REGULAR OF THE

CHARTER TOWNSHIP OF COMSTOCK PLANNING COMMISSION

THURSDAY, JULY 23, 2026 at 6:00 PM

NOTICE AND AGENDA

5858 KING HIGHWAY
COMSTOCK TOWNSHIP HALL

Call to Order

Pledge of Allegiance to the Flag of the United States of America

Approval of Agenda

Citizen Comment

A citizen may state their name and address and may speak only one time, for no more than three (3) minutes. This time may not be given to another citizen to extend their time. The person speaking has the floor and no other citizen shall speak during someone else's time. During this time, you will be making statements to the Board, without discussion from the Board members, but you are welcome to make an appointment with Planning & Zoning staff to discuss your comments further. Please keep comments clean and respectful.

Approval of Minutes

July 9, 2026 - Draft Meeting Minutes

New Business

67 Van Bruggen - Wireless Communications Facility Proposal (Continuation)

Battery Energy Storage System Proposal

Old Business

Any Other Business

Citizen Comment

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Updates from Other Boards

Training Updates

Training Updates

Informational/Future Action Items

Planning Commissioner Comments

Adjournment

MEMO

Charter Township of Comstock Planning Commission
July 23, 2026

From: **Kyle Mucha, Principal Planner**

Re: **July 9, 2026 - Draft Meeting Minutes**

Seeking review and approval of the draft meeting minutes.

Attachments:
2026_0709 Comstock PC Minutes - DRAFT.docx

COMSTOCK CHARTER TOWNSHIP
PLANNING COMMISSION
MINUTES OF MEETING HELD JULY 09, 2026

A meeting of the Comstock Charter Township Planning Commission was held on Thursday, July 09, 2026 at the Comstock Township Hall beginning at 6:00 p.m.

Members Present:	Amber Lawrence, Chair
	Greg Nowak
	Sandy Bloomfield, Treasurer
	James Criteser, Secretary
	Joseph Weintraub
	Larry Nichols

Members Absent: None

Also in attendance were Township Attorney Rob Thall, Township Planner Kyle Mucha and approximately 8 members of the general public.

Call to Order

Chair Lawrence called the meeting to order at 6:00 p.m.

Pledge of Allegiance

Pledge of Allegiance was recited.

Approval of Agenda

Criteser motioned, with support from Weintraub, to approve the agenda as presented. Upon voice vote, motion carried 6-0.

Approval of Minutes

Weintraub motioned, with support from Nichols, to approve the meeting minutes of June 11, 2026 with clerical changes, noting meeting attendance and the current chair. Upon voice vote, motion passed 6-0.

Citizen Comment #1

1. Eileen C: expressed gratitude towards the Planning Commission for the work they have done on the battery energy storage system ordinance, as well as the due diligence they will be undertaking when reviewing a proposed BESS project within the township.

New Business

1) 5441 E. ML Avenue – Special Land Use Request.

Introduction

Mr. Mucha summarized the staff report, noting that the owners of 5441 E ML Avenue seek to construct a 3,200 square foot accessory building on their property. Mucha provided a synopsis of the report, detailing site plan and special land use review criteria. Mucha noted that one criteria in need of further clarification was for the applicant to provide confirmation of what the proposed accessory structure is to be used for. The applicant noted that storage would consist of personal equipment, such as vehicles and other hobby items. Mucha iterated to the Commission that the district in which the property is zoned does not permit commercial operations.

Nichols motioned, with support from Weintraub, to open the public hearing for 5441 E ML Avenue Special Land Use request. Upon voice vote, motion passed 6-0.

Public Hearing

No person in attendance spoke towards the request. Staff noted that no written communication had been received pertaining to this application.

Nichols motioned, with support from Criteser, to close the public hearing. Upon voice vote, the public hearing was closed.

Discussion

The Commission discussed the application as presented, with a general consensus noting that the level of detail provided seemed to be lacking. The Commission noted that the aerial drawing did not include dimensions from the proposed structure to the property boundaries. There being a desire to see revised materials before a decision could be rendered, Nichols motioned, with support from Criteser, to table the application until such a time as the applicant can provide the supplemental information. Upon voice vote, motion passed 6-0.

Mucha indicated that contact with the property owner and staff will take place in terms of needed materials.

2) 67 Van Bruggen – Special Land Use – Wireless Communications Facility

Introduction

Mucha provided a summary of the request to construct a wireless telecommunications facility (cellular tower) located at 67 Van Bruggen Street. During the summary, Mucha provided an overview of the requirements for site plan, special land use and specific use (wireless telecommunications) that were evaluated during the review of the proposed facility. Mucha noted that the applicant has proposed landscaping around their immediate facility, but has requested consideration from the Commission as it relates to requiring landscaping along the entirety of the property when their site only impacts the eastern portion.

Mr. Leland Calloway, representing the applicant, addressed the Commission and concerns raised regarding landscaping, site lighting, maintenance needs, co-location of additional service providers, tower design and the proposed location in order to effectively service the region.

Criteser motioned, with support from Nichols, to open the public hearing for 67 Van Bruggen Street. Motion passed unanimously upon voice vote, 6-0.

Public Hearing

Mucha informed the Commission that two people of interest connected with staff during the 15-day public hearing notice: one requesting that any projects proposed within this industrial park be passed along to the park board of directors in order to conduct an architectural review. The second person of interest asked for clarification as to the proposal.

There being no members of the general public wishing to speak to the request, Criteser motioned, with support from Nichols, to close the public hearing. Motion passed unanimously upon voice vote, 6-0.

Discussion

Next, the Commission began discussion of the request for a wireless communications facility. Weintraub inquired with the applicant on matters pertaining to the decommissioning of the site, should the tower cease operations. Mr. Calloway noted that decommissioning of the tower is typically an item contained within a property lease agreement; dialogue followed.

The Commission, upon a collective observation, opinioned that having financial backing to remove the tower, should it cease operation, would better protect the township. Mr. Calloway noted that such a review of financial assurance could be reviewed further by the project team and reported back to the Commission at a future date.

The Commission preliminary discussed the proposed landscaping, with staff providing the observation that any landscaping elements would be more intended to screen the ground equipment and not that of the tower itself. There being no further discussion, and expressing a desire to see financial security related to the decommissioning of the site, Weintraub motioned to table the application review. There being no second, Nowak motioned, with support from Nichols, to waive the Commission's by-laws in order to take action on the item before them. Upon voice vote: Lawrence – Yes; Bloomfield – Yes; Criteser – Yes; Nowak – Yes; Nichols – Yes; Weintraub – No. Motion *failed*.

With the motion to waive by-laws and take action, the agenda item will be placed on the next meeting date [July 23] unless a different timeline is requested by the applicant.

3) Code Enforcement Presentation & Dialogue

Next, the Commission invited the Township's Code Enforcement Officer – D. Szczepanski – to provide his analysis of the challenges the current zoning ordinance poses when enforcing the regulations throughout the community. Mr. Szczepanski touched on the following regulations during his presentation and dialogue with the Planning Commission:

i. Political sign definition
ii. Off-Street Parking in residential areas
iii. Trailers, RVs, Campers & number permitted
iv. Definition of temporary structure & time period it's considered temporary
v. Exterior lighting and permitted foot candles
vi. Shipping containers and where such are permitted
vii. Animals: provisions for the keeping of dogs and cats
viii. Police Power (General Ordinance) verse Zoning Ordinance
ix. Temporary Business (garage sale verse 'lemonade stand')
x. Definition of Family
xi. Rental Ordinance

Upon conclusion of the presentation and dialogue, the Commission thanked Szczepanski and noted that the aforementioned regulations may be added to the future work plan, once larger items have been addressed. The Commission encouraged Szczepanski to continue to note the provisions within

the Zoning Ordinance that prove problematic to enforce and welcome his insight as to potential modifications.

Continuing/Old Business

None

Any Other Business

1) UpJohn Institute – Comstock Township Housing Plan

Mucha informed the Commission of a notice the Township received from MSHDA (Michigan State Housing & Development Authority) pertaining to grant funding that was awarded for project updates. Attorney Thall provided additional context to the Commission, noting that the grant funding has a timeline attached to it, and that each quarter updates need to be provided to MSHDA in order to remain eligible for the grant funding. Discussion followed with the Commission pertaining to the housing study and whether to move it forward or cease the work/operations. Upon conclusion of discussion, the Commission noted the following:

a. Eliminate objectives within the Housing Plan
b. Include the Goals from the Plan into the Master Plan update.
c. Transmit the proposed revisions of the Planned Unit Development Ordinance to MSHDA
d. Transmit the revised R-1C standards to MSHDA

Attorney Thall noted that he will coordinate with Supervisor Martin on a response to MSHDA.

Citizen Comment #2

None

Updates from Other Boards

None

Training Updates

Mucha noted that the Michigan Association of Planning Annual Conference will be held once again in Kalamazoo this fall and indicated that if a commission member is interested in attending, to please notify staff of such.

Informational/Future Action Items

Mucha informed the Commission of an upcoming application and the tentative timeline for the introduction of the project, as well as the projected public hearing date.

Planning Commissioner Comments

Chair Lawrence opened the floor to members:

a. Lawrence: None.

b. Nowak: None

c. Weintraub: None

d. Criteser: Expressed gratitude towards fellow commissioners and the continued work being done.

e. Treasurer Bloomfield: None

f. Nichols: None

Adjournment

There being no further business before the Planning Commission, Chair Lawrence adjourned the meeting at 7:50 p.m.

Prepared by: Kyle Mucha, AICP – Township Planning Consultant

Minutes prepared: July 15, 2026
Minutes approved:

MEMO

Charter Township of Comstock Planning Commission
July 23, 2026

From: **Kyle Mucha, Principal Planner**

Re: **67 Van Bruggen - Wireless Communications Facility Proposal (Continuation)**

Consider the supplemental material and render a decision on the proposed special land use and site plan for the construction of a wireless communication facility.

Attachments:
67 Van Bruggen - Cell Tower Review #1 2026_0715.pdf
Proposed Removal Agreement 2026_0714_Redacted.pdf
MI-4082 Rowe Island - Sample Bond.docx
MI-4082 Landscape Burden Document - Signed.pdf
MI-4082_Rowe Island_FZL_07.01.26.pdf
MI-4082_Rowe Island_Prelimanry FDN Design_07.01.26.pdf
Rowe Island_Tower Design_07.01.26.pdf
MI-4082 - Rowe Island Final Zds Rev 3_06-30-26.pdf
MI-4082 - Rowe Island Photosim_extra landscaping.pdf
2751 Rowe Island 17480646 - 5000974494 - Zoning Packet 2.pdf

MCKENNA

Memorandum

TO: Leland Calloway – ArcHaven LLC – APC Towers & Verizon Wireless

FROM: Kyle Mucha, AICP, Principal Planner – Comstock Township Planning
Andrea Hendrick, Principal Planner

SUBJECT: **67 Van Bruggen (Parcel No. 07-22-220-230) – Special Land Use & Site Plan Review #2 – Wireless Telecommunication Tower**

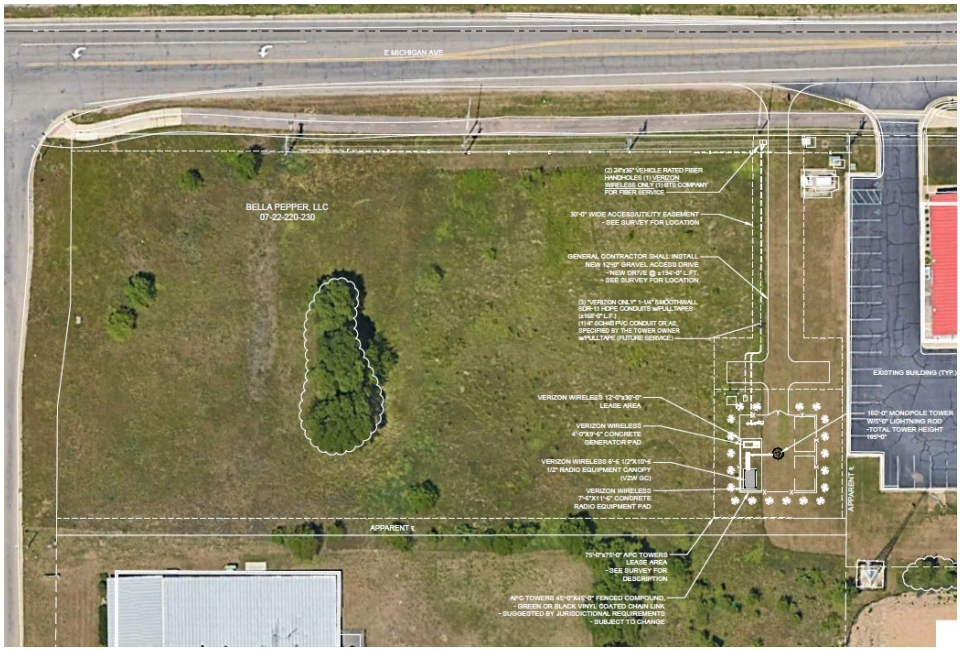
DATE: July 15, 2026

To Leland Calloway,

On behalf of Comstock Charter Township, McKenna has reviewed the special land use and site plan application, for the establishment of a wireless telecommunication tower at 67 Van Bruggen Street.

PROJECT SUMMARY

The applicant, on behalf of Verizon Wireless, seeks special land use and site plan approval for the construction of a 165-foot monopole telecommunications tower and associated equipment at 67 Van Bruggen Street, which is located within the LM, Light Manufacturing District. The subject site is approximately 2.56 acres in size and is located at the intersection of Van Bruggen Street and E Michigan Avenue.



HEADQUARTERS
235 East Main Street
Suite 105
Northville, Michigan 48167

O 248.596.0920
F 248.596.0930
MCKA.COM

Communities for real life.

FINDINGS OF FACT

The proposed *special land use* and *site plan* have been reviewed against the standards of approval, per the Comstock Charter Township Zoning Ordinance and planning principles. The following observations and findings are recommended for consideration by the Township's Planning Commission. Items within this report that need further review or clarification have been underlined.

At this time, there are minor items within the submission material that should be addressed, prior to the Planning Commission rendering a decision on the site plan and special land use application.

Ordinance Standard	Compliance	Comments
Zoning and Use	**Complies**	The LM District permits wireless telecommunication towers as a *special land use*.
Schedule of Regulations	**Complies**	Additional information requested
Landscaping, Screening, and Buffering	**Partially Complies**	See Landscaping provisions under site plan review [Planning Commission may modify requirements]
Trash Enclosure	**NA**	Not Applicable
Parking and Loading	**NA**	Not Applicable: unmanned station
Exterior Lighting	**Complies**	Motion lighting; no site illumination proposed.
Agency Reviews	**Additional Review**	See Separate Memorandums

Respectfully submitted,

McKENNA

Kyle Mucha

Kyle Mucha, AICP
Principal Planner
Township Planning Consultant

Andrea Hendrick

Andrea Hendrick
Principal Planner

Special Land Use Review

This project is reviewed against Comstock's Zoning Ordinance and Master Plan. We offer the following comments for your consideration; underlined items require additional discussion and/or identify outstanding items to be addressed.

1. HARMONY WITH ZONING CODE

The special land use shall be harmonious with and in accordance with the general objectives, intent and purposes of this Code.

Findings: The intent of the LM, Light Manufacturing District is to *"provide a district wherein those resources and services essential to good industrial development may be provided, while guarding against such development encroaching into other districts where they would be incompatible"*. Subject to the application and proposed development meeting the provisions of the site plan review criteria as well as the specific use standards, this provision can be satisfied.

2. HARMONY WITH EXISTING CHARACTER

The special land use shall be designed, constructed, operated and maintained in a manner harmonious with the character of existing and future land uses on adjacent property and the surrounding area.

Applicant Notes: *The search area request[ed] by Verizon Wireless encompasses an area with no existing towers or structures that meet their requirements other than the current tower, were found within that geographical area. [The] proposal allows for better and more comprehensive mobile wireless service to your community by enhancing Verizon's deployment of 5G and other next generation technology across the U.S., including FirstNet, public safety's dedicated, nationwide communications platform.*

Findings: The proposed project seeks to develop on a portion of the 2.56 acre parcel of land that is currently vacant/undeveloped. The subject property and those around it are classified as light manufacturing.

Location	Existing Land Use	Zoning District	Future Land Use Designation
Subject Site	Vacant / Undeveloped	LM, Light Manufacturing	General Industrial
North	Commercial	LM, Light Manufacturing	General Industrial
South	Industrial/Manufacturing	LM, Light Manufacturing	General Industrial
East	Comstock Twp Fire	LM, Light Manufacturing	General Industrial
West	Dog Kennel	LM, Light Manufacturing	General Industrial

The Comstock Charter Township Master Plan (Vision 2030) defines *General Industrial,* which can be reviewed below and observed on page 29 of the Master Plan:

> ***General Industrial***
>
> *This land use designation is intended to provide employment opportunities for area residents as well as manufactured goods for the Greater Kalamazoo Area and beyond. General Industrial uses may include warehousing, manufacturing and assembly, mini-storage, contractor's offices and yards and shipping facilities. Facilities will be developed with appropriate utility and transportation connections and in harmony with surrounding uses. Additionally, appropriate screening and landscaping should be present so as to properly separate potentially incompatible uses.*

As the Planning Commission is most likely aware, wireless telecommunication towers do not typically require 'manned' staffing, nor do these uses produce a physical good; however, this land use type does provide a 'service' to the area in terms of additional wireless coverage. The following graphics provide a visualization of the subject site and surrounding land uses, which was captured by Google Streetview in May 2025.

Eastward Facing:



Southwest Facing:



Southeast Facing:



Northeast Facing:



Northwest Facing:



3. ESSENTIAL CHARACTER

The special land use shall not change the essential character of the surrounding area.

Findings: The proposed project is not anticipated to cover the majority of the subject site; however, as the cell tower will be the highest man-made structure in the area, the visual viewsheds of the surrounding area may be minimally impacted. Further, once the tower is fully constructed, the need for on-site staff will be limited to general maintenance and upkeep of the site. Therefore, no additional noticeable traffic is anticipated once the project is fully complete.

While we do note that the viewsheds of the area may be impacted with a tower that is in excess of 160 feet in vertical dimensions, this impact should be weighed against the demonstrated need – as identified by the applicant – for increased coverage of wireless communications. While the applicant may be able to provide a greater analysis of readily available data, there are approximately 298,000 mobile subscriptions within Kalamazoo County. This number was determined based on population of Kalamazoo County, 264,000, and using a multiplier of 113 (Federal Reserve Bank of St. Louis – Mobile Cellular Subscriptions in the United States, updated April 2026). **This information is not presented as a sales pitch for the applicant**; this information is provided to the Planning Commission so that the necessity of this type of use in correlation to the character of the area can be adequately evaluated.

4. HAZARDOUS OR DISRUPTIVE

The special land use shall not be hazardous to adjacent property or involve uses, activities, materials or equipment which, will be detrimental to the health, safety or welfare of persons or property through the excessive production of traffic, noise, smoke, fumes or glare.

Findings: The proposed establishment of a wireless telecommunications tower is not expected to be hazardous to adjacent property or involve uses, activities, materials or equipment which would be detrimental to the health, safety or welfare of the area. As previously referenced, the use is not anticipated to have active personnel on site, day-in and day-out; it is anticipated that general maintenance and upkeep will be conducted as needed. The applicant notes that the facility will be *"self-contained, self-operating which do not emit pollutants nor require public services such as traffic control, water and sewage, etc."*.

5. ADEQUATE PUBLIC SERVICES AND FACILITIES

The special use shall be required to be served by public sanitary sewer and water supply systems when available or other systems approved by the Health Department, and served adequately by other essential public facilities and services; such as highways, streets, drives, sidewalks, police and fire protection, drainage structures, refuse disposal, or that the persons or agencies responsible for the establishment of the proposed special use shall be able to provide adequately all such services. Further the special use shall not place demands on public services and facilities in excess of current capacity.

Findings: As the proposed used is typically unmanned, the need for public services and facilities is diminished. The subject site is located along a major thoroughfare within the Township, and is adjacent to an emergency personnel station. It is not anticipated that the proposed special use will place demands on public services and facilities that exceed current capacity.

Additional Use Standards

Section 4.60 – Wireless Communication Facilities (WCF) establishes additional regulations for this particular land use. The purpose of Section 4.60 is to *establish uniform standards for the siting, design, permitting, maintenance and use of wireless communications facilities.* The goals of Section 4.60 are to:

1. *Protect residential areas and land uses from potential adverse impacts of towers and antennas;*
2. *Encourage the location of towers in non-residential areas;*
3. *Minimize the number of new towers throughout the community;*
4. *Strongly encourage the joint use of new and existing tower sites as a primary option rather than construction of single-use towers;*
5. *Encourage users of towers and antennas to locate them, to the extent possible, in areas where the adverse impact on the community is minimal;*
6. *Encourage users of towers and antennas to configure them in a way that minimizes the adverse visual impact of the towers and antennas through careful design, siting, landscape screening, and innovative camouflaging techniques;*
7. *Enhance the ability of the providers of telecommunications services to provide such services to the community quickly, effectively, and efficiently;*
8. *Consider the public health and safety; and*
9. *Avoid potential damage to adjacent properties from structural failure through engineering and careful siting of tower structures.*

Section 4.60.C. provides general requirements for wireless communication facilities (WCF) outside of the right-of-way (ROW). The following findings are offered pertaining to these standards. Items that need to be further reviewed have been underlined.

A. ***Height****. Tower-Based WCFs shall not exceed a height of one hundred twenty (120) feet. Higher towers may be permitted, however, if necessary to achieve co-location. The buildings, cabinets, and other accessory structures shall not exceed the maximum height for accessory structures in the zoning district in which the facility is located.*

Finding: site plan materials submitted by the applicant notes a tower height of 160 feet, with an additional 5 feet for a lightning rod; the combined height of the proposed structure is shown to be 165 feet. The applicant notes the following:

The additional height will allow the possibility of co-location. The next closest towers in Comstock Township at 6581 E K Ave and 618 N 33rd are 198-feet and 254-feet, respectively. The height required for signal optimized propagation and coverage in the Comstock Township area exceeds the 120-foot limit.

Further, the applicant has provided documentation from the Federal Aviation Administration (FAA) that the structure "*does not exceed obstruction standards and would not be a hazard to air navigation".* Therefore, the Planning Commission could consider approving the tower height of 165-feet.

B. ***Setbacks****. The setback of a new or modified Tower-Based WCF support structure from any residential-zoned property line or existing or proposed right-of-way or other publicly traveled road shall be no less than the total height of the structure and attachments thereto. Non-Tower WCF support structure shall satisfy the setback requirements of the applicable zoning district for principal buildings in Section 3.1 Establishment of districts.*

Where the proposed new or modified Tower-Based WCF support structure abuts a parcel of land zoned for a use other than residential, it shall comply with the required setbacks for principal buildings specified in Section 3.1 Establishment of districts for the zoning district in which it is located. Buildings and facilities accessory to the WCF (other than the wireless support structure) shall comply with the required setbacks for principal buildings specified in Section 3.1 Establishment of districts for the zoning district in which the WCF is located.

Findings: The subject site is adjacent to other parcels that are zoned LM, Light Manufacturing. The LM District requires a 25-foot front yard setback, and a 20-foot side & rear yard setback. The site plan notes a setback of 40 feet from the tower to the eastern (side) property line; 47 feet to the southern (rear) property line; 421 feet to the western (front) property line and 185 feet to the northern (front) property line. As a reminder, this site has two front yards. The tower, based on the dimensions provided, meets the dimensional requirements of this provision.

C. ***Equipment Location****. Equipment enclosures proposed as building or ground-mounted structures shall comply with the required setbacks and other requirements specified for principal buildings in Section 3.1 Establishment of districts for the zoning district in which the facility is located. If an equipment enclosure is proposed as a roof appliance on a building, it shall be designed, constructed and maintained to be architecturally compatible with the principal building.*

Finding: the supporting equipment appears to meet the front yard and side yard setback requirements; revised drawings have been submitted showing dimensional measurements.

D. ***Standards and Conditions.*** *All applications for WCFs that require special land use approval shall be reviewed in accordance with the following additional standards and conditions. If approved, such facilities shall be constructed and maintained in accordance with such standards and conditions and any additional conditions imposed by the Planning Commission.*

1. ***Public Health and Safety.*** *Facilities and/or support structures shall not be detrimental to the public health, safety and welfare.*

   Finding: See note above in *special land use* regarding this provision.

2. ***Compliance with Federal, State and Local Standards.*** *WCFs shall comply with applicable federal and state standards, including requirements promulgated by the Federal Aviation Administration (FAA), Federal Communications Commission (FCC), and Michigan Aeronautics Commission. Wireless support structures shall comply with all applicable building codes.*

Finding: the applicant has provided documentation from the FAA. As the Township does not have authority over Federal or State agencies, the Planning Commission is recommended to defer to such entities for additional rules and regulation enforcement.

3. ***Maximum Height.*** *Applicant shall demonstrate a justification for the proposed height of the wireless support structures and an evaluation of alternative designs which might result in lower heights. The maximum height of a new or modified wireless support structure and/or antenna shall be the minimum height demonstrated to be necessary for reasonable communication by the applicant (and by other entities to co-locate on the structure).*

   Finding: the applicant has submitted propagation maps, noting different tower heights and the coverage such towers would provide. As McKenna planners do not possess the qualifications to quantify tower height and location, we will defer to the applicant's team in addressing this stipulation.

4. ***Access.*** *When a wireless support structure is located outside the ROW, unobstructed permanent access to it shall be provided for operation, maintenance, repair and inspection purposes, which may be provided through or over an easement. The permitted type of surfacing, dimensions and location of such access route shall be subject to approval by the Planning Commission, based on evaluation of the location of adjacent roads, layout of buildings and equipment on the site, utilities needed to service the facility, proximity to residential districts, disturbance to the natural landscape, and the type of vehicles and equipment that will visit the site. When located within the ROW, access will be as required by the agency having regulatory authority over the ROW.*

   Finding: the site plan materials note an access drive heading north, connecting to E. Michigan Avenue. The plan set notes the access drive with be constructed of gravel, with a width of 12 feet. While the regulation notes that the Planning Commission has approval of the access route, the Planning Commission **does not** have authority over the public right-of-way; that authority resides with the Road Commission of Kalamazoo County. The applicant is encouraged to coordinate right-of-way permitting with the RCKC and provide a determination to the Township.

   Lastly, the application materials note that a 30-foot wide access easement will be provided, in order to access the primary facility.

5. ***Division of property****. The division of property for the purpose of locating a WCF shall be permitted only if all zoning requirements, including lot size and lot width requirements, are met.*

   Finding: no apparent division of land is proposed at this time; should a division of land be sought after, the applicant will need to coordinate further with Township personnel regarding division standards.

6. ***Design objectives****. To the extent feasible, the wireless support structure, WCF and all accessory buildings shall be designed utilizing stealth technology to minimize distraction, reduce visibility, maximize aesthetic appearance, and ensure compatibility with surroundings. Accordingly, wireless support structures, other than street light poles in the ROW, shall not have lights unless*

required otherwise by the Federal Aviation Administration (FAA). No signs or logos visible from off-site shall be permitted on a support structure.

Finding: the applicant notes that the tower will be a monopole design, in order to keep with the look and feel of a manufactured district. The applicant is encouraged to expand upon the design as it relates to the use of stealth technology and the visibility reduction of the tower.

7. ***Fencing****. When located outside the ROW, WCFs and equipment compounds shall be enclosed by an open weave, green or black vinyl-coated, chain link fence having a maximum height of six (6) feet. Barbed wire may be permitted. When located within the ROW, any fencing will be as permitted by the agency having regulatory authority over the ROW.*

   Finding: the site plan notes a '*green or black vinyl coated chain link, suggested by jurisdictional requirements, subject to change'*. The plan set further notes that the fence will be topped with barbed wire, for a total fence height of seven (7) feet. The Planning Commission will need to determine if the proposed fencing meets the intent of the supplemental use standards.

8. ***Structural integrity****. WCFs and wireless support structures shall be constructed and maintained in structurally sound condition, using the best available technology, to minimize any threat to public safety.*

   Finding: The applicant notes that "*this request will be met. As part of the building permit process. APC Tower will provide a Structural Analysis showing the design for the proposed tower will support th[e] proposed antenna and accessory equipment."*. It is our understanding that the applicant is securing an engineering letter, addressing the structural integrity of the site.

9. ***Maintenance****. A plan for the long term, continuous maintenance of the facility shall be submitted. The plan shall identify who will be responsible for maintenance, and shall include a method of notifying the Township if maintenance responsibilities change.*

   Finding: the applicant has provided a single page, noting a generalized maintenance policy. The Planning Commission should determine if such statements are satisfactory. Based upon the ordinance stipulation, and the information provided within this single sheet, McKenna views the maintenance plan as *lacking*. A further detailed/robust plan is recommended.

Site Plan Review

SUMMARY

Standards for Site Plan Review are set forth by Section 6.1 of the Township's Zoning Ordinance. This project is reviewed against the Township's Zoning Ordinance, Master Plan, existing site conditions, and sound planning and design principles. We offer the following comments for your consideration; underlined items require additional discussion and/or identify outstanding items to be addressed. A summary of our findings is shown in the table below.

Ordinance Standard	Compliance	Comments
Zoning and Use	**Complies**	A WCF is considered a SLU within the LM District
Schedule of Regulations	**Complies**	See Section 2
Landscaping, Screening, and Buffering	**Complies**	See Standard 3. *Planning Commission may waive these requirements.*
Trash Enclosure	**Complies**	See Standard 3.
Parking and Loading	**Complies**	See Standard 4.
Exterior Lighting	**Complies**	See Standard 5.
Agency Reviews	**Additional Review**	See Separate Memorandums

Further specifications, review, and recommendations are detailed on the following pages.

The applicant is advised to review the provisions for site landscaping and site lighting. Subject to these modifications and any other comments provided by the Township's Engineer & Fire Authority, a revised plan set is needed.

1. ZONING & USE

The subject site is zoned LM, Light Manufacturing. The intent of the LM, Light Manufacturing District is to *"provide a district wherein those resources and services essential to good industrial development may be provided, while guarding against such development encroaching into other districts where they would be incompatible".*

Location	Existing Land Use	Zoning District
Subject Site	Vacant / Undeveloped	LM,
North	Commercial	LM, Light Manufacturing
South	Industrial/Manufacturing	LM, Light Manufacturing
East	Comstock Twp Fire	LM, Light Manufacturing
West	Dog Kennel	LM, Light Manufacturing

2. SCHEDULE OF REGULATIONS

Section 3.1.N outlines the requirements as it pertains to lot size, yards, setbacks and other dimensional regulations within the LM, Light Manufacturing district.

Findings:

The proposed building meets dimensional standards for the B-2, Community Business district.

Requirement Type	Required	Proposed	Comments
Minimum Lot Size	*	2.56 acres	N/A
Minimum Lot Width	*	NA	N/A
Front Yard Setback	25 ft.	185 ft.	Complies
Side Yard Setback	20 ft.	40 ft.	Complies
Rear Yard Setback	20 ft.	47 ft. (tower)	Equipment to be a minimum of 20 feet away
Building Height	120 (WCF)	165 ft	PC may approve greater height
Lot Coverage by Buildings	*	NA	N/A

**While no specific standards may be included herein, attention is directed to other applicable regulations in this ordinance for specific intended uses*

3. LANDSCAPING AND SCREENING

Portions of the site not devoted to floor area, parking, access ways or pedestrian use shall be landscaped with live plant material consisting of deciduous canopy and coniferous trees, understory trees, shrubs, ground cover, and grasses and maintained in a neat and orderly manner.

Parking lot landscaping shall be designed and situated to define safe access and circulation routes, provide shade and visual relief, and diminish the scale of large lots.

Landscape features, including end islands, peninsulas, and strips shall be installed in the interior of parking lots to delineate on-site circulation, ensure adequate sight distance at the intersection of aisles and interior roadways, and to prevent diagonal vehicular movement through parking lots. Features shall be designed with sufficient radii to ensure drivers are able to make 90-degree right turns without encroaching upon landscaping or adjacent traffic lanes.

Site landscaping.

A landscaping plan has been submitted for consideration. The plan appears to focus solely around the tower location and does not account for the remainder portion of the parcel. The subject parcel has frontage along Van Bruggen of 244 feet, with frontage along E Michigan of 462 feet.

Type	Number per 100 linear ft. 706 L.F.	Proposed	Comments
Canopy Tree	2 per 100 ft = 14 trees	0	**PC may grant alternative landscaping**
Understory Tree	3 per 100 ft = 21 trees	0	**PC may grant alternative landscaping**
Shrubs	4 per 100 ft = 28 shrubs	0	**PC may grant alternative landscaping**
Greenspace	20 feet	>20 ft.	Complies

The landscaping plan notes the installation of 20 Norway Spruce Evergreen trees, to be placed along the periphery of the fenced area of the wireless communication facility. However, the landscaping plan does not take into account the remainder of the site. The Planning Commission will need to accept an alternative landscaping plan OR require that the entirety of the site be brought into compliance with ordinance standards.

The Zoning Ordinance does note the following in Section 5.4.P.2:

> **Reductions and substitutions of plantings.** *If a physical hardship exists or existing topography and vegetation are determined by the reviewing body to provide equal or better landscape and buffering effect, the reviewing body may approve modifications only to the planting requirements of subsection D. The reviewing body may require such alternate plantings and visual screens as hedges, fences, walls, and/or combination thereof which it deems necessary to ensure compliance with the spirit, purpose and intent of this Section.*

The Planning Commission will need to make the determination if a physical hardship exists or if existing topography and vegetation is equal or better landscaping than that which would be required by this Ordinance.

Trash Enclosure. *The location of all rubbish receptacles and the location, height, and type of enclosures, fences and walls are required to be on site plans. Dumpsters shall be situated on a hard surface and enclosed by a solid wall or solid fence no less than six (6) feet in height on three sides.*

Findings. As this site is anticipated to be unmanned, the need for a trash enclosure is minimal; the Planning Commission may find that a trash enclosure is not necessary, given the proposed use for the subject site.

4. OFF-STREET PARKING

The Township's off-street parking regulations do not appear to address wireless communication facilities (WCF); as such, and given that the proposed use is not anticipated to have a manned presence, off-street parking may not be applicable. The site plan notes two areas of the site in which maintenance vehicles may be positioned during on-site work, which would be located outside of any vehicular travel lanes and public right-of-way. Therefore, it is not anticipated that off-street parking is applicable at this time.

5. EXTERIOR LIGHTING

All exterior lighting. The regulations are intended to accomplish the following; Protect the public health, safety and general welfare; Provide for the fair and consistent enforcement of these regulations; Control light spillover and glare; Minimize the detrimental effect of exterior lighting on astronomical observations by the general public; Encourage lighting arrangements which conserve energy; Preserve community character; Provide for nighttime safety, utility, security and productivity.

Sufficient lighting shall be required for parking areas, walkways, driveways, building entrances, loading areas and public areas to ensure the security of property and safety of people. Site and area lighting shall be designed so that light levels do not exceed 10.0 footcandles within the site.

Findings: The submission material does not make any apparent reference to exterior lighting of the site. McKenna defers to the applicant to determine if exterior lighting is appropriate for a site/facility of this caliber.

6. ADDITIONAL AGENCY REVIEWS

See supplemental memorandums as it pertains to Fire & Engineering reviews.

Outlook

Removal agreement for proposed tower at 67 Van Bruggen

From Leland Calloway <[redacted]>
Date Tue 07/14/2026 1:36 PM
To Kyle Mucha <[redacted]>

1 attachment (19 KB)
MI-4082 Rowe Island - Sample Bond.docx;

Good afternoon Kyle,

Below are the proposed terms for a removal agreement with Comstock Township and attached is the example of the proposed bond. Please let me know if this is acceptable to the township.

A. Removal Obligation
APC Towers IV, LLC (the "Owner") shall remove the telecommunications tower located at 67 Van Bruggen, Galesburg, MI 49053, in accordance with the provisions set forth herein.

B. Definition and Notice of Abandonment
Any tower that remains unused for a continuous period of twelve (12) consecutive months shall be deemed abandoned. Upon receipt of written notice of abandonment from the Township, the Owner shall remove the tower and all associated structures within one hundred eighty (180) days.

C. Site Restoration Requirements
The Owner is required to restore the project site to its original, pre-construction condition. Restoration activities must include:

- Foundation Removal: Excavation and removal of all foundational elements to a minimum depth of two (2) feet below the final grade.
- Vegetation Restoration: Replanting and restoring the site's natural vegetation to ensure proper soil stabilization.

D. Non-Compliance and Enforcement
Failure to remove the abandoned tower within the mandated one hundred eighty (180) day period shall grant the Township the authority to remove the tower and restore the site. All costs incurred by the Township during this removal process shall be charged directly to the Owner.

E. Financial Security
The applicant shall post a bond. The bond amount must equal the projected cost of removing

the tower and its attendant accessory structures.

All the best,
Leland Calloway
Principal SAQ



Bond Number: _____

KNOW ALL MEN BY THESE PRESENTS, That we, APC Towers IV, LLC, as Principal, and The Ohio Casualty Insurance Company, a corporation organized under the laws of Massachusetts and authorized to transact business of surety in the State of Michigan, as Surety, are firmly bound unto Charter Township of Comstock, as Obligee, in the penal sum of Twenty-Five Thousand and 00/100 Dollars ($25,000) for which sum, well and truly to be paid, we bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH, That WHEREAS, the Principal has entered into a certain agreement described as Performance Bond for Clean Up, Restoration and Removal for Site ID No. MI-4082 Rowe Island located at approximately 67 Van Bruggen, Galesburg, MI 49053

and is required to furnish an indemnity bond as conditioned in said agreement.

NOW THEREFORE, If the said Principal shall fully comply with all provisions of said agreement then this obligation shall be null and void; otherwise, to remain in full force and effect.

PROVIDED, HOWEVER, that the aggregate liability of the Surety shall be limited to the penal sum herein, regardless of the number of years the bond remains in effect.

PROVIDED, FURTHER, that the Surety may cancel this bond by giving (30) thirty days written notice to the Obligee or its agents, provided, however, such notice shall not affect any liability arising prior to the effective date of cancelation.

SIGNED, SEALED AND DATED this ___th day of _____, 2026.

PRINCIPAL – APC Towers IV, LLC

_____

SURETY – The Ohio Casualty Insurance Company

_____

Stacy A. Helpman - Attorney-in-Fact

July 1, 2026

Comstock Township Planning Commission

5858 King Highway

Kalamazoo, MI 49048

RE: Burden of Proof Statement for Landscaping Modification

Property Address: 67 Van Bruggen, Galesburg, MI 49053

1. Project Summary and Requested Relief

Pursuant to Section 5.4.P.2 of the Comstock Township Zoning Ordinance, APC Towers respectfully requests a modification from the standard landscaping requirements outlined in Section 5.4.D.

The ordinance mandates two (2) canopy trees, three (3) understory trees, and four (4) shrubs per 100 linear feet. Given the property's 706 linear feet of frontage, a strict application of the ordinance would require 14 canopy trees, 21 understory trees, and 28 shrubs.

In lieu of this frontage requirement, APC Towers proposes an alternative compliance screening plan for the lease area pursuant to Section 5.4.E (Screening). We propose planting 25 Norwood Spruce trees around the perimeter of the 5,625-square-foot lease area. The highest concentration of these plantings will be positioned on the north side facing E. Michigan Avenue, where the site is most visible to the public.

2. Justification and Technical Constraints

APC Towers is bound by Federal Communications Commission (FCC) regulations, which mandate rigorous environmental, aviation, and historical reviews prior to construction. The federally required environmental studies for this project were strictly scoped to the 5,625-square-foot lease area.

Extending landscaping work outside this designated footprint would trigger supplemental federal applications and additional environmental reviews. Subjecting the applicant to these extraneous

processes represents an extraordinary and disproportionate burden in both time and financial expenditure.

Granting this modification will not injure surrounding properties, nor will it alter the essential character of the neighborhood. The proposed alternative landscape plan aligns more closely with the established intent of Section 5.4 than a strict adherence to the frontage requirements, as detailed below:

- Compatibility and Buffering: A 165-foot tower cannot be visually screened by standard canopy trees, understory trees, or shrubs. However, the ground-level equipment can be effectively shielded. The proposed perimeter of Norwood Spruce trees will provide a dense, year-round buffer that protects neighboring properties far more effectively than standard frontage plantings.

- Residential Quality of Life: There are no residential properties within 300 feet of the tower, and none possess a direct line of sight. Frontage plantings would offer no practical visual mitigation for more distant residences, whereas the proposed lease-area screening addresses the immediate ground-level visual footprint.

- Environmental Benefits (Air Quality, Shade, Noise): The Norwood Spruce plantings will actively improve air quality and dampen operational noise from the ground equipment. Because the parent parcel is currently vacant, additional shade along the frontage is unnecessary until future development occurs.

- Erosion and Water Retention: The dense root systems and year-round foliage of the Norwood Spruce trees will decrease wind velocity, mitigate soil erosion, and enhance surface water retention directly around the developed portion of the vacant parcel.

- Glare Reduction: The proposed facility will not generate glare from night lighting, buildings, or equipment. Any incidental ground-level glare from service vehicles will be optimally screened by the evergreen perimeter.

- Screening of Unattractive Features: The evergreen canopy of the Norwood Spruce will screen the ground-level equipment compound much more effectively than the standard deciduous plantings required under Section 5.4.D.

- Visual Relief: This project does not include building walls, large parking lots, or new streets, making standard frontage relief inapplicable.

- Low-Maintenance, Adapted Vegetation: Once established, the Norwood Spruce will not require fertilizers or pesticides, and will rely solely on natural precipitation. This selection represents a highly sustainable, low-maintenance solution compared to the varied plantings required by Section 5.4.D.

3. Conclusion

This request represents the most ecologically and logistically sound landscape plan for the site. By focusing dense, evergreen screening on the developed lease area—which constitutes just 5% of the total undeveloped parcel—APC Towers fulfills the core intent and purpose of the Comstock Township Zoning Ordinance while respecting the technical boundaries of its federal environmental reviews.

Jonathan Greene

Jonathan Greene
Director of Development | **APC Towers**
8601 Six Forks Road, Suite 250, Raleigh, NC 27615
M (704) 724-8382 | O (919) 948-4788 | jgreene@apctowers.com

July 1, 2026

MTS Engineering, P.L.L.C.
1717 S. Boulder, Suite 300
Tulsa, OK 74119
(918) 587-4630
btwo@btgrp.com

Subject:	**Fall Certification Letter**	
APC Designation:	**APC Project Number:**	MI-4082
	APC Site Name:	Rowe Island
Engineering Firm Designation:	**B+T Group Project Number:**	26-003675
Site Data:	**Rowe Island (MI-4082)** **160' Monopole Tower**	

To Whom it May Concern:

B+T Group is pleased to submit this "Fall Certification Letter" for the 160' monopole tower to be constructed at the **Rowe Island (MI-4082)** site.

This tower will be designed in accordance with the TIA 222-H standard for Kalamazoo county, MI. The tower will be designed to support antennas and transmission lines for wireless carriers. The design criteria are more particularly described as follows:

Design Wind Speed: 107 mph 3-sec gust (no ice), 40 mph 3-sec gust (1.5" ice)
Structure Class: II
Exposure Category: C
Topographic Category: 1

Based on our understanding, this structure is to be designed such that, in the unlikely event of a failure, the tower would fall within a radius of 75 feet from the base of the structure.

