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Public Service Commission of Wisconsin
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# BLACK MOUNTAIN ENERGY STORAGE

# AMERICAN PHARAOH BATTERY STORAGE PROJECT

# ENGINEERING PLAN

February 2024

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## ACRONYMS

The following acronyms are listed as reference and are used throughout this Engineering Plan.

| Term | Definition |
|---|---|
| AC | Alternating Current |
| ATC | American Transmission Company |
| BCC | Birds of Conservation Concern |
| BESS | Battery Energy Storage System |
| BGEPA | Bald and Golden Eagle Protection Act |
| BMES | Black Mountain Energy Systems |
| BMP | Best Management Practices |
| CFR | Code of Federal Regulations |
| CPCN | Certificate of Public Convenience and Necessity |
| DC | Direct Current |
| DCS | Distributed Control System |
| DPP | Definitive Planning Phase (MISO Interconnection) |
| EMS | Energy Management System |
| EPA | Environmental Protection Agency |
| ESA | Endangered Species Act |
| FEMA | Federal Emergency Management Agency |
| FSS | Fire Suppression System |
| GIA | Generator Interconnect Agreement |
| GSU | Generator Step-Up (Transformer) |
| HPZ | High Potential Zone |
| Hz | Hertz |
| kV | Kilovolt |
| kW | Kilowatt |
| LFP | Lithium Iron Phosphate |
| MBTA | Migratory Bird Treaty Act |
| MISO | Midcontinent Independent System Operator |
| MVPS | Medium Voltage Power Station |
| MW | Megawatt |

| | |
|---|---|
| NERC | North American Reliability Corporation |
| NFPA | National Fire Protection Association |
| NWI | National Wetlands Inventory |
| PCS | Power Conversion System |
| PSCW | Public Service Commission of Wisconsin |
| SPCC | Spill Prevention, Control, and Countermeasure Plan |
| UPS | Uninterrupted Power Supply |
| USEPA | United States Environmental Protection Agency |
| USFWS | United States Fish and Wildlife Service |
| WDNR | Wisconsin Department of Natural Resources |
| WOTUS | Waters of The United States |
| WSDOT | Wisconsin Department of Transportation |

# Introduction

## Purpose of Engineering Plan

Black Mountain Energy Storage (BMES) submits this Engineering Plan in support of the development of the American Pharaoh Battery Energy Storage System (BESS) project in Milwaukee, Wisconsin. This Engineering Plan is in support of the application for a Certificate of Public Convenience and Necessity (CPCN) to be filed with the Public Service Commission of Wisconsin (PSCW), pursuant to Wisconsin Statute § 196.491 (3). Pursuant to this statute, the Engineering Plan must include "…the location of the facility, a description of the facility, including the major components of the facility that have a significant air, water or solid waste pollution potential, and a brief description of the anticipated effects of the facility on air quality, water quality, wetlands, solid waste disposal capacity, and other natural resources." The purpose of this Engineering Plan is to provide the PSCW and the Wisconsin Department of Natural Resources (WDNR) an overall project description and sufficient information such that the agencies are able to provide a listing of each permit or approval required for the construction and operation of the project.

## Project Overview

The American Pharaoh BESS will be located in the City of Milwaukee, Wisconsin on a 32 acre tract at the intersection of N 84$^{th}$ St and Kaul Ave, just north of existing Union Pacific railroad tracks (Figure 1). It is a 300 MW/1200 MWH energy storage facility and will connect to the electric grid through a new 345 kV transmission line to the adjacent Granville substation.

## Description of Proposed Technology

This Engineering Plan provides an overview of the site under consideration, an overall description of the project, anticipated electric transmission interconnection facilities, and potential effects on the surrounding environment and potential permitting needed. Wisconsin Statute § 196.491 (3)(a)3.a provides that, within 30 days of receipt of this Engineering Plan, the WDNR will provide a listing of each federal, state, and local department permit or approval that is anticipated to be required for the construction and operation of the project.

