underdrain system shown in the drawings.
2. The tops of each stormwater manhole will serve as a catch-basins to receive water from grass-lined, open-channel swales that have been engineered to collect and convey any surface water runoff. This feature of the manhole will be visible above grade in the form of a bee-hive-like domed grate, and will be a design feature that prevents large pieces of trash or debris from flowing into the stormwater pond.
3. The bottom of the stormwater manholes will be a few feet deeper than the outlet pipe conveying water to the stormwater pond. This sump will enable any large suspended solids to settle out before being conveyed to the stormwater pond. This feature makes it possible for the contents of the sump to be pumped out occasionally as part of maintenance activities at the site.
4. A single outlet pipe will convey the stormwater collected in each stormwater manhole to the pond.

The entire stormwater detention pond will be graded into the dense in-situ clay known to exist in that part of the site. The deepest portions of the stormwater detention pond at the southern end will be formed into a permanent micro pool that provides a final location for suspended solids to settle out of the stormwater prior to being discharged via an outlet structure that limits flow rates leaving the pond. Below the micro pool and even portions north of the micro pool, an impermeable liner will be installed that prevent infiltration of the stormwater into the groundwater below.

Enhanced controls shown on Sheet 14 will be included in the stormwater system to help trap floating debris or other floatables. These controls serve to further keep potential human exposure risks contained within the site, if they occur.

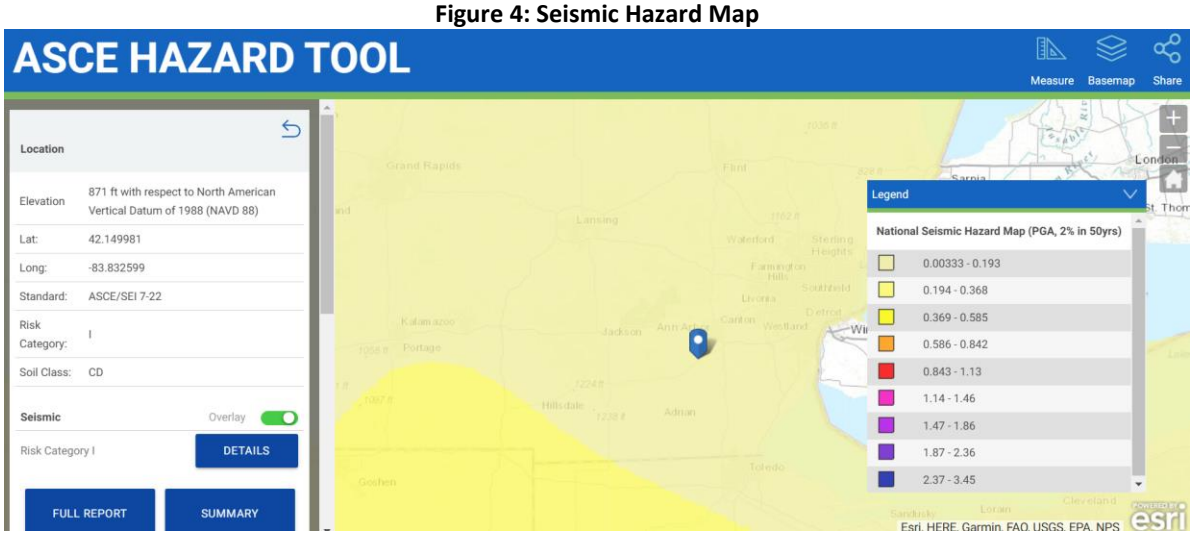
3.4 SEISMIC CLASS DETERMINATION USING HAZARD TOOL ASCE/SEI 7-22

Application requirements specifically request details about the support arrangement associated with the installation, including any seismic restraint. Equipment installation and support details will be designed and stamped by licensed structural engineers to meet seismic restraint requirements. Using ASCE/SEI 7-22, Figure 4 was obtained. With an applicable Risk Category "I" and Soil Class CD, see seismic data below:

Seismic Data for Structural Design Engineer

S_S	0.12
S_1	0.054
S_{MS}	0.15
S_{M1}	0.1
S_{DS}	0.098
S_{D1}	0.068
T_L	12
PGA_M	0.065
V_{S30}	365
Seismic Design Category	B
Note	Where values of the multi-period 5%-damped MCER response spectrum are not available from the USGS Seismic Design Geodatabase, the design response spectrum shall be permitted to be determined in accordance with Section 11.4.5.2

Figure 4: Seismic Hazard Map



If you have any questions or comments regarding this memorandum, or if we can be of further assistance, please feel free to contact us at (800) 525-6016.

Sincerely,
Metro Consulting Associates, LLC

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