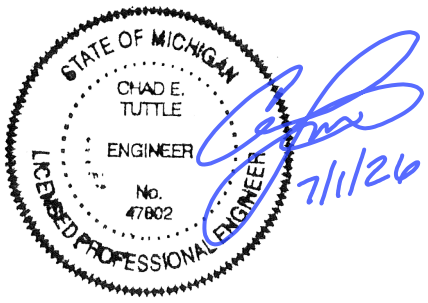
Communication towers are designed in accordance with stringent structural standards, and failures of properly maintained towers under normal operating conditions are extremely rare. Should a structural failure occur, the most probable failure mode would be compression buckling. In such a scenario, it is reasonable to expect that a structure of this type would collapse primarily within its own height, resulting in a fall radius not exceeding 75 feet from the base of the structure.

This opinion does not consider extraordinary catastrophic events beyond the design basis of the structure. However, in such events, any damage attributable to tower failure would generally be secondary to the broader impacts caused by the event itself.

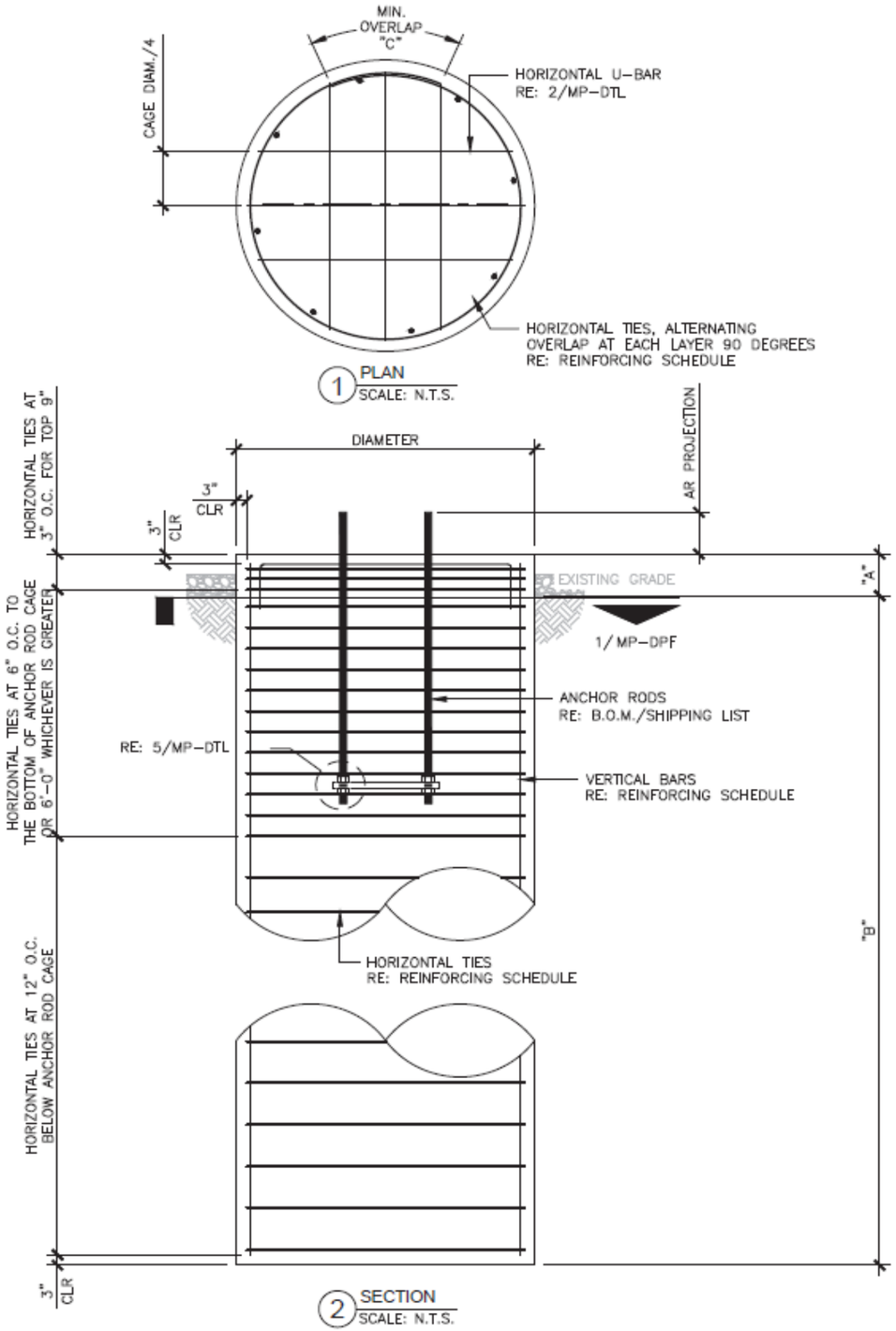
We trust this letter addresses your concerns. Please contact us if additional information or clarification is required.

Letter prepared by: Brandon Sevier, P.E.

Submitted by: MTS Engineering, P.L.L.C.



Chad Tuttle, P.E.



NOTES:

1. REINFORCEMENT STEEL SHALL CONFORM TO THE REQUIREMENT OF ASTM A-615 (GRADE 60) EXCEPT THAT TIES MAY BE ASTM-615 (GRADE 40) WITH 3" MINIMUM CLEAR COVER.
2. REINFORCEMENT STEEL SHALL BE DETAILED, FABRICATED, BENT, AND PLACED IN ACCORDANCE WITH THE CRSI MANUAL OF STANDARD PRACTICE AND THE ACI 315 (LATEST EDITION).
3. THE CONTRACTOR SHALL THOROUGHLY REVIEW THE GEOTECH REPORT FOR THIS PROJECT AND FOLLOW THE RECOMMENDATIONS IN THAT REPORT WHEN CONSTRUCTING THE FOUNDATION.
   GEOTECHNICAL PROPERTIES BY: TIA-222-H ANNEX F
   PROJECT NUMBER:
   DATE:
4. THIS FOUNDATION HAS BEEN DESIGNED, IN ACCORDANCE WITH THE TIA 222-H STANDARD, SPECIFICALLY FOR THE TOWER AND SOIL CONDITION REFERENCED ABOVE. IF ANYTHING DIFFERS, THIS DESIGN SHALL BE CONSIDERED INVALID AND MUST BE REDESIGNED PRIOR TO CONSTRUCTION.
5. TOTAL CONCRETE VOLUME IN CUBIC YARDS: 36.35
6. ALL CONCRETE SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 4000 PSI AT 28 DAYS.
7. CONCRETE MIXTURES SHALL MEET DURABILITY REQUIREMENTS OF CHAPTER 19 OF THE ACI 318-14
8. ALL CONCRETE TESTING SHALL BE IN ACCORDANCE WITH ACI 318-14. A MINIMUM OF (2) 6"X12" OR (3) 4"X8" CONCRETE CYLINDERS PER INDIVIDUAL FOUNDATION AND A MINIMUM OF (6) 6"X12" OR (6) 4"X8" CYLINDERS PER BATCH REQUIRED.
9. SLUMP TEST SHALL BE MADE IN ACCORDANCE WITH ASTM C143. THE ALLOWABLE CONCRETE SLUMP SHALL BE 4 INCHES (±1") UNLESS ADMIXTURES ARE USED. ADMIXTURE SHALL BE IN ACCORDANCE WITH ASTM C494 STANDARD TYPES A, B, C, D OR E. THE ENGINEER SHALL PRE-APPROVE SUPER PLASTICIZER USE. DO NOT USE CHLORIDE-CONTAINING ADMIXTURES. AIR ENTRAINING ADMIXTURES SHALL CONFORM TO ASTM C260.
10. BACKFILL MATERIAL SHALL BE COMPACTED TO A MIN. UNIT WEIGHT OF 110 PCF OR AS SPECIFIED IN GEOTECH REPORT. THE SOIL SHALL BE INSTALLED IN 6" TO 8" LIFTS AND COMPACTED THOROUGHLY TO ACHIEVE APPROPRIATE UNIT WEIGHT UNLESS GEOTECH SPECIFIES OTHER COMPACTION REQUIREMENTS.
11. VERIFY ALL DIMENSIONS AGAINST MANUFACTURER'S DRAWINGS.

STIPULATION FOR REUSE:

1. THIS DRAWING WAS SPECIFICALLY DESIGNED FOR USE BY THE CUSTOMER ON THIS DRAWING AT THE SPECIFIED LOCATION. USE OF THIS DRAWING FOR REFERENCE OR EXAMPLE ON ANOTHER PROJECT REQUIRES THE SERVICES OF A PROPERLY LICENSED ENGINEER.

DIMENSIONING SCHEDULE	
DIM "A"	0' 6"
DIM "B"	25' 0"
MIN. OVERLAP "C"	2' 8"
DIAMETER	7' 0"
AR PROJECTION	REF TO MFG

REINFORCING SCHEDULE	SIZE	TOTAL QTY
VERTICAL BARS	# 10	29
HORIZONTAL TIES	# 5	33
U-BAR HORIZONTAL	# 5	6

BASE REACTIONS: (FACTORED LOADS)		
MOMENT	3788	KIPS-FT
AXIAL	46	KIPS
SHEAR	32	KIPS

MTS Engineering, P.L.L.C.
B+T GRP
1717 S BOULDER AVE #300, TULSA, OK 74119
(918) 587-4630

APC Towers
8601 SIX FORKS RD., STE. 250, RALEIGH, NC

ISSUED FOR:

REV	DATE	DESCRIPTION
0	07/01/26	NOT FOR CONSTRUCTION

IT IS A VIOLATION OF LAW FOR ANY PERSON UNLESS THEY ARE ACTING UNDER THE DIRECTIONS OF A LICENSES PROFESSIONAL ENGINEER, TO ALTER THIS DOCUMENT

PROJECT INFORMATION:

PROJECT NO: 26-003675
SITE NAME: ROWE ISLAND
SITE NO: MI-4082
CLIENT NAME: APC TOWERS

DRAWN BY: BRANDON SEVIER, P.E.
CHECKED BY:

SHEET TITLE:

DRILLED PIER FOUNDATION FOR 160 FT. MONOPOLE TOWER

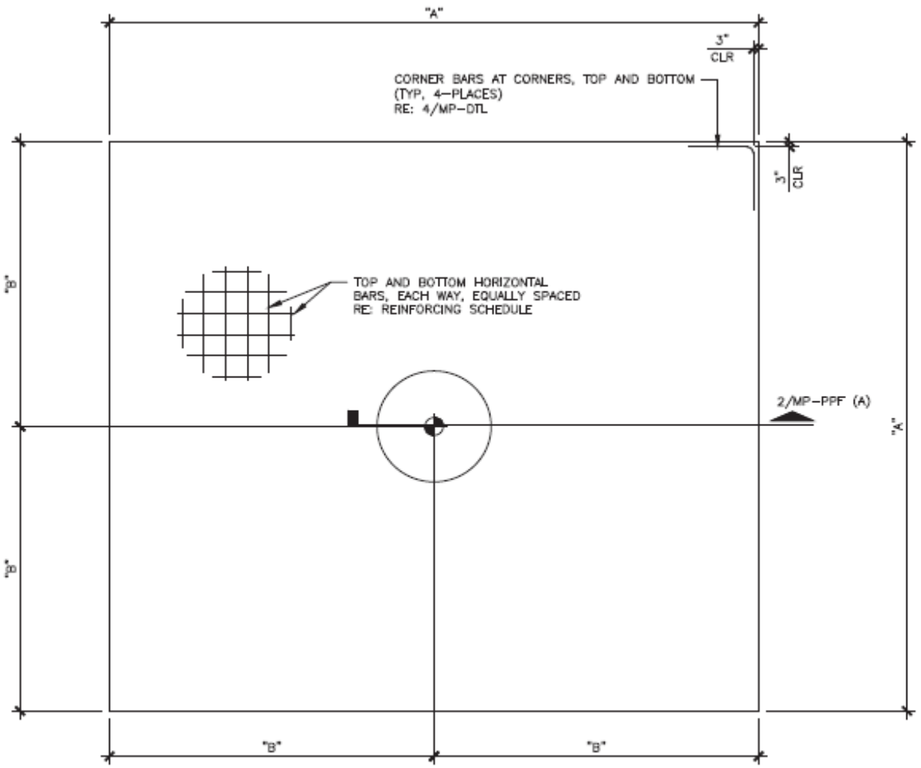
SHEET NUMBER: MP-DPF

REVISION: 0

DIMENSIONING SCHEDULE	
A	28' 0"
B	14' 0"
C	0' 6"
D	6' 0"
E	2' 6"
DIAMETER	7' 6"
MIN. OVERLAP "M"	2' 3"
AR PROJECTION	REF TO MFG

REINFORCING SCHEDULE	SIZE	TOTAL QTY
VERTICAL BARS WITH 90° BEND	# 9	32
HORIZONTAL TIES	# 4	14
HORIZONTAL U-BAR (PEDESTAL)	# 4	6
TOP HORIZONTAL BARS	# 9	64
BOTTOM HORIZONTAL BARS	# 9	64
CORNER BARS	# 4	8
VERTICAL U-BARS (PAD)	# 4	128

BASE REACTIONS (FACTORED LOADS)		
MOMENT	3788	KIP-FT
AXIAL	46	KIPS
SHEAR	32	KIPS



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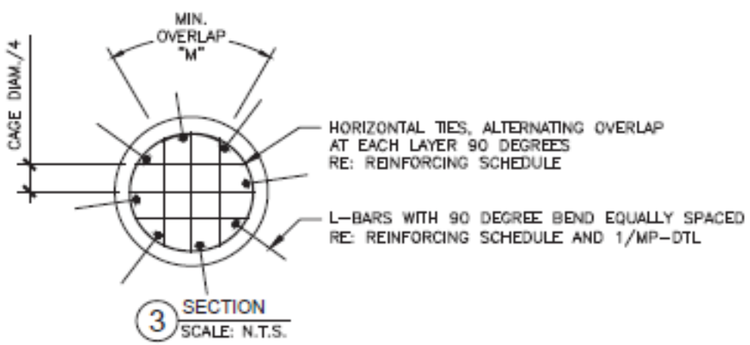
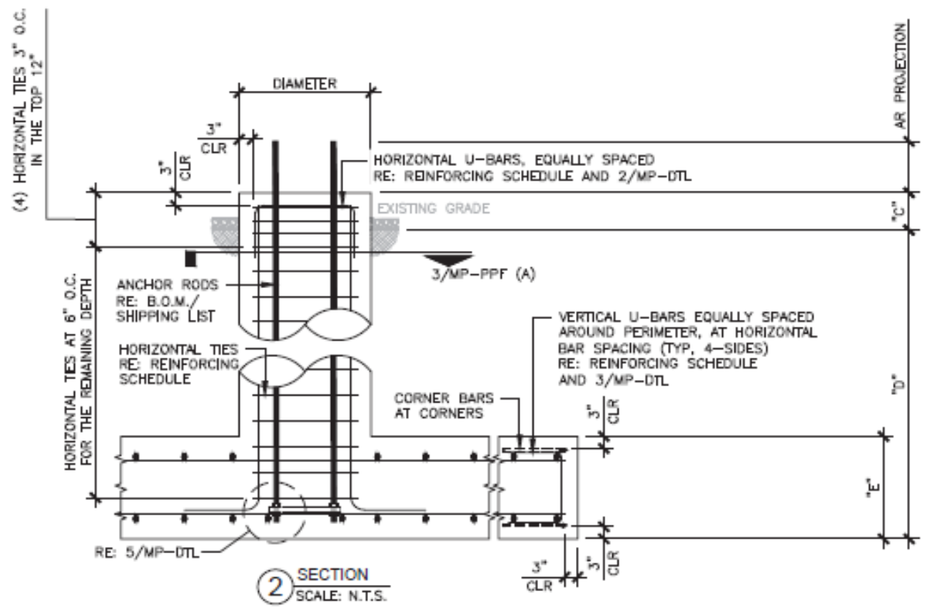


3 SECTION
SCALE: N.T.S.



2 SECTION
SCALE: N.T.S.

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APC Towers
8601 SIX FORKS RD., STE. 250, RALEIGH, NC

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SITE NAME: ROWE ISLAND
SITE NO: MI-4082
CLIENT NAME: APC TOWERS

DRAWN BY: BRANDON SEVIER, P.E.
CHECKED BY:

SHEET TITLE:

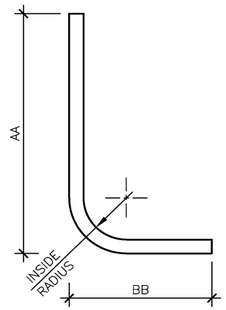
PAD & PIER FOUNDATION FOR 160 FT. MONOPOLE TOWER

SHEET NUMBER: MP-PPF

REVISION: 0

DIMENSIONING SCHEDULE	
AA*	5' 9-3/4"
BB	1' 6"
CC*	VARIES
DD*	2' 0"
EE	3' 0"

*NOTE: CONTRACTOR TO VERIFY DIMENSIONS PRIOR TO FABRICATION



1 L-BAR
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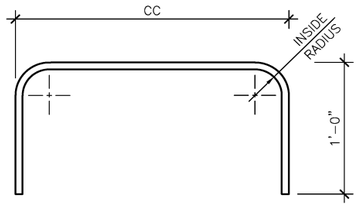

2 HORIZONTAL U-BAR
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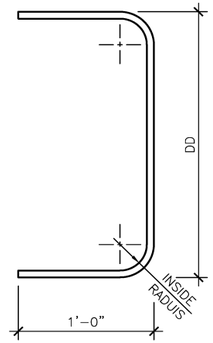

3 VERTICAL U-BAR
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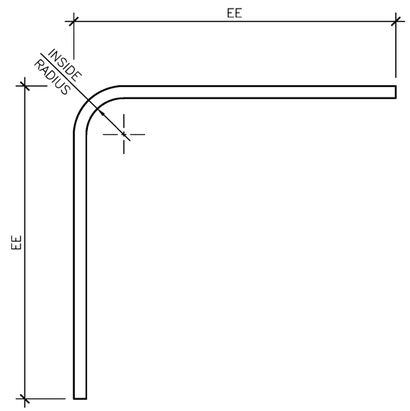

4 CORNER BAR
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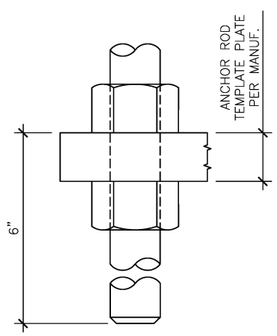

5 ANCHOR ROD DETAIL
SCALE: N.T.S.

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SITE NO: MI-4082
CLIENT NAME: APC TOWERS

DRAWN BY: BRANDON SEVIER, P.E.
CHECKED BY:

SHEET TITLE:

DIMENSIONING DETAIL

SHEET NUMBER:	REVISION:
MP-DTL	0

Drilled Pier Foundation

BT # :	26-003675
Site Name:	Rowe Island
Site #:	MI-4082
TIA-222 Revison:	H
Tower Type:	Monopole

Applied Loads	Comp.	Uplift
Moment (kip-ft)	3788	
Axial Force (kips)	46	
Shear Force (kips)	32	

Material Properties		
Concrete Strength, f'c:	4	ksi
Rebar Strength, Fy:	60	ksi
Tie Yield Strength, Fyt:	40	ksi

Pier Design Data		
Depth	25	ft
Ext. Above Grade	0.5	ft
Pier Section 1		
From 0.5' above grade to 25' below grade		
Pier Diameter	7	ft
Rebar Quantity	29	
Rebar Size	10	
Clear Cover to Ties	3	in
Tie Size	5	
Tie Spacing	12	in

Rebar & Pier Options

Embedded Pole Inputs

Belled Pier Inputs

Analysis Results		
Soil Lateral Check	*Compression*	*Uplift*
$D_{v=0}$ (ft from TOC)	6.26	-
Soil Safety Factor	2.26	-
Max Moment (kip-ft)	3954.92	-
Rating	*58.7%*	-
Soil Vertical Check	*Compression*	*Uplift*
Skin Friction (kips)	177.30	-
End Bearing (kips)	339.14	-
Weight of Concrete (kips)	176.64	-
Total Capacity (kips)	516.45	-
Axial (kips)	222.64	-
Rating	*43.1%*	-
Reinforced Concrete Flexure	*Compression*	*Uplift*
Critical Depth (ft from TOC)	6.11	-
Critical Moment (kip-ft)	3954.73	-
Critical Moment Capacity	5992.25	-
Rating	*66.0%*	-
Reinforced Concrete Shear	*Compression*	*Uplift*
Critical Depth (ft from TOC)	18.64	-
Critical Shear (kip)	452.71	-
Critical Shear Capacity	659.26	-
Rating	*68.7%*	-

Structural Foundation Rating	**68.7%**
Soil Interaction Rating	**58.7%**

Check Limitation	
Apply TIA-222-H Section 15.5:	☐
N/A	☐
Design Options	
Input Effective Depths (else Actual):	☐
Consider non-tapered moment capacity:	☐
Check Shear along Depth of Pier:	☑
Utilize Shear-Friction Methodology:	☐
Override Critical Depth:	☐

Go to Soil Calculations

Soil Profile

Groundwater Depth	N/A	# of Layers	2

Layer	Top (ft)	Bottom (ft)	Thickness (ft)	γ_{soil} (pcf)	$\gamma_{concrete}$ (pcf)	Cohesion (ksf)	Angle of Friction (degrees)	Calculated Ultimate Skin Friction Comp (ksf)	Calculated Ultimate Skin Friction Uplift (ksf)	Ultimate Skin Friction Comp Override (ksf)	Ultimate Skin Friction Uplift Override (ksf)	Ult. Net Bearing Capacity (ksf)	SPT Blow Count	Soil Type
1	0	3.5	3.5	110	150	0	0	0.000	0.000					Cohesionless
2	3.5	25	21.5	110	150		30	0.000	0.000	0.50	0.50	9		Cohesionless

Pier and Pad Foundation

Project #:	26-003675
Site Name:	Rowe Island
Site #:	MI-4082

TIA-222 Revision:	H
Tower Type:	Monopole

Top & Bot. Pad Rein. Different?:	☐
Block Foundation?:	☐
Rectangular Pad?:	☐

Superstructure Analysis Reactions		
Compression, P_{comp}:	46	kips
Base Shear, Vu_comp:	32	kips
Moment, M_u:	3788	ft-kips
Tower Height, **H**:	160	ft
BP Dist. Above Fdn, bp_{dist}:	3	in

Pier Properties		
Pier Shape:	Circular	
Pier Diameter, **dpier**:	7.5	ft
Ext. Above Grade, **E**:	0.5	ft
Pier Rebar Size, **Sc**:	9	
Pier Rebar Quantity, **mc**:	32	
Pier Tie/Spiral Size, **St**:	4	
Pier Tie/Spiral Quantity, **mt**:	14	
Pier Reinforcement Type:	Tie	
Pier Clear Cover, cc_{pier}:	3	in

Pad Properties		
Depth, **D**:	6	ft
Pad Width, W_1:	28	ft
Pad Thickness, **T**:	2.5	ft
Pad Rebar Size (Bottom dir. 2), Sp_2:	9	
Pad Rebar Quantity (Bottom dir. 2), mp_2:	32	
Pad Clear Cover, cc_{pad}:	3	in

Material Properties		
Rebar Grade, **Fy**:	60	ksi
Concrete Compressive Strength, **F'c**:	4	ksi
Dry Concrete Density, δ**c**:	150	pcf

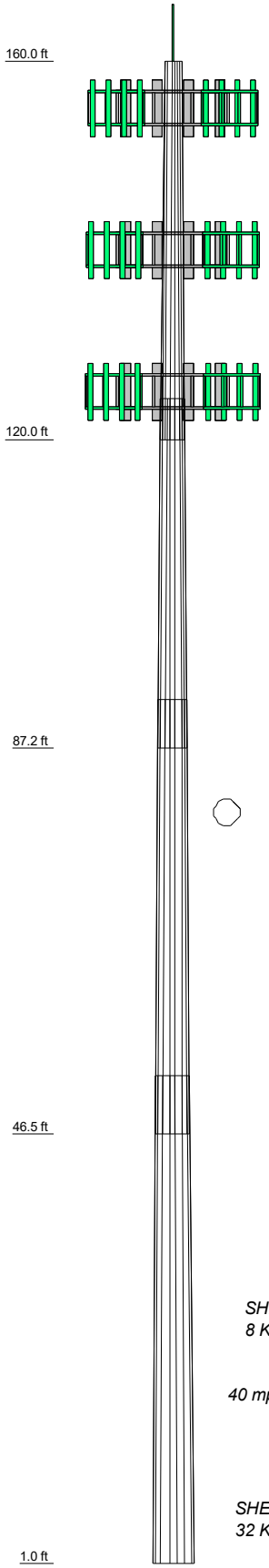
Soil Properties		
Total Soil Unit Weight, γ:	110	pcf
Ultimate Gross Bearing, Qult:	4.000	ksf
Cohesion, **Cu**:		ksf
Friction Angle, φ:	30	degrees
SPT Blow Count, N_{blows}:		
Base Friction, μ:		
Neglected Depth, **N**:	3.50	ft
Foundation Bearing on Rock?	No	
Groundwater Depth, **gw**:	N/A	ft

<--Toggle between Gross and Net

Foundation Analysis Checks	Capacity	Demand	Rating	Check
Lateral (Sliding) (kips)	240.43	32.00	**13.3%**	**Pass**
Bearing Pressure (ksf)	3.00	1.78	**59.3%**	**Pass**
*Overturning (kip*ft)*	6071.47	4004.00	**65.9%**	**Pass**
*Pier Flexure (Comp.) (kip*ft)*	5696.52	3916.00	**68.7%**	**Pass**
Pier Compression (kip)	28118.83	77.81	**0.3%**	**Pass**
*Pad Flexure (kip*ft)*	3523.34	1396.21	**39.6%**	**Pass**
Pad Shear - 1-way (kips)	806.71	202.74	**25.1%**	**Pass**
Pad Shear - 2-way (Comp) (ksi)	0.190	0.048	**25.5%**	**Pass**
*Flexural 2-way (Comp) (kip*ft)*	3737.62	2349.60	**62.9%**	**Pass**

Structural Rating:	**68.7%**
Soil Rating:	**65.9%**

Section	Length (ft)	Number of Sides	Thickness (in)	Socket Length (ft)	Top Dia (in)	Bot Dia (in)	Grade	Weight (K)
1	40.000	18	0.250	4.250	22.200	30.600		2.8
2	37.000	18	0.312	5.250	29.207	36.977		4.1
3	46.000	18	0.375	6.250	35.250	44.910		7.4
4	51.750	18	0.438		42.847	53.715		11.7
							A572-65	26.0



DESIGNED APPURTENANCE LOADING

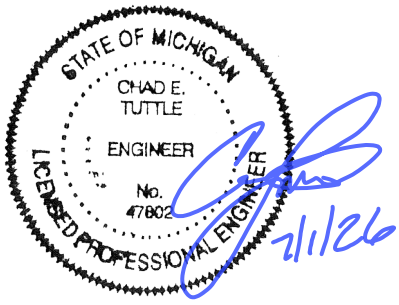
TYPE	ELEVATION	TYPE	ELEVATION
5' Lightning Rod	163	Sector3(CaAa=10000 Sq.in)No Ice (Carrier 3)	140
Sector1(CaAa=14000 Sq.in)No Ice (Carrier 2)	155	Sector1(CaAa=10000 Sq.in)No Ice (Carrier 4)	125
Sector2(CaAa=14000 Sq.in)No Ice (Carrier 2)	155	Sector2(CaAa=10000 Sq.in)No Ice (Carrier 4)	125
Sector3(CaAa=14000 Sq.in)No Ice (Carrier 2)	155	Sector3(CaAa=10000 Sq.in)No Ice (Carrier 4)	125
Sector1(CaAa=10000 Sq.in)No Ice (Carrier 3)	140		
Sector2(CaAa=10000 Sq.in)No Ice (Carrier 3)	140		

MATERIAL STRENGTH

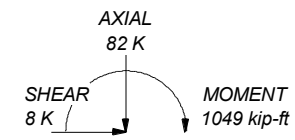
GRADE	Fy	Fu	GRADE	Fy	Fu
A572-65	65 ksi	80 ksi			

TOWER DESIGN NOTES

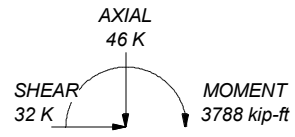
1. Tower is located in Kalamazoo County, Michigan.
2. Tower designed for Exposure C to the TIA-222-H Standard.
3. Tower designed for a 107 mph basic wind in accordance with the TIA-222-H Standard.
4. Tower is also designed for a 40 mph basic wind with 1.50 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.
6. Tower Risk Category II.
7. Topographic Category 1 with Crest Height of 0.000 ft
8. Please see feedline plan for proper feedline placement. Deviation from plan may reduce tower capacity.
9. Design is preliminary and subject to change.



ALL REACTIONS ARE FACTORED



TORQUE 3 kip-ft
40 mph WIND - 1.500 in ICE



TORQUE 9 kip-ft
REACTIONS - 107 mph WIND

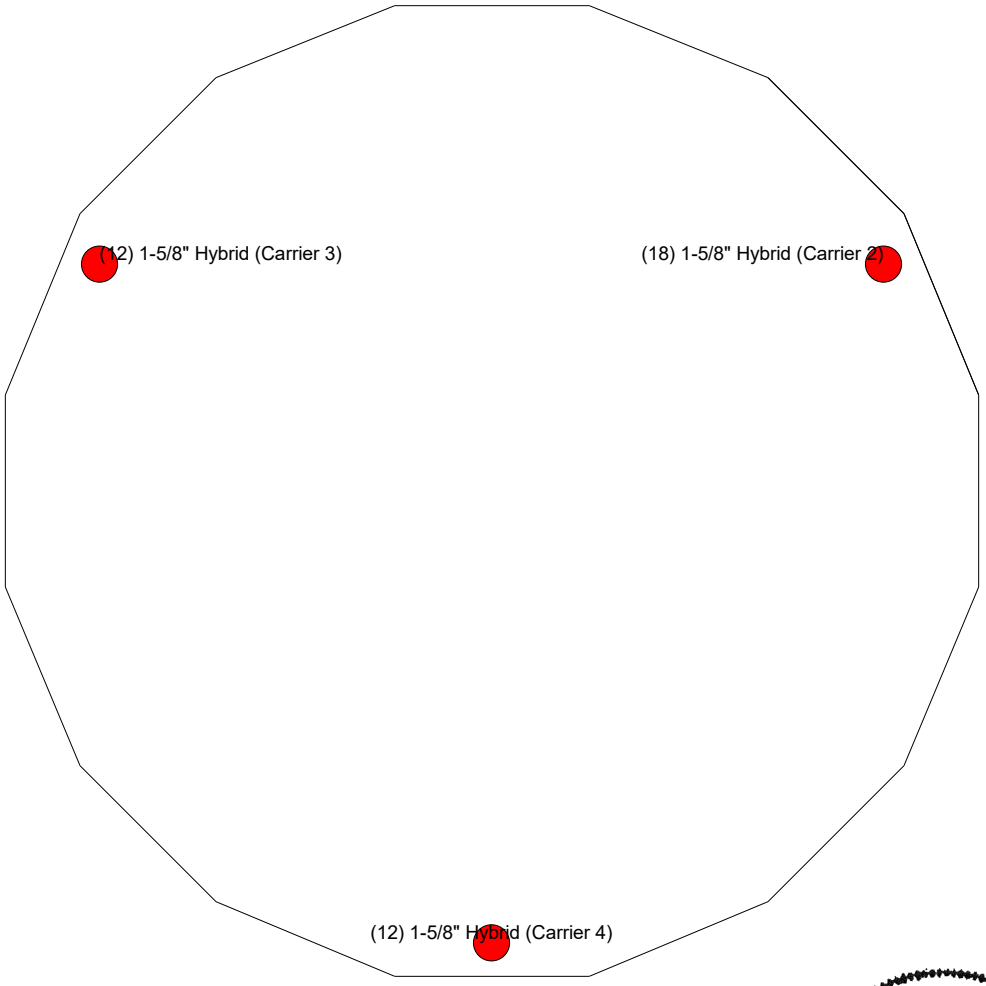
ARCOSA
TELECOM STRUCTURES

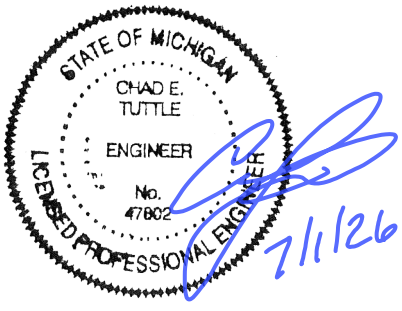
MTS Engineering, P.L.L.C.
1717 S Boulder Ave, Suite 300
Tulsa, OK 74119
Phone: (918) 587-4630
FAX: (918) 295-0265

B+T GRP

Job: ***Proposal Design - Rowe Island (Site# MI-4082)***		
Project: ***160' MP/42.287875, -85.45964722***		
Client: APC Towers	Drawn by: BSevier	App'd:
Code: TIA-222-H	Date: 07/01/26	Scale: NTS
Path: C:\Users\bsevier\OneDrive - B+T Group\Desktop\Working Folder\0626-005_180MP_Rowe Island\tnxTower\0626-005_160MP_Rowe Island.eri		Dwg No. E-1

Feed Line Plan





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MTS Engineering, P.L.L.C.
1717 S Boulder Ave, Suite 300
Tulsa, OK 74119
Phone: (918) 587-4630
FAX: (918) 295-0265

Job: ***Proposal Design - Rowe Island (Site# MI-4082)***			
Project: ***160' MP/42.287875, -85.45964722***			
Client: APC Towers	Drawn by: BSevier	App'd:	
Code: TIA-222-H	Date: 07/01/26	Scale: N	
Path: S:\Projects\Arcosa Telecom Structures\105341 Rowe Island\Engineering\tnxTower\0626-005_160MP_Rowe Island.eri		Dwg No. 38	

Tower Input Data

The tower is a monopole.
This tower is designed using the TIA-222-H standard.
The following design criteria apply:

Tower is located in Kalamazoo County, Michigan.
Tower base elevation above sea level: 816.000 ft.
Basic wind speed of 107 mph.
Risk Category II.
Exposure Category C.
Simplified Topographic Factor Procedure for wind speed-up calculations is used.
Topographic Category: 1.
Crest Height: 0.000 ft.
Nominal ice thickness of 1.500 in.
Ice thickness is considered to increase with height.
Ice density of 56.000 pcf.
A wind speed of 40 mph is used in combination with ice.
Temperature drop of 50.000 °F.
Deflections calculated using a wind speed of 60 mph.
Please see feedline plan for proper feedline placement. Deviation from plan may reduce tower capacity..
Design is preliminary and subject to change..
Non-linear (P-delta) analysis was used.
Pressures are calculated at each section.
Stress ratio used in pole design is 1.
Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

	Consider Moments - Legs		Assume Legs Pinned		Calculate Redundant Bracing Forces
	Consider Moments - Horizontals	√	Assume Rigid Index Plate		Ignore Redundant Members in FEA
	Consider Moments - Diagonals	√	Use Clear Spans For Wind Area		SR Leg Bolts Resist Compression
	Use Moment Magnification		Use Clear Spans For KL/r		All Leg Panels Have Same Allowable
√	Use Code Stress Ratios		Retension Guys To Initial Tension		Offset Girt At Foundation
√	Use Code Safety Factors - Guys	√	Bypass Mast Stability Checks	√	Consider Feed Line Torque
	Escalate Ice	√	Use Azimuth Dish Coefficients		Include Angle Block Shear Check
	Always Use Max Kz	√	Project Wind Area of Appurtenances		Use TIA-222-H Bracing Resist. Exemption
	Kz In Exposure D Hurricane Region		Alternative Appurt. EPA Calculation		Use TIA-222-H Tension Splice Exemption
	Include Bolts In Member Capacity		Autocalc Torque Arm Areas		Poles
	Leg Bolts Are At Top Of Section		Add IBC .6D+W Combination		Include Shear-Torsion Interaction
	Secondary Horizontal Braces Leg		Sort Capacity Reports By Component		Always Use Sub-Critical Flow
	Use Diamond Inner Bracing (4 Sided)		Triangulate Diamond Inner Bracing		Use Top Mounted Sockets
	SR Members Have Cut Ends		Treat Feed Line Bundles As Cylinder		Pole Without Linear Attachments
	SR Members Are Concentric		Ignore KL/ry For 60 Deg. Angle Legs		Pole With Shroud Or No Appurtenances
	Distribute Leg Loads As Uniform		Use ASCE 10 X-Brace Ly Rules		Outside and Inside Corner Radii Are Known
	Use Special Wind Profile				

Tapered Pole Section Geometry

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L1	160.000-120.000	40.000	4.250	18	22.200	30.600	0.250	1.000	A572-65 (65 ksi)
L2	120.000-87.250	37.000	5.250	18	29.207	36.977	0.312	1.250	A572-65 (65 ksi)
L3	87.250-46.500	46.000	6.250	18	35.250	44.910	0.375	1.500	A572-65 (65 ksi)
L4	46.500-1.000	51.750		18	42.847	53.715	0.438	1.750	A572-65 (65 ksi)

Tapered Pole Properties

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t
L1	22.504	17.417	1060.200	7.792	11.278	94.009	2121.796	8.710	3.467	13.869
	31.033	24.083	2802.596	10.774	15.545	180.292	5608.879	12.044	4.946	19.782
L2	30.516	28.660	3023.169	10.258	14.837	203.753	6050.317	14.333	4.591	14.69
	37.500	36.367	6176.600	13.016	18.785	328.812	12361.327	18.187	5.958	19.066
L3	36.855	41.510	6378.496	12.381	17.907	356.201	12765.385	20.759	5.544	14.784
	45.545	53.008	13282.506	15.810	22.814	582.201	26582.489	26.509	7.244	19.318
L4	44.774	58.892	13382.192	15.056	21.767	614.806	26781.992	29.451	6.771	15.477
	54.476	73.982	26531.020	18.914	27.287	972.287	53096.950	36.998	8.684	19.849

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
L1 160.000-120.000				1	1	1			
L2 120.000-87.250				1	1	1			
L3 87.250-46.500				1	1	1			
L4 46.500-1.000				1	1	1			

Monopole Base Plate Data

Base Plate Data	
Base plate is square	√
Base plate is grouted	
Anchor bolt grade	A615-75
Anchor bolt size	2.250 in
Number of bolts	20
Embedment length	72.000 in
f'_c	4.000 ksi
Grout space	2.250 in
Base plate grade	A572-50
Base plate thickness	3.000 in
Bolt circle diameter	61.000 in
Outer diameter	63.000 in
Inner diameter	35.810 in
Corner clipped	8.000 in
Base plate type	Plain Plate

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	*Sector*	*Exclude From Torque Calculation*	*Component Type*	*Placement* *ft*	*Total Number*	*Number Per Row*	*Start/End Position*	*Width or Diameter* *in*	*Perimeter* *in*	*Weight* *klf*
**										
Safety Line 3/8	A	No	Surface Ar (CaAa)	160.000 - 10.000	1	1	0.000 0.010	0.375		0.000
**										

Feed Line/Linear Appurtenances - Entered As Area

Description	*Face or Leg*	*Allow Shield*	*Exclude From Torque Calculation*	*Component Type*	*Placement* *ft*	*Total Number*		*C_AA_A* *ft^2/ft*	*Weight* *klf*
**									
1-5/8" Hybrid (Carrier 2)	B	No	No	Inside Pole	155.000 - 10.000	18	No Ice 1/2" Ice 1" Ice 2" Ice	0.000 0.000 0.000 0.000	0.001 0.001 0.001 0.001
**									
1-5/8" Hybrid (Carrier 3)	A	No	No	Inside Pole	140.000 - 10.000	12	No Ice 1/2" Ice 1" Ice 2" Ice	0.000 0.000 0.000 0.000	0.001 0.001 0.001 0.001
**									
1-5/8" Hybrid (Carrier 4)	C	No	No	Inside Pole	125.000 - 10.000	12	No Ice 1/2" Ice 1" Ice 2" Ice	0.000 0.000 0.000 0.000	0.001 0.001 0.001 0.001
**									

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	160.000-120.000	A	0.000	0.000	1.500	0.000	0.258
		B	0.000	0.000	0.000	0.000	0.655
		C	0.000	0.000	0.000	0.000	0.062
L2	120.000-87.250	A	0.000	0.000	1.228	0.000	0.416
		B	0.000	0.000	0.000	0.000	0.613
		C	0.000	0.000	0.000	0.000	0.409
L3	87.250-46.500	A	0.000	0.000	1.528	0.000	0.518
		B	0.000	0.000	0.000	0.000	0.763
		C	0.000	0.000	0.000	0.000	0.509
L4	46.500-1.000	A	0.000	0.000	1.369	0.000	0.464
		B	0.000	0.000	0.000	0.000	0.683
		C	0.000	0.000	0.000	0.000	0.456

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	160.000-120.000	A	1.732	0.000	0.000	15.357	0.000	0.437
		B		0.000	0.000	0.000	0.000	0.655
		C		0.000	0.000	0.000	0.000	0.062
L2	120.000-87.250	A	1.681	0.000	0.000	12.573	0.000	0.562
		B		0.000	0.000	0.000	0.000	0.613
		C		0.000	0.000	0.000	0.000	0.409
L3	87.250-46.500	A	1.609	0.000	0.000	15.230	0.000	0.690
		B		0.000	0.000	0.000	0.000	0.763
		C		0.000	0.000	0.000	0.000	0.509
L4	46.500-1.000	A	1.453	0.000	0.000	13.113	0.000	0.606
		B		0.000	0.000	0.000	0.000	0.683
		C		0.000	0.000	0.000	0.000	0.456

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	160.000-120.000	-0.259	-0.153	-1.298	-0.768
L2	120.000-87.250	-0.260	-0.154	-1.360	-0.804
L3	87.250-46.500	-0.260	-0.154	-1.370	-0.810
L4	46.500-1.000	-0.205	-0.121	-1.083	-0.640

Note: For pole sections, center of pressure calculations do not consider feed line shielding.