# Facility location

## General Description

The American Pharaoh BESS will be located on what is currently two parcels that will be combined through the City's formal process. The 32 acre site is east of N 84th St, north of the Union Pacific railroad, west of the existing Granville Substation, north and east-northeast of an existing industrial area, and south of an existing residential area (Figure 1). The property will be owned by BMES and consists of undeveloped land overgrown with native vegetation. The site was used for agricultural purposes up until the mid-1960s when residential development occurred to the north and the neighboring substation was built to the east. Afterwards the site was abandoned until 2000 when excavation was done but nothing was built. Following the excavation for a prior project, it was again left abandoned until now.

## BESS Facility Equipment

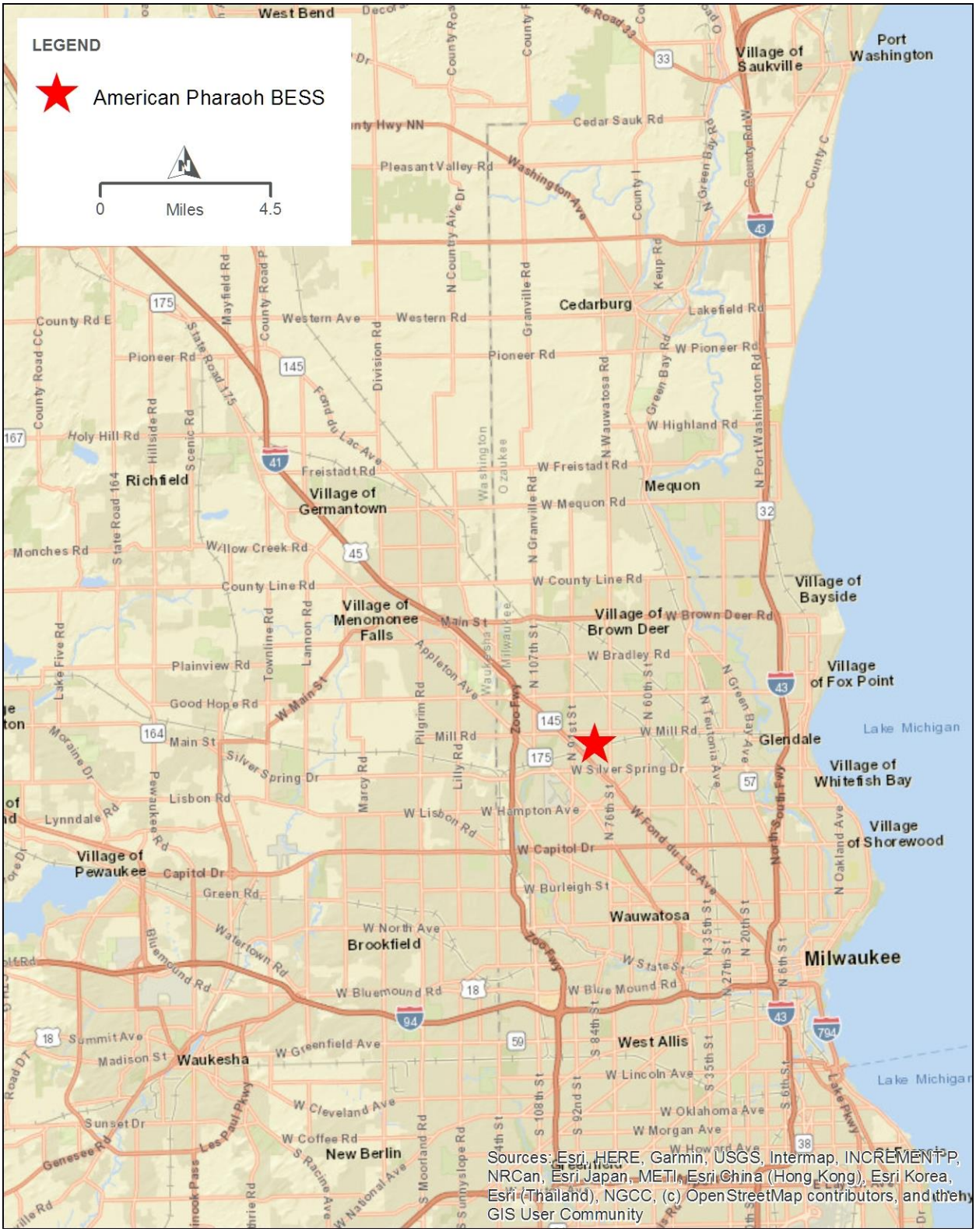
The preliminary design of the BESS facility is composed of 368 BYD MC *Cube Generation 1* battery containers, 92 SMA *MVPS 4000-S2-US* power conversion systems (PCS), and two transformers located in the substation footprint. The equipment selection will be made during the final detailed design process but the specifications and performance will meet or exceed the preliminary design details and it will have all required certifications. The facility anticipates utilizing AC augmentation to compensate for degradation in capacity of the batteries throughout the lifetime of the project. The total of this augmentation over the lifetime of the project is anticipated as 84 battery containers as well as 23 PCS. Within the BESS project boundary, additional miscellaneous equipment such as panelboards, auxiliary transformers, auxiliary switchboards, UPS, EMS, FSS, and power equipment may be determined upon final design of the project. Major pieces of equipment within the project that have the potential to impact natural resources include, but are not limited to, the lithium iron phosphate (LFP) batteries, transformers, PVC conduit, PCS, asphalt, and the substation steel structures.