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L1	9	Safety Line 3/8	120.00 - 160.00	1.0000	1.0000
L2	9	Safety Line 3/8	87.25 - 120.00	1.0000	1.0000
L3	9	Safety Line 3/8	46.50 - 87.25	1.0000	1.0000
L4	9	Safety Line 3/8	10.00 - 46.50	1.0000	1.0000

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
5' Lightning Rod	C	None		0.000	163.000	No Ice	1.000	1.000	0.040
						1/2" Ice	2.017	2.017	0.049
						1" Ice	3.050	3.050	0.065
						2" Ice	5.148	5.148	0.116
**									
**									
Sector1(CaAa=14000 Sq.in)No Ice (Carrier 2)	A	From Leg	4.000 0.000 0.000	0.000	155.000	No Ice 1/2" Ice 1" Ice 2" Ice	97.222 121.527 145.832 194.442	65.138 81.423 97.708 130.278	0.700 1.400 2.100 3.500
Sector2(CaAa=14000 Sq.in)No Ice (Carrier 2)	B	From Leg	4.000 0.000 0.000	0.000	155.000	No Ice 1/2" Ice 1" Ice 2" Ice	97.222 121.527 145.832 194.442	65.138 81.423 97.708 130.278	0.700 1.400 2.100 3.500
Sector3(CaAa=14000 Sq.in)No Ice (Carrier 2)	C	From Leg	4.000 0.000 0.000	0.000	155.000	No Ice 1/2" Ice 1" Ice 2" Ice	97.222 121.527 145.832 194.442	65.138 81.423 97.708 130.278	0.700 1.400 2.100 3.500
**									
Sector1(CaAa=10000 Sq.in)No Ice (Carrier 3)	A	From Leg	4.000 0.000 0.000	0.000	140.000	No Ice 1/2" Ice 1" Ice 2" Ice	69.444 86.805 104.166 138.888	46.527 58.159 69.791 93.055	0.700 1.400 2.100 3.500
Sector2(CaAa=10000 Sq.in)No Ice (Carrier 3)	B	From Leg	4.000 0.000 0.000	0.000	140.000	No Ice 1/2" Ice 1" Ice 2" Ice	69.444 86.805 104.166 138.888	46.527 58.159 69.791 93.055	0.700 1.400 2.100 3.500
Sector3(CaAa=10000 Sq.in)No Ice (Carrier 3)	C	From Leg	4.000 0.000 0.000	0.000	140.000	No Ice 1/2" Ice 1" Ice 2" Ice	69.444 86.805 104.166 138.888	46.527 58.159 69.791 93.055	0.700 1.400 2.100 3.500
**									
Sector1(CaAa=10000 Sq.in)No Ice (Carrier 4)	A	From Leg	4.000 0.000 0.000	0.000	125.000	No Ice 1/2" Ice 1" Ice 2" Ice	69.444 86.805 104.166 138.888	46.527 58.159 69.791 93.055	0.700 1.400 2.100 3.500
Sector2(CaAa=10000 Sq.in)No Ice (Carrier 4)	B	From Leg	4.000 0.000 0.000	0.000	125.000	No Ice 1/2" Ice 1" Ice 2" Ice	69.444 86.805 104.166 138.888	46.527 58.159 69.791 93.055	0.700 1.400 2.100 3.500

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
Sector3(CaAa=10000 Sq.in)No Ice (Carrier 4) **	C	From Leg	4.000 0.000 0.000	0.000	125.000	No Ice 1/2" Ice 1" Ice 2" Ice	69.444 86.805 104.166 138.888	46.527 58.159 69.791 93.055	0.700 1.400 2.100 3.500

Load Combinations

Comb. No.	Description
1	Dead Only
2	1.2 Dead+1.0 Wind 0 deg - No Ice
3	0.9 Dead+1.0 Wind 0 deg - No Ice
4	1.2 Dead+1.0 Wind 30 deg - No Ice
5	0.9 Dead+1.0 Wind 30 deg - No Ice
6	1.2 Dead+1.0 Wind 60 deg - No Ice
7	0.9 Dead+1.0 Wind 60 deg - No Ice
8	1.2 Dead+1.0 Wind 90 deg - No Ice
9	0.9 Dead+1.0 Wind 90 deg - No Ice
10	1.2 Dead+1.0 Wind 120 deg - No Ice
11	0.9 Dead+1.0 Wind 120 deg - No Ice
12	1.2 Dead+1.0 Wind 150 deg - No Ice
13	0.9 Dead+1.0 Wind 150 deg - No Ice
14	1.2 Dead+1.0 Wind 180 deg - No Ice
15	0.9 Dead+1.0 Wind 180 deg - No Ice
16	1.2 Dead+1.0 Wind 210 deg - No Ice
17	0.9 Dead+1.0 Wind 210 deg - No Ice
18	1.2 Dead+1.0 Wind 240 deg - No Ice
19	0.9 Dead+1.0 Wind 240 deg - No Ice
20	1.2 Dead+1.0 Wind 270 deg - No Ice
21	0.9 Dead+1.0 Wind 270 deg - No Ice
22	1.2 Dead+1.0 Wind 300 deg - No Ice
23	0.9 Dead+1.0 Wind 300 deg - No Ice
24	1.2 Dead+1.0 Wind 330 deg - No Ice
25	0.9 Dead+1.0 Wind 330 deg - No Ice
26	1.2 Dead+1.0 Ice+1.0 Temp
27	1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp
28	1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp
29	1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp
30	1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp
31	1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp
32	1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp
33	1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp
34	1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp
35	1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp
36	1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp
37	1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp
38	1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp
39	Dead+Wind 0 deg - Service
40	Dead+Wind 30 deg - Service
41	Dead+Wind 60 deg - Service
42	Dead+Wind 90 deg - Service

Comb. No.	Description
43	Dead+Wind 120 deg - Service
44	Dead+Wind 150 deg - Service
45	Dead+Wind 180 deg - Service
46	Dead+Wind 210 deg - Service
47	Dead+Wind 240 deg - Service
48	Dead+Wind 270 deg - Service
49	Dead+Wind 300 deg - Service
50	Dead+Wind 330 deg - Service

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	160 - 120	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-35.836	0.163	0.094
			Max. Mx	20	-9.444	399.113	0.640
			Max. My	2	-9.444	0.009	399.108
			Max. Vy	20	-22.555	399.113	0.640
			Max. Vx	2	-22.555	0.009	399.108
			Max. Torque	13			9.557
L2	120 - 87.25	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-44.683	0.341	0.197
			Max. Mx	20	-15.978	1157.310	0.283
			Max. My	2	-15.979	0.020	1157.299
			Max. Vy	20	-25.173	1157.310	0.283
			Max. Vx	2	-25.174	0.020	1157.299
			Max. Torque	13			9.554
L3	87.25 - 46.5	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-58.976	0.601	0.347
			Max. Mx	20	-27.100	2223.990	0.114
			Max. My	2	-27.100	0.036	2223.968
			Max. Vy	20	-28.396	2223.990	0.114
			Max. Vx	2	-28.396	0.036	2223.968
			Max. Torque	13			9.521
L4	46.5 - 1	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-81.970	0.908	0.524
			Max. Mx	20	-45.764	3787.530	0.122
			Max. My	2	-45.764	0.056	3787.497
			Max. Vy	20	-31.733	3787.530	0.122
			Max. Vx	2	-31.733	0.056	3787.497
			Max. Torque	13			9.489

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	36	81.970	8.148	0.000
	Max. H_x	20	45.791	31.694	-0.000
	Max. H_z	2	45.791	0.000	31.694
	Max. M_x	2	3787.497	0.000	31.694
	Max. M_z	8	3787.419	-31.694	-0.000
	Max. Torsion	13	9.476	-15.847	-27.448

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
	Min. Vert	25	34.344	15.847	27.448
	Min. H_x	8	45.791	-31.694	-0.000
	Min. H_z	14	45.791	0.000	-31.694
	Min. M_x	14	-3787.433	0.000	-31.694
	Min. M_z	20	-3787.530	31.694	-0.000
	Min. Torsion	17	-9.476	15.847	-27.448

Tower Mast Reaction Summary

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead Only	38.159	0.000	0.000	-0.026	0.045	0.000
1.2 Dead+1.0 Wind 0 deg - No Ice	45.791	0.000	-31.694	-3787.497	0.056	0.000
0.9 Dead+1.0 Wind 0 deg - No Ice	34.344	0.000	-31.694	-3750.223	0.041	0.000
1.2 Dead+1.0 Wind 30 deg - No Ice	45.791	15.847	-27.448	-3280.036	-1893.762	-9.473
0.9 Dead+1.0 Wind 30 deg - No Ice	34.344	15.847	-27.448	-3247.761	-1875.118	-9.476
1.2 Dead+1.0 Wind 60 deg - No Ice	45.791	27.448	-15.847	-1893.770	-3279.994	0.000
0.9 Dead+1.0 Wind 60 deg - No Ice	34.344	27.448	-15.847	-1875.125	-3247.729	-0.000
1.2 Dead+1.0 Wind 90 deg - No Ice	45.791	31.694	0.000	-0.124	-3787.419	9.473
0.9 Dead+1.0 Wind 90 deg - No Ice	34.344	31.694	0.000	-0.091	-3750.161	9.476
1.2 Dead+1.0 Wind 120 deg - No Ice	45.791	27.448	15.847	1893.706	-3279.994	0.000
0.9 Dead+1.0 Wind 120 deg - No Ice	34.344	27.448	15.847	1875.077	-3247.729	0.000
1.2 Dead+1.0 Wind 150 deg - No Ice	45.791	15.847	27.448	3280.064	-1893.602	-9.473
0.9 Dead+1.0 Wind 150 deg - No Ice	34.344	15.847	27.448	3247.780	-1875.002	-9.476
1.2 Dead+1.0 Wind 180 deg - No Ice	45.791	0.000	31.694	3787.433	0.056	-0.000
0.9 Dead+1.0 Wind 180 deg - No Ice	34.344	0.000	31.694	3750.176	0.041	-0.000
1.2 Dead+1.0 Wind 210 deg - No Ice	45.791	-15.847	27.448	3280.064	1893.713	9.473
0.9 Dead+1.0 Wind 210 deg - No Ice	34.344	-15.847	27.448	3247.780	1875.084	9.476
1.2 Dead+1.0 Wind 240 deg - No Ice	45.791	-27.448	15.847	1893.705	3280.105	-0.000
0.9 Dead+1.0 Wind 240 deg - No Ice	34.344	-27.448	15.847	1875.077	3247.812	-0.000
1.2 Dead+1.0 Wind 270 deg - No Ice	45.791	-31.694	0.000	-0.124	3787.530	-9.473
0.9 Dead+1.0 Wind 270 deg - No Ice	34.344	-31.694	0.000	-0.091	3750.243	-9.476
1.2 Dead+1.0 Wind 300 deg - No Ice	45.791	-27.448	-15.847	-1893.770	3280.105	0.000
0.9 Dead+1.0 Wind 300 deg - No Ice	34.344	-27.448	-15.847	-1875.125	3247.812	0.000

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
1.2 Dead+1.0 Wind 330 deg - No Ice	45.791	-15.847	-27.448	-3280.035	1893.873	9.473
0.9 Dead+1.0 Wind 330 deg - No Ice	34.344	-15.847	-27.448	-3247.760	1875.201	9.476
1.2 Dead+1.0 Ice+1.0 Temp	81.970	0.000	0.000	-0.524	0.908	0.000
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	81.970	-0.000	-8.148	-1048.643	1.016	0.000
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	81.970	4.074	-7.056	-908.238	-523.041	-2.507
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	81.970	7.056	-4.074	-524.626	-906.647	0.000
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	81.970	8.148	-0.000	-0.607	-1047.042	2.507
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	81.970	7.056	4.074	523.453	-906.647	0.000
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	81.970	4.074	7.056	907.087	-523.005	-2.507
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	81.970	-0.000	8.148	1047.471	1.016	-0.000
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	81.970	-4.074	7.056	907.086	525.037	2.507
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	81.970	-7.056	4.074	523.452	908.678	-0.000
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	81.970	-8.148	-0.000	-0.607	1049.072	-2.507
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	81.970	-7.056	-4.074	-524.625	908.678	0.000
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	81.970	-4.074	-7.056	-908.238	525.073	2.507
Dead+Wind 0 deg - Service	38.159	0.000	-8.917	-1060.420	0.046	0.000
Dead+Wind 30 deg - Service	38.159	4.458	-7.722	-918.351	-530.156	-2.703
Dead+Wind 60 deg - Service	38.159	7.722	-4.458	-530.224	-918.283	0.000
Dead+Wind 90 deg - Service	38.159	8.917	0.000	-0.033	-1060.347	2.703
Dead+Wind 120 deg - Service	38.159	7.722	4.458	530.171	-918.283	0.000
Dead+Wind 150 deg - Service	38.159	4.458	7.722	918.306	-530.146	-2.703
Dead+Wind 180 deg - Service	38.159	0.000	8.917	1060.367	0.046	-0.000
Dead+Wind 210 deg - Service	38.159	-4.458	7.722	918.305	530.239	2.703
Dead+Wind 240 deg - Service	38.159	-7.722	4.458	530.171	918.375	-0.000
Dead+Wind 270 deg - Service	38.159	-8.917	0.000	-0.033	1060.439	-2.703
Dead+Wind 300 deg - Service	38.159	-7.722	-4.458	-530.224	918.375	0.000
Dead+Wind 330 deg - Service	38.159	-4.458	-7.722	-918.351	530.248	2.703

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX K	PY K	PZ K	PX K	PY K	PZ K	% Error
1	0.000	-38.159	0.000	0.000	38.159	0.000	0.000%
2	0.000	-45.791	-31.694	0.000	45.791	31.694	0.000%
3	0.000	-34.344	-31.694	0.000	34.344	31.694	0.000%
4	15.847	-45.791	-27.448	-15.847	45.791	27.448	0.000%
5	15.847	-34.344	-27.448	-15.847	34.344	27.448	0.000%
6	27.448	-45.791	-15.847	-27.448	45.791	15.847	0.000%
7	27.448	-34.344	-15.847	-27.448	34.344	15.847	0.000%
8	31.694	-45.791	0.000	-31.694	45.791	-0.000	0.000%
9	31.694	-34.344	0.000	-31.694	34.344	-0.000	0.000%
10	27.448	-45.791	15.847	-27.448	45.791	-15.847	0.000%
11	27.448	-34.344	15.847	-27.448	34.344	-15.847	0.000%

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
12	15.847	-45.791	27.448	-15.847	45.791	-27.448	0.000%
13	15.847	-34.344	27.448	-15.847	34.344	-27.448	0.000%
14	0.000	-45.791	31.694	0.000	45.791	-31.694	0.000%
15	0.000	-34.344	31.694	0.000	34.344	-31.694	0.000%
16	-15.847	-45.791	27.448	15.847	45.791	-27.448	0.000%
17	-15.847	-34.344	27.448	15.847	34.344	-27.448	0.000%
18	-27.448	-45.791	15.847	27.448	45.791	-15.847	0.000%
19	-27.448	-34.344	15.847	27.448	34.344	-15.847	0.000%
20	-31.694	-45.791	0.000	31.694	45.791	-0.000	0.000%
21	-31.694	-34.344	0.000	31.694	34.344	-0.000	0.000%
22	-27.448	-45.791	-15.847	27.448	45.791	15.847	0.000%
23	-27.448	-34.344	-15.847	27.448	34.344	15.847	0.000%
24	-15.847	-45.791	-27.448	15.847	45.791	27.448	0.000%
25	-15.847	-34.344	-27.448	15.847	34.344	27.448	0.000%
26	0.000	-81.970	0.000	0.000	81.970	0.000	0.000%
27	0.000	-81.970	-8.148	0.000	81.970	8.148	0.000%
28	4.074	-81.970	-7.056	-4.074	81.970	7.056	0.000%
29	7.056	-81.970	-4.074	-7.056	81.970	4.074	0.000%
30	8.148	-81.970	0.000	-8.148	81.970	0.000	0.000%
31	7.056	-81.970	4.074	-7.056	81.970	-4.074	0.000%
32	4.074	-81.970	7.056	-4.074	81.970	-7.056	0.000%
33	0.000	-81.970	8.148	0.000	81.970	-8.148	0.000%
34	-4.074	-81.970	7.056	4.074	81.970	-7.056	0.000%
35	-7.056	-81.970	4.074	7.056	81.970	-4.074	0.000%
36	-8.148	-81.970	0.000	8.148	81.970	0.000	0.000%
37	-7.056	-81.970	-4.074	7.056	81.970	4.074	0.000%
38	-4.074	-81.970	-7.056	4.074	81.970	7.056	0.000%
39	0.000	-38.159	-8.917	0.000	38.159	8.917	0.000%
40	4.458	-38.159	-7.722	-4.458	38.159	7.722	0.000%
41	7.722	-38.159	-4.458	-7.722	38.159	4.458	0.000%
42	8.917	-38.159	0.000	-8.917	38.159	-0.000	0.000%
43	7.722	-38.159	4.458	-7.722	38.159	-4.458	0.000%
44	4.458	-38.159	7.722	-4.458	38.159	-7.722	0.000%
45	0.000	-38.159	8.917	0.000	38.159	-8.917	0.000%
46	-4.458	-38.159	7.722	4.458	38.159	-7.722	0.000%
47	-7.722	-38.159	4.458	7.722	38.159	-4.458	0.000%
48	-8.917	-38.159	0.000	8.917	38.159	-0.000	0.000%
49	-7.722	-38.159	-4.458	7.722	38.159	4.458	0.000%
50	-4.458	-38.159	-7.722	4.458	38.159	7.722	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00000001
2	Yes	4	0.00000001	0.00026318
3	Yes	4	0.00000001	0.00008649
4	Yes	6	0.00000001	0.00004742
5	Yes	5	0.00000001	0.00048796
6	Yes	6	0.00000001	0.00005348
7	Yes	5	0.00000001	0.00055106
8	Yes	5	0.00000001	0.00030404
9	Yes	5	0.00000001	0.00013293
10	Yes	6	0.00000001	0.00005348
11	Yes	5	0.00000001	0.00055105
12	Yes	6	0.00000001	0.00006252

13	Yes	5	0.00000001	0.00064753
14	Yes	4	0.00000001	0.00026318
15	Yes	4	0.00000001	0.00008649
16	Yes	6	0.00000001	0.00006252
17	Yes	5	0.00000001	0.00064754
18	Yes	6	0.00000001	0.00005348
19	Yes	5	0.00000001	0.00055107
20	Yes	5	0.00000001	0.00030405
21	Yes	5	0.00000001	0.00013293
22	Yes	6	0.00000001	0.00005348
23	Yes	5	0.00000001	0.00055108
24	Yes	6	0.00000001	0.00004742
25	Yes	5	0.00000001	0.00048798
26	Yes	4	0.00000001	0.00000001
27	Yes	5	0.00000001	0.00077852
28	Yes	6	0.00000001	0.00014885
29	Yes	6	0.00000001	0.00015171
30	Yes	5	0.00000001	0.00084096
31	Yes	6	0.00000001	0.00015143
32	Yes	6	0.00000001	0.00016465
33	Yes	5	0.00000001	0.00077754
34	Yes	6	0.00000001	0.00016510
35	Yes	6	0.00000001	0.00015182
36	Yes	5	0.00000001	0.00084280
37	Yes	6	0.00000001	0.00015210
38	Yes	6	0.00000001	0.00014936
39	Yes	4	0.00000001	0.00005409
40	Yes	4	0.00000001	0.00098456
41	Yes	5	0.00000001	0.00004237
42	Yes	4	0.00000001	0.00076023
43	Yes	5	0.00000001	0.00004237
44	Yes	5	0.00000001	0.00006275
45	Yes	4	0.00000001	0.00005408
46	Yes	5	0.00000001	0.00006276
47	Yes	5	0.00000001	0.00004238
48	Yes	4	0.00000001	0.00076030
49	Yes	5	0.00000001	0.00004238
50	Yes	4	0.00000001	0.00098488

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	160 - 120	32.911	48	1.784	0.023
L2	124.25 - 87.25	20.009	48	1.580	0.014
L3	92.5 - 46.5	10.767	48	1.151	0.007
L4	52.75 - 1	3.349	48	0.600	0.003

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
163.000	5' Lightning Rod	48	32.911	1.784	0.023	35530
155.000	Sector1(CaAa=14000 Sq.in)No Ice	48	31.036	1.766	0.022	35530
140.000	Sector1(CaAa=10000 Sq.in)No Ice	48	25.495	1.699	0.018	8882
125.000	Sector1(CaAa=10000 Sq.in)No Ice	48	20.259	1.588	0.014	5132

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	160 - 120	117.459	20	6.374	0.082
L2	124.25 - 87.25	71.452	20	5.646	0.048
L3	92.5 - 46.5	38.467	20	4.113	0.023
L4	52.75 - 1	11.967	20	2.143	0.009

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
163.000	5' Lightning Rod	20	117.459	6.374	0.082	10182
155.000	Sector1(CaAa=14000 Sq.in)No Ice	20	110.774	6.309	0.077	10182
140.000	Sector1(CaAa=10000 Sq.in)No Ice	20	91.018	6.071	0.063	2542
125.000	Sector1(CaAa=10000 Sq.in)No Ice	20	72.343	5.672	0.049	1466

Base Plate Design Data

Plate Thickness in	Number of Anchor Bolts	Anchor Bolt Size in	Actual Allowable Ratio Bolt Tension K	Actual Allowable Ratio Bolt Compression K	Actual Allowable Ratio Plate Stress ksi	Actual Allowable Ratio Stiffener Stress ksi	Controlling Condition	Ratio
3.000	20	2.250	146.730 243.576 0.60	151.306 404.336 0.37	29.031 45.000 0.65		Plate	0.65 ✔

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
L1	160 - 120 (1)	TP30.6x22.2x0.25	40.000	0.000	0.0	23.375	-9.444	1367.410	0.007
L2	120 - 87.25 (2)	TP36.978x29.208x0.313	37.000	0.000	0.0	35.274	-15.978	2063.500	0.008
L3	87.25 - 46.5 (3)	TP44.91x35.25x0.375	46.000	0.000	0.0	51.446	-27.100	3009.570	0.009
L4	46.5 - 1 (4)	TP53.715x42.848x0.438	51.750	0.000	0.0	73.982	-45.764	4327.970	0.011

Pole Bending Design Data

Section No.	Elevation ft	Size	M_{ux} kip-ft	ϕM_{nx} kip-ft	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M_{uy} kip-ft	ϕM_{ny} kip-ft	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
L1	160 - 120 (1)	TP30.6x22.2x0.25	399.113	991.267	0.403	0.000	991.267	0.000
L2	120 - 87.25 (2)	TP36.978x29.208x0.313	1157.308	1824.708	0.634	0.000	1824.708	0.000
L3	87.25 - 46.5 (3)	TP44.91x35.25x0.375	2223.992	3222.442	0.690	0.000	3222.442	0.000
L4	46.5 - 1 (4)	TP53.715x42.848x0.438	3787.533	5616.408	0.674	0.000	5616.408	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V_u K	ϕV_n K	Ratio $\frac{V_u}{\phi V_n}$	Actual T_u kip-ft	ϕT_n kip-ft	Ratio $\frac{T_u}{\phi T_n}$
L1	160 - 120 (1)	TP30.6x22.2x0.25	22.555	410.223	0.055	9.555	1058.267	0.009
L2	120 - 87.25 (2)	TP36.978x29.208x0.313	25.173	619.051	0.041	9.523	1927.967	0.005
L3	87.25 - 46.5 (3)	TP44.91x35.25x0.375	28.396	902.870	0.031	9.488	3417.550	0.003
L4	46.5 - 1 (4)	TP53.715x42.848x0.438	31.733	1298.390	0.024	9.473	6058.008	0.002

Pole Interaction Design Data

Section No.	Elevation ft	Ratio $\frac{P_u}{\phi P_n}$	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	Ratio $\frac{M_{uy}}{\phi M_{ny}}$	Ratio $\frac{V_u}{\phi V_n}$	Ratio $\frac{T_u}{\phi T_n}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	160 - 120 (1)	0.007	0.403	0.000	0.055	0.009	0.414 ✔	1.000	✔
L2	120 - 87.25 (2)	0.008	0.634	0.000	0.041	0.005	0.644 ✔	1.000	✔
L3	87.25 - 46.5 (3)	0.009	0.690	0.000	0.031	0.003	0.700 ✔	1.000	✔
L4	46.5 - 1 (4)	0.011	0.674	0.000	0.024	0.002	0.686 ✔	1.000	✔

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
L1	160 - 120	Pole	TP30.6x22.2x0.25	1	-9.444	1367.410	41.4	Pass
L2	120 - 87.25	Pole	TP36.978x29.208x0.313	2	-15.978	2063.500	64.4	Pass
L3	87.25 - 46.5	Pole	TP44.91x35.25x0.375	3	-27.100	3009.570	70.0	Pass
L4	46.5 - 1	Pole	TP53.715x42.848x0.438	4	-45.764	4327.970	68.6	Pass
							Summary	
						Pole (L3)	70.0	Pass
						Base Plate	64.5	Pass
						RATING =	**70.0**	**Pass**

Program Version 8.3.1.2 - 12/11/2024

APC Towers
8601 SIX FORKS ROAD, SUITE 250
RALIEGH, NC 27615

ROWE ISLAND

MI-4082

67 VAN BRUGGEN
GALESBURG, MI 49053
KALAMAZOO COUNTY
TENANT: LEGAL BUSINESS ENTITY d/b/a VERIZON WIRELESS
"ROWE ISLAND"
MDG #: 5000974494

NEW 160'-0" MONOPOLE TOWER
w/5'-0" LIGHTNING ROD
TOTAL TOWER HEIGHT 165'-0"

PROJECT SUMMARY

TOWER OWNER SITE
ROWE ISLAND
SITE #: MI-4082

VERIZON WIRELESS SITE
ROWE ISLAND
PROJECT#: 17585076
MARKET ID: MICHIGAN
MDG#: 5000974494

SITE ADDRESS
67 VAN BRUGGEN
GALESBURG, MI 49053
KALAMAZOO COUNTY
E911 ADDRESS: TBD

TOWER OWNER
APC TOWERS
8601 SIX FORKS ROAD, SUITE 250
RALIEGH, NC 27615
CONTACT: JONATHAN GREENE
PHONE: 704-724-8382
E-MAIL: jgreene@apctowers.com

PROPERTY OWNER
BELLA PEPPER LLC, JENNIFER COPELAND
8468 E K AVENUE
GALESBURG, MI 49053
CONTACT: JENNIFER COPELAND
PHONE: 269-484-1011
E-MAIL: TBD

POLICE
KALAMAZOO COUNTY SHERIFF'S OFFICE
1500 LAMONT AVE
KALAMAZOO, MI 49048
PHONE: 269-383-8821

FIRE
COMSTOCK TOWNSHIP FIREFIGHTERS
5819 COMSTOCK AVE
KALAMAZOO, MI 49048
PHONE: 269-345-924

GENERAL INFORMATION
LATITUDE - 42° 17' 16.35" N
LONGITUDE - 85° 27' 34.73" W
1983 (NAD83)
ELEVATION - 815' AMSL
1988 (NAVD88)

TOWER OWNER LEASE AREA
75'-0"x75'-0"
(5625 SF)

VERIZON WIRELESS LEASE AREA
536 SQFT

PROJECT TOTAL DISTURBED AREA
COMPOUND: (2025 SF) = (0.046 ACRE)
ACCESS DRIVE: (3111 SF) = (0.071 ACRE)
GROSS AREA: (5136 SF) = (0.117 ACRE)

ALL CONSTRUCTION ITEMS ARE TO BE COMPLETED BY THE TOWER OWNER GENERAL CONTRACTOR UNLESS NOTED AS (VZW GC) WHICH SHALL BE COMPLETED BY THE VERIZON WIRELESS GENERAL CONTRACTOR

PROJECT DESCRIPTION

PROJECT DESCRIPTION:
- ALL WORK ITEMS WITHIN THESE CONSTRUCTION DOCUMENTS ARE BY THE TOWER OWNER'S GENERAL CONTRACTOR AND THEIR SUB-CONTRACTOR(S) UNLESS NOTED AS (VZW GC) WHICH SHALL BE PERFORMED BY THE VERIZON WIRELESS GENERAL CONTRACTOR AND THEIR SUB-CONTRACTOR(S), AND IS GENERALLY DESCRIBED BELOW.
- PERMANENT ELECTRIC POWER MUST BE AVAILABLE FOR VERIZON WIRELESS AT THE METER BASE PRIOR TO THE SITE BEING RELEASED AS TENANT READY

RESPONSIBLE PARTY		ITEM OF WORK
TOWER OWNER	VERIZON	
X		INSTALL THE TOWER
X		INSTALL THE FENCED GRAVEL COMPOUND AND ALL GENERAL SITE CONSTRUCTION ITEMS
X		INSTALL A GRAVEL ACCESS DRIVE
X		INSTALL TOWER AND SITE GROUNDING
X		INSTALL VERIZON GROUNDING (IN VERIZON LEASE SPACE)
X		INSTALL NEW ELECTRICAL SERVICE TO THE NEW UTILITY H-FRAME
X		OBTAIN VERIZON METER WITH THE NEW ELECTRICAL SERVICE REQUEST
X		INSTALL CONCRETE FOUNDATIONS FOR VERIZON EQUIPMENT AND GENERATOR
X		INSTALL VERIZON PROPANE TANK CONCRETE FOUNDATION AND BELOW GRADE FUEL LINE CONDUIT (ONLY FOR SITES WITH PROPANE GENERATOR AND TANK)
X		INSTALL VERIZON ICE BRIDGE AND FOUNDATIONS
X		INSTALL VERIZON EQUIPMENT H-FRAME w/ FOUNDATION, AND ICE PROTECTION
X		INSTALL ELECTRICAL SERVICE CONDUIT WITH PULL TAPE FROM UTILITY H-FRAME TO VERIZON ILC STUB UP LOCATION
X		INSTALL CONDUIT(S) WITH PULL TAPE FROM VERIZON ILC STUB UP LOCATION TO GENERATOR STUB UP LOCATION
X		INSTALL TELCO CONDUIT(S) W/ TRACER WIRE FROM HANDHOLE(S) AT PUBLIC R.O.W. TO THE UTILITY H-FRAME OR HANDHOLE(S) AT COMPOUND - VERIZON HANDHOLE(S) TO BE LABELLED AS "VERIZON WIRELESS ONLY"
X		INSTALL VERIZON ONLY TELCO CONDUIT W/ TRACER WIRE FROM UTILITY H-FRAME/COMPOUND HANDHOLE TO VERIZON EQUIPMENT H-FRAME
	X	INSTALL VERIZON EQUIPMENT CABINET(S), GENERATOR AND PREFABRICATED CANOPY AND SUPPORTS
	X	INSTALL VERIZON PROPANE TANK AND FUEL LINE TO GENERATOR (ONLY FOR SITES WITH PROPANE GENERATOR AND TANK)
	X	CONNECT SUBSURFACE GROUND LEADS (INSTALLED BY TOWER OWNER) TO VERIZON EQUIPMENT AND FACILITIES
	X	FURNISH AND INSTALL VERIZON ANTENNA MOUNT ASSEMBLY ON TOWER
	X	INSTALL VERIZON ANTENNAS, LINES, RADIO EQUIPMENT, AND GPS ANTENNA
	X	INSTALL GROUND OVP AND CABLING ON VERIZON EQUIPMENT H-FRAME
	X	INSTALL ILC ENCLOSURE, POWER AND FIBER JUNCTION BOXES AND ASSOCIATED CONDUITS WITH PULL TAPES ON VERIZON EQUIPMENT H-FRAME
	X	INSTALL VERIZON ELECTRIC SERVICE CONDUCTORS FROM UTILITY H-FRAME TO ILC ENCLOSURE ON VERIZON EQUIPMENT H-FRAME
	X	INSTALL CIRCUITS FROM ILC ENCLOSURE TO VERIZON EQUIPMENT CABINET(S) AND GENERATOR.

ALL WORK AND MATERIALS SHALL BE PERFORMED AND INSTALLED IN ACCORDANCE WITH THE INTERNATIONAL BUILDING CODE (IBC) AND THE CURRENT EDITIONS OF THE FOLLOWING CODES AS ADOPTED BY THE LOCAL GOVERNING AUTHORITIES. NOTHING IN THESE PLANS IS TO BE CONSTRUCTED TO PERMIT WORK NOT CONFORMING TO THESE CODES.

BUILDING CODE	MICHIGAN BUILDING CODE ADOPTED EDITION (2021 IBC)
STRUCTURAL CODE	TIA/EIA-222 - REVISION H
MECHANICAL CODE	MICHIGAN MECHANICAL CODE ADOPTED EDITION (2021 IMC)
PLUMBING CODE	MICHIGAN PLUMBING CODE ADOPTED ADDITION (2021 IPC)
ELECTRICAL CODE	2023 NATIONAL ELECTRICAL CODE (NEC) - NFPA 70
FIRE/LIFE SAFETY CODE	MICHIGAN LIFE SAFETY CODE (2021 NFPA 101)

ACCESSIBILITY REQUIREMENTS:
FACILITY IS UNMANNED AND NOT FOR HUMAN HABITATION. BARRIER FREE ACCESS REQUIREMENTS ARE NOT REQUIRED IN ACCORDANCE WITH THE MICHIGAN (IBC) BUILDING CODE.

APPLICABLE CODES

SURVEYOR
LANDTECH PROFESSIONAL
SURVEYING & ENGINEERING
1275 MCGREGOR WAY
GRAWN, MI 49637
PHONE: 231-383-8821

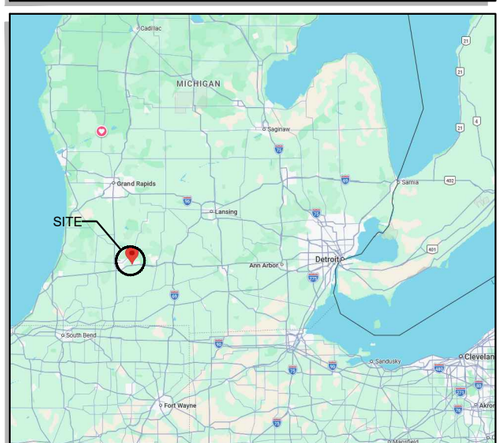
ELECTRICAL
CONSUMERS POWER
ADDRESS: ONE ENERGY POWER
JACKSON, MI 49201
CONTACT: TBD
PHONE: 800-488-5050
EMAIL: TBD

ARCHITECTURAL
TELECAD WIRELESS
1961 NORTHPOINT BLVD, STE 130
HIXSON, TN 37343
CONTACT: MATT BATES
PHONE: 423-843-9500
EMAIL: matt.bates@telecadeng.com

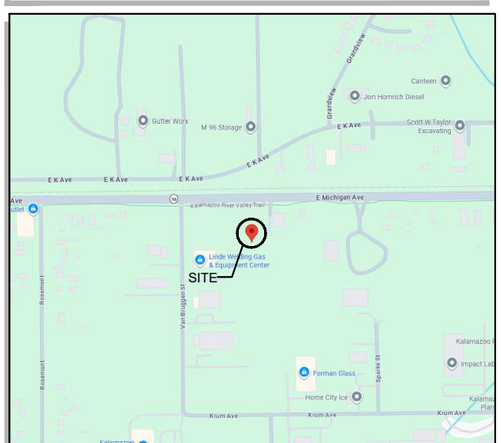
ELECTRICAL UTILITY COORDINATION IS NOT FINALIZED, DO NOT PROCEED WITH CONSTRUCTION.

CONSULTANT TEAM

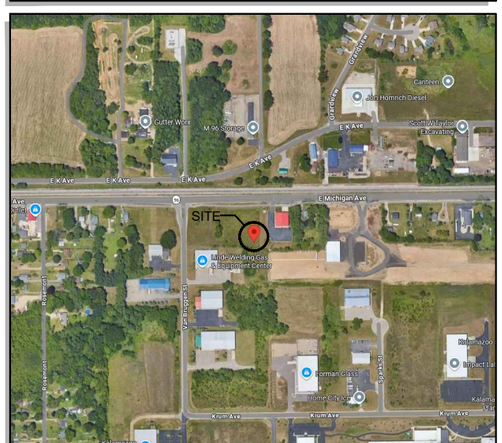
SHEET NUMBER	DESCRIPTION
T-1	TITLE SHEET
	SURVEY PLAN
Z-1	OVERALL SITE PLAN w/AERIAL OVERLAY
Z-2	OVERALL SITE PLAN w/TOWER DISTANCE TO PROPERTY LINES
Z-3	GRADING AND E&S CONTROL PLAN
Z-4	DETAILED & DIMENSIONED SITE PLAN
Z-5	TOWER ELEVATION
Z-6	SITE DETAILS
Z-7	FENCE DETAILS AND NOTES
Z-8	TOWER OWNER SIGNAGE
L-1	LANDSCAPE PLAN



VICINITY MAP



LOCATION MAP



AERIAL

PREPARED FOR:
APC Towers
8601 SIX FORKS ROAD, SUITE 250
RALIEGH, NC 27615

PREPARED BY:
TeleCAD Wireless
1961 NORTHPOINT BLVD, SUITE 130
HIXSON, TN 37343
PH: 423-843-9500
FAX: 423-843-9509

DRAWING NOTICE:
THE INFORMATION CONTAINED IN THIS SET OF DOCUMENTS IS PROPRIETARY BY NATURE. ANY USE OR DISCLOSURE OTHER THAN THAT WHICH RELATES TO THE CLIENT IS STRICTLY PROHIBITED.

DRAWN BY:	JAE
CHECKED BY:	DS

REVISIONS

NO.	DATE	BY	DESCRIPTION
3	06/30/26	PLS	ZONING ISSUE
2	06/29/26	JAE	ZONING ISSUE
1	04/28/26	MDR	ZONING ISSUE
0	04/17/26	WAM	PRELIMINARY REVIEW
C	04/08/26	PLS	PRELIMINARY REVIEW
B	04/07/26	WAM	PRELIMINARY REVIEW
A	03/24/26	JAE	PRELIMINARY REVIEW

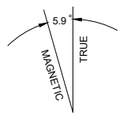
ENGINEER'S STAMP:
STATE OF MICHIGAN
Stephen E. Hunt
License No. 6201054169
LICENSED PROFESSIONAL ENGINEER
06/30/26
NOT VALID WITHOUT P.E. STAMP & SIGNATURE

SITE NAME: ROWE ISLAND
ADDRESS: 67 VAN BRUGGEN GALESBURG, MI 49053
COUNTY: KALAMAZOO
LATITUDE: 42° 17' 16.35" N
LONGITUDE: 85° 27' 34.73" W
SITE NUMBER: MI-4082
SHEET TITLE: TITLE SHEET

DRAWING NO.	REVISION:
T-1	3

LATITUDE & LONGITUDE

LATITUDE AND LONGITUDE OF SITE ARE BASED ON NAD 83 (2011).
LATITUDE: 42° 17' 16.35"N 42.287875°
LONGITUDE: 85° 27' 34.73"W -85.459647°
GROUND ELEVATION AT TOWER BASE: 815' AMSL



SITE INFORMATION

SITE ADDRESS:
67 VAN BRUGGEN STREET
GALESBURG, MI 49053

PROPERTY OWNER:
BELLA PEPPER, LLC
9468 E K AVENUE
GALESBURG, MI 49053

PARCEL ID

07-22-220-230

PARENT PARCEL DESCRIPTION (AS PROVIDED)

LAND SITUATED IN THE STATE OF MICHIGAN, COUNTY OF KALAMAZOO, TOWNSHIP OF COMSTOCK.

UNIT 23, COMSTOCK COMMERCE PARK, A CONDOMINIUM, ACCORDING TO THE MASTER DEED THEREOF, AS RECORDED IN LIBER 1993, PAGE 950; FIRST AMENDMENT TO MASTER DEED RECORDED IN LIBER 2011, PAGE 90; SECOND AMENDMENT TO MASTER DEED RECORDED IN LIBER 2063, PAGE 870; THIRD AMENDMENT TO MASTER DEED RECORDED IN INSTRUMENT NO. 1999-042979; FOURTH AMENDMENT TO MASTER DEED RECORDED IN INSTRUMENT NO. 2000-010566; FIFTH AMENDMENT TO MASTER DEED RECORDED IN INSTRUMENT NO. 2007-041265; KALAMAZOO COUNTY RECORDS, AND ANY AMENDMENTS THERETO, IF ANY, AND DESIGNATED AS KALAMAZOO COUNTY CONDOMINIUM SUBDIVISION PLAN NO. 96, TOGETHER WITH RIGHTS IN GENERAL COMMON ELEMENTS AND LIMITED COMMON ELEMENTS AS SET FORTH IN SAID MASTER DEED AND AS DESCRIBED IN ACT 59 OF THE PUBLIC ACTS OF 1978, AS AMENDED.

TOWER LEASE DESCRIPTION

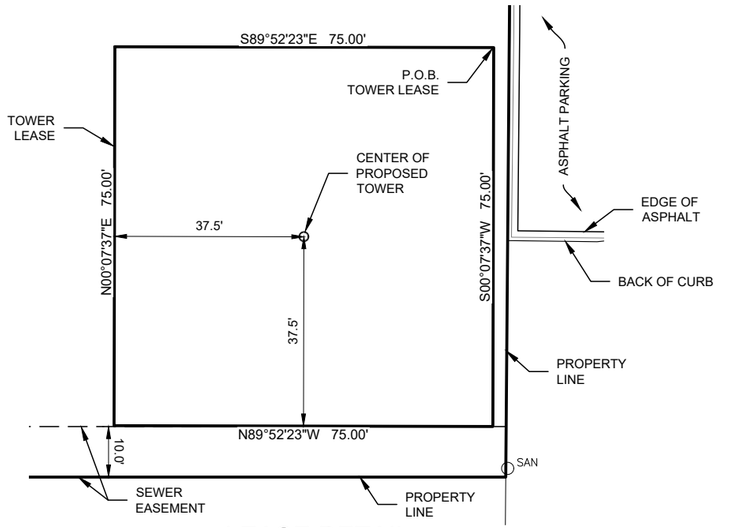
PART OF THE NORTHEAST 1/4 OF SECTION 22, TOWNSHIP 2 SOUTH, RANGE 10 WEST, COMSTOCK TOWNSHIP, KALAMAZOO COUNTY, MICHIGAN DESCRIBED AS: COMMENCING AT A REMONUMENTATION DISK FOUND AT THE NORTH 1/4 CORNER OF SAID SECTION 22; THENCE SOUTH 89°59'52" EAST ALONG THE NORTH LINE OF SAID SECTION A DISTANCE OF 968.23 FEET; THENCE SOUTH 00°07'37" WEST A DISTANCE OF 60.77 FEET TO THE SOUTHERLY RIGHT-OF-WAY OF E. MICHIGAN AVENUE, A.K.A. M-96 (VARIABLE WIDTH/PUBLIC); THENCE CONTINUING SOUTH 00°07'37" WEST A DISTANCE OF 118.37 FEET; THENCE SOUTH 89°52'53" EAST A DISTANCE OF 22.50 FEET; THENCE SOUTH 00°07'37" WEST A DISTANCE OF 30.00 FEET TO THE POINT OF BEGINNING; THENCE CONTINUING SOUTH 00°07'37" WEST A DISTANCE OF 75.00 FEET; THENCE NORTH 89°52'23" WEST A DISTANCE OF 75.00 FEET; THENCE NORTH 00°07'37" EAST A DISTANCE OF 75.00 FEET; THENCE SOUTH 89°52'23" EAST A DISTANCE OF 75.00 FEET TO THE POINT OF BEGINNING. CONTAINING 5,625 SQUARE FEET OR 0.129 ACRES.

ACCESS/UTILITY EASEMENT DESCRIPTION

A 30 FOOT WIDE EASEMENT FOR INGRESS/EGRESS AND THE INSTALLATION & MAINTENANCE OF UTILITIES OVER/UNDER AND ACROSS ALL THAT PART OF THE NORTHEAST 1/4 OF SECTION 22, TOWNSHIP 2 SOUTH, RANGE 10 WEST, COMSTOCK TOWNSHIP, KALAMAZOO COUNTY, MICHIGAN DESCRIBED AS: COMMENCING AT A REMONUMENTATION DISK FOUND AT THE NORTH 1/4 CORNER OF SAID SECTION 22; THENCE SOUTH 89°59'52" EAST ALONG THE NORTH LINE OF SAID SECTION A DISTANCE OF 968.23 FEET; THENCE SOUTH 00°07'37" WEST A DISTANCE OF 60.77 FEET TO THE SOUTHERLY RIGHT-OF-WAY OF E. MICHIGAN AVENUE, A.K.A. M-96 (VARIABLE WIDTH/PUBLIC) AND THE POINT OF BEGINNING; THENCE CONTINUING SOUTH 00°07'37" WEST A DISTANCE OF 118.37 FEET; THENCE SOUTH 89°52'23" EAST A DISTANCE OF 22.50 FEET; THENCE SOUTH 00°07'37" WEST A DISTANCE OF 30.00 FEET TO THE NORTHEAST CORNER OF THE TOWER LEASE; THENCE NORTH 89°52'23" WEST ALONG THE NORTHERLY LINE OF SAID LEASE A DISTANCE OF 75.00 FEET TO THE NORTHWEST CORNER OF SAID LEASE; THENCE NORTH 00°07'37" EAST A DISTANCE OF 30.00 FEET; THENCE SOUTH 89°52'23" EAST A DISTANCE OF 22.50 FEET; THENCE NORTH 00°07'37" EAST A DISTANCE OF 118.37 FEET TO SAID SOUTHERLY RIGHT-OF-WAY; THENCE SOUTH 89°52'23" EAST ALONG SAID RIGHT-OF-WAY A DISTANCE OF 30.00 FEET TO THE POINT OF BEGINNING. CONTAINING 5,805 SQUARE FEET OR 0.133 ACRES.

GENERAL NOTES

- NO PROPOSED MUNICIPAL SEWER OR WATER UTILITIES ARE REQUIRED FOR THIS SITE.
- THERE WILL BE NO CHANGE IN DRAINAGE PATTERN DUE TO THE PROPOSED INSTALLATION.
- NO SIGNIFICANT RUNOFF IS GENERATED BY THE PROPOSED INSTALLATION.
- THE LEASE AREA SHOWN HEREON MAY BE SUBJECT TO THE REQUIREMENTS OF MICHIGAN PUBLIC ACT 132 OF 1970 AS AMENDED.
- NO HAZARDOUS MATERIALS WILL BE USED, PROCESSED OR STORED AT THE SITE.
- TOWER LIGHTING SHALL CONFORM TO FAA STANDARDS AS REQUIRED.
- ALL WORK SHALL CONFORM TO FAA & FCC REGULATIONS.
- THERE ARE NO WATER BODIES WITHIN 500 FEET OF THE PROPOSED TOWER.



LEASE DETAIL

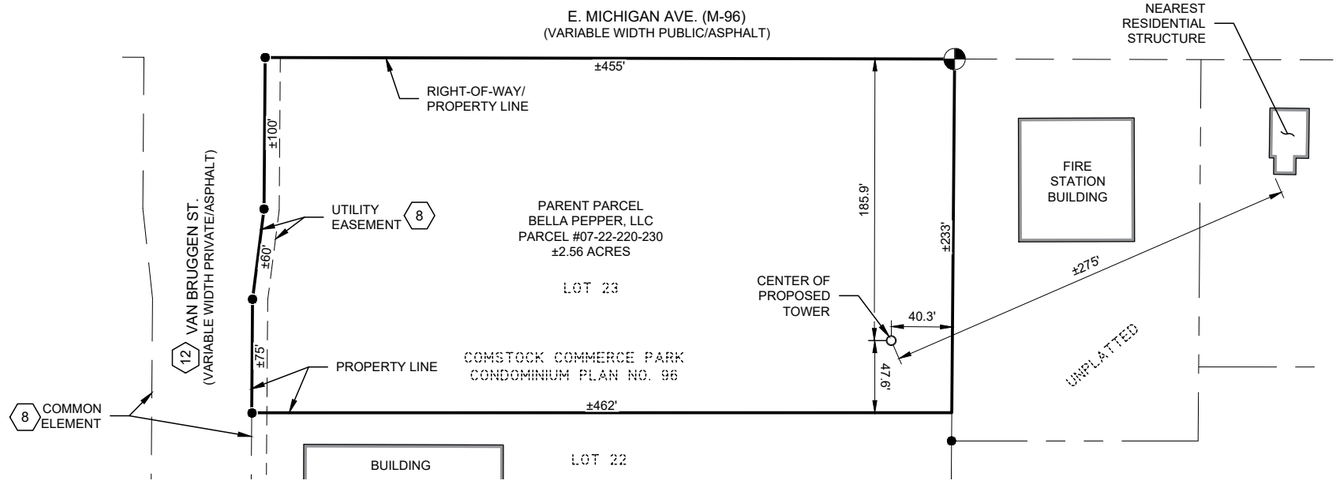
SCALE: 1"=30'

0 30' 60'



VICINITY MAP

NOT TO SCALE



PARENT PARCEL DETAIL

SCALE: 1"=100'

0 100' 200'

CERTIFICATION :

I MATTHEW T. MOKANYK CERTIFY THAT I HAVE SURVEYED AND MARKED THE PROPOSED TELECOM INSTALLATION AND EXISTING FEATURES, THAT THIS MAP IS A TRUE REPRESENTATION THEREOF AND ALL ACCURACIES ARE WITHIN ACCEPTABLE LIMITS.

Matthew T. Mokanyk, P.S., P.E.
Michigan P.S. No. 4001042063

03/23/26
Date

STATE OF MICHIGAN
Matthew Mokanyk
License No. 4001042063
LICENSED PROFESSIONAL SURVEYOR

BEARINGS ARE BASED ON MICHIGAN STATE PLANE COORDINATES, SOUTH ZONE. NAD 83.

ZONING INFORMATION

SUBJECT SITE ZONING: LM LIGHT MANUFACTURING

TOWER SETBACKS:
FRONT: 30' REAR: 30'
SIDES: 30'

FLOOD NOTE

BY GRAPHIC PLOTTING ONLY, THIS PROPERTY IS IN ZONE(S) "X" OF THE FLOOD INSURANCE RATE MAP, COMMUNITY PANEL NO. 26077C0215E ,WHICH BEARS AN EFFECTIVE DATE OF 7/31/2024 AND IS NOT IN A SPECIAL FLOOD HAZARD AREA.

811 Know what's below. Call before you dig.

IRON FOUND	ELECTRIC HANDHOLE
IRON SET	POWER POLE
P.K. NAIL FOUND	GUY
P.K. NAIL SET	WATER VALVE
GPS MONUMENT	HYDRANT
MONUMENT BOX FOUND	GAS METER
MONUMENT FOUND	GAS MARKER
MONUMENT SET	GAS VALVE
(R) RECORD	TELEPHONE PEDESTAL
(M) MEASURED	SIGN POST
STORM MANHOLE	FENCE LINE
CATCH BASIN	BENCHMARK
SQUARE CATCH BASIN	
SANITARY MANHOLE	
SANITARY CLEAN-OUT	
MONITOR WELL	
TELCO. MANHOLE	
LIGHT POLE	
ELECTRIC TRANSFORMER	
ELECTRIC METER	

LEGEND

ALL UTILITIES AS SHOWN ARE APPROXIMATE LOCATIONS DERIVED FROM ACTUAL MEASUREMENTS AND AVAILABLE RECORDS. THEY SHOULD NOT BE INTERPRETED TO BE EXACT LOCATION NOR SHOULD IT BE ASSUMED THAT THEY ARE THE ONLY UTILITIES IN THE AREA.

APC Towers
3000 Aerial Center Parkway, Suite 110
Morrisville, NC 27560

New Par, a Delaware Partnership dba
verizon wireless

LANDTECH PROJECT NUMBER: 26309007

REV.	DATE	DESCRIPTION	REQ. BY	BY
0	03/23/26	PRELIMINARY DRAWINGS	EG	TJW
1	03/23/26	REVISE EASEMENT	EG	TJW
2	03/27/26	ADD TITLE	EG	TJW
3	04/01/26	MOVE TOWER	EG	TJW

DRAWING SCALE NOTE: THE DRAWINGS ARE DESIGNED FOR 11"x17" (TABLOID/LEGAL) SIZED PAPER. WHERE MUNICIPALITIES REQUIRE 24"x36" COPIES OF PRINTS, LANDTECH SHALL PLOT THE DRAWINGS AT A RATIO OF 2:1. ALL SUCH COPIES SHALL HAVE A SCALE 1/2 THE SHOWN SIZE.

TeleCAD Wireless
1961 NORTHPOINT BLVD, SUITE 130
HIXSON, TN 37343
PH: 423-843-9500 FAX: 423-843-9509

LANDTECH
PROFESSIONAL SURVEYING & ENGINEERING
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231.943.0050ph 877.820.LAND toll free
www.landtechps.com www.towersurveyors.com

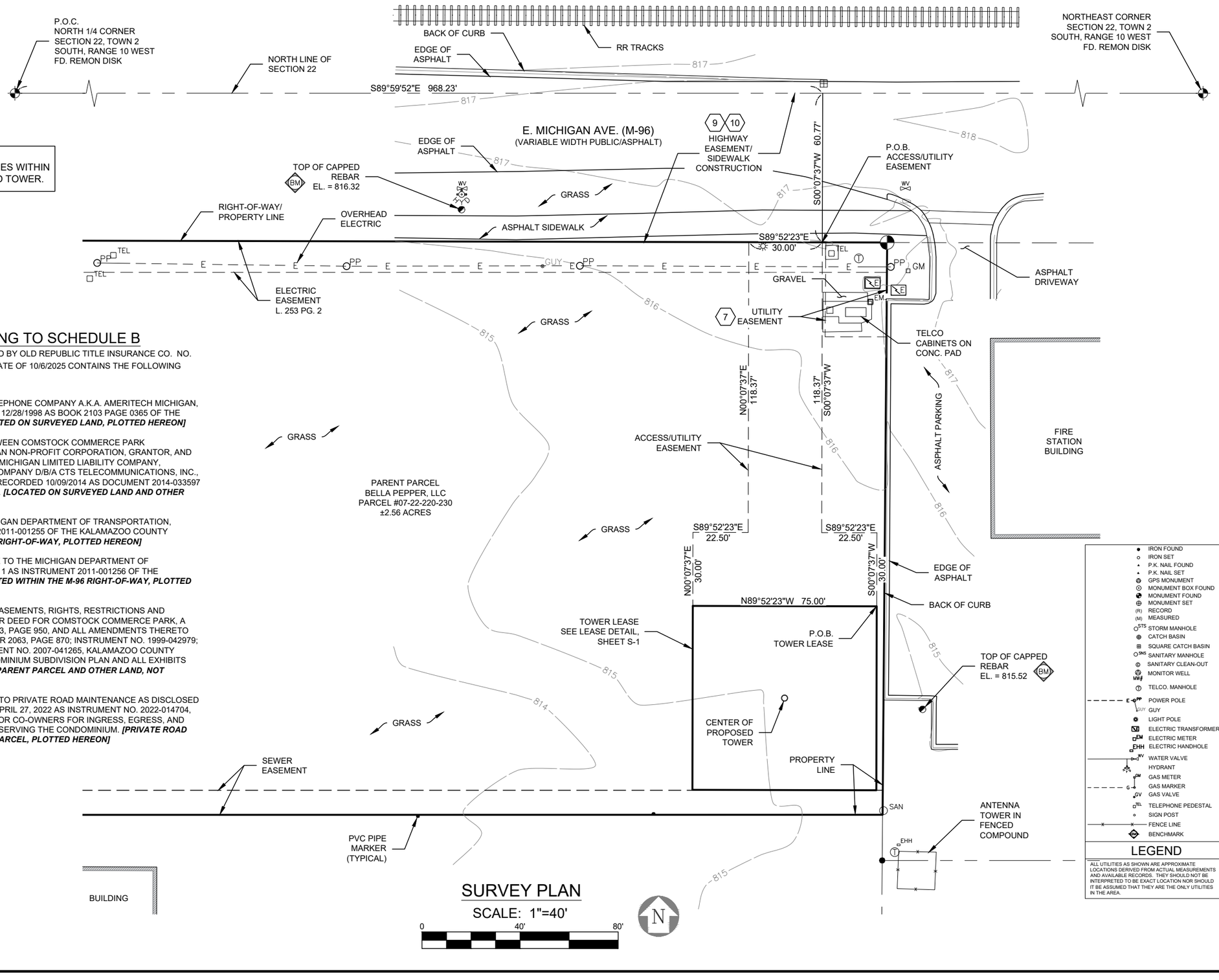
ROWE ISLAND
MI-4082

SITE ADDRESS:
67 VAN BRUGGEN STREET
GALESBURG, MI 49053

COUNTY: KALAMAZOO

Sheet Title:
SURVEY PLAN

Sheet Number:
S-1



NOTE:
THERE ARE NO WATER BODIES WITHIN 500 FEET OF THE PROPOSED TOWER.

NOTES CORRESPONDING TO SCHEDULE B

THE TITLE COMMITMENT REPORT ISSUED BY OLD REPUBLIC TITLE INSURANCE CO. NO. 01-250066064-01T WITH AN EFFECTIVE DATE OF 10/6/2025 CONTAINS THE FOLLOWING SURVEY RELATED ITEMS:

7. EASEMENT UNTO MICHIGAN BELL TELEPHONE COMPANY A.K.A. AMERITECH MICHIGAN, A MICHIGAN CORPORATION, RECORDED 12/28/1998 AS BOOK 2103 PAGE 0365 OF THE KALAMAZOO COUNTY RECORDS. ***[LOCATED ON SURVEYED LAND, PLOTTED HEREON]***

8. EASEMENT AGREEMENT BY AND BETWEEN COMSTOCK COMMERCE PARK CONDOMINIUM ASSOCIATION, A MICHIGAN NON-PROFIT CORPORATION, GRANTOR, AND CCP DEVELOPMENT COMPANY, L.L.C., A MICHIGAN LIMITED LIABILITY COMPANY, DEVELOPER AND CLIMAX TELEPHONE COMPANY D/B/A CTS TELECOMMUNICATIONS, INC., A MICHIGAN CORPORATION, GRANTEE, RECORDED 10/09/2014 AS DOCUMENT 2014-033597 OF THE KALAMAZOO COUNTY RECORDS. ***[LOCATED ON SURVEYED LAND AND OTHER LAND, PLOTTED HEREON]***

9. HIGHWAY EASEMENT UNTO THE MICHIGAN DEPARTMENT OF TRANSPORTATION, RECORDED 01/11/2011 AS INSTRUMENT 2011-001255 OF THE KALAMAZOO COUNTY RECORDS. ***[LOCATED WITHIN THE M-96 RIGHT-OF-WAY, PLOTTED HEREON]***

10. CONSENT TO CONSTRUCT SIDEWALK TO THE MICHIGAN DEPARTMENT OF TRANSPORTATION, RECORDED 01/11/2011 AS INSTRUMENT 2011-001256 OF THE KALAMAZOO COUNTY RECORDS. ***[LOCATED WITHIN THE M-96 RIGHT-OF-WAY, PLOTTED HEREON]***

11. TERMS, COVENANTS, CONDITIONS, EASEMENTS, RIGHTS, RESTRICTIONS AND OBLIGATIONS SET FORTH IN THE MASTER DEED FOR COMSTOCK COMMERCE PARK, A CONDOMINIUM, RECORDED IN LIBER 1993, PAGE 950, AND ALL AMENDMENTS THERETO RECORDED IN LIBER 2011, PAGE 90; LIBER 2063, PAGE 870; INSTRUMENT NO. 1999-042979; INSTRUMENT NO. 2000-010566; INSTRUMENT NO. 2007-041265, KALAMAZOO COUNTY RECORDS, TOGETHER WITH THE CONDOMINIUM SUBDIVISION PLAN AND ALL EXHIBITS THERETO. ***[BLANKET IN NATURE OVER PARENT PARCEL AND OTHER LAND, NOT PLOTTED]***

12. RIGHTS AND OBLIGATIONS RELATED TO PRIVATE ROAD MAINTENANCE AS DISCLOSED BY PRIVATE ROAD NOTICE RECORDED APRIL 27, 2022 AS INSTRUMENT NO. 2022-014704, AND ANY RIGHTS OF THE ASSOCIATION OR CO-OWNERS FOR INGRESS, EGRESS, AND MAINTENANCE OF PRIVATE ROADWAYS SERVING THE CONDOMINIUM. ***[PRIVATE ROAD LOCATED WESTERLY OF THE PARENT PARCEL, PLOTTED HEREON]***

SURVEY PLAN

SCALE: 1"=40'

0 40' 80'

N

LEGEND

ALL UTILITIES AS SHOWN ARE APPROXIMATE LOCATIONS DERIVED FROM ACTUAL MEASUREMENTS AND AVAILABLE RECORDS. THEY SHOULD NOT BE INTERPRETED TO BE EXACT LOCATION NOR SHOULD IT BE ASSUMED THAT THEY ARE THE ONLY UTILITIES IN THE AREA.

APC Towers
3000 Aerial Center Parkway, Suite 110
Morrisville, NC 27560

New Par, a Delaware Partnership dba
verizon wireless

LANDTECH PROJECT NUMBER: 26309007

REV.	DATE	DESCRIPTION	REQ. BY	BY
0	03/23/26	PRELIMINARY DRAWINGS	EG	TJW
1	03/23/26	REVISE EASEMENT	EG	TJW
2	03/27/26	ADD TITLE	EG	TJW
3	04/01/26	MOVE TOWER	EG	TJW

DRAWING SCALE NOTE: THE DRAWINGS ARE DESIGNED FOR 11"x17" (TABLOID/LEGAL) SIZED PAPER. WHERE MUNICIPALITIES REQUIRE 24"x36" COPIES OF PRINTS, LANDTECH SHALL PLOT THE DRAWINGS AT A RATIO OF 2:1. ALL SUCH COPIES SHALL HAVE A SCALE 1/2 THE SHOWN SIZE.

TeleCAD Wireless
1961 NORTHPOINT BLVD, SUITE 130
HIXSON, TN 37343
PH: 423-843-9500 FAX: 423-843-9509

LANDTECH
PROFESSIONAL SURVEYING & ENGINEERING
AL, AR, AZ, CO, FL, GA, IL, IA, IN, KS, KY, LA, MI, MN, MO, NE, NC, ND, NJ, NM, NY, OH, OK, PA, SC, SD, TN, TX, VA, WV, WI
231.943.0050ph 877.820.LAND toll free
www.landtechps.com www.towersurveyors.com

ROWE ISLAND

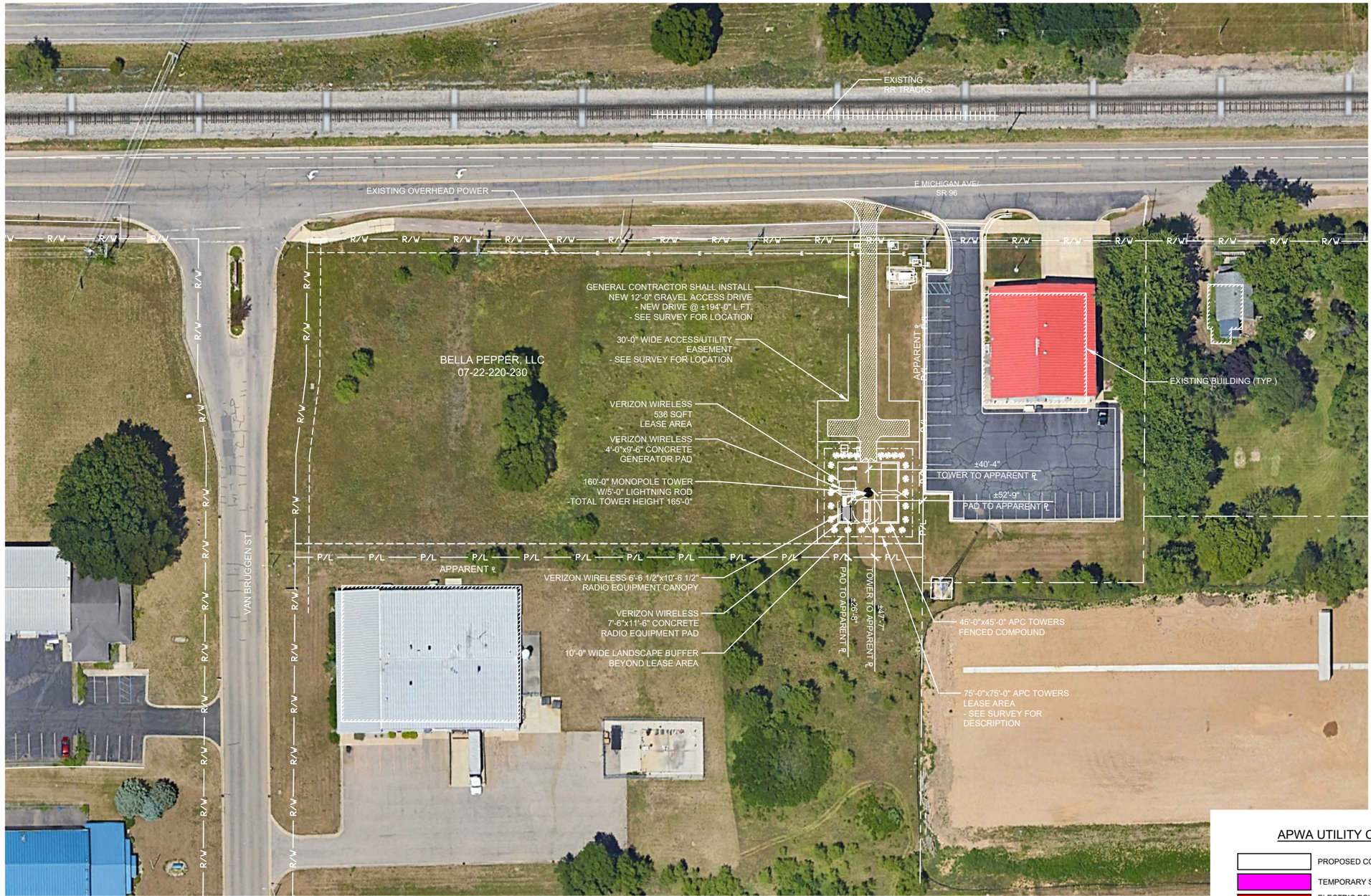
MI-4082

SITE ADDRESS:
67 VAN BRUGGEN STREET
GALESBURG, MI 49053

COUNTY: KALAMAZOO

Sheet Title:
SURVEY PLAN

Sheet Number:
S-2



TO OBTAIN LOCATION OF PARTICIPANTS UNDERGROUND FACILITIES BEFORE YOU DIG IN MICHIGAN, CALL MISS DIG
TOLL FREE: 1-800-482-7171 OR
www.missdig.org
MICHIGAN STATUTE REQUIRES MIN OF 2 WORKING DAYS NOTICE BEFORE YOU EXCAVATE

Know what's below. Call before you dig.

GRAPHIC SCALE

80 0 40 80 160

OVERALL SITE PLAN W/AERIAL OVERLAY

SCALE: 1" = 80'

NORTH

NOTE:
NO GROUND LEVEL LIGHTING AT THE SITE EXCEPT FOR WHEN WORKERS ARE PRESENT

APWA UTILITY COLOR CODES

- PROPOSED CONSTRUCTION
- TEMPORARY SURVEY MARKINGS
- ELECTRIC POWER LINES, CABLES, CONDUIT, AND LIGHTING CABLES
- GAS, OIL STEAM PETROLEUM OR GASEOUS MATERIALS
- COMMUNICATION, ALARM OR SIGNAL LINES, CABLES OR CONDUIT
- POTABLE WATER
- RECLAIMED WATER, IRRIGATION AND SLURRY LINES
- SEWERS AND DRAIN LINES

PREPARED FOR:

APC Towers

8601 SIX FORKS ROAD, SUITE 250
RALIEGH, NC 27615

PREPARED BY:

TeleCAD Wireless

1961 NORTHPOINT BLVD, SUITE 130
HIXSON, TN 37343
PH: 423-843-9500
FAX: 423-843-9509

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DRAWN BY:	JAE
CHECKED BY:	DS

REVISIONS

NO.	DATE	BY	DESCRIPTION
3	06/30/26	PLS	ZONING ISSUE
2	06/29/26	JAE	ZONING ISSUE
1	04/28/26	MDR	ZONING ISSUE
0	04/17/26	WAM	PRELIMINARY REVIEW
C	04/08/26	PLS	PRELIMINARY REVIEW
B	04/07/26	WAM	PRELIMINARY REVIEW
A	03/24/26	JAE	PRELIMINARY REVIEW

ENGINEER'S STAMP:

STATE OF MICHIGAN
Stephen E. Hunt
License No. 6201054169
LICENSED PROFESSIONAL ENGINEER
3/30/26

NOT VALID WITHOUT P.E. STAMP & SIGNATURE

SITE NAME:
ROWE ISLAND

ADDRESS:
67 VAN BRUGGEN
GALESBURG, MI 49053

COUNTY:
KALAMAZOO

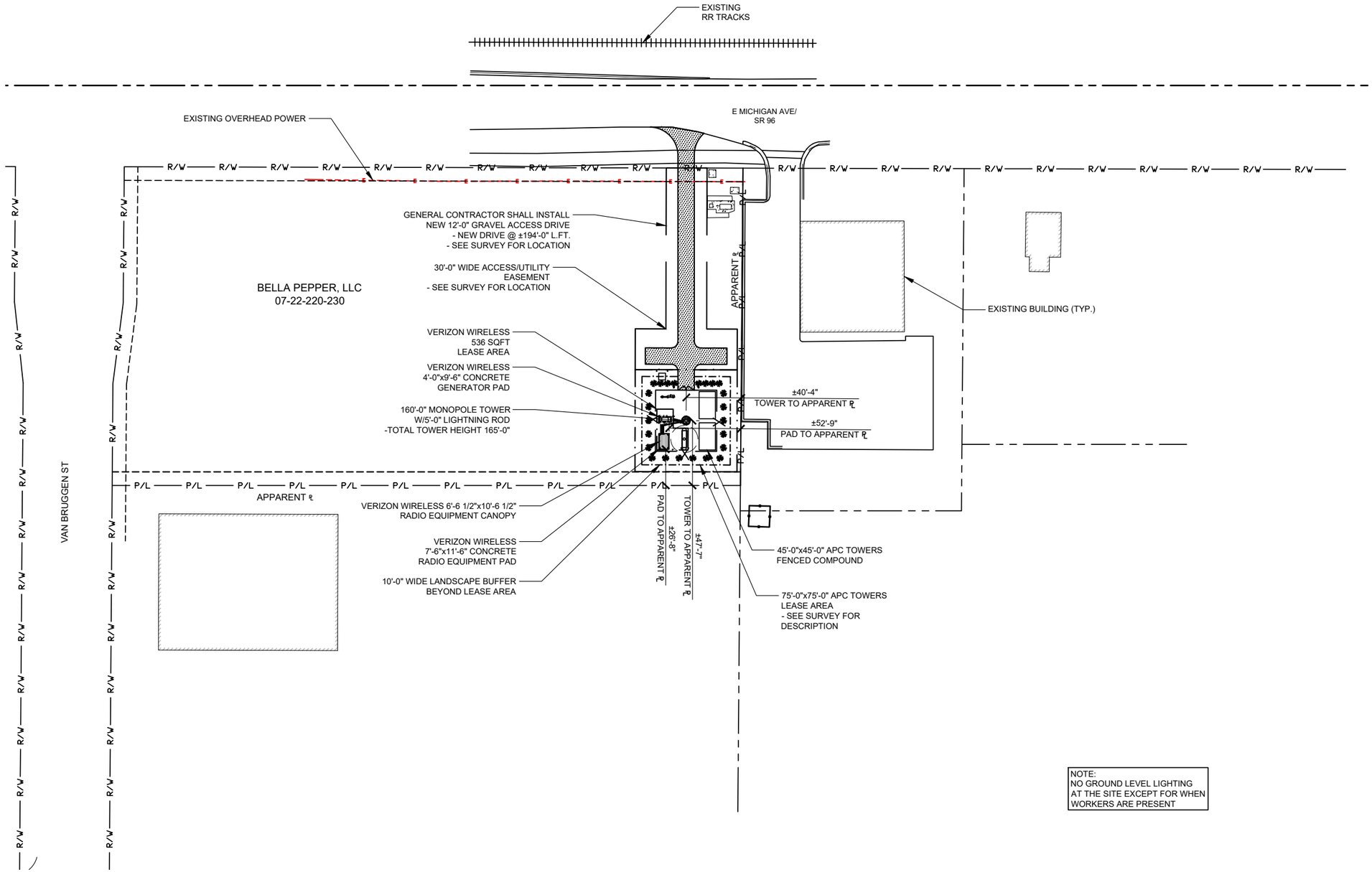
LATITUDE:
42° 17' 16.35" N

LONGITUDE:
85° 27' 34.73" W

SITE NUMBER:
MI-4082

SHEET TITLE:
OVERALL SITE PLAN

DRAWING NO.	REVISION:
Z-1	3



NOTE:
NO GROUND LEVEL LIGHTING AT THE SITE EXCEPT FOR WHEN WORKERS ARE PRESENT

GRAPHIC SCALE
80 0 40 80 160

OVERALL SITE PLAN w/TOWER DISTANCE TO PROPERTY LINES

SCALE: 1" = 80'

NORTH

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TOLL FREE: 1-800-482-7171 OR
www.missdig.org
MICHIGAN STATUTE REQUIRES MIN OF 2 WORKING DAYS NOTICE BEFORE YOU EXCAVATE

PREPARED FOR:
APC Towers
8601 SIX FORKS ROAD, SUITE 250
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GALESBURG, MI 49053

COUNTY:
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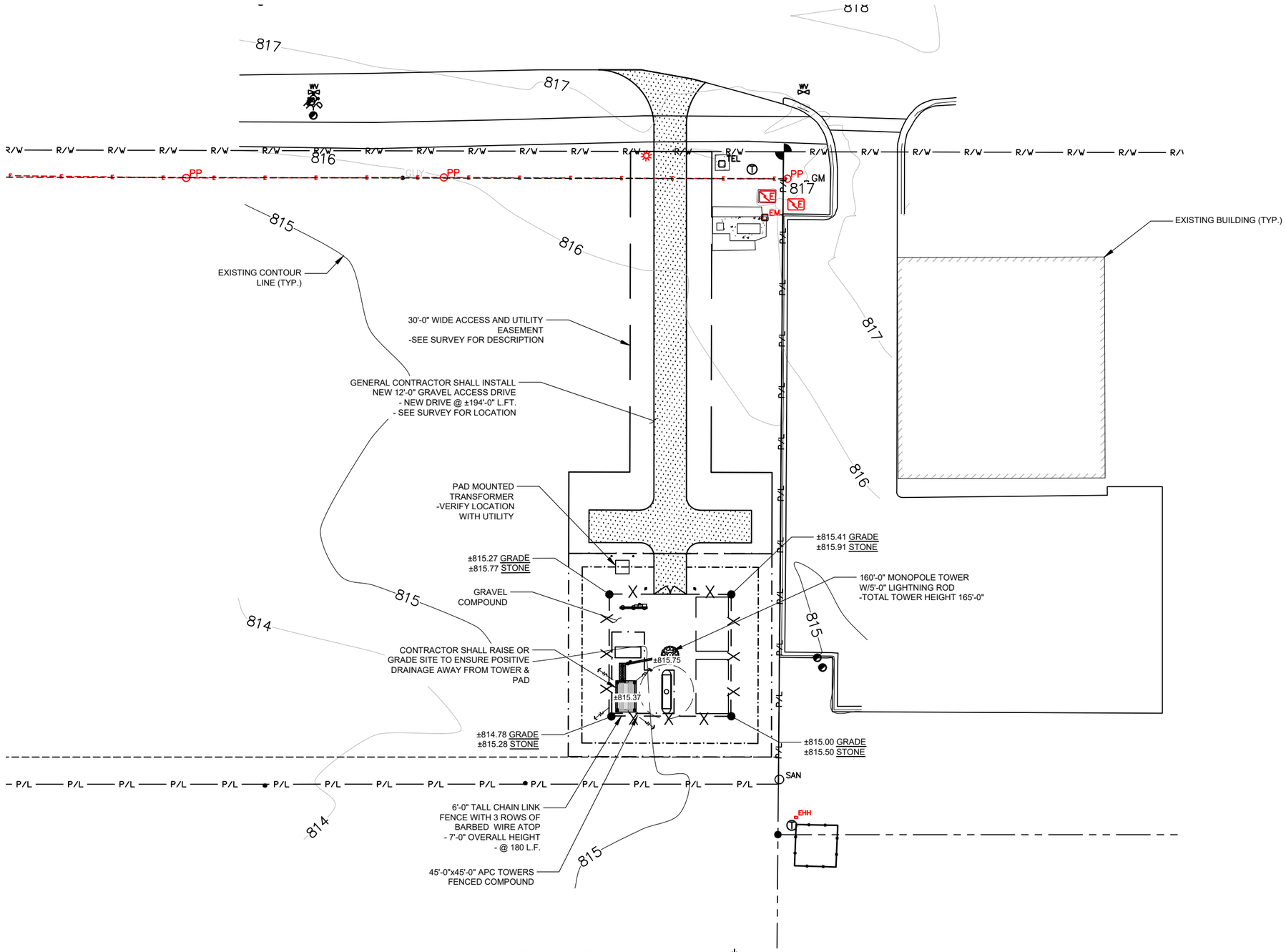
42° 17' 16.35" N

LONGITUDE:
85° 27' 34.73" W

SITE NUMBER:
MI-4082

SHEET TITLE:
OVERALL SITE PLAN

DRAWING NO.	REVISION:
Z-2	3



GRADING AND E&S CONTROL PLAN

SCALE: 1" = 40'

NORTH

GRAPHIC SCALE

40 0 20 40 80

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PREPARED FOR:

APC Towers

8601 SIX FORKS ROAD, SUITE 250
RALIEGH, NC 27615

PREPARED BY:

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STATE OF MICHIGAN
Stephen E. Hunt
License No. 6201054169
LICENSED PROFESSIONAL ENGINEER
6/30/26

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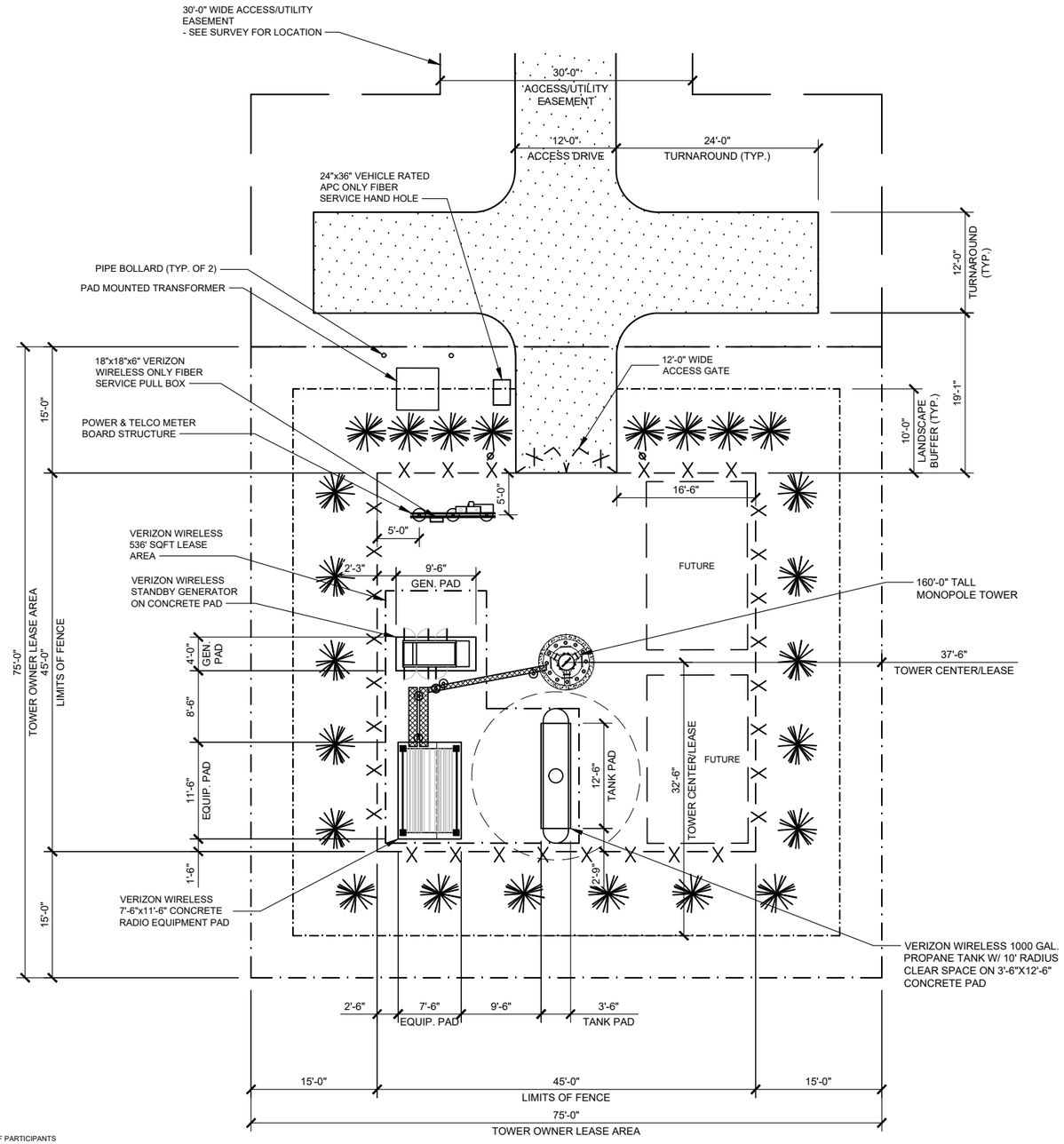
SITE NAME:	ROWE ISLAND
ADDRESS:	67 VAN BRUGGEN GALESBURG, MI 49053
COUNTY:	KALAMAZOO
LATITUDE:	42° 17' 16.35" N
LONGITUDE:	85° 27' 34.73" W
SITE NUMBER:	MI-4082
SHEET TITLE:	GRADING AND E&S CONTROL PLAN
DRAWING NO.	Z-3
REVISION:	3



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*NOTE:
GENERAL CONTRACTOR IS TO ENSURE THERE IS NO DISTURBANCE OF PROPERTY, SOIL, ETC. OUTSIDE OF THE STAKED LEASE AREA WITHOUT APPROVAL FROM VERIZON WIRELESS CONSTRUCTION MANAGER

DETAILED & DIMENSIONED SITE PLAN

SCALE: 1/16" = 1'-0"

NORTH

NOTE:
NO GROUND LEVEL LIGHTING AT THE SITE EXCEPT FOR WHEN WORKERS ARE PRESENT

LEGEND

- IRON PIN
- DRAINAGE LINE
- +XXX.XX SPOT ELEVATION
- GRAVEL COMPOUND
- CENTER LINE
- NEW FENCE LINE
- NEW SILT FENCE LINE
- POWER POLE w/OVERHEAD ELEC./TELE.
- EDGE OF NEW DRIVE
- UNDERGROUND ELECTRICAL CONDUIT
- UNDERGROUND TELEPHONE CONDUIT
- EXISTING CONTOURS
- NEW CONTOURS
- FENCED COMPOUND
- CONCRETE
- ACCESS DRIVE

PREPARED FOR:

APC Towers

8601 SIX FORKS ROAD, SUITE 250
RALIEGH, NC 27615

PREPARED BY:

TeleCAD Wireless

1961 NORTHPOINT BLVD, SUITE 130
HIXSON, TN 37343
PH: 423-843-9500
FAX: 423-843-9509

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CHECKED BY:	DS

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A	03/24/26	JAE	PRELIMINARY REVIEW

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Stephen E. Hunt
License No. 6201054169
LICENSED PROFESSIONAL ENGINEER
06/30/26

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ROWE ISLAND

ADDRESS:
67 VAN BRUGGEN
GALESBURG, MI 49053

COUNTY:
KALAMAZOO

LATITUDE:
42° 17' 16.35" N

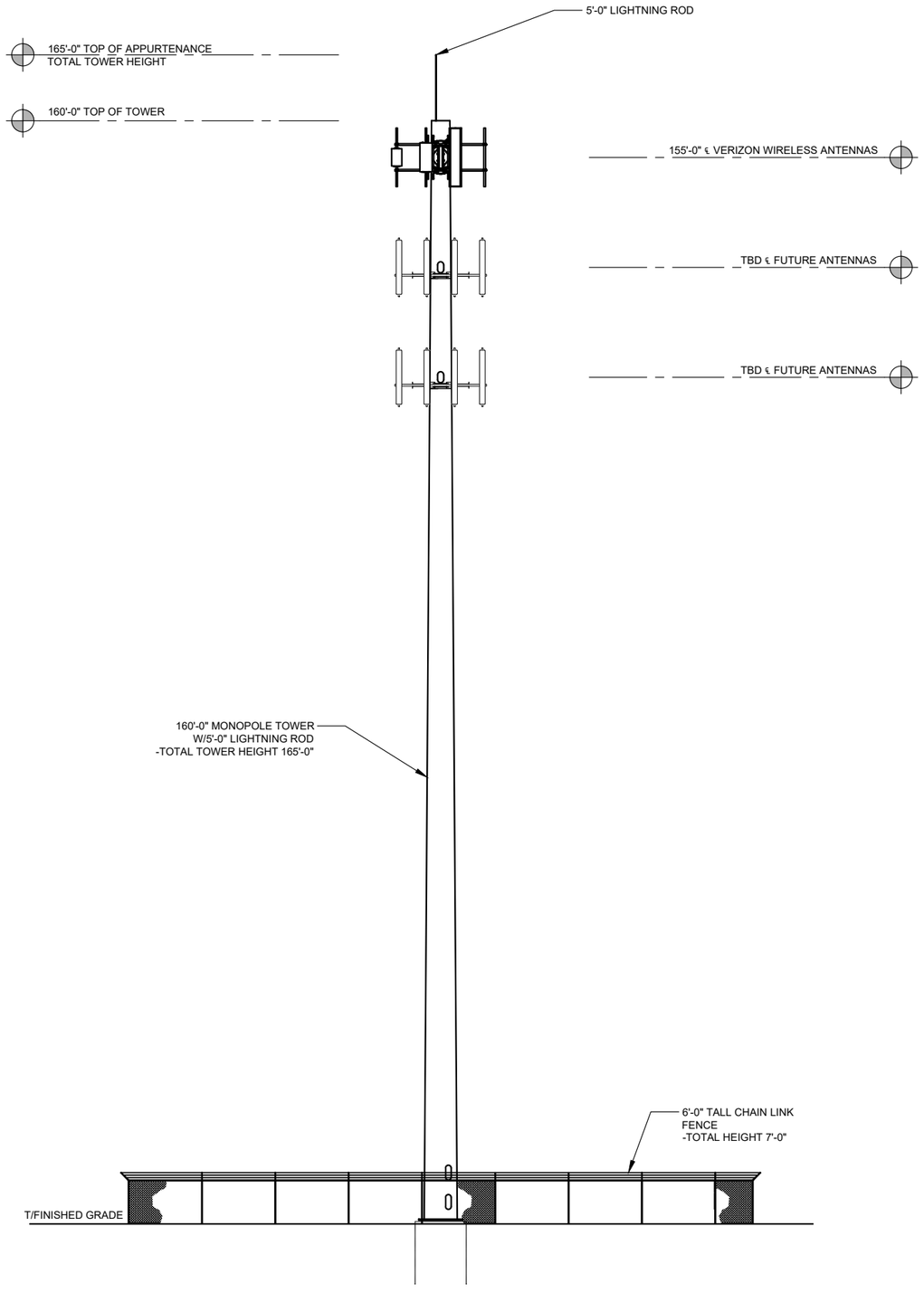
LONGITUDE:
85° 27' 34.73" W

SITE NUMBER:
MI-4082

SHEET TITLE:
DETAILED SITE PLAN

DRAWING NO.	REVISION:
Z-4	3

NOTE:
TOWER LIGHTING NOT REQUIRED UNLESS DETERMINED BY FAA



TOWER ELEVATION

SCALE: N.T.S.