# Electrical Interconnection Facilities

The BESS equipment will be interconnecting to the site substation at the MVAC collection voltage of 34.5 kV. The project would interconnect to American Transmission Company's existing 345 kV transmission system via one short radial 345 kV transmission less than one-half mile in length connecting to the existing 345 kV Granville Substation.

The Midcontinent Independent System Operator, Inc. (MISO) has conducted a Feasibility Study for the interconnection location, and additional system impact and facilities studies are planned to be conducted during the Definitive Planning Phase (DPP) of the MISO generator interconnect agreement (GIA) process. The project is part of the 2022 DPP study group. Some transmission system and substation upgrades may likely be required to deliver the facility output to the bulk electric system.

**Figure 1 LOCATION MAP**



## Alternative Locations

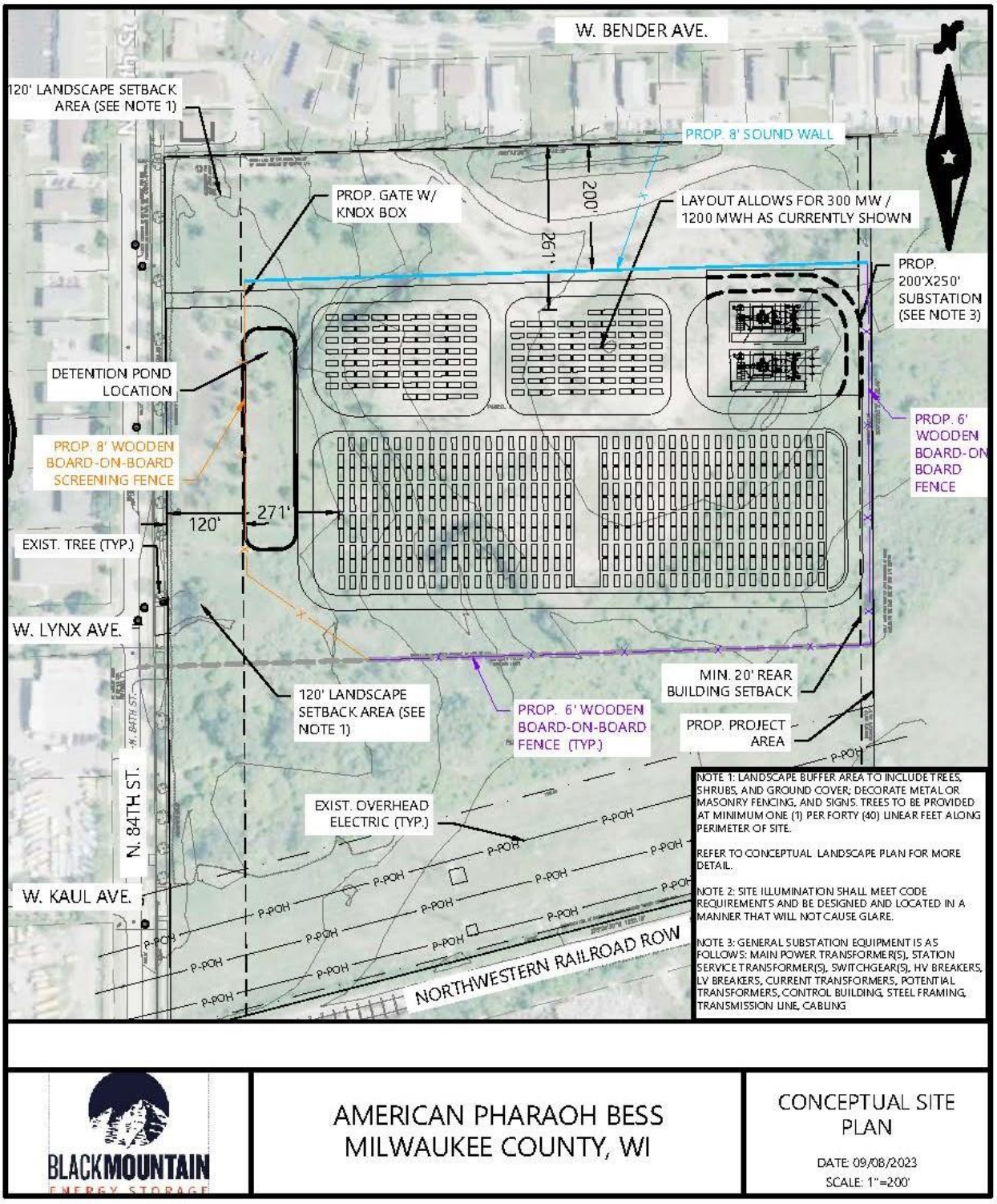
The vacant site immediately adjacent to the existing Granville substation was chosen specifically because of its location between the power supply from multiple facilities to the north of Milwaukee and the retiring Oak Creek Power Plant (coal) to the south of Milwaukee. When the Oak Creek plant retires, there will be an imbalance in supply that will lead to higher electricity volatility and prices in the greater Milwaukee area. A battery storage facility can help alleviate this problem by capturing load from the north and distributing it through the grid when most needed.