NOTE:
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PREPARED FOR:

APC Towers

8601 SIX FORKS ROAD, SUITE 250
RALIEGH, NC 27615

PREPARED BY:

TeleCAD Wireless

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HIXSON, TN 37343
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A	03/24/26	JAE	PRELIMINARY REVIEW

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Stephen E. Hunt
License No. 6201054169
LICENSED PROFESSIONAL ENGINEER
30/26

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SITE NAME:
ROWE ISLAND

ADDRESS:
67 VAN BRUGGEN
GALESBURG, MI 49053

COUNTY:
KALAMAZOO

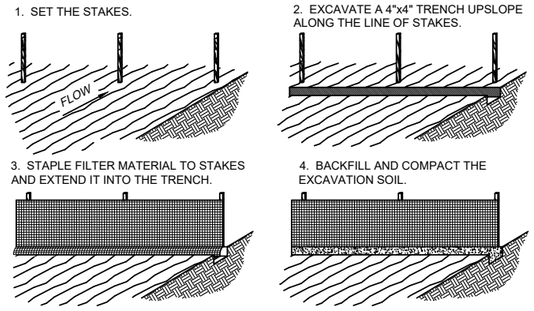
LATITUDE:
42° 17' 16.35" N

LONGITUDE:
85° 27' 34.73" W

SITE NUMBER:
MI-4082

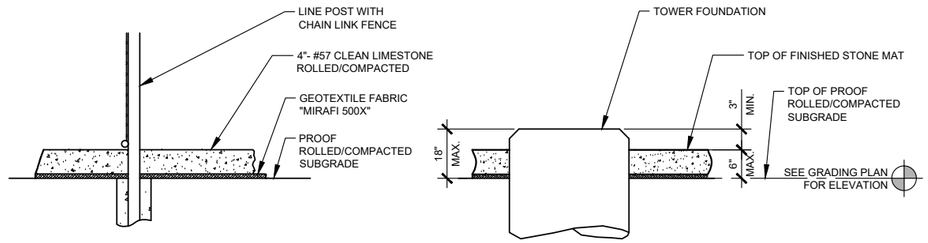
SHEET TITLE:
TOWER ELEVATION

DRAWING NO.	REVISION:
Z-5	3



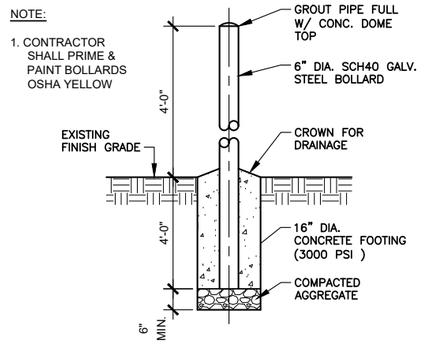
SILT FENCE DETAIL

SCALE: N.T.S.



PARTIAL COMPOUND SECTION

SCALE: N.T.S.



BOLLARD DETAIL

SCALE: N.T.S.

PREPARED FOR:

APC Towers

8601 SIX FORKS ROAD, SUITE 250
RALIEGH, NC 27615

PREPARED BY:

TeleCAD Wireless

1961 NORTHPOINT BLVD, SUITE 130
HIXSON, TN 37343
PH: 423-843-9500
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CHECKED BY:	DS

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A	03/24/26	JAE	PRELIMINARY REVIEW

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STATE OF MICHIGAN
Stephen E. Hunt
License No. 6201054169
LICENSED PROFESSIONAL ENGINEER
06/30/26

NOT VALID WITHOUT P.E. STAMP & SIGNATURE

SITE NAME:
ROWE ISLAND

ADDRESS:
67 VAN BRUGGEN
GALESBURG, MI 49053

COUNTY:
KALAMAZOO

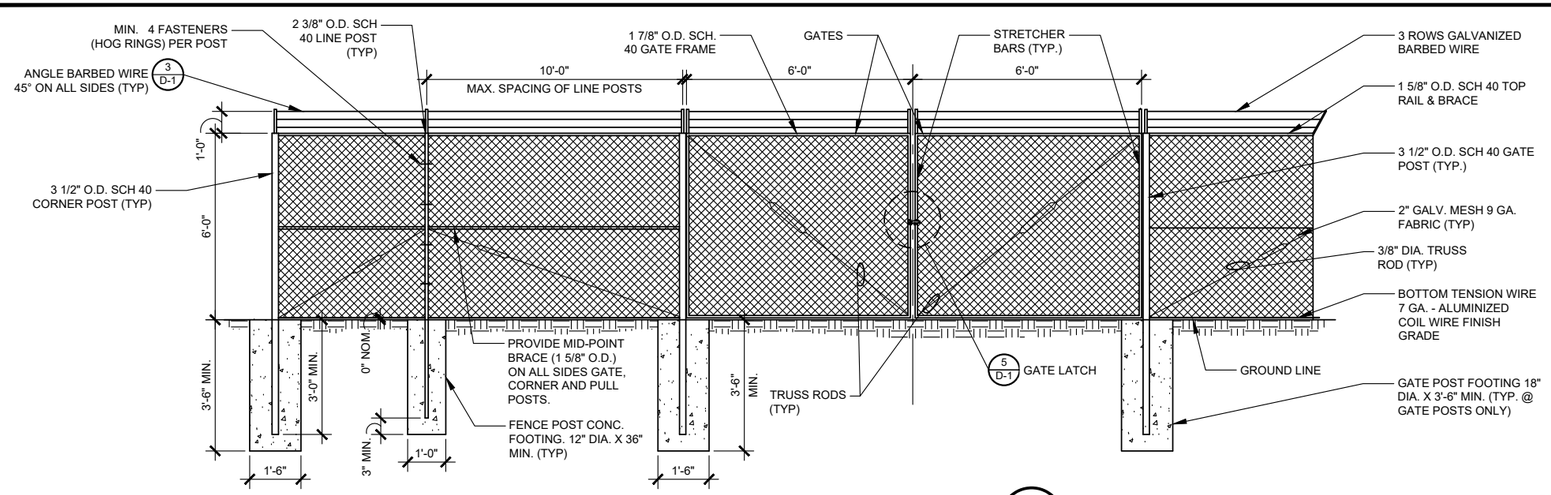
LATITUDE:
42° 17' 16.35" N

LONGITUDE:
85° 27' 34.73" W

SITE NUMBER:
MI-4082

SHEET TITLE:
DETAILED EQUIPMENT PAD PLAN

DRAWING NO.	REVISION:
Z-6	3

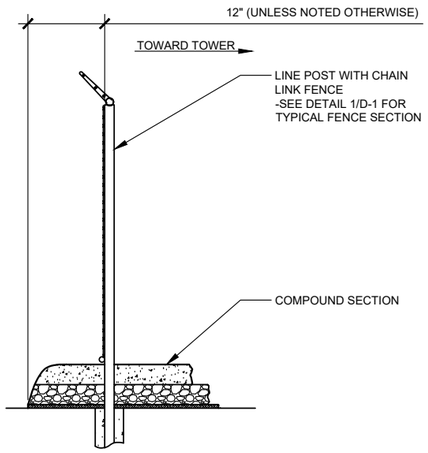


CHAIN LINK FENCE & POST DETAIL 1 D-1

SCALE: N.T.S.

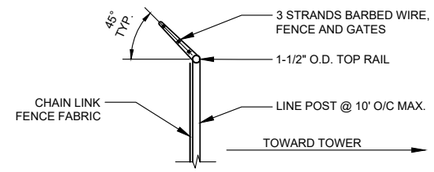
CHAIN LINK FENCING NOTES

1. ALL FENCE AND FABRIC SHALL BE HOT DIPPED GALVANIZED WITH A MINIMUM OF 2 OZ. PER SQUARE FOOT, 9 GAUGE WIRE (MIN. BREAKING STRENGTH OF 1,290 LBS) WITH 2" MESH. ALL BARBED WIRE SHALL BE ALUMINUM OR COATED PER NOTE #4.
2. BOTTOM EDGE OF FENCE FABRIC SHALL EXTEND TO FINISHED GRADE.
3. SITE FENCE SHALL BE 6'-0" FABRIC W/ 3 STRAND BARBED WIRE FOR TOTAL HEIGHT OF 7'-0".
4. BARBED WIRE SHALL MEET ASTM A 121, CLASS 3 GALV. OR ASTM A 585, TYPE I, CLASS 2 COATING (NOT LESS THAN 0.8 OZ. PER SQ. FT.) AND SHALL BE THREE STRAND 12.5 GAGE w/4 POINT BARBS AT 5" O/C.
5. BOTTOM OF CONCRETE BASE SHALL BE SET BELOW FROSTLINE (SEE LOCAL CODE). WHERE SOIL BEARING CAPACITY IS LESS THAN 2000 PSF, INCREASE CONCRETE SURROUNDING FENCE POST FOUNDATION DIAMETERS BY 8", PROVIDE CONCRETE WITH A 28 DAY STRENGTH OF 3000 PSI (MIN.)
6. PROVIDE A DIAGONAL BRACE ROD AND TURN BUCKLE ON BOTH GATE LEAFS.
7. ALL RAILS AND BRACES SHALL BE SCHEDULE 40 STEEL PIPE, AND ALL FENCE POSTS SHALL BE SCHEDULE 40 STEEL PIPE, AND BE 2 OZ. GALVANIZED COATED.
8. CONTRACTOR SHALL ENSURE ALL POSTS ARE PLUMB.
9. ALL FENCE SHALL BE FABRICATED AND INSTALLED PER ASTM F2611-15, ASTM F567-14a AND CHAIN LINK FENCE MANUFACTURES INSTITUTE CLFMI-PM 2445.
10. CONTRACTOR SHALL FURNISH AND INSTALL ONE (1) MASTER LOCK LONG SHANK #175LH COMBINATION PADLOCK. COMBINATION TO BE SET AT 7011.



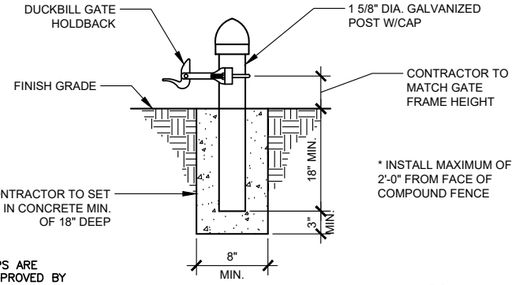
SITE AREA SURFACING 2 D-1

SCALE: N.T.S.



TYPICAL BARBED WIRE DETAIL 3 D-1

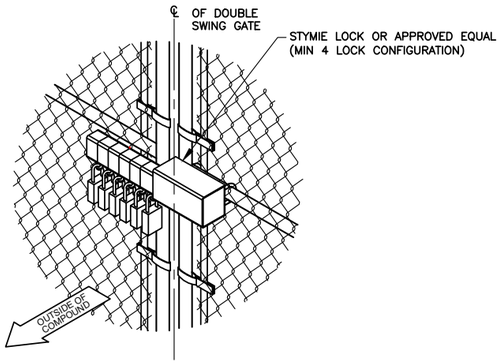
SCALE: N.T.S.



NOTE:
ALTERNATE FENCE STOPS ARE ACCEPTABLE, TO BE APPROVED BY TOWER OWNER CONSTRUCTION MANAGER

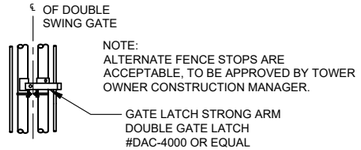
GATE KEEPER DETAIL 4 D-1

SCALE: N.T.S.



GATE LOCK DETAIL 5 D-1

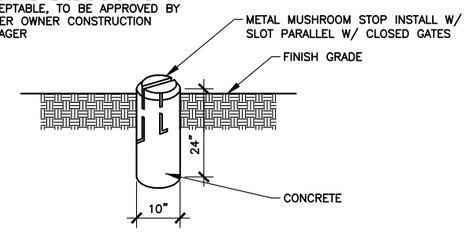
SCALE: N.T.S.



GATE LATCH DETAIL 6 D-1

SCALE: N.T.S.

NOTE:
ALTERNATE FENCE STOPS ARE ACCEPTABLE, TO BE APPROVED BY TOWER OWNER CONSTRUCTION MANAGER



MUSHROOM STOP DETAIL 6 D-1

SCALE: N.T.S.

PREPARED FOR:

APC Towers

8601 SIX FORKS ROAD, SUITE 250
RALIEGH, NC 27615

PREPARED BY:

TeleCAD Wireless

1961 NORTHPOINT BLVD, SUITE 130
HIXSON, TN 37343
PH: 423-843-9500
FAX: 423-843-9509

DRAWING NOTICE:

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DRAWN BY:	JAE
CHECKED BY:	DS

REVISIONS

NO.	DATE	BY	DESCRIPTION
3	06/30/26	PLS	ZONING ISSUE
2	06/29/26	JAE	ZONING ISSUE
1	04/28/26	MDR	ZONING ISSUE
0	04/17/26	WAM	PRELIMINARY REVIEW
C	04/08/26	PLS	PRELIMINARY REVIEW
B	04/07/26	WAM	PRELIMINARY REVIEW
A	03/24/26	JAE	PRELIMINARY REVIEW

ENGINEER'S STAMP:

STATE OF MICHIGAN
Stephen E. Hunt
License No. 6201054169
LICENSED PROFESSIONAL ENGINEER
3.0.26

NOT VALID WITHOUT P.E. STAMP & SIGNATURE

SITE NAME:
ROWE ISLAND

ADDRESS:
67 VAN BRUGGEN
GALESBURG, MI 49053

COUNTY:
KALAMAZOO

LATITUDE:
42° 17' 16.35" N

LONGITUDE:
85° 27' 34.73" W

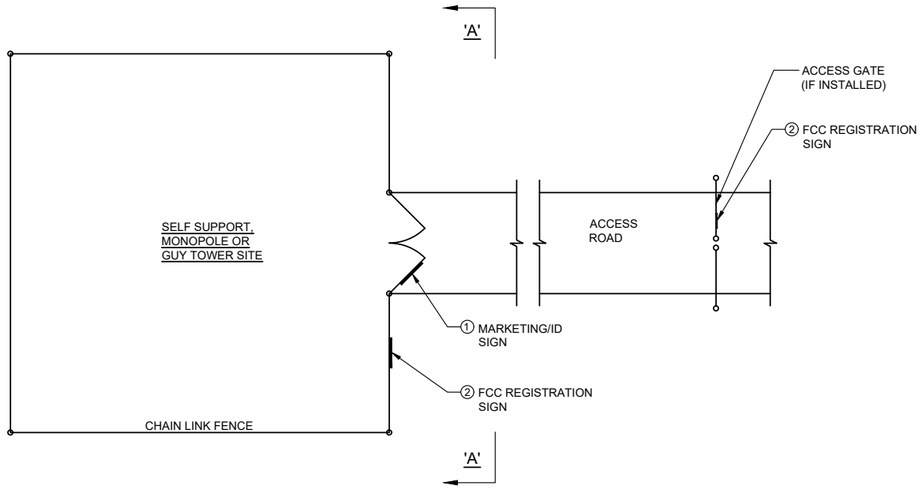
SITE NUMBER:
MI-4082

SHEET TITLE:
FENCE DETAILS AND NOTES

DRAWING NO.	REVISION:
Z-7	3

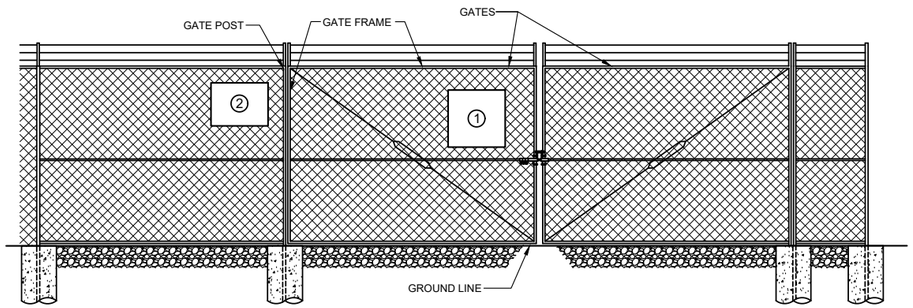
NOTES:

VERIZON WIRELESS SITE ID SIGN, RFE SIGNS, NOC INFORMATION SIGN AND ALL OTHER SIGNAGE NOT REFERENCED IN THIS DRAWING WILL BE FURNISHED AND INSTALLED BY VERIZON WIRELESS PERSONNEL PER VERIZON WIRELESS RFC SIGNAGE & DEMARCATION POLICY.



TYPICAL SITE FENCE SIGNAGE PLAN

SCALE: N. T. S.



ELEVATION "A-A"

SCALE: N. T. S.

APC Towers

SITE NUMBER: MI-4082

SITE NAME: ROWE ISLAND

SITE ADDRESS: 8601 SIX FORKS ROAD, SUITE 250 RALIEGH, NC 27615

WHITE BACKGROUND w/BLACK LETTERING

NOC/LEASING/EMERGENCY CONTACT

Log in before entering

(800) 640-1379

www.apctowers.com

PRIVATE PROPERTY- NO TRESPASSING

MARKETING/ID SIGN — 1

24" WIDE x 32" HIGH

FCC ANTENNA STRUCTURE REGISTRATION

WHITE BACKGROUND w/BLACK LETTERING

FCC REGISTRATION SIGN — 2

24" WIDE x 18" HIGH

PREPARED FOR:

APC Towers

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CHECKED BY:	DS

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A	03/24/26	JAE	PRELIMINARY REVIEW

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STATE OF MICHIGAN
Stephen E. Hunt
License No. 6201054169
LICENSED PROFESSIONAL ENGINEER
3/30/26

NOT VALID WITHOUT P.E. STAMP & SIGNATURE

SITE NAME: ROWE ISLAND

ADDRESS: 67 VAN BRUGGEN GALESBURG, MI 49053

COUNTY: KALAMAZOO

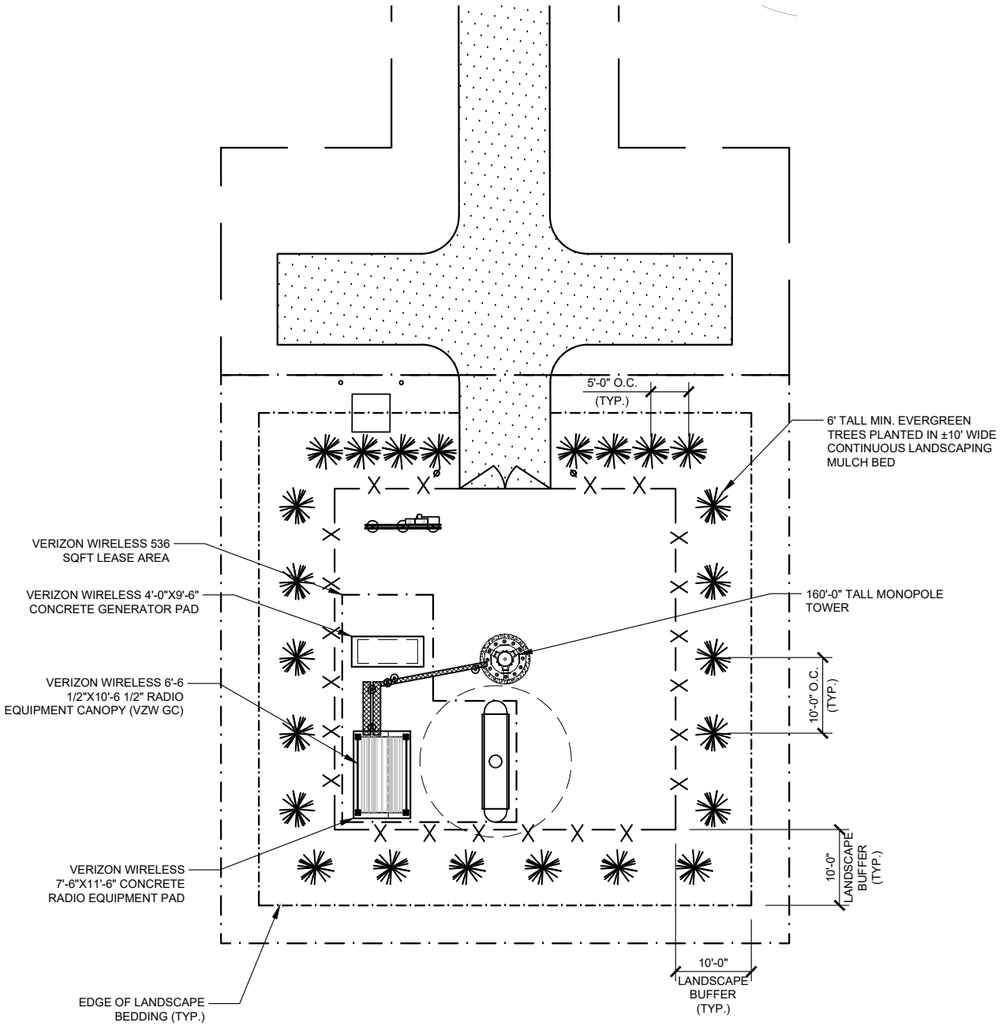
LATITUDE: 42° 17' 16.35" N

LONGITUDE: 85° 27' 34.73" W

SITE NUMBER: MI-4082

SHEET TITLE: TOWER OWNER SIGNAGE

DRAWING NO.	REVISION:
Z-8	3



GRAPHIC SCALE

20 0 10 20 40

LANDSCAPE PLAN

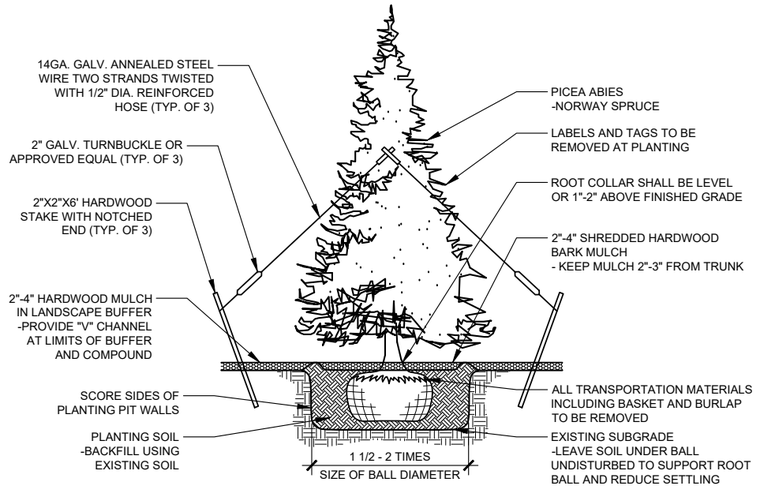
SCALE: 1" = 20'

NORTH

LANDSCAPING CONTRACTOR NOTES

1. THE CONTRACTOR SHALL VISIT THE SITE & BECOME COMPLETELY FAMILIAR WITH ALL EXISTING CONDITIONS AND EROSION CONTROL MEASURES PRIOR TO STARTING WORK.
2. THE CONTRACTOR SHALL FURNISH ALL LABOR AND MATERIALS COMPLETE IN ACCORDANCE WITH THE DRAWINGS AND SPECIFICATIONS.
3. THE CONTRACTOR SHALL COMPLY WITH ALL BUILDING CODES, INSPECTIONS AND SAFETY REGULATIONS, AND PROVIDE ALL NECESSARY PERMITS. THE CONTRACTOR SHALL HAVE ALL NECESSARY LOCAL, STATE & FEDERAL LICENSE REQUIRED. UPON REQUEST, THE CONTRACTOR SHALL SHOW EVIDENCE OF WORKERS COMPENSATION COVERAGE AND LIABILITY POLICY.
4. THE CONTRACTOR SHALL GUARANTEE ALL PLANTS TO BE IN A HEALTHY, VIGOROUS CONDITION (INCLUDING WATERING AND UPKEEP) FOR A PERIOD OF ONE (1) YEAR FOLLOWING ACCEPTANCE BY OWNER AND/OR PROJECT REPRESENTATIVE. THE CONTRACTOR SHALL REPLACE WITHOUT COST TO OWNER, ANY DEAD OR UNACCEPTABLE PLANTS.
5. THE CONTRACTOR SHALL VERIFY THE LOCATION OF ALL UNDERGROUND UTILITIES AND PERFORM WORK IN A MANNER WHICH WILL AVOID POSSIBLE DAMAGE; HAND EXCAVATE AS REQUIRED.
6. ALL LANDSCAPE/PLANTING AREAS SHALL HAVE PROPER DRAINAGE THAT PREVENTS EXCESS WATER FROM STANDING AROUND TREES AND SHRUBS. IT IS INTENDED THAT THIS SITE WILL MATCH EXISTING GROUND ELEVATIONS AND WILL MAINTAIN EXISTING DRAINAGE PATTERNS WHERE APPLICABLE.
7. THE CONTRACTOR SHALL PROVIDE PLANT MATERIAL OF THE SIZE & TYPE SPECIFIED, IF SUBSTITUTIONS ARE PROPOSED, THEY MUST BE APPROVED BY TOWER OWNER. ALL PLANT MATERIAL SHALL BE FREE OF DISEASE, INSECTS AND DEFECTS SUCH AS BUT NOT LIMITED TO KNOTS, SUN-SCALD, INJURIES, ABRASIONS AND DISFIGUREMENT. APPROVAL OF PLANT MATERIAL AT THE SOURCE DOES NOT ALTER THE RIGHT OF REJECTION AT PROJECT. ALL PLANT MATERIAL SHALL COMPLY WITH THE CURRENT ISSUE OF "ASSOCIATION OF AMERICAN STANDARD" FOR NURSERY STOCK PUBLISHED BY THE "AMERICAN ASSOCIATION OF NURSERYMEN".
8. THE CONTRACTOR SHALL PROVIDE A FINISHED GRADE THAT SHALL BE REASONABLY SMOOTH, COMPACTED AND FREE OF ANY IRREGULAR SURFACE CHANGE. THE CONTRACTOR SHALL SLOPE ALL PLANTING BEDS AND LAWN AREAS TO CAUSE RUN-OFF TO FLOW AWAY FROM BUILDING AND PAVING.
9. THE CONTRACTOR SHALL BACKFILL ALL PLANT MATERIAL WITH SHREDDED TOPSOIL AND THE SPECIFIED AMOUNT OF PEAT MOSS AS REQUIRED FOR THE BED PREPARATION.
10. THE LANDSCAPING CONTRACTOR SHALL USE SOME TYPE OF HARDWOOD MULCH.
    - THE FINISHED DEPTH OF MULCH MUST BE AT LEAST 2" AND NO MORE THAN 4".
    - PRIOR TO MULCHING THE CONTRACTOR SHALL APPLY A PRE-EMERGENT HERBICIDE TO AID IN WEED CONTROL. READ WARNING LABEL BEFORE APPLYING. WATER ALL TREES IMMEDIATELY OR WITHIN 16 HOURS AFTER INSTALLATION
    - THE CONTRACTOR SHALL INSTALL GEOTEXTILE FABRIC AFTER APPLICATION OF PRE-EMERGENT HERBICIDE AND PRIOR TO MULCH INSTALLATION. SEE NOTE #7 ON SHEET C-5 FOR GEOTEXTILE FABRIC.

SYMBOL	QUANTITY	PLANT NAME	BOTANICAL NAME	COMMENTS/SPECIFICATIONS
	24	NORWAY SPRUCE EVERGREEN TREE	PICEA ABIES	6 FEET HEIGHT MINIMUM (BALLED & BURLAPPED)



NOTE:
CONTRACTOR SHALL GUARANTEE ALL NEWLY PLANTED AND RELOCATED TREES FOR A MINIMUM OF 1 YEAR AFTER COMPLETION OF PROJECT. GUARANTEE SHALL BE FOR FULL REPLACEMENT OF LOST PLANTS.

EVERGREEN TREE PLANTING

SCALE: N.T.S.

811 Know what's below. Call before you dig.

TO OBTAIN LOCATION OF PARTICIPANTS UNDERGROUND FACILITIES BEFORE YOU DIG IN MICHIGAN, CALL MISS DIG

TOLL FREE: 1-800-482-7171 OR www.missdig.org

MICHIGAN STATUTE REQUIRES MIN OF 2 WORKING DAYS NOTICE BEFORE YOU EXCAVATE

PREPARED FOR:

APC Towers

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RALIEGH, NC 27615

PREPARED BY:

TeleCAD Wireless

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HIXSON, TN 37343
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GALESBURG, MI 49053

COUNTY:
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LATITUDE:
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LONGITUDE:
85° 27' 34.73" W

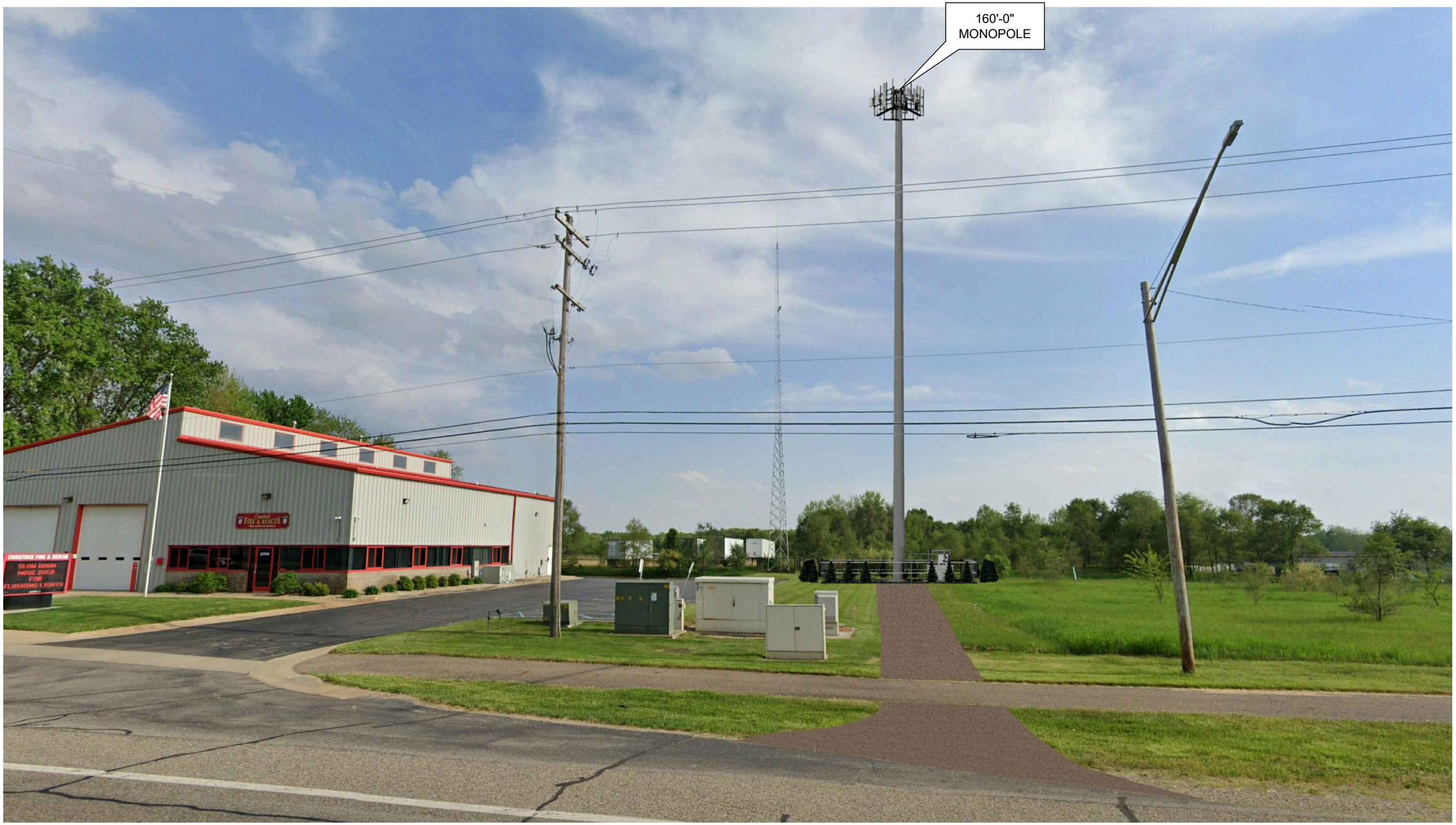
SITE NUMBER:
MI-4082

SHEET TITLE:
LANDSCAPE PLAN

DRAWING NO.	REVISION:
L-1	3


E K Ave
Location 1
E Michigan Ave
96
96
Location 2
The Puppy Playground
MI-4082 Rowe Island
Location 4
Van Brugge
Elite Welding & Fabrication
Sparks St
Impact Label Corporation
Kalam
Home City Ice
Kalamazoo
Krum Ave
Location 3
Krum Ave
Google Earth


COMSTOCK FIRE & RESCUE
SLOW DOWN
MOVE OVER
FOR
FLASHING LIGHTS
Comstock
FIRE & RESCUE
8700



MI-4082 - ROWE ISLAND - LOCATION 1 - AFTER


Google Earth
Miller Welding Supply
Welding Supplies
Accessories
Industrial Gases
Parts & Service
269-679-3110


160'-0"
MONOPOLE
Miller Welding supply
Welding Supplies
Accessories
Industrial Gases
Parts & Service
269-679-3110
Google Earth



MI-4082 - ROWE ISLAND - LOCATION 3 - BEFORE


160'-0"
MONOPOLE
Google Earth



MI-4082 - ROWE ISLAND - LOCATION 4 - BEFORE



MI-4082 - ROWE ISLAND - LOCATION 4 - AFTER

APPLICATION FOR SPECIAL USE PERMIT AND NECESSARY APPROVALS TO CONSTRUCT A NEW WIRELESS TELECOM FACILITY AT

67 VAN BRUGGEN
GALESBURG, MI 49053

APC SITE: MI-4082 ROWE ISLAND

VERIZON SITE: # 2751 ROWE ISLAND

ArcHaven, LLC

April 24, 2026

Charter Township of Comstock
Attn: Director of Planning and Zoning
5858 King Hwy
Kalamazoo, MI 49041

Re: Cellco Partnership dba Verizon Wireless and APC, LLC Application for Special Use Permit and Necessary Approvals to Construct an Unmanned Multi-Carrier Wireless Telecom Facility located at 67 Van Bruggen, Galesburg, MI 49053

Dear Ms Bryant,

Enclosed for consideration, please find Cellco Partnership dba Verizon Wireless along with APC (The Applicants) joint application for a Special Use Permit and necessary approvals to construct a new 165-foot tall monopole telecommunications tower with associated equipment to be located in a 45-foot by 45-foot fenced compound within a 75' x 75' or 5,625-square foot lease parcel, and construct a gravel access drive within a 30-foot easement for access and public utilities leading west off of 30th street at the above referenced location per the attached plans. In support of the application, please find enclosed the following documentation:

- Special Exception Use Application
- Legal Description
- Site Plan Checklist
- Site Plan and Survey
- Zoning requirements and responses
- FAA Determination of No Hazard
- Tower Search Map
- RF Statement and Propagation Maps
- Maintenance Letter

The Applicants would like to emphasize that their proposal to construct an additional tower in your jurisdiction is intended for the consideration of not only The Applicants but any and all wireless providers (carriers, wireless internet

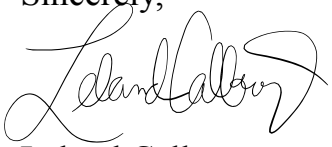
providers and E911) interested in improving service to your area. We have approached this project as thoughtfully as possible with an emphasis on blending the needs of the local citizenry with the need of our wireless clients. A clear requirement for additional antenna siting options spurred this request from the wireless providers.

APC is constructing this tower to allow flexibility, efficiency, and economy in providing upgrades and improving its service to all consumers. The search area request by Verizon Wireless encompasses an area with no existing towers or structures that meet their requirements other than the current tower, were found within that geographical area. The proposed tower will meet the requirements of The Applicants and possibly other wireless communications providers. Our proposal allows for better and more comprehensive mobile wireless service to your community by enhancing Verizon's deployment of 5G and other next generation technology across the U.S., including FirstNet, public safety's dedicated, nationwide communications platform. The First Net program, which is a federally funded program for local, state & federal agencies First Responders, is designed to help all E911 agencies communicate and access data quickly to fulfill their duties. Included with this application is a "Fall Letter" from the tower manufacturer that states the proposed tower would collapse upon itself in the lease area. This allows us flexibility when placing the tower on a parcel to provide the property owner greater use of their land. With this technology, traditional setbacks are no longer an issue.

Upon review of the submittal package, please advise if the package is considered complete for a Special Use Permit and any other necessary approvals to needed to construct this proposed facility.

We look forward to working with you and staff to help bring state of the art wireless telecommunications to the residents and workforce in your area. Please do not hesitate to contact us if you have questions, concerns, or require additional information.

Sincerely,



Leland Calloway
ArcHaven LLC for Verizon Wireless and APC
248-808-2774 | lc@arc-haven.com

Special Exception Use Application

CHARTER TOWNSHIP OF COMSTOCK
PLANNING & ZONING APPLICATION

Shipping: 5858 King Highway, Kal., MI 49048
Mailing: PO Box 449, Comstock MI 49041-0449
Phone: 269-381-2360 Fax: 269-381-4328

PLEASE PRINT

PROJECT NAME AND ADDRESS: MI - 4082 Rowe Island / 67 Van Bruggen, Galesburg, MI 49053

APPLICANT:

Name: Leland Calloway of ArcHaven LLC and agent for
Company: APC Towers and Verizon Wireless
Address: 23133 Woodward Ave., #446
Ferndale, MI 48220
Email: lc@arc-haven.com
Phone: 248-808-2774 Fax: _____
Interest in the Property: Lessee

Township Use:

Fee:
$_____

Escrow:
$_____

Date Paid:
_____
cash/credit card
check # _____

OWNER*:

Name: Jennifer Copeland
Company: Bella Pepper, LLC
Address: 9468 E K Avenue
Galesburg, MI 49053
Email: jennifer@bailtek.com
Phone: 269-484-1011 Fax: _____

*If different

NATURE OF REQUEST: (Please check all the appropriate item(s))

- ☐ Site Plan Review
- ☐ Administrative Site Plan Review
- ☒ Special Exception Use
- ☐ Site Condominium
- ☐ Subdivision Plat Review
- ☐ PUD/PURD/PMUD
- ☐ Other _____
- ☐ Rezoning
- ☐ Master Plan Amendment
- ☐ Text Amendment
- ☐ Variance
- ☐ Interpretation
- ☐ Planning Escrow

BRIEFLY DESCRIBE YOUR REQUEST (*Use Attachments if Necessary*):

A wireless communications facility consisting of a 45' x 45' fenced lease area to enclose a 165-foot monopole including the lightening rod, equipment cabinets, generator, propane tank and meter rack. There will also be a 12-foot wide driveway from E. Michigan Avenue to the lease area.

LEGAL DESCRIPTION OF PROPERTY (*Use Attachments if Necessary*):

Please see attached.

PARCEL NUMBER: 3907 - 22-220-230

ADDRESS OF PROPERTY: 67 Van Bruggen, Galesburg, MI 49053

PRESENT USE OF THE PROPERTY: Vacant

PRESENT ZONING: LM - Light Manufacturing **SIZE OF PROPERTY:** 2.56 acres

NAME(S) & ADDRESS(ES) OF ALL OTHER PERSONS, CORPORATIONS, OR FIRMS HAVING A LEGAL OR EQUITABLE INTEREST IN THE PROPERTY:

Name(s)	**Address(es)**

SIGNATURES

I (we) the undersigned certify that the information contained on this application form and the required documents attached hereto are to the best of my (our) knowledge true and accurate. By submitting this Planning & Zoning Application, I (we) grant permission for Comstock Township officials and agents to enter the subject property of the applicant as part of completing the reviews necessary to process the application. I (we) as Applicant(s), understand that I (we) am responsible for the reimbursement to the Township of its actual expenses in connection with my (our) application, under the Township's Escrow Fee Policy, and I (we) agree to pay such amounts under the terms of that policy.

Applicant's Signature — **Date** 5/6/26

Owner's Signature authorizing submission of Application (* *If different from Applicant*) — **Date** 4/14/26

*** * PLEASE ATTACH ALL REQUIRED DOCUMENTS * ***

Copies to:
Planning & Zoning - 1
Applicant - 1
Treasurer - 1
Assessor - 1
Administrative Assistant - Original

Revised: September 2024

Legal Description of Property

PARENT PARCEL DESCRIPTION (AS PROVIDED)

LAND SITUATED IN THE STATE OF MICHIGAN, COUNTY OF KALAMAZOO, TOWNSHIP OF COMSTOCK.

UNIT 23, COMSTOCK COMMERCE PARK, A CONDOMINIUM, ACCORDING TO THE MASTER DEED THEREOF, AS RECORDED IN LIBER 1993, PAGE 950; FIRST AMENDMENT TO MASTER DEED RECORDED IN LIBER 2011, PAGE 90; SECOND AMENDMENT TO MASTER DEED RECORDED IN LIBER 2063, PAGE 870; THIRD AMENDMENT TO MASTER DEED RECORDED IN INSTRUMENT NO. 1999-042979; FOURTH AMENDMENT TO MASTER DEED RECORDED IN INSTRUMENT NO. 2000-010566; FIFTH AMENDMENT TO MASTER DEED RECORDED IN INSTRUMENT NO. 2007-041265; KALAMAZOO COUNTY RECORDS, AND ANY AMENDMENTS THERETO, IF ANY, AND DESIGNATED AS KALAMAZOO COUNTY CONDOMINIUM SUBDIVISION PLAN NO. 96, TOGETHER WITH RIGHTS IN GENERAL COMMON ELEMENTS AND LIMITED COMMON ELEMENTS AS SET FORTH IN SAID MASTER DEED AND AS DESCRIBED IN ACT 59 OF THE PUBLIC ACTS OF 1978, AS AMENDED.

TOWER LEASE DESCRIPTION

PART OF THE NORTHEAST 1/4 OF SECTION 22, TOWNSHIP 2 SOUTH, RANGE 10 WEST, COMSTOCK TOWNSHIP, KALAMAZOO COUNTY, MICHIGAN DESCRIBED AS: COMMENCING AT A REMONUMENTATION DISK FOUND AT THE NORTH 1/4 CORNER OF SAID SECTION 22; THENCE SOUTH 89°59'52" EAST ALONG THE NORTH LINE OF SAID SECTION A DISTANCE OF 968.23 FEET; THENCE SOUTH 00°07'37" WEST A DISTANCE OF 60.77 FEET TO THE SOUTHERLY RIGHT-OF-WAY OF E. MICHIGAN AVENUE, A.K.A. M-96 (VARIABLE WIDTH/PUBLIC); THENCE CONTINUING SOUTH 00°07'37" WEST A DISTANCE OF 118.37 FEET; THENCE SOUTH 89°52'53" EAST A DISTANCE OF 22.50 FEET; THENCE SOUTH 00°07'37" WEST A DISTANCE OF 30.00 FEET TO THE POINT OF BEGINNING; THENCE CONTINUING SOUTH 00°07'37" WEST A DISTANCE OF 75.00 FEET; THENCE NORTH 89°52'23" WEST A DISTANCE OF 75.00 FEET; THENCE NORTH 00°07'37" EAST A DISTANCE OF 75.00 FEET; THENCE SOUTH 89°52'23" EAST A DISTANCE OF 75.00 FEET TO THE POINT OF BEGINNING. CONTAINING 5,625 SQUARE FEET OR 0.129 ACRES.

ACCESS/UTILITY EASEMENT DESCRIPTION

A 30 FOOT WIDE EASEMENT FOR INGRESS/EGRESS AND THE INSTALLATION & MAINTENANCE OF UTILITIES OVER/UNDER AND ACROSS ALL THAT PART OF THE NORTHEAST 1/4 OF SECTION 22, TOWNSHIP 2 SOUTH, RANGE 10 WEST, COMSTOCK TOWNSHIP, KALAMAZOO COUNTY, MICHIGAN DESCRIBED AS: COMMENCING AT A REMONUMENTATION DISK FOUND AT THE NORTH 1/4 CORNER OF SAID SECTION 22; THENCE SOUTH 89°59'52" EAST ALONG THE NORTH LINE OF SAID SECTION A DISTANCE OF 968.23 FEET; THENCE SOUTH 00°07'37" WEST A DISTANCE OF 60.77 FEET TO THE SOUTHERLY RIGHT-OF-WAY OF E. MICHIGAN AVENUE, A.K.A. M-96 (VARIABLE WIDTH/PUBLIC) AND THE POINT OF BEGINNING; THENCE CONTINUING SOUTH 00°07'37" WEST A DISTANCE OF 118.37 FEET; THENCE SOUTH 89°52'23" EAST A DISTANCE OF 22.50 FEET; THENCE SOUTH 00°07'37" WEST A DISTANCE OF 30.00 FEET TO THE NORTHEAST CORNER OF THE TOWER LEASE; THENCE NORTH 89°52'23" WEST ALONG THE NORTHERLY LINE OF SAID LEASE A DISTANCE OF 75.00 FEET TO THE NORTHWEST CORNER OF SAID LEASE; THENCE NORTH 00°07'37" EAST A DISTANCE OF 30.00 FEET; THENCE SOUTH 89°52'23" EAST A DISTANCE OF 22.50 FEET; THENCE NORTH 00°07'37" EAST A DISTANCE OF 118.37 FEET TO SAID SOUTHERLY RIGHT-OF-WAY; THENCE SOUTH 89°52'23" EAST ALONG SAID RIGHT-OF-WAY A DISTANCE OF 30.00 FEET TO THE POINT OF BEGINNING. CONTAINING 5,805 SQUARE FEET OR 0.133 ACRES.

Site Plan Check List

SITE PLAN REVIEW CHECKLIST

YES	NO	N/A	
			Application Date: _____ Name: _____
X			Complete Planning & Zoning Application submitted and Application Fee paid.
X			Name and address of owner, including the names and addresses of any officers of a corporation, or partners of a partnership, including documentation of ownership.
X			Legal description of the property.
X			Area of the subject parcel stated in acres or, if less than one acre, in square feet.
X			Present zoning classification of the property and general description of the proposed use.
		X	Environmental Permits Checklist.
		X	Hazardous Substance Reporting form.
			3 Copies of the Initial Site Plan (or 2 if a set is also submitted electronically), addressing the following:
X			1 – The site plan shall be of a scale of not less than one inch (1") equals fifty feet (50') and in sufficient detail that the reviewing body can readily interpret the site plan.
X			2 – Name and address of the preparer; signed and sealed by a professional engineer, architect or land surveyor licensed by the State of Michigan.
X			3 – Date prepared, including revisions.
X			4 – Vicinity map showing the location of the site and relation to the surrounding street system and indicating adjacent parcels with the existing use.
X			5 – Topography, both existing and proposed at two feet contour intervals, and its relationship to adjoining land. (Arrows should indicate direction of drainage.)
X			6 – Soil characteristics and natural features (such as woodlots, marshlands, streams, lakes, drain basins, and similar features). Indicate oak trees > 8" and sugar maple trees > 12".
X			7 – Existing man-made features.
X			8 – Location and address of existing and proposed buildings or structures on the site, indicating the height, size, floor plan, and construction type of each.
X			9 – Building setback of front, side and rear yards and property line dimensions.
X			10 – Minimum spacing between buildings on the site.
		X	11 – First floor elevation of buildings.
X			12 – Grade elevation at all property corners, building corners, and street center line.
		X	13 – Percentage of land covered by buildings and percentage of land reserved for open space.
X			14 – Line demarcating limits of land clearing. Clearing limited to minimum necessary for buildings, parking and grading for site improvements.
		X	15 – Dwelling unit density, typical front and side elevations and dimensioned floor plan for each dwelling unit type.

YES	NO	N/A	
X	___	___	16 – Adjacent right of ways or easements including the location of existing drives on the frontage opposite the site to be developed; if corner site, both sides.
X	___	___	17 – Other public or private right of ways or easements existing or proposed.
X	___	___	18 – Proposed drive locations, width and approach type.
___	___	X	19 – Existing and proposed driving lanes and traffic patterns.
X	___	___	20 – Existing and proposed parking and loading areas (including size and number of parking spaces).
___	___	X	21 – Existing and proposed fire lanes and accessibility for fire-fighting equipment.
___	___	X	22 – Location of refuse and recycling containers and enclosure details.
___	___	X	23 – Location of HVAC, pedestrian walks, non-motorized facilities and recreation areas.
X	___	___	24 – Location of utility poles, guys, underground gas, electric and telephone lines.
___	___	X	25 – Location of water lines including proposed service, and hydrants and other appurtenances as required by the Fire Department.
___	___	X	26 – Location of sanitary sewer lines including the location and size of the proposed service.
___	___	X	27 – Location and type of on-site storm water drainage.
X	___	___	28 – Location of existing and proposed fencing, landscaping, screening or other buffers required. Required landscaping must be indicated on the site plan or on a separate landscaping plan.
X	___	___	29 – Fixture details, location and direction of all exterior on-site illumination.
X	___	___	30 – Location, size and height of all existing and proposed signs.
___	___	X	31 – Where applicable, location of existing and proposed ground water supply wells, septic systems and other waste water treatment systems.
___	___	X	32 – Interior and exterior areas to be used for storage, use, loading/unloading, recycling or disposal of hazardous substances.
___	___	X	33 – Underground and above ground storage tanks location, specifications and use.
___	___	X	34 – Points of discharge for all drains and pipes.
___	___	X	35 – Flood Plain Certification.
			Approvals from the following agencies:
___	X	___	Road Commission of Kalamazoo County (269) 381-3171.
___	X	___	Michigan Department of Transportation – Kalamazoo TSC (269) 375-8622.
___	___	X	Kalamazoo County Environmental Health Bureau (269) 373-5210.
___	___	X	Kalamazoo County Drain Commissioner for Earth Change Permit (269) 384-8117.
___	___	X	Michigan Department of Environmental Quality for work in a floodway (269) 567-3500.

Site Plan and Survey

ROWE ISLAND

MI-4082

67 VAN BRUGGEN
GALESBURG, MI 49053
KALAMAZOO COUNTY
TENANT: LEGAL BUSINESS ENTITY d/b/a VERIZON WIRELESS
"ROWE ISLAND"

APC Towers

8601 SIX FORKS ROAD, SUITE 250
RALEIGH, NC 27615

NEW 160'-0" MONOPOLE TOWER
w/5'-0" LIGHTNING ROD
TOTAL TOWER HEIGHT 165'-0"

FROM MICHIGAN MTSO: 24242 NORTHWESTERN HWY SOUTHFIELD, MI 48075: LEAVE FROM NORTHWESTERN HWY. BEAR LEFT AT MICHIGAN 10 N/M-10 N. TAKE EXIT 18C ON THE LEFT ONTO INTERSTATE HIGHWAY 696 W/I-696 W TOWARD LANSING. TAKE THE I-696 W FREEWAY. TAKE EXIT 1 ON THE RIGHT ONTO INTERSTATE HIGHWAY 275 S/I-96 E/I-275 S TOWARD TOLEDO. KEEP LEFT AT INTERSTATE HIGHWAY 275 S/I-96 E/I-275 S TOWARD TOLEDO. KEEP LEFT AT INTERSTATE HIGHWAY 275 S/I-96 E/I-275 S TOWARD DETROIT. TAKE THE I-96 E/I-275 S FREEWAY. FOLLOW INTERSTATE HIGHWAY 275 S/I-96 E/I-275 S TOWARD ANN ARBOR. KEEP RIGHT AT INTERSTATE HIGHWAY 275 S/I-275 S TOWARD ANN ARBOR. TAKE THE RIGHT EXIT ONTO STATE HIGHWAY 14/M-14 W TOWARD ANN ARBOR. KEEP LEFT AT STATE HIGHWAY 14/M-14 W TOWARD ANN ARBOR. FOLLOW STATE HIGHWAY 14/M-14 W. TAKE EXIT 85 ON THE RIGHT ONTO S 35TH ST. TURN RIGHT ONTO S 35TH ST. TURN LEFT ONTO E MICHIGAN AVE/M-96. TURN LEFT. ARRIVE AT SITE ON THE RIGHT.

TOWER OWNER SITE
ROWE ISLAND
SITE #: MI-4082

VERIZON WIRELESS SITE
ROWE ISLAND
PROJECT#: 17545317
MARKET ID: MICHIGAN
MDG#: 5000974494

SITE ADDRESS
67 VAN BRUGGEN
GALESBURG, MI 49053
KALAMAZOO COUNTY
E911 ADDRESS: TBD

TOWER OWNER
APC TOWERS
8601 SIX FORKS ROAD, SUITE 250
RALEIGH, NC 27615
CONTACT: JONATHAN GREENE
PHONE: 704-724-8382
E-MAIL: jgreene@apctowers.com

PROPERTY OWNER
BELLA PEPPER LLC, JENNIFER COPELAND
9468 E K AVENUE
GALESBURG, MI 49053
CONTACT: TBD
PHONE: 269-484-1011
E-MAIL: TBD

POLICE
KALAMAZOO COUNTY SHERIFF'S OFFICE
1500 LAMONT AVE
KALAMAZOO, MI 49048
PHONE: 269-383-8821

FIRE
COMSTOCK TOWNSHIP FIREFIGHTERS
5819 COMSTOCK AVE
KALAMAZOO, MI 49048
PHONE: 269-345-9244

GENERAL INFORMATION
LATITUDE - 42° 17' 16.35" N
LONGITUDE - 85° 27' 34.73" W
1983 (NAD83)

ELEVATION - 815' AMSL
1988 (NAVD88)

TOWER OWNER LEASE AREA
75'-0"x75'-0"
(5625 SF)

VERIZON WIRELESS LEASE AREA
12'-0"x30'-0"
(360 SF)

PROJECT TOTAL DISTURBED AREA
COMPOUND: (2025 SF) = (0.046 ACRE)
ACCESS DRIVE: (3111 SF) = (0.071 ACRE)
GROSS AREA: (5136 SF) = (0.117 ACRE)

ALL CONSTRUCTION ITEMS ARE TO BE COMPLETED BY THE TOWER OWNER GENERAL CONTRACTOR UNLESS NOTED AS (VZW GC) WHICH SHALL BE COMPLETED BY THE VERIZON WIRELESS GENERAL CONTRACTOR

PROJECT SUMMARY

PROJECT DESCRIPTION:
NOTE: ALL ITEMS WITHIN THESE CONSTRUCTION DOCUMENTS ARE BY TOWER OWNER'S GENERAL CONTRACTOR AND HIS SUB-CONTRACTORS UNLESS NOTED AS (VZW GC) WHICH SHALL INCLUDE VERIZON WIRELESS GENERAL CONTRACTOR AND HIS SUB-CONTRACTORS, GENERALLY DESCRIBED BELOW:

TOWER OWNER SCOPE:
- INSTALL A NEW 160'-0" MONOPOLE TOWER w/ 5'-0" LIGHTNING ROD (TOTAL 165'-0")
- INSTALL A NEW TOWER FOUNDATION SYSTEM
- INSTALL A NEW 45'-0"x45'-0" FENCED GRAVEL COMPOUND AND ALL GENERAL SITE CONSTRUCTION ITEMS
- INSTALL A NEW ELECTRICAL SERVICE RUN TO SITE UTILITY H-FRAME
- INSTALL A NEW GRAVEL ACCESS DRIVE
- NO WATER OR SEWAGE SERVICES RUN TO SITE
- INSTALL NEW TOWER & SITE GROUNDING SYSTEM
- INSTALL NEW VZW SUBSURFACE GROUNDING SYSTEM
- INSTALL A NEW VZW CONCRETE EQUIPMENT AND GENERATOR PADS
- INSTALL VZW ICE BRIDGE AND FOUNDATIONS
- INSTALL VZW EQUIPMENT H-FRAME AND FOUNDATIONS
- INSTALL ELECTRICAL SERVICE CONDUIT WITH PULL TAPES FROM ILC ENCLOSURE STUB-UP TO UTILITY H-FRAME
- INSTALL NEW CONDUITS WITH PULL TAPES FROM VZW ILC STUB-UP LOCATION TO THE GENERATOR STUB-UP AT VZW GENERATOR PAD
- INSTALL (2) 1-1/4" SMOOTHWALL SDR-11 HDPE FIBER OPTIC CONDUITS W/PULL TAPES AND TRACER WIRE FROM "VERIZON WIRELESS ONLY" HAND HOLE OUTSIDE COMPOUND TO VZW EQUIPMENT PAD
- INSTALL (3) NEW "VERIZON WIRELESS ONLY" 1-1/4" SMOOTHWALL SDR 11 HDPE FIBER OPTIC CONDUITS WITH PULL TAPES AND TRACER WIRE FROM 18"X18"X6" PULL BOX ON UTILITY H-FRAME THEN TO NEW 24"X36" HANDHOLE AT R.O.W.
- INSTALL (1) NEW (FUTURE USE) FIBER OPTIC 4" PVC CONDUIT OR AS SPECIFIED BY THE TOWER OWNER FOR THEIR OWNED FIBER CONDUIT W/PULL TAPE AND TRACER WIRE FROM 24"X36" HAND HOLE OUTSIDE COMPOUND TO 24"X36 HANDHOLE AT R.O.W.
- PERMANENT ELECTRIC POWER MUST BE AVAILABLE FOR VERIZON WIRELESS AT THE METER BASE PRIOR TO THE SITE BEING RELEASED AS TENANT READY

VERIZON WIRELESS SCOPE (VZW GC):
- INSTALL VZW PREFABRICATED CANOPY AND FOUNDATIONS
- INSTALL VZW ANTENNA MOUNTING SUPPORT STRUCTURE ON TOWER
- INSTALL VZW ANTENNAS, LINES, COAX, GPS ANTENNA AND RADIO EQUIPMENT
- INSTALL EXISTING SUBSURFACE GROUND LEADS TO VZW EQUIPMENT & FACILITIES
- INSTALL VZW ELECTRIC SERVICE CONDUCTORS FROM UTILITY H-FRAME TO VZW ILC ENCLOSURE
- INSTALL NEW CONDUITS WITH PULL TAPES FROM RF CABINET TO OVP H-FRAME LIT FIBER LOCATION
- INSTALL NEW CONDUITS AND CIRCUITS FROM VZW ILC ENCLOSURE TO EQUIPMENT ENCLOSURES AT VZW EQUIPMENT PAD
- INSTALL VZW GENERATOR CIRCUITS FROM VZW ILC & EQUIPMENT ENCLOSURES TO VZW GENERATOR
- INSTALL NEW OUTDOOR OVPs AND CABLING ON VERIZON EQUIPMENT H-FRAME

PROJECT DESCRIPTION

ALL WORK AND MATERIALS SHALL BE PERFORMED AND INSTALLED IN ACCORDANCE WITH THE INTERNATIONAL BUILDING CODE (IBC) AND THE CURRENT EDITIONS OF THE FOLLOWING CODES AS ADOPTED BY THE LOCAL GOVERNING AUTHORITIES. NOTHING IN THESE PLANS IS TO BE CONSTRUCTED TO PERMIT WORK NOT CONFORMING TO THESE CODES.

BUILDING CODE	MICHIGAN BUILDING CODE ADOPTED EDITION (IBC)
STRUCTURAL CODE	TIA/EIA-222 - REVISION H
MECHANICAL CODE	MICHIGAN MECHANICAL CODE ADOPTED EDITION (IMC)
PLUMBING CODE	MICHIGAN PLUMBING CODE ADOPTED ADDITION (IPC)
ELECTRICAL CODE	2017 NATIONAL ELECTRICAL CODE (NEC) - NFPA 70
FIRE/LIFE SAFETY CODE	MICHIGAN LIFE SAFETY CODE (2021 NFPA 101)

ACCESSIBILITY REQUIREMENTS:
FACILITY IS UNMANNED AND NOT FOR HUMAN HABITATION. BARRIER FREE ACCESS REQUIREMENTS ARE NOT REQUIRED IN ACCORDANCE WITH THE MICHIGAN (IBC) BUILDING CODE.

APPLICABLE CODES

SURVEYOR
LANDTECH PROFESSIONAL SURVEYING & ENGINEERING
1275 MCGREGOR WAY
GRAWN, MI 49637
PHONE: 231-943-0050

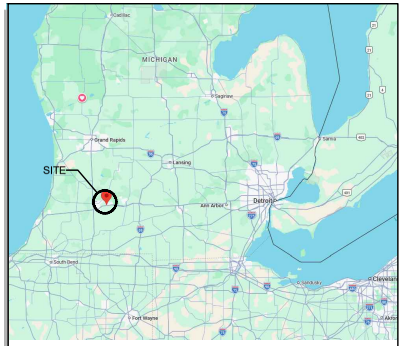
ARCHITECTURAL
TELECAD WIRELESS
1961 NORTHPOINT BLVD, STE 130
HIXSON, TN 37343
CONTACT: MATT BATES
PHONE: 423-843-9500
EMAIL: matt.bates@telecadeng.com

ELECTRICAL
CONSUMERS POWER
ADDRESS: ONE ENERGY PLAZA JACKSON, MI 49201
CONTACT: TBD
PHONE: 800-488-5050
EMAIL: TBD

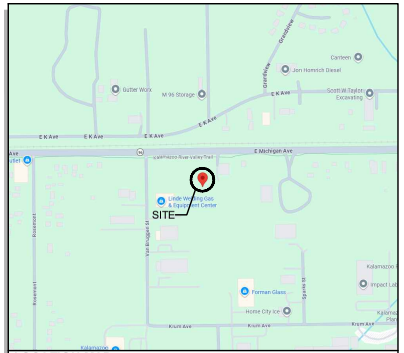
ELECTRICAL UTILITY COORDINATION IS NOT FINALIZED. DO NOT PROCEED WITH CONSTRUCTION.

CONSULTANT TEAM

SHEET NUMBER	DESCRIPTION
T-1	TITLE SHEET
	SURVEY PLAN
Z-1	OVERALL SITE PLAN w/AERIAL OVERLAY
Z-2	OVERALL SITE PLAN w/TOWER DISTANCE TO PROPERTY LINES
Z-3	GRADING AND E&S CONTROL PLAN
Z-4	DIMENSIONED SITE PLAN
Z-5	TOWER ELEVATION
Z-6	SITE DETAILS
Z-7	FENCE DETAILS AND NOTES
Z-8	TOWER OWNER SIGNAGE
L-1	LANDSCAPE PLAN



VICINITY MAP



LOCATION MAP



AERIAL

PREPARED FOR:
APC Towers
8601 SIX FORKS ROAD, SUITE 250
RALEIGH, NC 27615

PREPARED BY:
TeleCAD Wireless
1961 NORTHPOINT BLVD, SUITE 130
HIXSON, TN 37343
PH: 423-843-9500
FAX: 423-843-9509

DRAWING NOTICE:
THE INFORMATION CONTAINED IN THIS SET OF DOCUMENTS IS PROPRIETARY BY NATURE. ANY USE OR DISCLOSURE OTHER THAN THAT WHICH RELATES TO THE CLIENT IS STRICTLY PROHIBITED.

DRAWN BY:	JAE
CHECKED BY:	DS

REVISIONS

NO.	DATE	BY	DESCRIPTION
0	04/17/26	WAM	ZONING ISSUE
C	04/08/26	PLS	PRELIMINARY REVIEW
B	04/07/26	WAM	PRELIMINARY REVIEW
A	03/24/26	JAE	PRELIMINARY REVIEW

ENGINEER'S STAMP:
STATE OF MICHIGAN
Stephen E. Hunt
License No. 6201054169
LICENSED PROFESSIONAL ENGINEER
4/17/26
NOT VALID WITHOUT P.E. STAMP & SIGNATURE

SITE NAME:
ROWE ISLAND

ADDRESS:
67 VAN BRUGGEN
GALESBURG, MI 49053

COUNTY:
KALAMAZOO

LATITUDE:
42° 17' 16.35" N

LONGITUDE:
85° 27' 34.73" W

SITE NUMBER:
MI-4082

SHEET TITLE:
TITLE SHEET

DRAWING NO.	REVISION:
T-1	0

LATITUDE & LONGITUDE

LATITUDE AND LONGITUDE OF SITE ARE BASED ON NAD 83 (2011).
LATITUDE: 42° 17' 16.35"N 42.287875°
LONGITUDE: 85° 27' 34.73"W -85.459647°
GROUND ELEVATION AT TOWER BASE: 815' AMSL



SITE INFORMATION

SITE ADDRESS:
67 VAN BRUGGEN STREET
GALESBURG, MI 49053

PROPERTY OWNER:
BELLA PEPPER, LLC
9468 E K AVENUE
GALESBURG, MI 49053

PARCEL ID

07-22-220-230

PARENT PARCEL DESCRIPTION (AS PROVIDED)

LAND SITUATED IN THE STATE OF MICHIGAN, COUNTY OF KALAMAZOO, TOWNSHIP OF COMSTOCK.

UNIT 23, COMSTOCK COMMERCE PARK, A CONDOMINIUM, ACCORDING TO THE MASTER DEED THEREOF, AS RECORDED IN LIBER 1993, PAGE 950; FIRST AMENDMENT TO MASTER DEED RECORDED IN LIBER 2011, PAGE 90; SECOND AMENDMENT TO MASTER DEED RECORDED IN LIBER 2063, PAGE 870; THIRD AMENDMENT TO MASTER DEED RECORDED IN INSTRUMENT NO. 1999-042979; FOURTH AMENDMENT TO MASTER DEED RECORDED IN INSTRUMENT NO. 2000-010566; FIFTH AMENDMENT TO MASTER DEED RECORDED IN INSTRUMENT NO. 2007-041265; KALAMAZOO COUNTY RECORDS, AND ANY AMENDMENTS THERETO, IF ANY, AND DESIGNATED AS KALAMAZOO COUNTY CONDOMINIUM SUBDIVISION PLAN NO. 96, TOGETHER WITH RIGHTS IN GENERAL COMMON ELEMENTS AND LIMITED COMMON ELEMENTS AS SET FORTH IN SAID MASTER DEED AND AS DESCRIBED IN ACT 59 OF THE PUBLIC ACTS OF 1978, AS AMENDED.

TOWER LEASE DESCRIPTION

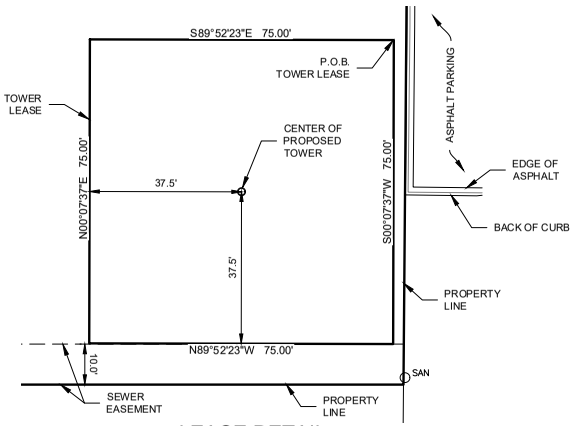
PART OF THE NORTHEAST 1/4 OF SECTION 22, TOWNSHIP 2 SOUTH, RANGE 10 WEST, COMSTOCK TOWNSHIP, KALAMAZOO COUNTY, MICHIGAN DESCRIBED AS: COMMENCING AT A REMONUMENTATION DISK FOUND AT THE NORTH 1/4 CORNER OF SAID SECTION 22; THENCE SOUTH 89°59'52" EAST ALONG THE NORTH LINE OF SAID SECTION A DISTANCE OF 968.23 FEET; THENCE SOUTH 00°07'37" WEST A DISTANCE OF 60.77 FEET TO THE SOUTHERLY RIGHT-OF-WAY OF E. MICHIGAN AVENUE, A.K.A. M-96 (VARIABLE WIDTH/PUBLIC); THENCE CONTINUING SOUTH 00°07'37" WEST A DISTANCE OF 118.37 FEET; THENCE SOUTH 89°52'53" EAST A DISTANCE OF 22.50 FEET; THENCE SOUTH 00°07'37" WEST A DISTANCE OF 30.00 FEET TO THE POINT OF BEGINNING; THENCE CONTINUING SOUTH 00°07'37" WEST A DISTANCE OF 75.00 FEET; THENCE NORTH 89°52'23" WEST A DISTANCE OF 75.00 FEET; THENCE NORTH 00°07'37" EAST A DISTANCE OF 75.00 FEET; THENCE SOUTH 89°52'23" EAST A DISTANCE OF 75.00 FEET TO THE POINT OF BEGINNING. CONTAINING 5,625 SQUARE FEET OR 0.129 ACRES.

ACCESS/UTILITY EASEMENT DESCRIPTION

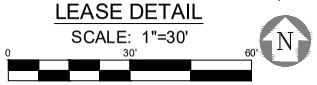
A 30 FOOT WIDE EASEMENT FOR INGRESS/EGRESS AND THE INSTALLATION & MAINTENANCE OF UTILITIES OVER/UNDER AND ACROSS ALL THAT PART OF THE NORTHEAST 1/4 OF SECTION 22, TOWNSHIP 2 SOUTH, RANGE 10 WEST, COMSTOCK TOWNSHIP, KALAMAZOO COUNTY, MICHIGAN DESCRIBED AS: COMMENCING AT A REMONUMENTATION DISK FOUND AT THE NORTH 1/4 CORNER OF SAID SECTION 22; THENCE SOUTH 89°59'52" EAST ALONG THE NORTH LINE OF SAID SECTION A DISTANCE OF 968.23 FEET; THENCE SOUTH 00°07'37" WEST A DISTANCE OF 60.77 FEET TO THE SOUTHERLY RIGHT-OF-WAY OF E. MICHIGAN AVENUE, A.K.A. M-96 (VARIABLE WIDTH/PUBLIC) AND THE POINT OF BEGINNING; THENCE CONTINUING SOUTH 00°07'37" WEST A DISTANCE OF 118.37 FEET; THENCE SOUTH 89°52'23" EAST A DISTANCE OF 22.50 FEET; THENCE SOUTH 00°07'37" WEST A DISTANCE OF 30.00 FEET TO THE NORTHEAST CORNER OF THE TOWER LEASE; THENCE NORTH 89°52'23" WEST ALONG THE NORTHERLY LINE OF SAID LEASE A DISTANCE OF 75.00 FEET TO THE NORTHWEST CORNER OF SAID LEASE; THENCE NORTH 00°07'37" EAST A DISTANCE OF 30.00 FEET; THENCE SOUTH 89°52'23" EAST A DISTANCE OF 22.50 FEET; THENCE NORTH 00°07'37" EAST A DISTANCE OF 118.37 FEET TO SAID SOUTHERLY RIGHT-OF-WAY; THENCE SOUTH 89°52'23" EAST ALONG SAID RIGHT-OF-WAY A DISTANCE OF 30.00 FEET TO THE POINT OF BEGINNING. CONTAINING 5,805 SQUARE FEET OR 0.133 ACRES.

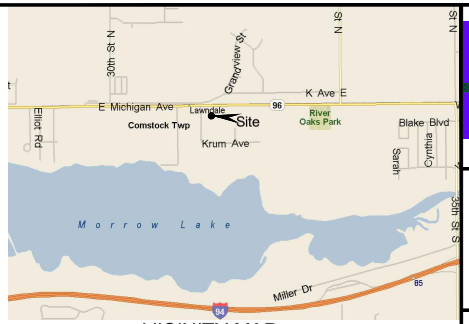
GENERAL NOTES

- NO PROPOSED MUNICIPAL SEWER OR WATER UTILITIES ARE REQUIRED FOR THIS SITE.
- THERE WILL BE NO CHANGE IN DRAINAGE PATTERN DUE TO THE PROPOSED INSTALLATION.
- NO SIGNIFICANT RUNOFF IS GENERATED BY THE PROPOSED INSTALLATION.
- THE LEASE AREA SHOWN HEREON MAY BE SUBJECT TO THE REQUIREMENTS OF MICHIGAN PUBLIC ACT 132 OF 1970 AS AMENDED.
- NO HAZARDOUS MATERIALS WILL BE USED, PROCESSED OR STORED AT THE SITE.
- TOWER LIGHTING SHALL CONFORM TO FAA STANDARDS AS REQUIRED.
- ALL WORK SHALL CONFORM TO FAA & FCC REGULATIONS.
- THERE ARE NO WATER BODIES WITHIN 500 FEET OF THE PROPOSED TOWER.



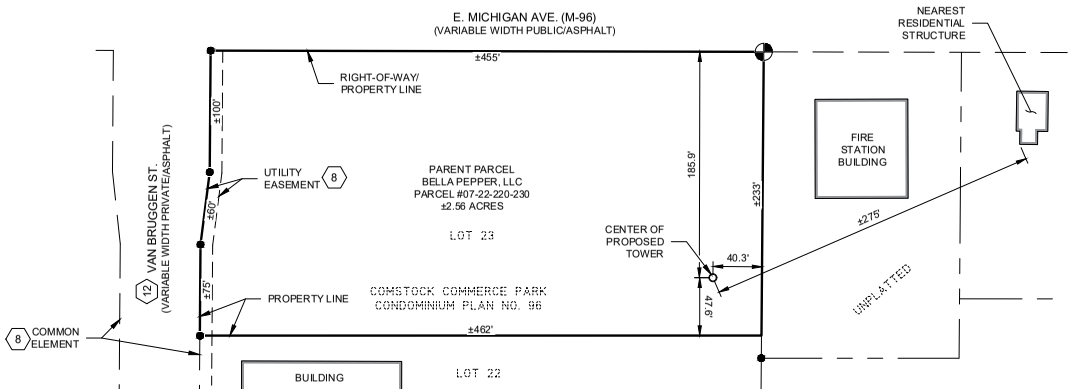
LEASE DETAIL
SCALE: 1"=30'



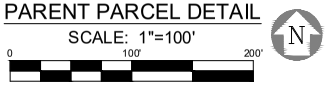


VICINITY MAP
NOT TO SCALE





PARENT PARCEL DETAIL
SCALE: 1"=100'



CERTIFICATION :

I MATTHEW T. MOKANYK CERTIFY THAT I HAVE SURVEYED AND MARKED THE PROPOSED TELECOM INSTALLATION AND EXISTING FEATURES, THAT THIS MAP IS A TRUE REPRESENTATION THEREOF AND ALL ACCURACIES ARE WITHIN ACCEPTABLE LIMITS.

Matthew T. Mokanyk, P.S., P.E.
Michigan P.S. No. 4001042063

03/23/26
Date



BEARINGS ARE BASED ON MICHIGAN STATE PLANE COORDINATES, SOUTH ZONE. NAD 83.

ZONING INFORMATION

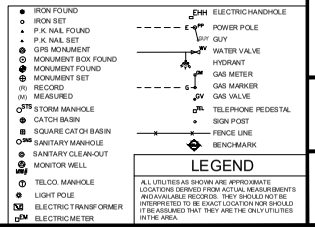
SUBJECT SITE ZONING: LM LIGHT MANUFACTURING

TOWER SETBACKS:
FRONT: 30' REAR: 30'
SIDES: 30'

FLOOD NOTE

BY GRAPHIC PLOTTING ONLY, THIS PROPERTY IS IN ZONE(S) "X" OF THE FLOOD INSURANCE RATE MAP, COMMUNITY PANEL NO. 26077C0215E, WHICH BEARS AN EFFECTIVE DATE OF 7/31/2024 AND IS NOT IN A SPECIAL FLOOD HAZARD AREA.





LEGEND

ALL UTILITIES AS SHOWN ARE APPROXIMATE LOCATIONS DERIVED FROM ACTUAL MEASUREMENTS AND AVAILABLE RECORDS. THEY SHOULD NOT BE INTERPRETED TO BE EXACT LOCATION NOR SHOULD IT BE ASSUMED THAT THEY ARE THE ONLY UTILITIES IN THE AREA.

APC Towers
3000 Aerial Center Parkway, Suite 110
Morrisville, NC 27560

New Par, a Delaware Partnership dba
verizon wireless

TeleCAD Wireless
1961 NORTHPOINT BLVD, SUITE 130
HIXSON, TN 37343
PH: 423-843-9500 FAX: 423-843-9509

LANDTECH
PROFESSIONAL SURVEYING & ENGINEERING
231.943.0050ph 877.820.LAND toll free

LANDTECH PROJECT NUMBER: 26309007

REV.	DATE	DESCRIPTION	REQ. BY	BY
0	03/23/26	PRELIMINARY DRAWINGS	EG	TJW
1	03/23/26	REVISE EASEMENT	EG	TJW
2	03/27/26	ADD TITLE	EG	TJW
3	04/01/26	MOVE TOWER	EG	TJW

DRAWING SCALE NOTE: THE DRAWINGS ARE DESIGNED FOR 11"x17" (TABLOID/LEGAL) SIZED PAPER. WHERE MUNICIPALITIES REQUIRE 24"x36" COPIES OF PRINTS, LANDTECH SHALL PLOT THE DRAWINGS AT A RATIO OF 2:1. ALL SUCH COPIES SHALL HAVE A SCALE 1/2 THE SHOWN SIZE.

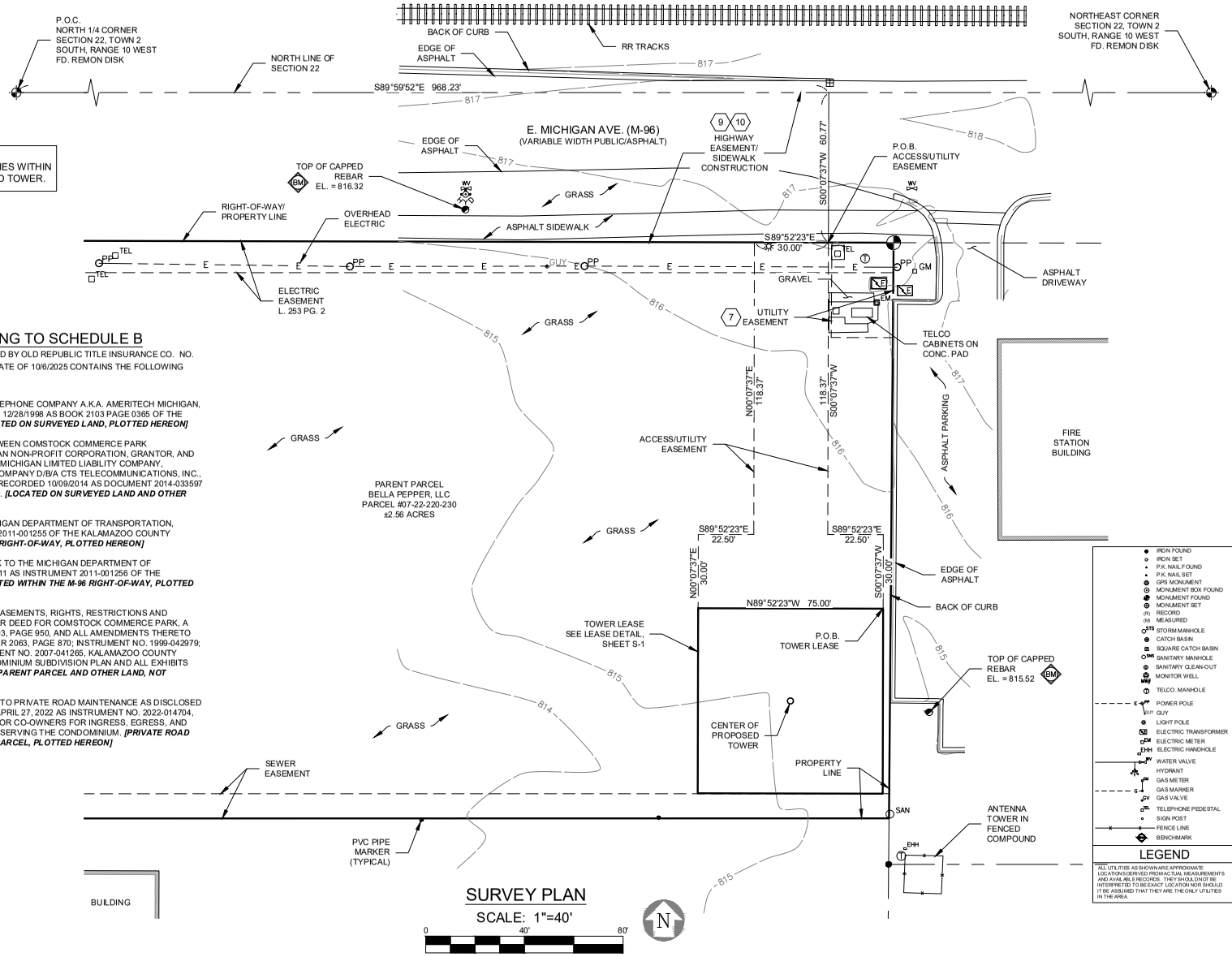
ROWE ISLAND
MI-4082

SITE ADDRESS:
67 VAN BRUGGEN STREET
GALESBURG, MI 49053

COUNTY: KALAMAZOO

Sheet Title:
SURVEY PLAN

Sheet Number:
S-1



NOTE:
THERE ARE NO WATER BODIES WITHIN 500 FEET OF THE PROPOSED TOWER.

NOTES CORRESPONDING TO SCHEDULE B

THE TITLE COMMITMENT REPORT ISSUED BY OLD REPUBLIC TITLE INSURANCE CO. NO. 01-250066064-01T WITH AN EFFECTIVE DATE OF 10/6/2025 CONTAINS THE FOLLOWING SURVEY RELATED ITEMS:

7. EASEMENT UNTO MICHIGAN BELL TELEPHONE COMPANY A.K.A. AMERITECH MICHIGAN, A MICHIGAN CORPORATION, RECORDED 12/28/1998 AS BOOK 2103 PAGE 0365 OF THE KALAMAZOO COUNTY RECORDS. ***[LOCATED ON SURVEYED LAND, PLOTTED HEREON]***

8. EASEMENT AGREEMENT BY AND BETWEEN COMSTOCK COMMERCE PARK CONDOMINIUM ASSOCIATION, A MICHIGAN NON-PROFIT CORPORATION, GRANTOR, AND CCP DEVELOPMENT COMPANY, L.L.C., A MICHIGAN LIMITED LIABILITY COMPANY, DEVELOPER AND CLIMAX TELEPHONE COMPANY D/B/A CTS TELECOMMUNICATIONS, INC., A MICHIGAN CORPORATION, GRANTEE, RECORDED 10/09/2014 AS DOCUMENT 2014-033597 OF THE KALAMAZOO COUNTY RECORDS. ***[LOCATED ON SURVEYED LAND AND OTHER LAND, PLOTTED HEREON]***

9. HIGHWAY EASEMENT UNTO THE MICHIGAN DEPARTMENT OF TRANSPORTATION, RECORDED 01/11/2011 AS INSTRUMENT 2011-001255 OF THE KALAMAZOO COUNTY RECORDS. ***[LOCATED WITHIN THE M-96 RIGHT-OF-WAY, PLOTTED HEREON]***

10. CONSENT TO CONSTRUCT SIDEWALK TO THE MICHIGAN DEPARTMENT OF TRANSPORTATION, RECORDED 01/11/2011 AS INSTRUMENT 2011-001256 OF THE KALAMAZOO COUNTY RECORDS. ***[LOCATED WITHIN THE M-96 RIGHT-OF-WAY, PLOTTED HEREON]***

11. TERMS, COVENANTS, CONDITIONS, EASEMENTS, RIGHTS, RESTRICTIONS AND OBLIGATIONS SET FORTH IN THE MASTER DEED FOR COMSTOCK COMMERCE PARK, A CONDOMINIUM, RECORDED IN LIBER 1993, PAGE 950, AND ALL AMENDMENTS THERETO RECORDED IN LIBER 2011, PAGE 90; LIBER 2063, PAGE 870; INSTRUMENT NO. 1999-042979; INSTRUMENT NO. 2000-010566; INSTRUMENT NO. 2007-041265, KALAMAZOO COUNTY RECORDS, TOGETHER WITH THE CONDOMINIUM SUBDIVISION PLAN AND ALL EXHIBITS THERETO. ***[BLANKET IN NATURE OVER PARENT PARCEL AND OTHER LAND, NOT PLOTTED]***

12. RIGHTS AND OBLIGATIONS RELATED TO PRIVATE ROAD MAINTENANCE AS DISCLOSED BY PRIVATE ROAD NOTICE RECORDED APRIL 27, 2022 AS INSTRUMENT NO. 2022-014704, AND ANY RIGHTS OF THE ASSOCIATION OR CO-OWNERS FOR INGRESS, EGRESS, AND MAINTENANCE OF PRIVATE ROADWAYS SERVING THE CONDOMINIUM. ***[PRIVATE ROAD LOCATED WESTERLY OF THE PARENT PARCEL, PLOTTED HEREON]***

SURVEY PLAN

SCALE: 1"=40'

0 40' 80'

N

APC Towers
3000 Aerial Center Parkway, Suite 110
Morrisville, NC 27560

New For, a Delaware Partnership dba
verizon wireless

TeleCAD Wireless
1961 NORTHPOINT BLVD, SUITE 130
HIXSON, TN 37343
PH: 423-843-9500 FAX: 423-843-9509

LANDTECH
PROFESSIONAL SURVEYING & ENGINEERING
231.943.0850ph 877.820.LAND toll free

LANDTECH PROJECT NUMBER: 26309007

REV.	DATE	DESCRIPTION	REQ. BY	BY
0	03/23/26	PRELIMINARY DRAWINGS	EG	TJW
1	03/23/26	REVISE EASEMENT	EG	TJW
2	03/27/26	ADD TITLE	EG	TJW
3	04/01/26	MOVE TOWER	EG	TJW

DRAWING SCALE NOTE: THE DRAWINGS ARE DESIGNED FOR 11"x17" (TABLOID/LEGAL) SIZED PAPER. WHERE MUNICIPALITIES REQUIRE 24"x36" COPIES OF PRINTS, LANDTECH SHALL PLOT THE DRAWINGS AT A RATIO OF 2:1. ALL SUCH COPIES SHALL HAVE A SCALE 1/2 THE SHOWN SIZE.