Alternative sites in proximity to other substations were considered during the siting process. The nearest substation to the north is too far outside of the Milwaukee load pocket to adequately address demand. The substation to the west is in a fully developed area and is also further away from the Milwaukee load pocket. There are no substations south or eastward that are large enough (345kV) or close enough to adequately capture the load from north of Milwaukee. The Granville substation is the only substation that can address the congestion and flow concerns outlined above.

## Alternative Configurations

Please refer to Figure 2 for the configuration currently proposed. Other configurations were previously considered and were altered to meet the requirements set forth by the City of Milwaukee. Particularly, a 200ft setback was applied to the residential neighborhood to the north, which will help reduce any noise impact as described in more detail under Environmental Impacts below. Other site configuration considerations included the topography of the site, natural features and wetlands on site, and the existing easements and infrastructure (adjacent roadways, railroad tracks, and utility lines).

**Figure 2 PROPOSED CONFIGURATION**



# Environmental Impacts

## Air Quality

The lithium iron phosphate batteries have the potential for air quality impact due to toxic gas release from regular gassing or combustion. To mitigate the concerns of hazardous gases, such as hydrofluoric acid, the battery containers are designed with a ventilation and fire suppression system (FSS).

## Water Resources

### Water Supply

Water is not needed for the operation of the facility other than domestic water needed for FSS equipment which would be supplied from nearby city potable water supply.

### Wastewater and Solid Waste

Each of these pieces of equipment have the potential to produce heavy metal leachates that could impact surrounding soil and water. To limit this concern, a site drainage basin has been included in design to collect potential pollutants and protect the water quality of any surrounding bodies of water that would receive drainage. Drainage for the site is found to favor the southeast and southwest due to a ridge along the north side of the project boundary. This drainage is taken into consideration for the grading of the site to reduce impact as much as possible.

All pieces of equipment within the BESS facility will undergo proper decommissioning with solid waste disposal to reduce impacts to natural resources at the end of life.