ROWE ISLAND
MI-4082

SITE ADDRESS:
67 VAN BRUGGEN STREET
GALESBURG, MI 49053

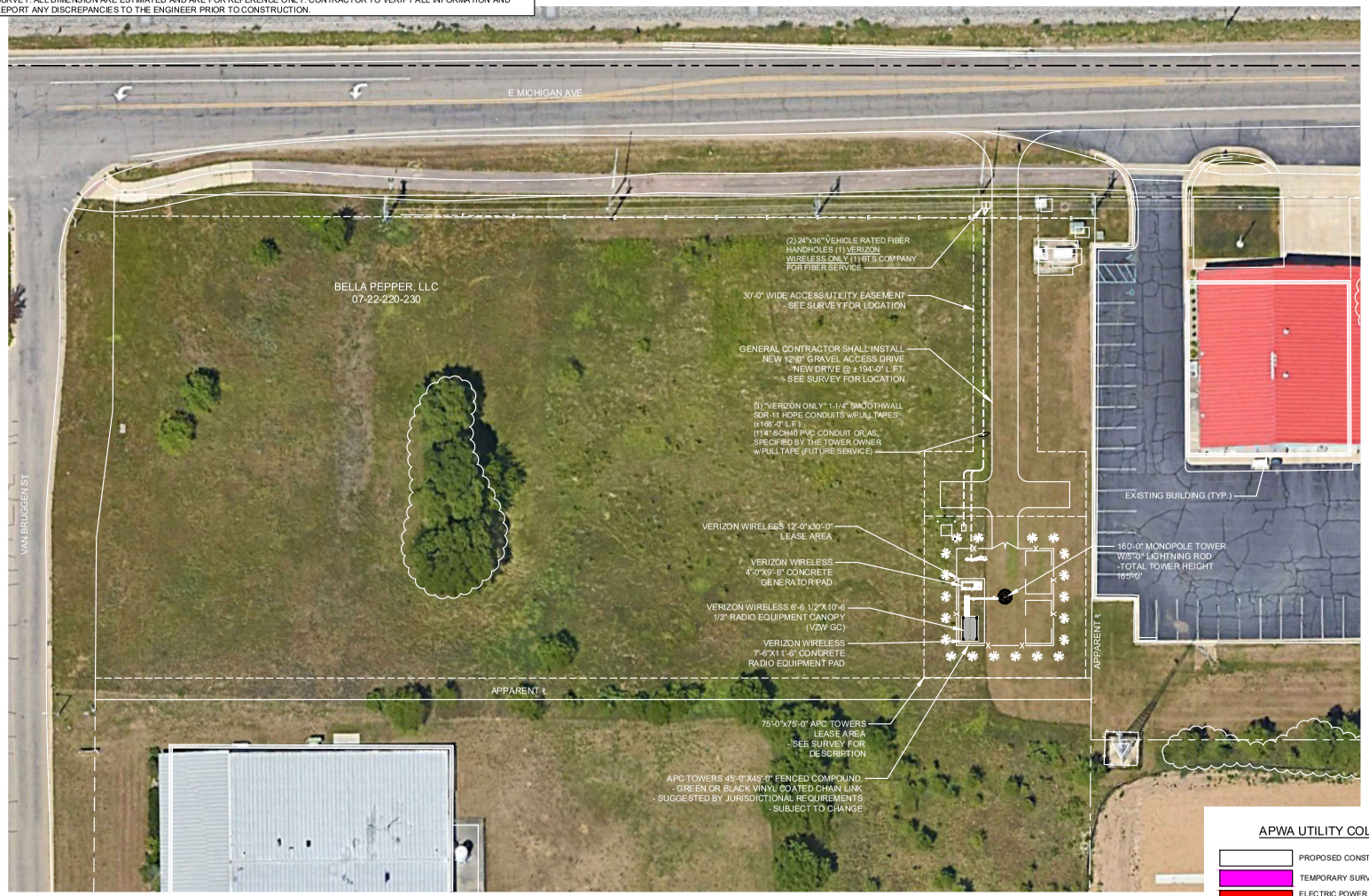
COUNTY: KALAMAZOO

Sheet Title:
SURVEY PLAN

Sheet Number:
S-2

SITE INFORMATION NOTES:

1. THIS PAGE WAS CREATED USING GOOGLE EARTH IMAGERY DATED: 06/30/22 AND HAS NOT BEEN VERIFIED WITH AN ACTUAL SURVEY. ALL DIMENSION ARE ESTIMATED AND ARE FOR REFERENCE ONLY. CONTRACTOR TO VERIFY ALL INFORMATION AND REPORT ANY DISCREPANCIES TO THE ENGINEER PRIOR TO CONSTRUCTION.



APWA UTILITY COLOR CODES

- PROPOSED CONSTRUCTION
- TEMPORARY SURVEY MARKINGS
- ELECTRIC POWER LINES, CABLES, CONDUIT, AND LIGHTING CABLES
- GAS, OIL STEAM PETROLEUM OR GASEOUS MATERIALS
- COMMUNICATION, ALARM OR SIGNAL LINES, CABLES OR CONDUIT
- POTABLE WATER
- RECLAIMED WATER, IRRIGATION AND SLURRY LINES
- SEWERS AND DRAIN LINES

811 Know what's below. Call before you dig.

TO OBTAIN LOCATION OF PARTICIPANTS UNDERGROUND FACILITIES BEFORE YOU DIG IN MICHIGAN, CALL MISS DIG
TOLL FREE: 1-800-482-7171 OR
www.missdig.org
MICHIGAN STATUTE REQUIRES MIN. OF 2 WORKING DAYS NOTICE BEFORE YOU EXCAVATE

OVERALL SITE PLAN w/AERIAL OVERLAY

NORTH

0' 50' 100'
SCALE: 1" = 50'

PREPARED FOR:

APC Towers
8601 SIX FORKS ROAD, SUITE 250
RALEIGH, NC 27615

PREPARED BY:

TeleCAD Wireless
1961 NORTHPOINT BLVD, SUITE 130
HIXSON, TN 37343
PH: 423-843-9500
FAX: 423-843-9509

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DRAWN BY:	JAE
CHECKED BY:	DS

REVISIONS

NO.	DATE	BY	DESCRIPTION
0	04/17/26	WAM	ZONING ISSUE
C	04/08/26	PLS	PRELIMINARY REVIEW
B	04/07/26	WAM	PRELIMINARY REVIEW
A	03/24/26	JAE	PRELIMINARY REVIEW

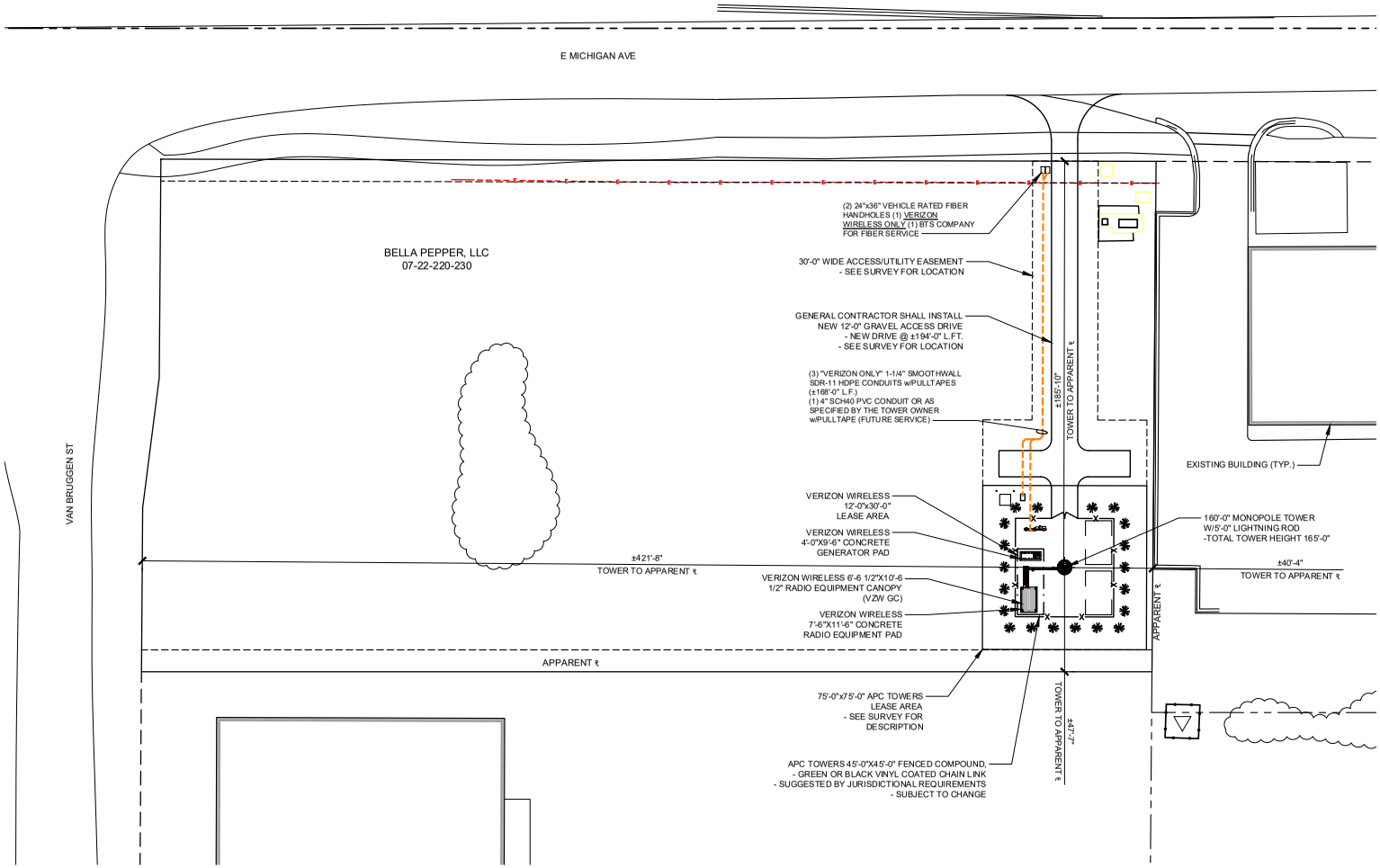
ENGINEER'S STAMP:

STATE OF MICHIGAN
Stephen E. Hunt
License No. 6201054169
LICENSED PROFESSIONAL ENGINEER
4/17/26

NOT VALID WITHOUT P.E. STAMP & SIGNATURE

SITE NAME: ROWE ISLAND
ADDRESS: 67 VAN BRUGGEN GALESBURG, MI 49053
COUNTY: KALAMAZOO
LATITUDE: 42° 17' 16.35" N
LONGITUDE: 85° 27' 34.73" W
SITE NUMBER: MI-4082
SHEET TITLE: OVERALL SITE PLAN

DRAWING NO.	REVISION:
Z-1	0



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www.missdig.org
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Know what's below. Call before you dig.

OVERALL SITE PLAN w/TOWER DISTANCE TO PROPERTY LINES

NORTH

0' 50' 100'

SCALE: 1" = 50'

PREPARED FOR:
APC Towers
8601 SIX FORKS ROAD, SUITE 250
RALEIGH, NC 27615

PREPARED BY:
TeleCAD Wireless
1961 NORTHPOINT BLVD, SUITE 130
HIXSON, TN 37343
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CHECKED BY:	DS

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4/17/26

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COUNTY: KALAMAZOO
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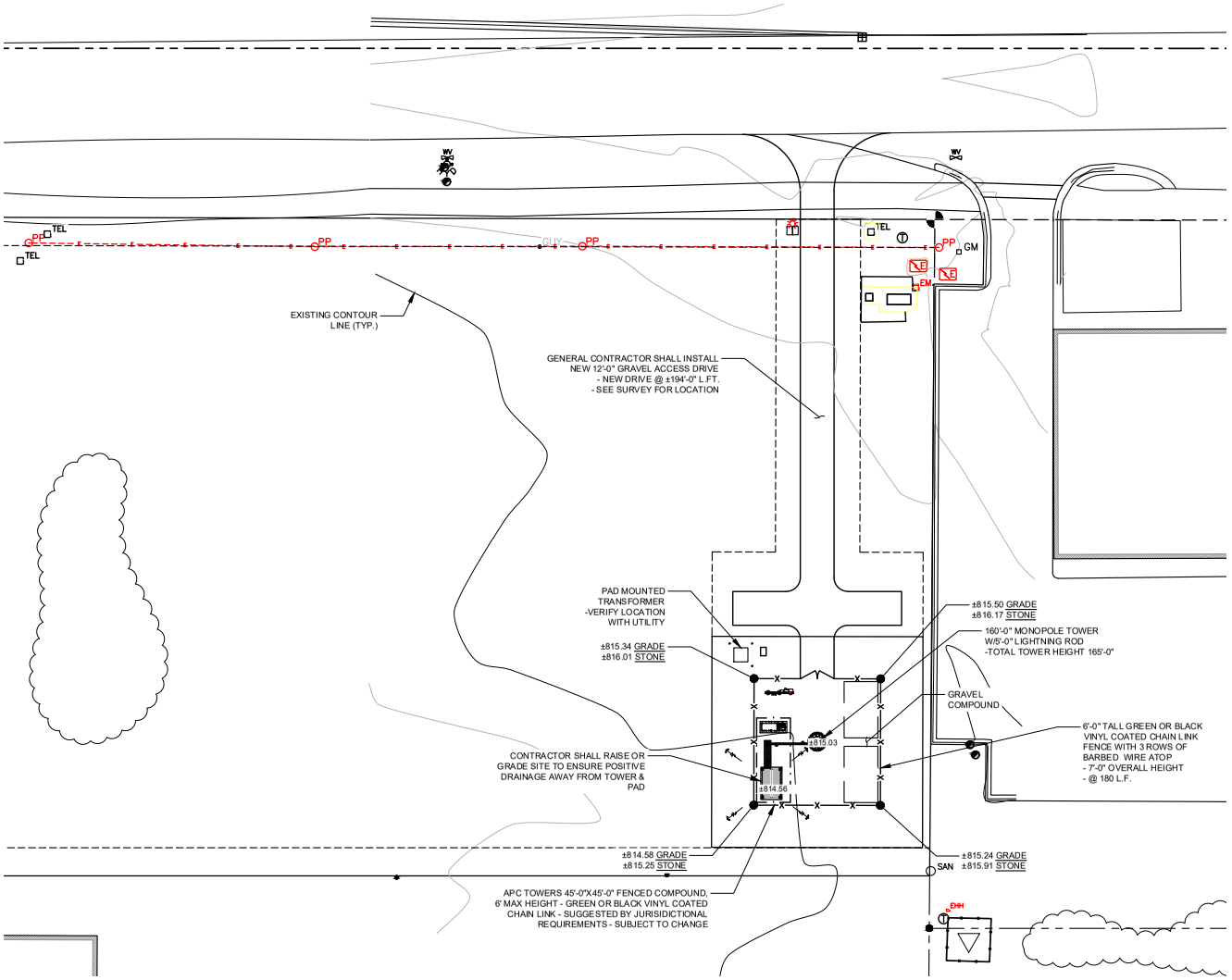
SITE NUMBER: MI-4082
SHEET TITLE: OVERALL SITE PLAN

DRAWING NO.	REVISION:
Z-2	0



GRADING AND E&S CONTROL PLAN

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APC Towers

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RALEIGH, NC 27615

PREPARED BY:

TeleCAD Wireless

1961 NORTHPOINT BLVD, SUITE 130
HIXSON, TN 37343
PH: 423-843-9500
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ENGINEER'S STAMP:

STATE OF MICHIGAN
Stephen E. Hunt
License No. 6201054169
LICENSED PROFESSIONAL ENGINEER
4/17/26

NOT VALID WITHOUT P.E. STAMP & SIGNATURE

SITE NAME: ROWE ISLAND

ADDRESS: 67 VAN BRUGGEN GALESBURG, MI 49053

COUNTY: KALAMAZOO

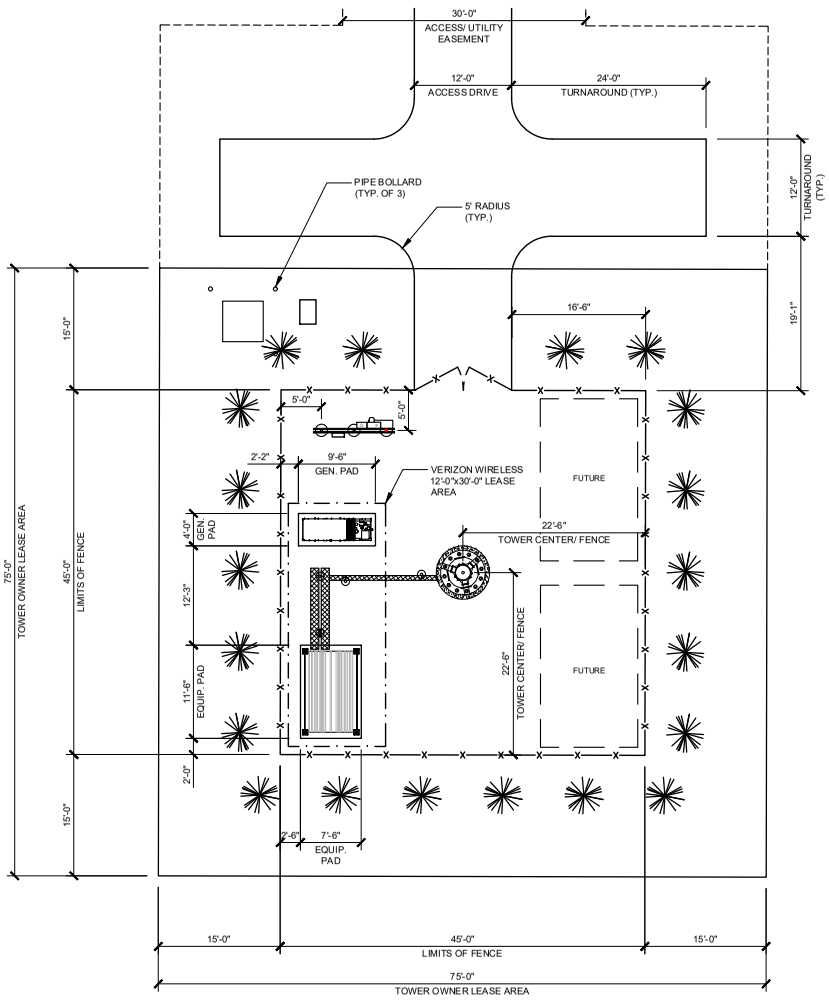
LATITUDE: 42° 17' 16.35" N

LONGITUDE: 85° 27' 34.73" W

SITE NUMBER: MI-4082

SHEET TITLE: GRADING AND E&S CONTROL PLAN

DRAWING NO.	REVISION:
Z-3	0



DIMENSIONED SITE PLAN

NORTH

0' 15' 30'

SCALE: 1" = 15'

811 Know what's below. Call before you dig.

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TOLL FREE: 1-800-482-7171 OR
www.missdig.org
MICHIGAN STATUTE REQUIRES MIN. OF 2 WORKING DAYS NOTICE BEFORE YOU EXCAVATE

*NOTE:
GENERAL CONTRACTOR IS TO ENSURE THERE IS NO DISTURBANCE OF PROPERTY, SOIL, ETC. OUTSIDE OF THE STAKED LEASE AREA WITHOUT APPROVAL FROM VERIZON WIRELESS CONSTRUCTION MANAGER

LEGEND

- IRON PIN
- +XXX.XX — SPOT ELEVATION
- DRAINAGE LINE
- GRAVEL COMPOUND
- CENTER LINE
- NEW FENCE LINE
- NEW SILT FENCE LINE
- POWER POLE w/OVERHEAD ELEC./TELE.
- EDGE OF NEW DRIVE
- UNDERGROUND ELECTRICAL CONDUIT
- UNDERGROUND TELEPHONE CONDUIT
- EXISTING CONTOURS
- NEW CONTOURS
- NEW LEASE AREA AND EASEMENT
- FENCED COMPOUND
- CONCRETE
- ACCESS DRIVE

PREPARED FOR:

APC Towers
8601 SIX FORKS ROAD, SUITE 250
RALEIGH, NC 27615

PREPARED BY:

TeleCAD Wireless
1961 NORTHPOINT BLVD, SUITE 130
HIXSON, TN 37343
PH: 423-843-9500
FAX: 423-843-9509

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Stephen E. Hunt
License No. 6201054169
LICENSED PROFESSIONAL ENGINEER
4/17/26

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COUNTY: KALAMAZOO
LATITUDE: 42° 17' 16.35" N
LONGITUDE: 85° 27' 34.73" W
SITE NUMBER: MI-4082
SHEET TITLE: DIMENSIONED SITE PLAN

DRAWING NO.	REVISION:
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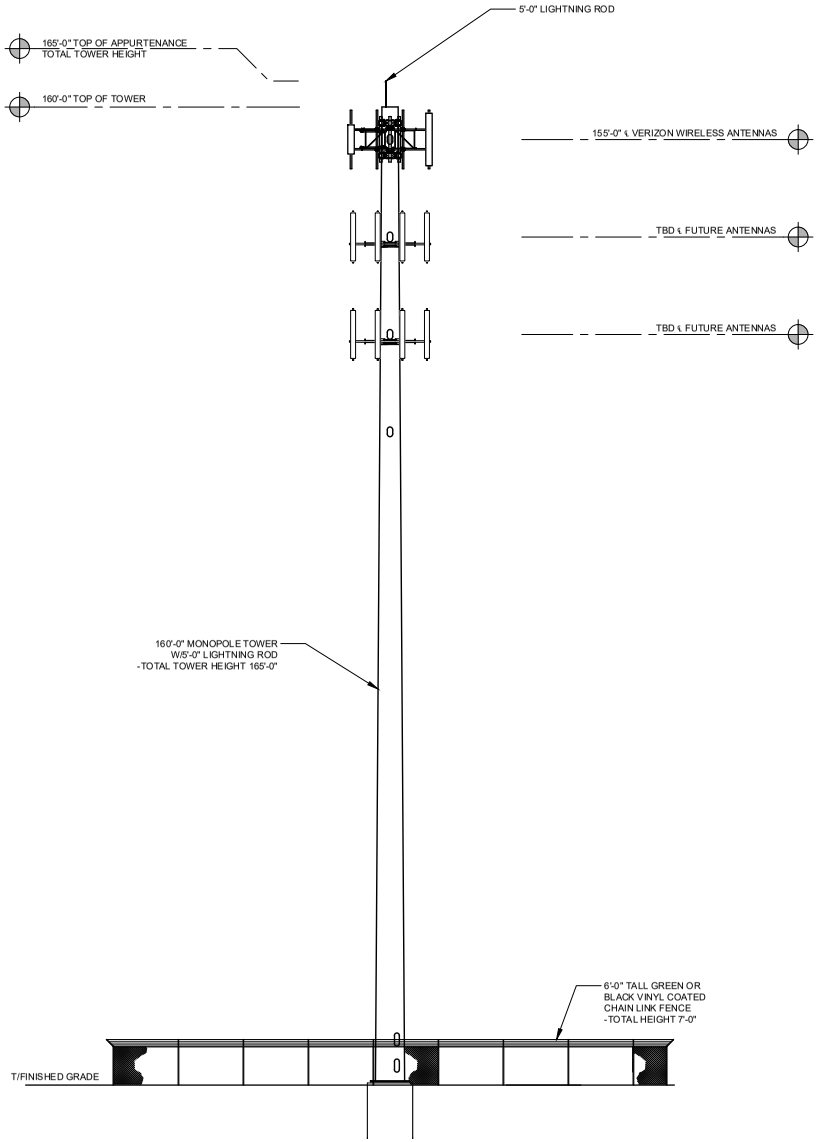

TOWER ELEVATION

SCALE: N.T.S.

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APC Towers

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RALEIGH, NC 27615

PREPARED BY:

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4/17/26

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SITE NAME:
ROWE ISLAND

ADDRESS:
67 VAN BRUGGEN
GALESBURG, MI 49053

COUNTY:
KALAMAZOO

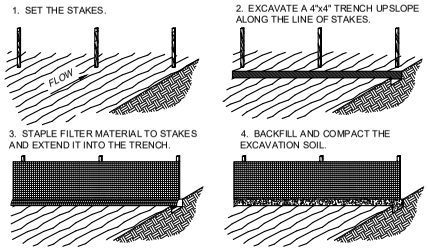
LATITUDE:
42° 17' 16.35" N

LONGITUDE:
85° 27' 34.73" W

SITE NUMBER:
MI-4082

SHEET TITLE:
TOWER ELEVATION

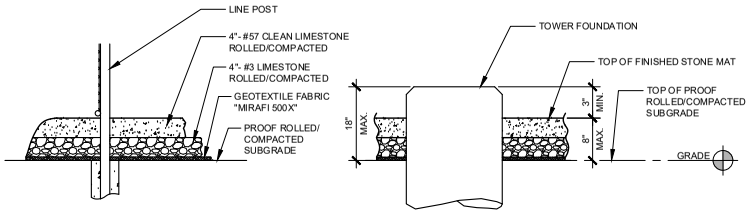
DRAWING NO.	REVISION:
Z-5	0



POINTS A SHOULD BE HIGHER THAN POINT B

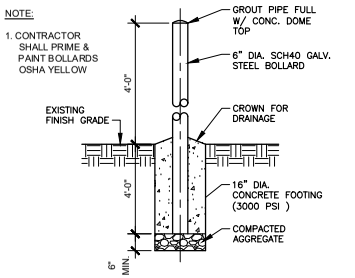
SILT FENCE DETAIL

SCALE: N.T.S.



PARTIAL COMPOUND SECTION

SCALE: N.T.S.



BOLLARD DETAIL

SCALE: N.T.S.

PREPARED FOR:

APC Towers

8601 SIX FORKS ROAD, SUITE 250
RALEIGH, NC 27615

PREPARED BY:

TeleCAD Wireless

1961 NORTHPOINT BLVD, SUITE 130
HIXSON, TN 37343
PH: 423-843-9500
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ENGINEER'S STAMP:

STATE OF MICHIGAN
Stephen E. Hunt
License No. 6201054169
LICENSED PROFESSIONAL ENGINEER

NOT VALID WITHOUT P.E. STAMP & SIGNATURE

SITE NAME:
ROWE ISLAND

ADDRESS:
67 VAN BRUGGEN
GALESBURG, MI 49053

COUNTY:
KALAMAZOO

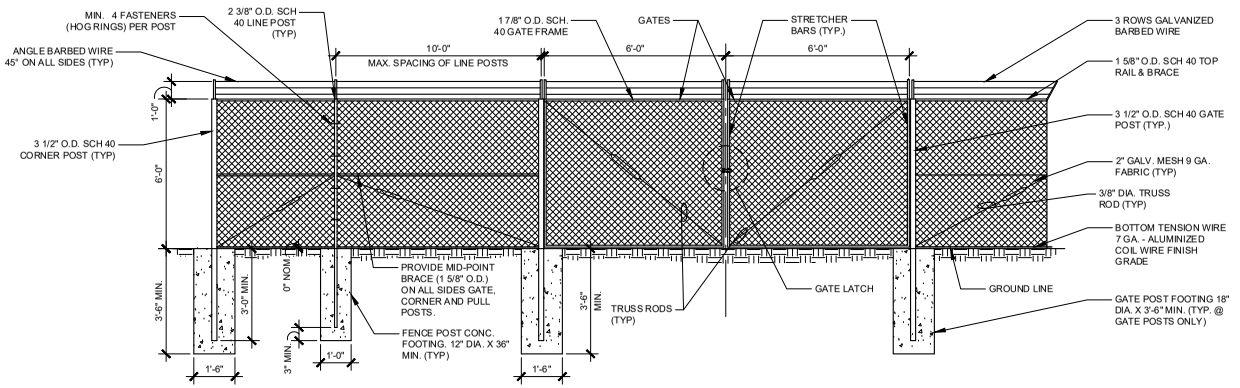
LATITUDE:
42° 17' 16.35" N

LONGITUDE:
85° 27' 34.73" W

SITE NUMBER:
MI-4082

SHEET TITLE:
SITE DETAILS

DRAWING NO.	REVISION:
Z-6	0



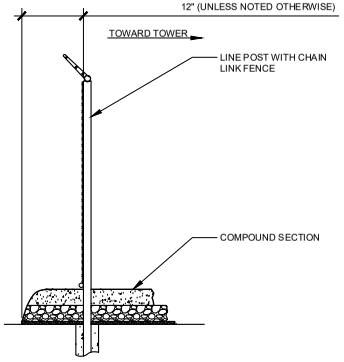
CHAIN LINK FENCE & POST DETAIL

SCALE: N.T.S.

CHAIN LINK FENCING NOTES

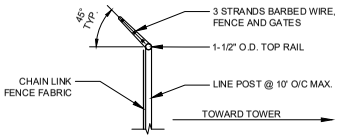
1. ALL FENCE AND FABRIC SHALL BE HOT DIPPED GALVANIZED WITH A MINIMUM OF 2 OZ. PER SQUARE FOOT, 9 GAUGE WIRE (MIN. BREAKING STRENGTH OF 1,290 LBS) WITH 2" MESH. ALL BARBED WIRE SHALL BE ALUMINUM OR COATED PER NOTE #4.
2. BOTTOM EDGE OF FENCE FABRIC SHALL EXTEND TO FINISHED GRADE.
3. SITE FENCE SHALL BE 6'-0" FABRIC W/ 3 STRAND BARBED WIRE FOR TOTAL HEIGHT OF 7'-0".
4. BARBED WIRE SHALL MEET ASTM A 121, CLASS 3 GALV. OR ASTM A 585, TYPE I, CLASS 2 COATING (NOT LESS THAN 0.8 OZ. PER SQ. FT.) AND SHALL BE THREE STRAND 12.5 GAGE w/4 POINT BARBS AT 5" O/C.
5. BOTTOM OF CONCRETE BASE SHALL BE SET BELOW FROSTLINE (SEE LOCAL CODE). WHERE SOIL BEARING CAPACITY IS LESS THAN 2000 PSF, INCREASE CONCRETE SURROUNDING FENCE POST FOUNDATION DIAMETERS BY 8", PROVIDE CONCRETE WITH A 28 DAY STRENGTH OF 3000 PSI (MIN.)
6. PROVIDE A DIAGONAL BRACE ROD AND TURN BUCKLE ON BOTH GATE LEAFS.
7. ALL RAILS AND BRACES SHALL BE SCHEDULE 40 STEEL PIPE, AND ALL FENCE POSTS SHALL BE SCHEDULE 40 STEEL PIPE, AND BE 2 OZ. GALVANIZED COATED.
8. CONTRACTOR SHALL ENSURE ALL POSTS ARE PLUMB.
9. ALL FENCE SHALL BE FABRICATED AND INSTALLED PER ASTM F261 1-15, ASTM F567-14a AND CHAIN LINK FENCE MANUFACTURES INSTITUTE CLFMI-PM 2445.
10. CONTRACTOR SHALL FURNISH AND INSTALL ONE (1) MASTER LOCK LONG SHANK #175LH COMBINATION PADLOCK. COMBINATION TO BE SET AT 7011.

NOTE:
GREEN OR BLACK VINYL COATED CHAIN LINK - SUGGESTED BY JURISDICTIONAL REQUIREMENTS - SUBJECT TO CHANGE



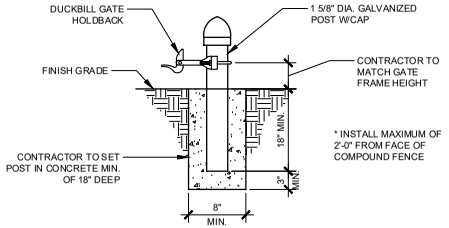
SITE AREA SURFACING

SCALE: N.T.S.



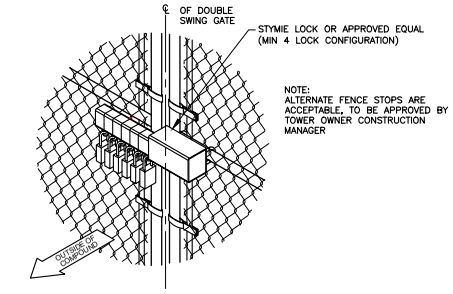
TYPICAL BARBED WIRE DETAIL

SCALE: N.T.S.



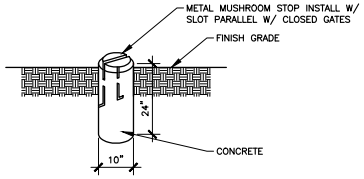
GATE KEEPER DETAIL

SCALE: N.T.S.



GATE LOCK DETAIL 5 D-1

SCALE: N.T.S.



MUSHROOM STOP DETAIL 6 D-1

SCALE: N.T.S.

PREPARED FOR:
APC Towers
8601 SIX FORKS ROAD, SUITE 250
RALEIGH, NC 27615

PREPARED BY:
TeleCAD Wireless
1961 NORTHPOINT BLVD, SUITE 130
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DRAWN BY:	JAE
CHECKED BY:	DS

REVISIONS

NO.	DATE	BY	DESCRIPTION
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B	04/07/26	WAM	PRELIMINARY REVIEW
A	03/24/26	JAE	PRELIMINARY REVIEW

ENGINEER'S STAMP:
STATE OF MICHIGAN
Stephen E. Hunt
License No. 6201054169
LICENSED PROFESSIONAL ENGINEER
4/17/26
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SITE NAME:	ROWE ISLAND
ADDRESS:	67 VAN BRUGGEN GALESBURG, MI 49053
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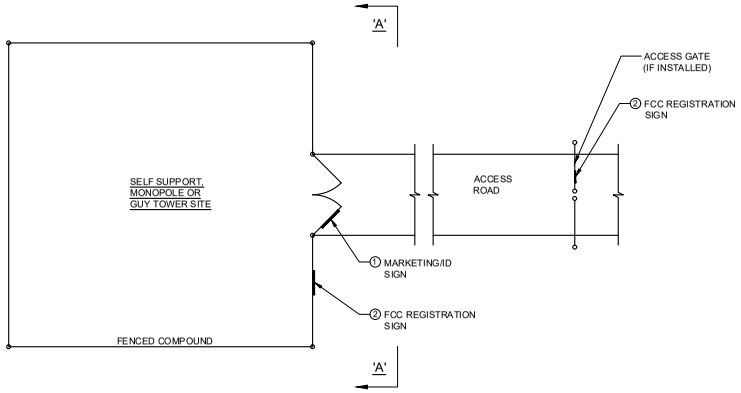
LONGITUDE:	85° 27' 34.73" W
SITE NUMBER:	MI-4082
SHEET TITLE:	FENCE DETAILS AND NOTES
DRAWING NO.	Z-7
REVISION:	0

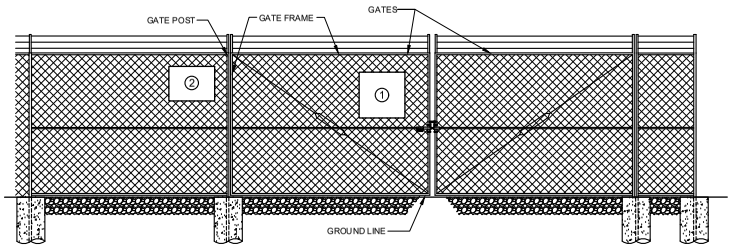
NOTES:

VERIZON WIRELESS SITE ID SIGN, RFE SIGNS, NOC INFORMATION SIGN AND ALL OTHER SIGNAGE NOT REFERENCED IN THIS DRAWING WILL BE FURNISHED AND INSTALLED BY VERIZON WIRELESS PERSONELL PER VERIZON WIRELESS RFC SIGNAGE & DEMARCATION POLICY.



TYPICAL SITE FENCE SIGNAGE PLAN

SCALE: N. T. S.



ELEVATION "A-A"

SCALE: N. T. S.

APC Towers

SITE NUMBER: MI-4082

SITE NAME: ROWE ISLAND

SITE ADDRESS: 67 VAN BRUGGEN
GALESBURG, MI 49053

FCC ASR: TBD

WHITE BACKGROUND w/BLACK LETTERING

NOC/LEASING/EMERGENCY CONTACT

Log in before entering
(800) 640-1379
www.apctowers.com

PRIVATE PROPERTY- NO TRESPASSING

MARKETING/ID SIGN 1

24" WIDE x 24" HIGH

FCC ANTENNA STRUCTURE REGISTRATION

WHITE BACKGROUND w/BLACK LETTERING

FCC REGISTRATION SIGN 2

24" WIDE x 18" HIGH

PREPARED FOR:

APC Towers

8601 SIX FORKS ROAD, SUITE 250
RALEIGH, NC 27615

PREPARED BY:

TeleCAD Wireless

1961 NORTHPOINT BLVD, SUITE 130
HIXSON, TN 37343
PH: 423-843-9500
FAX: 423-843-9509

DRAWING NOTICE:

THE INFORMATION CONTAINED IN THIS SET OF DOCUMENTS IS PROPRIETARY BY NATURE. ANY USE OR DISCLOSURE OTHER THAN THAT WHICH RELATES TO THE CLIENT IS STRICTLY PROHIBITED.

DRAWN BY:	JAE
CHECKED BY:	DS

REVISIONS

NO.	DATE	BY	DESCRIPTION
0	04/17/26	WAM	ZONING ISSUE
C	04/08/26	PLS	PRELIMINARY REVIEW
B	04/07/26	WAM	PRELIMINARY REVIEW
A	03/24/26	JAE	PRELIMINARY REVIEW

ENGINEER'S STAMP:

STATE OF MICHIGAN
Stephen E. Hunt
License No. 6201054169
LICENSED PROFESSIONAL ENGINEER
4/17/26

NOT VALID WITHOUT P.E. STAMP & SIGNATURE

SITE NAME: ROWE ISLAND

ADDRESS: 67 VAN BRUGGEN
GALESBURG, MI 49053

COUNTY: KALAMAZOO

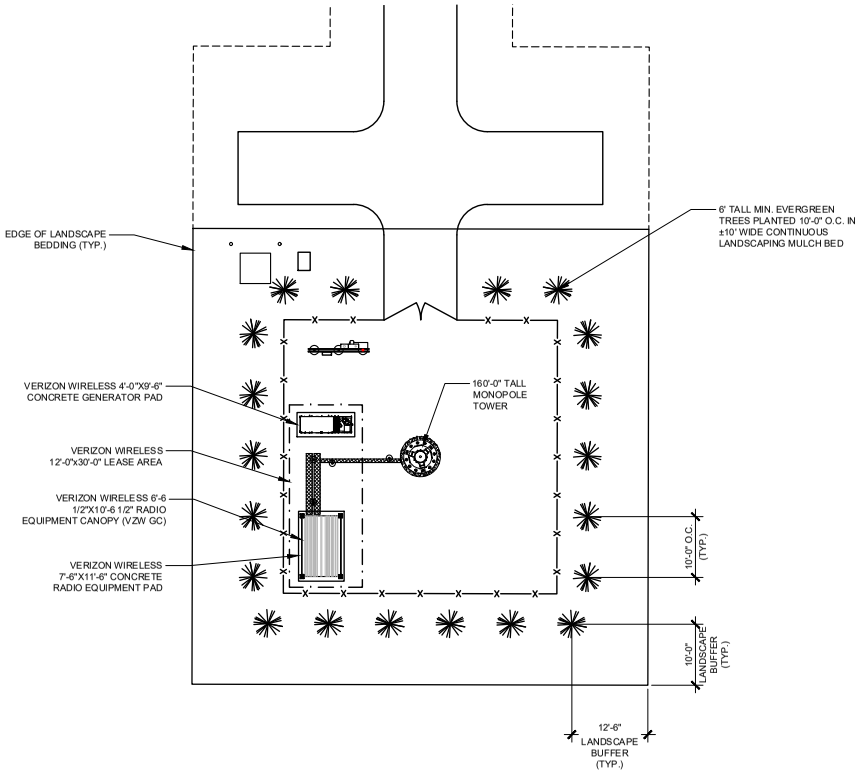
LATITUDE: 42° 17' 16.35" N

LONGITUDE: 85° 27' 34.73" W

SITE NUMBER: MI-4082

SHEET TITLE: TOWER OWNER SIGNAGE

DRAWING NO.	REVISION:
Z-8	0



0' 20' 40'

SCALE: 1" = 20'

LANDSCAPE PLAN

NORTH

811 Know what's below. Call before you dig.

TO OBTAIN LOCATION OF PARTICIPANTS UNDERGROUND FACILITIES BEFORE YOU DIG IN MICHIGAN, CALL MISS DIG

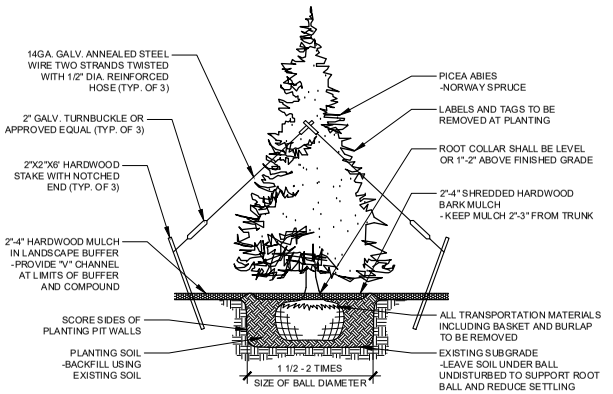
TOLL FREE: 1-800-482-7171 OR www.missdig.org

MICHIGAN STATUTE REQUIRES MIN OF 2 WORKING DAYS NOTICE BEFORE YOU EXCAVATE

LANDSCAPING CONTRACTOR NOTES

1. THE CONTRACTOR SHALL VISIT THE SITE & BECOME COMPLETELY FAMILIAR WITH ALL EXISTING CONDITIONS AND EROSION CONTROL MEASURES PRIOR TO STARTING WORK.
2. THE CONTRACTOR SHALL FURNISH ALL LABOR AND MATERIALS COMPLETE IN ACCORDANCE WITH THE DRAWINGS AND SPECIFICATIONS.
3. THE CONTRACTOR SHALL COMPLY WITH ALL BUILDING CODES, INSPECTIONS AND SAFETY REGULATIONS, AND PROVIDE ALL NECESSARY PERMITS. THE CONTRACTOR SHALL HAVE ALL NECESSARY LOCAL, STATE & FEDERAL LICENSE REQUIRED. UPON REQUEST, THE CONTRACTOR SHALL SHOW EVIDENCE OF WORKERS COMPENSATION COVERAGE AND LIABILITY POLICY.
4. THE CONTRACTOR SHALL GUARANTEE ALL PLANTS TO BE IN A HEALTHY, VIGOROUS CONDITION (INCLUDING WATERING AND UPKEEP) FOR A PERIOD OF ONE (1) YEAR FOLLOWING ACCEPTANCE BY OWNER AND/OR PROJECT REPRESENTATIVE. THE CONTRACTOR SHALL REPLACE WITHOUT COST TO OWNER, ANY DEAD OR UNACCEPTABLE PLANTS.
5. THE CONTRACTOR SHALL VERIFY THE LOCATION OF ALL UNDERGROUND UTILITIES AND PERFORM WORK IN A MANNER WHICH WILL AVOID POSSIBLE DAMAGE; HAND EXCAVATE AS REQUIRED.
6. ALL LANDSCAPE/PLANTING AREAS SHALL HAVE PROPER DRAINAGE THAT PREVENTS EXCESS WATER FROM STANDING AROUND TREES AND SHRUBS. IT IS INTENDED THAT THIS SITE WILL MATCH EXISTING GROUND ELEVATIONS AND WILL MAINTAIN EXISTING DRAINAGE PATTERNS WHERE APPLICABLE.
7. THE CONTRACTOR SHALL PROVIDE PLANT MATERIAL OF THE SIZE & TYPE SPECIFIED, IF SUBSTITUTIONS ARE PROPOSED, THEY MUST BE APPROVED BY TOWER OWNER. ALL PLANT MATERIAL SHALL BE FREE OF DISEASE, INSECTS AND DEFECTS SUCH AS BUT NOT LIMITED TO KNOTS, SUN-SCALD, INJURIES, ABRASIONS AND DISFIGUREMENT. APPROVAL OF PLANT MATERIAL AT THE SOURCE DOES NOT ALTER THE RIGHT OF REJECTION AT PROJECT. ALL PLANT MATERIAL SHALL COMPLY WITH THE CURRENT ISSUE OF "ASSOCIATION OF AMERICAN STANDARD" FOR NURSERY STOCK PUBLISHED BY THE "AMERICAN ASSOCIATION OF NURSERYMEN".
8. THE CONTRACTOR SHALL PROVIDE A FINISHED GRADE THAT SHALL BE REASONABLY SMOOTH, COMPACTED AND FREE OF ANY IRREGULAR SURFACE CHANGE. THE CONTRACTOR SHALL SLOPE ALL PLANTING BEDS AND LAWN AREAS TO CAUSE RUN-OFF TO FLOW AWAY FROM BUILDING AND PAVING.
9. THE CONTRACTOR SHALL BACKFILL ALL PLANT MATERIAL WITH SHREDDED TOPSOIL AND THE SPECIFIED AMOUNT OF PEAT MOSS AS REQUIRED FOR THE BED PREPARATION.
10. THE LANDSCAPING CONTRACTOR SHALL USE SOME TYPE OF HARDWOOD MULCH.
    - THE FINISHED DEPTH OF MULCH MUST BE AT LEAST 2" AND NO MORE THAN 4".
    - PRIOR TO MULCHING THE CONTRACTOR SHALL APPLY A PRE-EMERGENT HERBICIDE TO AID IN WEED CONTROL. READ WARNING LABEL BEFORE APPLYING. WATER ALL TREES IMMEDIATELY OR WITHIN 16 HOURS AFTER INSTALLATION
    - THE CONTRACTOR SHALL INSTALL GEOTEXTILE FABRIC AFTER APPLICATION OF PRE-EMERGENT HERBICIDE AND PRIOR TO MULCH INSTALLATION.