## Land Requirements

The American Pharaoh BESS project will be located on 32 acres of property and would use up to approximately 13 acres for final construction, which would include an auxiliary equipment area, project substation, and detention pond. The location of the detention pond is subject to change following additional analysis. The entirety of the project property is located on land to be owned by Black Mountain Energy Storage.

## Floodplains

Potential hazards associated with flooding would be reviewed under various state and local programs including necessary state standards and local reviews as listed in the Permitting Plan (Table 1).

Federal Emergency Management Agency (FEMA) 100- and 500-year floodplain data was reviewed for a wetland delineation report completed in January 2023. Based on the report results, the project site is located 0.19 miles from the nearest 100-year floodplain and is not within any floodway regulated by Milwaukee County. Therefore, the project would likely not impact the identified floodplains. Best management practices (BMPs) would be used during construction to minimize potential effects on adjacent floodplains.

## Threatened and Endangered Species

Black Mountain Energy Storage commissioned a Threatened and Endangered Species analysis in January 2023 and updated the analysis in January 2024. The analyses reviewed potential federally listed endangered and threatened species, proposed to be listed, and candidate species in the vicinity of the site. Additionally, the analyses identified potential USFWS Birds of Conservation Concern (BCC) that may be breeding on site during project construction.

Federally listed species in Milwaukee County and the area of the project include the endangered northern long-eared bat (*Myotis septentrionalis*) and rusty patched bumble bee (*Bombus affinis*), proposed endangered tricolored bat (*Perimyotis subflavus*), and candidate monarch butterfly (*Danaus plexippus*). The project site is located in a High Potential Zone (HPZ) for the rusty patched bumble bee, which indicates there may be grassland and forest habitat present on site that is capable of supporting this species. The tree area present within the site is not large enough to support the northern long-eared bat or tricolored bat and, therefore, impacts to these species are not anticipated. As the monarch butterfly is a candidate species and not protected under the Endangered Species Act (ESA), additional permitting for this species is not required at this time.

The analyses indicate ten migratory BCC, protected under the Migratory Bird Treaty Act (MBTA) and Bald and Golden Eagle Protection Act (BGEPA), could occur within the project site. Migratory BCC that may be present in the project area during the breeding season include the bald eagle (*Haliaeetus leucocephalus*), black-billed cuckoo (*Coccyzus erythropthalmus*), Canada warbler (*Cardellina canadensis*), chimney swift (*Chaetura pelagica*), eastern whip-poor-will (*Antrostomus vociferus*), golden-winged warbler (*Vermivora chrysoptera*), red-headed woodpecker (*Melanerpes erythrocephalus*), and wood thrush (*Hylocichla mustelina*). Breeding seasons differ depending on individual species, but typically span from April 15 to August 31 in Milwaukee County.

The BGEPA prohibits the take of bald and golden eagles without a permit, including their parts, nests, and eggs. This prohibited take includes disturbances that may “result in a decrease in [eagle] productivity by substantially interfering with normal breeding, feeding, or sheltering behavior.” Bald eagles may breed between December 1 through August 31, but have the highest probability of presence in the project area from January 1 to March 31.

Black Mountain Energy Storage will coordinate with the U.S. Fish and Wildlife Service (USFWS) about potential effects to federally listed species prior to CPCN submittal. At this time, no impacts to MBTA and BGEPA protected species are anticipated due to project construction. If tree removal or construction occurs between April 1 and July 15, the applicant will commit to conducting surveys for breeding migratory bird species.

## Wetlands

Preliminary onsite wetland delineation was conducted on January 10, 2023, for the project area, which encompassed the entirety of the buildable acreage for the project. An additional review will be conducted during spring of 2024 to confirm initial report conclusions and characterize soil profiles and vegetation during the growing season. BMPs would be used during construction to

minimize potential effects on any adjacent wetlands. The BESS facility will be sited to avoid direct wetland impacts.

## Noise

Under the Wisconsin General Municipality Law, counties and municipalities may establish and enforce local ordinances which prohibit excessive noise (Wisconsin Statutes § 66.0411). In September 2023, Black Mountain Energy Storage commissioned a noise assessment of the project area, which analyzed City of Milwaukee noise ordinances, pre-existing noise conditions at residential areas surrounding the project, and potential project noise values both with and without noise mitigation. The noise assessment results demonstrate that expected noise levels at the property lines of the adjacent residential locations can meet noise regulations if noise mitigation measures are incorporated during equipment selection and construction. Along the north and west side of the property there is a planned minimum 10' screening / landscape area. A 200' buffer area to the north and a 120' buffer area to the west will assist in resolving any concerns for noise by surrounding neighbors. Final noise mitigation measures will be determined after technology selection and layout finalization. Therefore, through various mitigation measures available, the American Pharaoh BESS project would comply with the City of Milwaukee codes and ordinances related to noise levels caused by construction or operational activities.

## Construction Impact

Initial work for the project would include site development activities, including preparation of equipment laydown areas, construction worker parking and other site preparation activities. After these activities are underway or completed, construction of the facility would begin.

During construction, steps would be taken to prevent excessive emissions of particulate matter related to vehicular traffic and construction activities. These activities would include seeding, paving, covering, wetting, or otherwise controlling particulate matter emissions. Materials suitable for backfill would be stored outside of floodplain areas or other regulated areas. Proper stormwater erosion control, pollution prevention methods and BMPs would be implemented as required by WDNR and local codes and applied as necessary.

Major equipment and other materials needed for construction would be delivered by rail or truck to the site. Additional information about anticipated construction related transportation would be provided in the CPCN application.

## Chemical Storage

Depending on the type of BESS technology utilized, its composition and quantity stored on site, notification under the Emergency Planning and Community Right-to-Know Act may be required. The current identified storage technology chemistry planned is LFP. Any possible chemical emissions would be fully described in the CPCN application and various permit applications. The project would also include a Spill Prevention, Control, and Countermeasure (SPCC) Plan, a Risk Management Plan (if necessary), as well as other procedures for maintaining onsite storage. Appropriate secondary containment measures would be installed for all storage tanks and facilities based upon the manufacturer's spill prevention standards. This chemical storage

mitigation will accommodate not only the BESS, but also the PCS and GSU and substation equipment on site.

## Permitting Plan

Table 1 provides a preliminary list of the permits and regulatory approvals anticipated for the American Pharaoh BESS project including federal, state, local, and other approval processes.

**Table 1 PRELIMINARY PERMIT LIST**

| Permit/Issue | Agency | Approval Process and Notes |
|---|---|---|
| **Federal** | | |
| **Chemical Facility Anti-Terrorism Standards** | Department of Homeland Security (DHS) | The same chemical storage thresholds that apply to ammonia for RMP purposes also trigger applicability of CFATS. Standards are published in 6 CFR Part 27. |
| **Federal Threatened and Endangered Species Review** | U.S. Fish and Wildlife Service (USFWS) | Prior to CPCN submittal, applicant will coordinate with USFWS and WDNR.<br>USFWS informal consultations precede formal consultation. Discussions during this phase may include whether and which species may occur in the proposed project area and what effect the project may have on listed species or critical habitats.<br>USFWS formal consultation is conducted if the Federal agency determines that the project may affect a listed species or its critical habitat and submits a written request to initiate formal consultation. These consultations result in a written biological opinion of whether the proposed project is likely to jeopardize a listed species or adversely modify designated critical habitat. An incidental take statement is also provided. |
| **Section 404 Permit** | US Army Corps of Engineers (USACE) | Individual permit may be required for construction in or disturbance of a wetland or water body (Section 404). If a Section 404 permit is needed, apply for Section 401 certification before selecting a site.<br>As no jurisdictional wetlands were identified on site, a need for this permit is not anticipated. |
| **Spill Prevention Control and Countermeasures (SPCC) Plan** | USEPA | Must prepare within 6 months after commencement of facility operations; must implement plan within 12 months.<br>No approval required. Plan must be made available and able to be implemented. |
| **Facility Response Plan** | USEPA | Submit with the SPCC Plan.<br>Must be submitted to Regional Administrator prior to the start of operations and changes to plant operations that require modification to the plan must be reported within 60 days for review. |
| **Emergency Planning and Community Right-to-Know Act (EPCRA) 311, 312** | USEPA<br>Submitted to State Emergency Response Commission (SERC) Local Emergency Planning Committee (LEPC) and local fire department | No approval required.<br>Material safety data sheets (MSDSs) or a list of any hazardousb chemicals used or stored must be submitted to the State Emergency Response Commission (SERC), Local Emergency Planning Committee (LEPC) and the local fire department.<br>Facilities must also report an annual inventory of these chemicals by March 1 of each year to their SERC, LEPC and local fire department. |
| **State** | | |
| **Engineering Plan** | WDNR, PSCW | Applicant must submit an engineering plan at least 60 days before submitting an application for a CPCN.<br>Within 30 days after submission, WDNR issues list of permits required for the project. |
| **Certificate of Public Convenience and Necessity (CPCN)** | PSCW | For any new electric generating facility over 100 MW, developer must be issued a CPCN from PSCW. Includes PSCW review of environmental and socio-economic impacts of the proposed facility. Must consider two or more facility sites and alternative routes and designs for related power lines and natural gas pipelines. |
| **Environmental Assessment (EA), Environmental Impact Statement (EIS)** | WDNR, PSCW | EA or EIS to be completed after submittal of CPCN application and applicable WDNR permits by the PSCW and WDNR |
| **Utility Permit** | Wisconsin Department of Transportation (WISDOT) | If required, Utility crossing permits to construct, operate or maintain a utility facility. Use Form DT1553. |
| **Oversize Overweight Equipment** | WISDOT | Moving of oversized or heavy equipment to be coordinated with state agencies. |

| Permit/Issue | Agency | Approval Process and Notes |
|---|---|---|
| **State Threatened and Endangered Species Review** | WDNR | Review of state-listed species and habitats is expected to occur before CPCN submittal and be ongoing while the EA or EIS is being developed. |
| **Storage Tank Permit, form ERS-7658** | Wisconsin Department of Agriculture, Trade, and Consumer Protection (ATCP) | Required for all flammable, combustible, and hazardous liquids. The tank owner shall apply for a permit for each tank after all requirements for plan approval under s. ATCP 93.100 and registration under s. ATCP 93.140 are completed and the tank is installed, but before the tank is placed into service. |
| **Cultural and Archaeological Resources Review** | Wisconsin Historical Society (WHS) State Historic Preservation Officer (SHPO) | Coordination with SHPO and PSCW is required during the CPCN process.<br>National Historic Preservation Act of 1966 requires a Section 106 review for any construction project in which any federal government agency plays a role such as project review, funding, oversight, etc. |
| **Wisconsin Administrative Code NR 103, Water Quality Compliance** | WDNR | 401 and 404 permit will meet standards set by state.<br>If a 404 permit is needed, apply for 401 water qualifications for impacts to wetlands, or a Chapter 30 permit (under Section 401) for navigable waters. This will require a detailed alternatives analysis to prove compliance with Wisconsin Administrative Code NR 103. |
| **Wisconsin Pollutant Discharge Elimination System (WPDES) General Permit** | WDNR | Within 100 business day of receiving permit application, WDNR will publish a notice and a final decision will be made within 50 business days after the hearing process |
| **WPDES Construction Stormwater Discharge Permit** | WDNR | A general permit for stormwater discharge is required for construction projects that disturb more than 5 acres of land. Must also prepare erosion control plan. A soil erosion control and stormwater management plan development in accordance with the Wisconsin Construction Site Best Management Practices Handbook must be on site during construction activities and be completed before submitting a Notice of Intent (NOI).<br>This information must also be submitted locally to the City of Milwaukee (see Local section). |
| **WPDES Chapter 30 Stormwater Pond Construction Permit** | WDNR | Required specifically for the construction of a stormwater pond if one is proposed with the site.<br>Included with stormwater discharge permit. |
| **Construction of all Buildings and Structures** | Wisconsin Department of Safety and Professional Services | Required approval of plans and specifications under Wisconsin Statute §101.02 |
| **Installation of Fuel or Lubricating Oil Storage Tanks** | Wisconsin Department of Safety and Professional Services | Required approval of plans and specifications under Wisconsin Statute §101.09 |
| **Installation of Dust Filtering and HVAC Equipment** | Wisconsin Department of Safety and Professional Services | Required approval of plans and specifications under Wisconsin Statute §101.12 |
| **Boiler and Unfired Pressure Vessel Registration** | Wisconsin Department of Safety and Professional Services | Requires an initial inspection after construction, annual thereafter. State of Wisconsin statutes s 101.17. |

| Permit/Issue | Agency | Approval Process and Notes |
|---|---|---|
| **Local** | | |
| **Oversize Load Permit** | Milwaukee County Department of Transportation | An Oversize Load Permit is issued to a carrier to allow operation of a vehicle or load that exceeds the statutory limits. An oversize load is defined in Chapter 348 of the Wisconsin State Statutes.<br>A minimum notice of three working days is requested for review and processing prior to issuance of the permit. |
| **Zoning Permit** | City of Milwaukee | A zoning permit is required for construction of any new building or structure. The required Site Plan Review Overlay Zone (SPROZ) approval was granted by the City of Milwaukee on September 25, 2023 (File No. 230708). |
| **Stormwater Management Plan (SWMP)** | City of Milwaukee | Stormwater detention and stormwater quality calculations and required to be reviewed by the City. A renewal is required every five (5) years. |
| **City Building Permit Planning and Approval Process**<br>**The approval process includes review of the following permits:**<br>**A) New Commercial Buildings and Additions Plan**<br>**B) HVAC permit and plan review**<br>**C) Plumbing Plan Examination**<br>**D) Gas Piping Permit and Exam Application**<br>**E) Fire Alarm Plan Application, Fire Protection Plan Examination Application, Fire Sprinkler Plan Review**<br>**F) Development Center Alterations Permit Form** | City of Milwaukee | A) The Milwaukee Development Center's plan examiners review New Commercial Buildings and Additions plans for compliance with the International Building Code as well as municipal building and zoning codes. Once the plans have been reviewed and approved, the construction permit will be prepared and issued.<br>B) HVAC plan submittal is required for HVAC work for new facilities except for the installation of air-conditioning-only systems.<br>C) A Plumbing Plan Examination is required for all new buildings regardless of the number of plumbing fixtures involved.<br>D) A Gas Piping Permit and Exam is required for gas piping work in a new structure or facility.<br>E) A Fire Protection Plan Examination application, Fire Alarm Plan application, and Fire Sprinkler Plan review is required for all new building constructions.<br>F) A Development Center Alterations Permit Form is required to apply for permits for air conditioning/ refrigeration systems, furnaces, boilers, unfired pressure vessels, power and large refrigeration piping installations, boiler or pressure vessel repairs, and electronic monitoring of boilers. |
| **Erosion Control Certification** | City of Milwaukee | City ordinances require control of on-site erosion for all construction and filling activities.<br>The erosion control certification, signed by the individual responsible for maintaining erosion control at the site, must be submitted before the permit is issued.<br>Submitted with the New Commercial Buildings and Additions Plan. |
| **Footing and Foundation Permit** | City of Milwaukee | This permit allows the contractor to proceed with excavation, foundations, and structural parts thereof, not higher than the first-floor level prior to other permit approvals. The issuance of a footing and foundation permit should not be construed as an approval of any other required permit or any use of the premises. |
| **Conditional Construction Permit** | City of Milwaukee | This permit is required to allow a Footing and Foundation Permit to be issued while an application for Board of Zoning Appeals, Certified Survey Map, Zoning Change, or similar amendment (requiring common council approval) is pending. |
| **Sign Permit** | City of Milwaukee | A sign permit is required to erect a sign or affix a sign to a building. |
| **Certificate of Footings, Certificate of Supervision, Certificate of Compliance** | City of Milwaukee | Applicable certification is required throughout construction to ensure construction design and processes are in substantial compliance with the approved plans and specifications and current Wisconsin Statutes. |
| **Certificate of Occupancy** | City of Milwaukee | Required for use of a new building or structure prior to final utilization. |

# Project Schedule

BMES is planning for a commercial operation date for the project in 2028. Currently, BMES is preparing the CPCN application and permitting documents. The CPCN application submittal is planned for April 2024, with anticipated approval within 12 months. The permitting process would be completed concurrently with the CPCN approval timeline.