SYMBOL	QUANTITY	PLANT NAME	BOTANICAL NAME	COMMENTS/SPECIFICATIONS
	20	NORWAY SPRUCE EVERGREEN TREE	PICEA ABIES	6 FEET HEIGHT MINIMUM (BALLED & BURLAPPED)



NOTE:
CONTRACTOR SHALL GUARANTEE ALL NEWLY PLANTED AND RELOCATED TREES FOR A MINIMUM OF 1 YEAR AFTER COMPLETION OF PROJECT. GUARANTEE SHALL BE FOR FULL REPLACEMENT OF LOST PLANTS.

EVERGREEN TREE PLANTING

SCALE: N.T.S.

PREPARED FOR:

APC Towers

8601 SIX FORKS ROAD, SUITE 250
RALEIGH, NC 27615

PREPARED BY:

TeleCAD Wireless

1961 NORTHPOINT BLVD, SUITE 130
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DRAWN BY:	JAE
CHECKED BY:	DS

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42° 17' 16.35" N

LONGITUDE:
85° 27' 34.73" W

SITE NUMBER:
MI-4082

SHEET TITLE:
LANDSCAPE PLAN

DRAWING NO.	REVISION:
L-1	0

Zoning Ordinance Responses

C. General Requirements for WCFs outside the ROW.

1. Height. Tower- Based WCFs shall not exceed a height of one hundred twenty (120) feet. Higher towers may be permitted, however, if necessary to achieve co-location. The buildings, cabinets, and other accessory structures shall not exceed the maximum height for accessory structures in the zoning district in which the facility is located.

The proposed tower is 160- foot tall with a 5-foot lightening rod. The additional height will allow the possibility of co-location. The next closest towers in Comstock Township at 6581 E K Ave. and 618 N 33rd are 198-feet and 254-feet respectively. The height required for signal optimized propagation and coverage in the Comstock township area exceeds the 120-foot limit.

2. Setbacks. The setback if a new or modified Tower - Based WCF support structure from any residential-zoned property line or existing or proposed right of way or other publicly traveled road shall be no less than the total height of the structure and attachments thereto. Non-Tower WCF support structure shall satisfy the setback requirements of the applicable zoning district for principal buildings in Section 3.1 Establishment of districts.

This requirement is met. The tower is setback 185-feet from the E. Michigan Ave and approximately 722-feet to the nearest residential zoned property at 8549 E K Ave.

Where the proposed new or modified Tower - Based WCF support structure abuts a parcel of land zoned for a use other than residential, it shall comply with the required setbacks for principal Section 3.1 Establishment of districts for the zoning district in which it is located.

This requirement is met. The tower is 40.3-feet from the nearest property line to the east. The required setback for LM - Light Manufacturing District is 30’

3. Equipment Location. Equipment enclosures proposed as building or ground-mounted structures shall comply with the required setbacks and other requirements specified for principal buildings in Section 3.1 Establishment of districts for the zoning district in which the facility is located. If an equipment enclosure is proposed as a roof appliance on a building, it shall be designed, constructed and maintained to be architecturally compatible with the principal building.

This requirement will be met. The proposed equipment cabinets will be on the west side of the fenced lease area which will be approximately 70-feet from the east property line and approximately 30’ from the south property line.

4. Type A. A Type A WCF is located outside the ROW and is a permitted use of property and not subject to special land use approval if all of the following requirements are met:

a. The WCF will be co-located on an existing wireless support structure or in an existing equipment compound.

N/A

b. The existing wireless support structure or existing equipment compound is in compliance with the Township Zoning Ordinance or was approved by the Township Planning Commission.

N/A

c. The proposed co-location will not do any of the following:

i. Increase the overall height of the wireless support structure by more than twenty (2) feet or ten percent of (10%) of its original height, whichever is greater.
ii. Increase the width of wireless support structure by more than the minimum necessary to permit co-location.
iii. Increase the area of the existing equipment compound to greater than 2,500 square feet.

N/A

d. The proposed co-location complies with the terms and conditions of any previous final approval by the Planning Commission.

N/A

5. Type B. A Type B WCF or antenna, is located outside the ROW and is subject to special land use approval, in accordance with Section 6.2 Special land uses of the Zoning Ordinance, if it does not meet requirements ‘c’ and ‘d under Type A but satisfies all of the following requirements:

a. The WCF or antenna will be co-located on an existing wireless support structure or in an existing equipment compound.

N/A

b. The existing wireless support structure or existing equipment compound is in compliance with the Township Zoning Ordinance or was approved by the Township Planning Commission.

N/A

6. Type C. A Type C WCF is located outside the ROW and subject to special land use approval, in accordance with Section 6.2 Special land uses of the Zoning Ordinance if the proposal does not involve collocation on an existing wireless support structure approved by the planning commission (e.g., A new WCF).

General Requirements for WCFs located within the ROW.

1. Height. Tower based WCFs may not exceed the height of 45 feet when located in the ROW of any public street and a height of 120 feet when located in any non-Street ROW. Non-Tower WCFs shall be collocated on existing poles such as utility poles or light poles.

N/A

2. Setbacks. Tower – based WCF's, non-Tower WCF, and accessory equipment should be located so as to not cause any physical or visual obstruction to pedestrian or vehicular traffic or to otherwise create safety hazards to pedestrians and/or motorists or to otherwise inconvenience public use structures whenever possible.

N/A

3. Equipment Location.

a. Ground mounted equipment shall be placed underground in the event an applicant can demonstrate to the satisfaction of the township that ground mounted equipment cannot be placed underground it shall be screened, to the fullest extent possible, through the use of landscaping or other decorative features to the satisfaction of the Township. In no case sell ground, mounted equipment, walls or landscaping be located within eighteen (18) inches of the face of the curb, or in the absence of a curb, the edge of the pavement.

N/A

b. Required electrical meter cabinets shall be screened to blend in with the surrounding area to the satisfaction of the Township.

N/A

c. Any graffiti on the tower or on any accessory equipment shall be removed at the Soul expense of the owner within 10 business days of notice of the existence of the graffiti.

N/A

d. Any underground vaults related to Tower – based WCF's shall be reviewed and approved by the Township and the agency owning the ROW.

N/A

4. Design Requirements.

a. Antennae and all support equipment shall be treated to match the wireless support structure. WCFs and accompanying equipment shall be painted, or otherwise coated, to be visually compatible with the wireless support structure upon which they are mounted.

N/A

b. WCF installations located above the surface of the ground shall consist of equipment and proportion to the structures upon which they are mounted. All equipment shall be the smallest and least visibly intrusive equipment feasible.

N/A

5. Every WCF, to be located in a ROW, must have prior consent, franchise, or lease as the case may dictate, from the Township Board and is subject to the terms and conditions placed therein.
N/A

6. Type D. A type DWCF is located in a ROW and a permitted use of property and is not subject to special land use approval if all of the following requirements are met:

a. The W CF will be co-located on an existing wireless support structure.
N/A
b. equipment location is entirely underground
N/A
c. the proposed location will not do any of the following:

i. increase the overall height of the support structure by more than 5 feet or 10% of its original height, whichever is less.
ii. Increase the width of the wireless support structure by more than the minimum necessary to permit collocation.

N/A

7. Type E. A Type E WCF or antenna is subject to special land use approval, in accordance with Section 6.2 Special land uses of the Zoning Ordinance, if it does not meet all of the requirements under Type D.

Approval Procedures for WCFs. The following procedures have been established to achieve approval of a proposed WCF:

1. Type A. Type A WCF proposals require only a Zoning Compliance Permit, pursuant to Section 7.2 Zoning compliance permits.

2. Type B. Type B WCF proposals require special land use approval. Accordingly, such proposals are subject to the procedures in subsection F, and the following special procedures.

3. Type C. Type C WCF proposals require special land use approval. Accordingly, such proposals are subject to the procedures outlined for Type B, except that in Step 4 the special land use complete.

4. Type D Section 7.2 Zoning compliance permits, as well as the appropriate permit from the ROW owner and the appropriate regulatory agencies over the ROW.

5. Type E. Type E WCF proposals require special land use approval. Accordingly, such proposals are subject to the procedures in subsection F, and the special procedures outlined for Type B in addition to obtaining the appropriate permit from the ROW owner and the appropriate regulatory agencies over the ROW.

F. Standards and Conditions. All applications for WCFs that require special land use approval shall be reviewed in accordance with the following additional standards and conditions. If approved, such facilities shall be constructed and maintained in accordance with such standards and conditions and any additional conditions imposed by the Planning Commission.

1. Public Health and Safety. Facilities and/or support structures shall not be detrimental to the public health, safety and welfare.
This requirement will be met. Wireless Communications facilities are not deemed to be detrimental to the public health, safety and welfare. They are self contained, self operating uses which do not emit pollutants nor require public services such as traffic control, water and sewage, etc.

2. Compliance with Federal, State and Local Standards. WCFs shall comply with applicable federal and state standards, including requirements promulgated by the Federal Aviation Commission. Wireless support structures shall comply with all applicable building codes.
This requirement is met. Please see the attached FAA determination.

3. Maximum Height. Applicant demonstrated justification for the proposed height of the wireless support structure and an evaluation of alternative designs which might result in lower shall be the minimum height demonstrated to be necessary for reasonable communication by the applicant (and by other entities to coca on the structure).
Please see the attached propagation maps

4. Access. When a wireless support structure is located outside the ROW, unobstructed permanent access to it shall be provided for operation, maintenance, repair and inspection purposes, which may be provided through or over an easement. The permitted type of surfacing, dimensions and location of such access route shall be subject to approval by the Planning Commission, based on evaluation of the location of adjacent roads, layout of buildings and equipment on the site, utilities needed to service the facility, proximity to residential districts,

disturbance to the natural landscape, and the type of vehicles and equipment that will visit the site. When located within the ROW, access will be as required by the agency having regulatory authority over the ROW.
This requirement will be met. The proposed project has a 30-foot wide access easement for driving to the site and utility runs. The 12-foot wide driveway will run from E Michigan to the lease area. Please see pages Z-2, Z3 and Z-4 of the zoning drawings.

5. Division of Property. The division of property for the purpose of locating a WCF shall be permitted only if all zoning requirements, including lot size and lot width requirements, are met.
N/A

6. Design Objectives. To the extent feasible, the wireless support structure, WCF and all accessory buildings shall be designed utilizing stealth technology to minimize distraction, reduce visibility, maximize aesthetic appearance, and ensure compatibility with surroundings. Accordingly, wireless support structures, other than street light poles in the ROW, shall not have lights unless required be permitted on a support structure.
In order to provide the best service to the Comstock community the proposed tower will be a monopole design and have up to platforms to support antenna and accessory equipment. This design will be in keeping with the look and feel of a manufacturing district.

7. Fencing. When located outside the ROW, WCFs and equipment compounds shall be enclosed in an open weave, green or black vinyl coated, chain-link fence having a maximum height of 6 feet. Barbed wire may be permitted. When located within the ROW any fencing will be as permitted by the agency having regulatory authority over the ROW.
This requirement will be met. The proposed lease area will be enclosed by a 6-foot chain link black vinyl coated fence with 3 strands of barbed wire. Please see page Z-7 of the zoning drawings.

8. Structural Integrity. WCFs and wireless support structures shall be constructed and maintained in structurally sound condition, using the best available technology, to minimize any threat to public safety.
This requirement will be met. As part of the building permit process. APC Tower will provide a Structural Analysis showing the design for the proposed tower will support th proposed antenna and accessory equipment.

9. Maintenance. A plan for the long term, continuous maintenance of the facility shall be submitted. The plan shall identify who will be responsible for maintenance, and shall include a method of notifying the Township if maintenance responsibilities change.
Please see attached maintenance plan.

G. Removal of Unused or Obsolete Facilities.
1. A condition of every approval of a WCF shall be adequate provision for removal of all or part of The facility by users and owners upon the occurrence of one or more of the following events:

a. When the facility has not been used for 180 days or more. For purposes of this section, the removal of antennas or other equipment from the facility, or the as the beginning of a period of no use.

b. Six months after new technology is available at reasonable cost, as determined by the Township, which permits the operation of the communication system without the requirement of the support structure.

This requirement will be met.

2. The situations in which removal of a facility is required, as set forth in paragraph (1) be applied and limited to portions of a facility.

3. Upon the occurrence of one or more of the events requiring removal, the property owner or persons who had used the facility shall immediately apply for any required demolition or removal permits, and immediately proceed with and complete the demolition, removal, and site restoration.

This requirement will be met.

4. If the required removal of a facility or a portion thereof has not been lawfully completed within 60 days of the applicable deadline, and after at least 30 days written notice the Township may remove or secure the removal of the facility or required portions thereof, with its actual cost and reasonable administrative charge to be drawn or collected and/or enforced from or under the performance guarantee posted at the time application was made for establishing the facility.

H. Application Requirements.
1. Site Plan and Special Land Use Review. A site plan prepared in accordance with Section 6.1 Site plan review procedures, subsection B shall be submitted, showing the location, size, screening and design of all buildings, outdoor equipment, and structures. Where the wireless communication facility is subject to special land use approval, the procedures and standards in Section 6.2 Special land uses shall be followed.
Please see attached site plan.

2. Property/ROW Owner Approvals. The application shall be accompanied by written approval from the property owner when the WCF is outside the ROW or written approval from the appropriate regulatory agencies when the WCF is within the ROW and the appropriate regulatory

agencies over the ROW.
Please see the Special Exception Use application with the landlords signature.

3. Landscape Plan. A landscaping plan shall be submitted in compliance with the requirements of Section 5.4 Landscaping.
Please find the landscape plan on page L-1 of the zoning drawings.

4. Structural Specifications. Structural specifications for the wireless support structure and foundation shall be submitted for review. The structural specifications shall state the number of various types of antennae capable of being supported on the structure. For new wireless support structures, a soils report prepared by a geotechnical engineer licensed in the State of Michigan plans shall be subject to review and approval by the Township Engineer.
This requirement will be met. As part of the building permit process. APC Tower will provide a Structural Analysis showing the design for the proposed tower will support th proposed antenna and accessory equipment.

5. Performance Guarantee. The application shall include a description of the performance guarantee to be posted immediately upon issuance of a building permit, when one is required or following approval by the Zoning Administrator for those not requiring a building permit. Said performance guarantee shall be to ensure removal of the facility when it has been abandoned or is no longer needed, as previously noted. In this regard, the performance guarantee shall, at the election of the applicant, be in the form of one cash; two surety bond; three letter of credit; or four an agreement in a form approved by the Township Attorney and recordable at the Kalamazoo County register of deeds, establishing a promise of applicant and owner of the property to remove the facility in a timely manner as required herein, with the further provision that the applicant and owner shall be responsible for the payment of any costs and attorney's fees incurred by the Township in securing removal.
This requirement will be met. APC will provide a surety bond per the Townships requirements.

Contact Person. The application shall include the name, address and phone number of the person to contact for engineering, maintenance and other notice purposes. This information shall be continuously updated during all times the facility is on the premises.

Contact for engineering, maintenance and notice purposes:
Name Jack Luckadoo, APC Towers
Address 8601 Six Forks Road, Suite 250, Raleigh, NC 27615
Phone (919) 948-4788

FAA Determination of No Hazard

Mail Processing Center
Federal Aviation Administration
Southwest Regional Office
Obstruction Evaluation Group
10101 Hillwood Parkway
Fort Worth, TX 76177

Aeronautical Study No.
2026-AGL-5486-OE

Issued Date: 04/20/2026

APC TOWERS
JONATHAN GREENE
8601 Six Forks Rd
Suite 250
Raleigh, NC 27615

**** DETERMINATION OF NO HAZARD TO AIR NAVIGATION ****

The Federal Aviation Administration has conducted an aeronautical study under the provisions of 49 U.S.C., Section 44718 and if applicable Title 14 of the Code of Federal Regulations, part 77, concerning:

Structure: Antenna Tower MI-4082 Rowe Island
County, State: Kalamazoo, Michigan

Collected Point(s):

Label	Latitude	Longitude	SE	DET AGL	AMSL
pt-1	42-17-16.35N	85-27-34.73W	815 Ft	165 Ft	980 Ft

This aeronautical study revealed that the structure does not exceed obstruction standards and would not be a hazard to air navigation provided the following condition(s), if any, is(are) met:

Emissions from this site must be in compliance with the parameters set by collaboration between the FAA and telecommunications companies and reflected in the FAA 5G C band compatibility evaluation process (such as power, frequencies, and tilt angle). Operational use of this frequency band is not objectionable provided the Wireless Providers (WP) obtain and adhere to the parameters established by the FAA 5G C band compatibility evaluation process. **Failure to comply with this condition will void this determination of no hazard.**

See attachment for additional condition(s) or information.
Based on this evaluation, marking and lighting are not necessary for aviation safety. However, if marking/ lighting are accomplished on a voluntary basis, we recommend it be installed in accordance with FAA Advisory circular 70/7460-1 M Change 1.

This determination expires on 10/20/2027 unless:

(a) the construction is started (not necessarily completed) and FAA Form 7460-2, Notice of Actual Construction or Alteration, is received by this office.
(b) extended, revised, or terminated by the issuing office.
(c) the construction is subject to the licensing authority of the Federal Communications Commission (FCC) and an application for a construction permit has been filed, as required by the FCC, within

6 months of the date of this determination. In such case, the determination expires on the date prescribed by the FCC for completion of construction, or the date the FCC denies the application.

NOTE: REQUEST FOR EXTENSION OF THE EFFECTIVE PERIOD OF THIS DETERMINATION MUST BE E-FILED AT LEAST 15 DAYS PRIOR TO THE EXPIRATION DATE. AFTER RE-EVALUATION OF CURRENT OPERATIONS IN THE AREA OF THE STRUCTURE TO DETERMINE THAT NO SIGNIFICANT AERONAUTICAL CHANGES HAVE OCCURRED, YOUR DETERMINATION MAY BE ELIGIBLE FOR ONE EXTENSION OF THE EFFECTIVE PERIOD.

This determination is based, in part, on the foregoing description which includes specific coordinates, heights, frequency(ies) and power. Any changes in coordinates, heights, and frequencies or use of greater power, except those frequencies specified in the Colo Void Clause Coalition; Antenna System Co-Location; Voluntary Best Practices, will void this determination. Any future construction or alteration, including increase to heights, power, or the addition of other transmitters, requires separate notice to the FAA.This determination includes all previously filed frequencies and power for this structure.

If construction or alteration is dismantled or destroyed, you must submit notice to the FAA within 5 days after the construction or alteration is dismantled or destroyed.

This determination does include temporary construction equipment such as cranes, derricks, etc., which may be used during actual construction of the structure. However, this equipment shall not exceed the overall heights as indicated above. Equipment which has a height greater than the studied structure requires separate notice to the FAA.

This determination concerns the effect of this structure on the safe and efficient use of navigable airspace by aircraft and does not relieve the sponsor of compliance responsibilities relating to any law, ordinance, or regulation of any Federal, State, or local government body.

A copy of this determination will be forwarded to the Federal Communications Commission (FCC) because the structure is subject to their licensing authority.

If we can be of further assistance, please contact our office at 1-816-329-2525, or natalie.schmalbeck@faa.gov. On any future correspondence concerning this matter, please refer to Aeronautical Study Number 2026-AGL-5486-OE.

Signature Control No: 699431988-700929091 (DNE)
Natalie Schmalbeck
Technician

Attachment(s)
Additional Information
Frequency Data
Map(s)

cc: FCC

BASIS FOR DECISION

Part 77 authorizes the FAA to evaluate a structure or object's potential electromagnetic effects on air navigation, communication facilities, and other surveillance systems. It also authorizes study of impact on arrival, departure, and en route procedures for aircraft operating under visual or instrument flight rules, as well as the impact on airport traffic capacity at existing public use airports. Broadcast in the 3.7 to 3.98 GHz frequency (5G C band) currently causes errors in certain aircraft radio altimeters and the FAA has determined they cannot be relied upon to perform their intended function when experiencing interference from wireless broadband operations in the 5G C band. The FAA has adopted Airworthiness Directives for all transport and commuter category aircraft equipped with radio altimeters that prohibit certain operations when in the presence of 5G C band.

This determination of no hazard is based upon those mitigations implemented by the FAA and operators of transport and commuter category aircraft, and helicopters operating in the vicinity of your proposed location. It is also based on telecommunication industry and FAA collaboration on acceptable power levels and other parameters as reflected in the FAA 5G C band evaluation process.

The FAA 5G C band compatibility evaluation is a data analytics system used by FAA to evaluate operational hazards related to aircraft design. The FAA 5G C band compatibility evaluation process refers to the process in which the telecommunication companies and the FAA have set parameters, such as power output, locations, frequencies, and tilt angles for antenna that mitigate the hazard to aviation. As the telecommunication companies and FAA refine the tools and methodology, the allowable frequencies and power levels may change in the FAA 5G C band compatibility evaluation process. Therefore, your proposal will not have a substantial adverse effect on the safe and efficient use of the navigable airspace by aircraft provided the equipment and emissions are in compliance with the parameters established through the FAA 5G C band compatibility evaluation process.

Any future changes that are not consistent with the parameters listed in the FAA 5G C band compatibility evaluation process will void this determination of no hazard.

Frequency Data for ASN 2026-AGL-5486-OE

LOW FREQUENCY	HIGH FREQUENCY	FREQUENCY UNIT	ERP	ERP UNIT
6	7	GHz	42	dBW
6	7	GHz	55	dBW
10	11.7	GHz	42	dBW
10	11.7	GHz	55	dBW
17.7	19.7	GHz	42	dBW
17.7	19.7	GHz	55	dBW
21.2	23.6	GHz	42	dBW
21.2	23.6	GHz	55	dBW
614	698	MHz	1000	W
614	698	MHz	2000	W
698	806	MHz	1000	W
806	824	MHz	500	W
806	901	MHz	500	W
824	849	MHz	500	W
851	866	MHz	500	W
869	894	MHz	500	W
896	901	MHz	500	W
901	902	MHz	7	W
929	932	MHz	3500	W
930	931	MHz	3500	W
931	932	MHz	3500	W
932	932.5	MHz	17	dBW
935	940	MHz	1000	W
940	941	MHz	3500	W
1670	1675	MHz	500	W
1710	1755	MHz	500	W
1850	1910	MHz	1640	W
1850	1990	MHz	1640	W
1930	1990	MHz	1640	W
1990	2025	MHz	500	W
2110	2200	MHz	500	W
2305	2360	MHz	2000	W
2305	2310	MHz	2000	W
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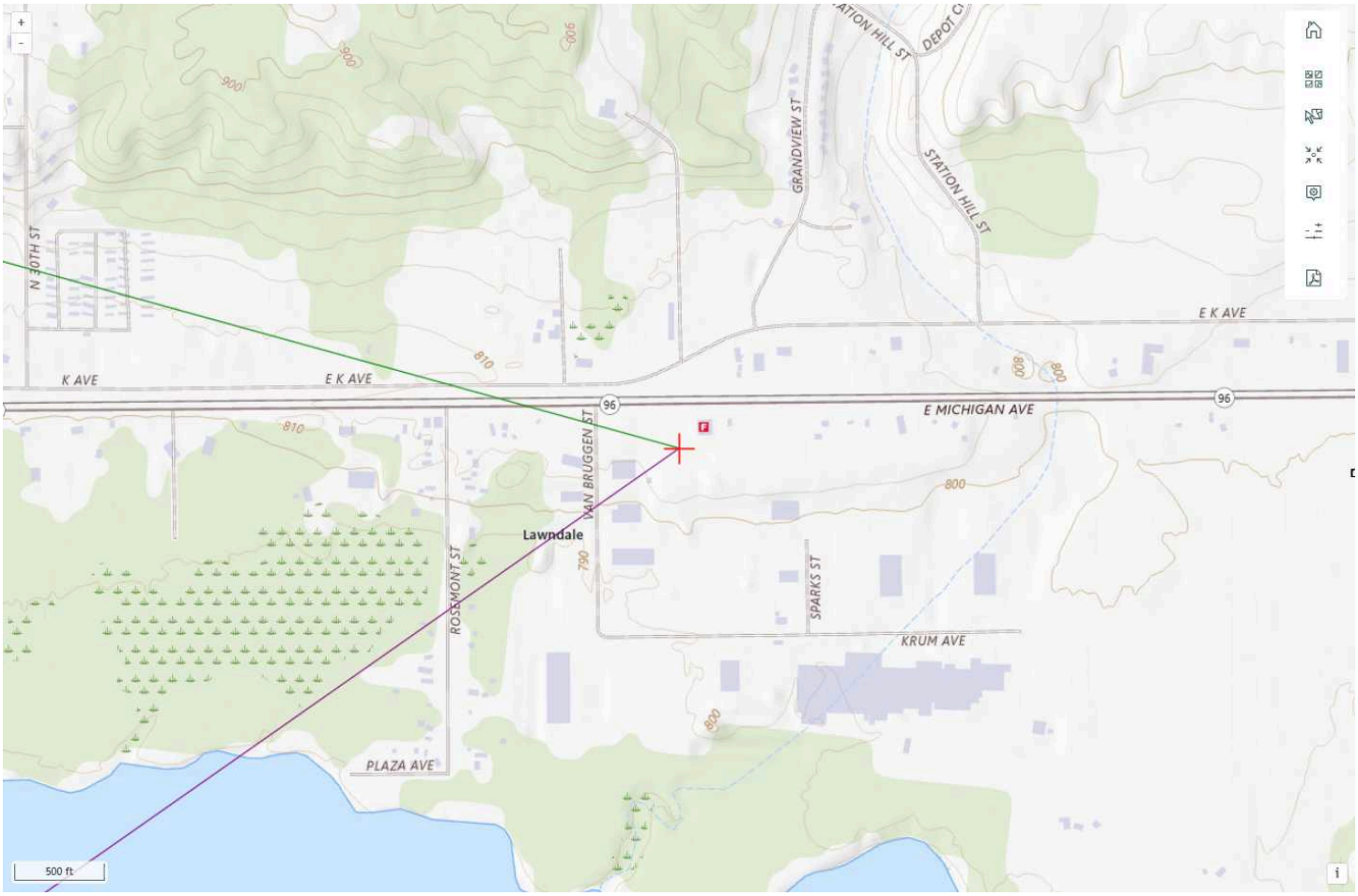
2496	2690	MHz	500	W
3700	3980	MHz	1640	W
3700	3980	MHz	3280	W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ROSEMONT ST
SPARKS ST
KRUM AVE
PLAZA AVE
810
810
800
800
800
800
790
900
900
500 ft

From: MDOT_Tall_Structures
To: Jonathan Greene
Cc: Jack Luckadoo
Subject: Michigan Tall Structure (ASN 2026-AGL-5486-OE)
Date: Thursday, April 16, 2026 9:20:50 AM
Attachments: image002.png

EXTERNAL EMAIL

Applicant –

The Office of Aeronautics has received notification concerning a proposal which may affect Michigan airspace.

The Michigan Tall Structure Act (Act 259, P.S. 1959, as amended by Act 28 P.A. 2016), places authority for review of construction proposals which may affect Michigan airspace with the Michigan Aeronautics Commission. The Michigan Aeronautics Commission has delegated its authority for airspace reviews and approvals to the Michigan Department of Transportation's Office of Aeronautics.

Our preliminary review of the FAA 7460-1 determined that a Michigan Tall Structure permit may not be required for this study. If you would like our office to conduct a full aeronautical study, you may request an application package via email.

Please contact me with the aeronautical study number if you have any questions or concerns.

Thank you,

Kelly Badra (she/her/hers)
Airspace Specialist
Office of Aeronautics – Planning & Environmental
Michigan Department of Transportation
Phone: 517-242-2362
www.michigan.gov/aero

Michigan Department of Transportation
Office of Aeronautics

From: Jonathan Greene <jgreene@apctowers.com>
Sent: Wednesday, April 15, 2026 4:44 PM
To: MDOT_Tall_Structures <MDOT_Tall_Structures@michigan.gov>
Cc: Jack Luckadoo <jluckadoo@apctowers.com>
Subject: 2026-AGL-5486-OE | MDOT Tall Structures Permit
Importance: High

CAUTION: This is an External email. Please report suspicious emails via the "Report to Abuse" button in Outlook

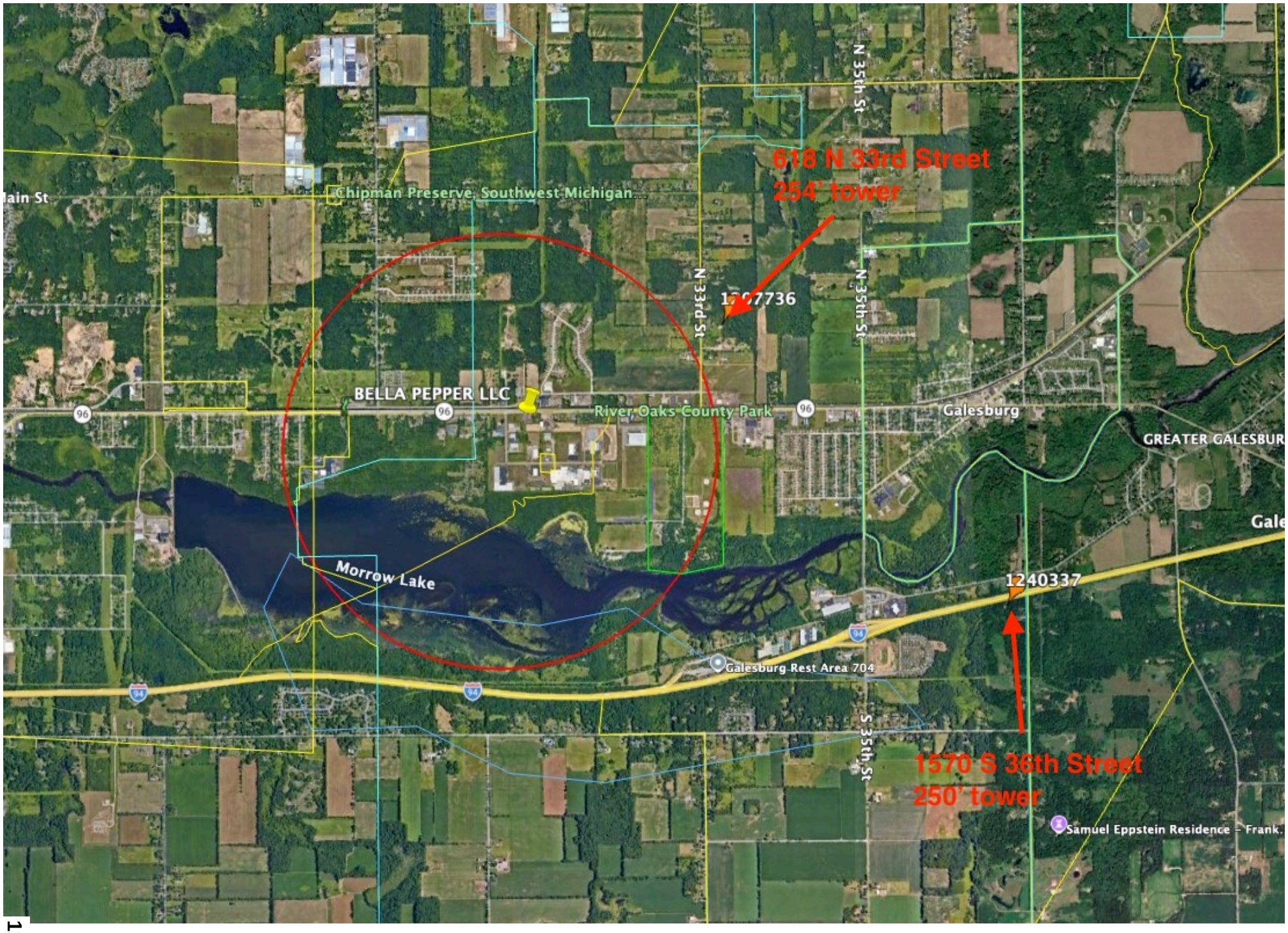
Good Afternoon,

We have not received any communication from this office regarding the study in the subject line. The FAA application is also attached here. Could you please advise on your review here as soon as possible? Thanks in advance for the time and consideration.

Thanks,

Jonathan Greene
Director of Development | **APC Towers**
8601 Six Forks Road, Suite 250, Raleigh, NC 27615
M (704) 724-8382 | O (919) 948-4788 | jgreene@apctowers.com

Tower Search Map


618 N 33rd Street
254' tower
1240337
1570 S 36th Street
250' tower
BELLA PEPPER LLC
Morrow Lake
River Oaks County Park
Galesburg
Galesburg Rest Area 704
Chipman Preserve, Southwest Michigan...
N 33rd St
N 35th St
S 35th St
Samuel Eppstein Residence - Frank.

RF Statement and Propagation Maps

verizon

Statement of Network Need for a New Communications Tower

1. My name is MD Fatah and I am a radio frequency (RF) engineer for Verizon Wireless ("Verizon"). I have been an RF engineer for 10 years, the last 6 years with Verizon.

2. The primary duties of my job as an RF engineer include the design and management of Verizon's wireless communications network in its Michigan/Indiana/Kentucky Market, which includes Kalamazoo County and the surrounding area. In this role, I am also responsible for identifying and correcting substantial service gaps that present themselves in Verizon's wireless network. These service gaps can be caused by a lack of coverage, insufficient system capacity, or both. Service gaps are identified through internal Verizon network monitoring tools and analysis showing the capacity and/or coverage needs of a particular area.

3. In the course of my employment at Verizon, I have become aware of a significant service gap in Verizon's wireless communications network in and around the area west of Galesburg and along E Michigan Ave, including the area near Linde Welding Gas & Equipment Center (the "Gap Area"). As a result of this significant service gap, residents and visitors using their devices in and around the Gap Area are likely to experience diminished call quality, slow and unreliable data transmission speeds, call drops, and diminished 911 services. The service issues in the Gap Area have existed for many years.

4. This significant service gap will remain and cannot be resolved unless a communications tower is constructed within the Gap Area. Verizon must remedy this service gap to provide high-speed wireless broadband access to the residents and visitors who frequent the surrounding areas, to fill in coverage gaps where wireless services are not reliable, and to provide enhanced E911 services.

5. Verizon identified a search area in which the tower would need to be located to resolve the service gap. Before proposing a new communications tower, Verizon first considered whether any existing towers in the area could be used to resolve the coverage gap in the Gap Area. There are no other existing towers in the search area on which Verizon could collocate its communications equipment to resolve the service gap. For this reason, APC Towers began looking for available properties in the search area that would be suitable for a tower.

6. Verizon and APC Towers have worked together to identify a property in the Gap Area that could accommodate a communications tower to correct the significant service gap in Verizon's wireless communications network. APC Towers has proposed to build a new 160-foot tower area west of Galesburg and along E Michigan Ave near Linde Welding Gas & Equipment center, approximately one mile south of E Main St ("Proposed Tower"). Verizon will install its equipment at a height of 155 feet, which is the minimum height required to overcome the challenging terrain/topography around this location in order to provide the coverage needed in the Gap Area. If Verizon is limited to installing

its equipment at a height lower than 155ft, the site would not provide the service needed in critical areas, especially in the area northeast of the proposed tower. Another tower would then be needed in that area in the near future to provide the additional service.

7. By co-locating its communications equipment on the Proposed Tower, Verizon will resolve the current significant service gap and will be able to provide improved service to residents, businesses, and emergency service providers in and around the Gap Area with a single tower. If APC Towers is unable to construct the new telecommunications tower, and Verizon is, therefore, unable to collocate its equipment on the Proposed Tower, the significant service gap in Verizon's wireless communications network will remain, and Verizon will be prohibited from providing reliable wireless service to its customers in the Gap Area.

Dated this 14th day of April, 2026

MD Fatah

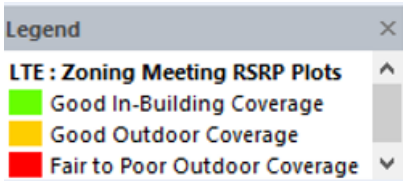
MD Fatah
RF Engineer
Verizon

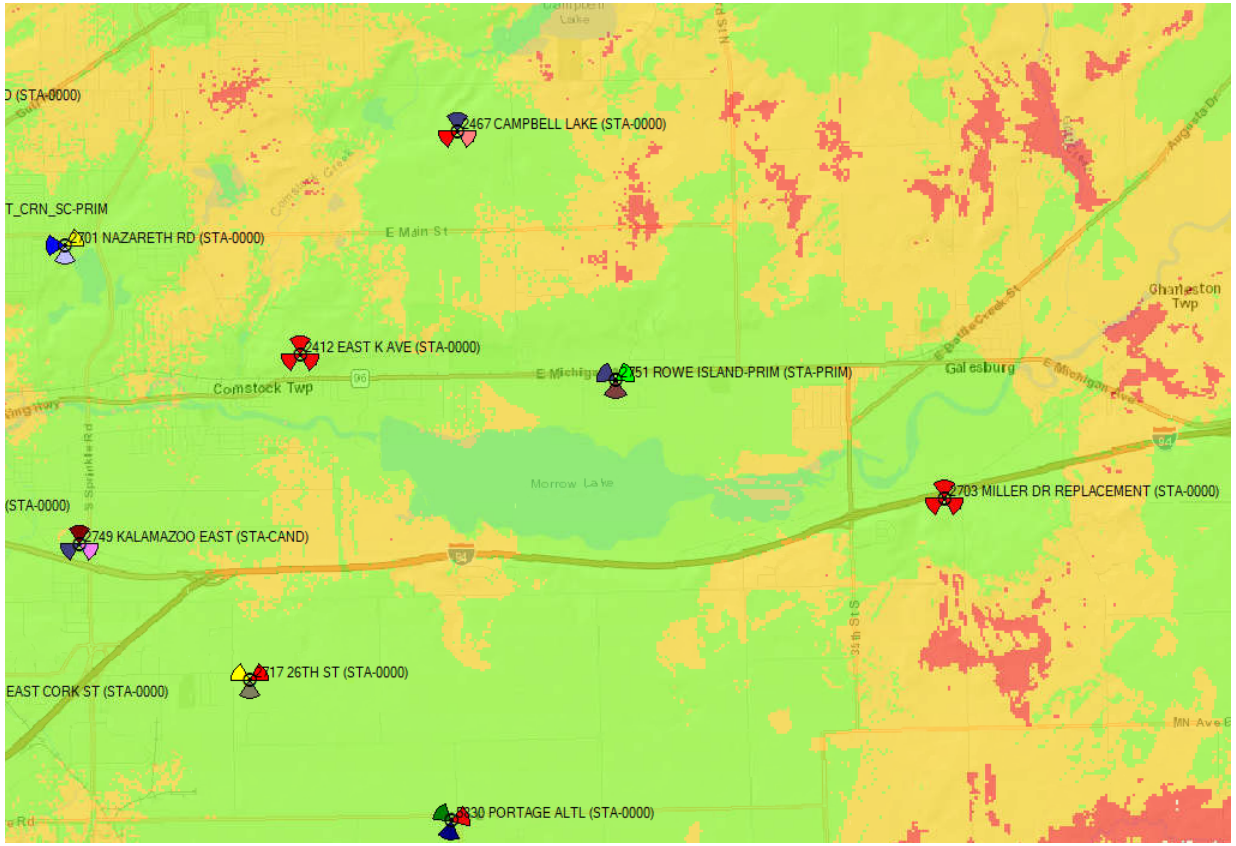
2751 Rowe Island

RFE Notes:

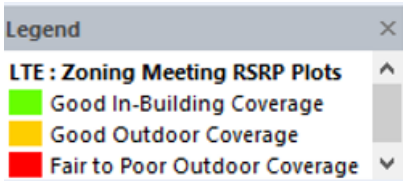
- Centerline RAD = 155’
- Antennas = NN-65C-HG-R2BD

Coverage at 115



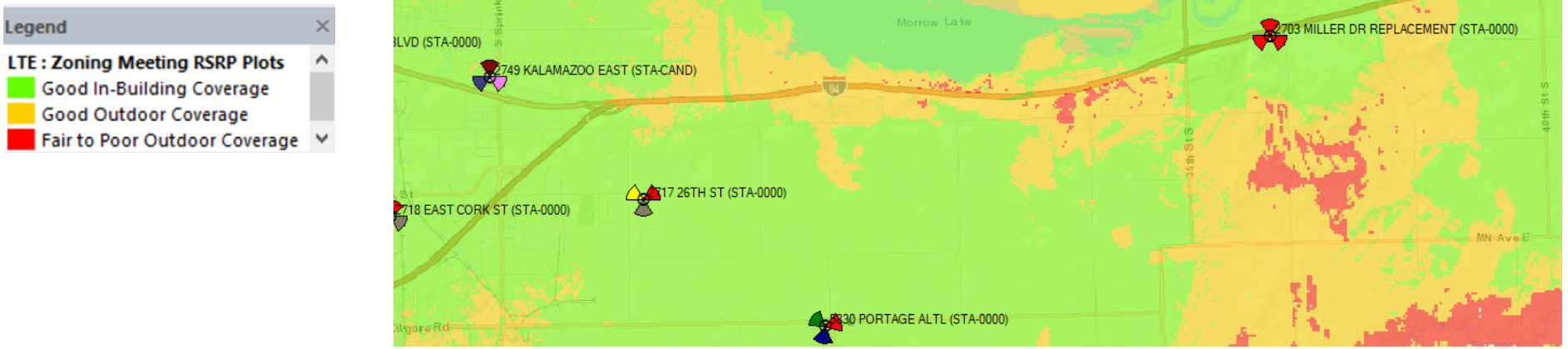


Coverage at 155





Current Coverage



Maintenance Letter

April 14, 2026

Planning Commission
Comstock Township
5858 King Highway
Kalamazoo, MI 49048
Phone: 269-381-2360

RE: APC Towers and Verizon Wireless Maintenance Plan

Dear Comstock Township Planning Commission:

The contact person for this site is Jonathan Greene, (919) 948-4788, jgreene@apctowers.com, 8601 Six Forks Road, Suite 250, Raliegh, NC 27615.

APC Towers and Verizon Wireless have prepared the following maintenance plan for the proposed wireless communication facility.

Routine Facility Maintenance – Routine maintenance includes such actions as visual ground inspection of the facility, trash and debris removal, security confirmation, and weed abatement. The normal frequency of routine maintenance varies per each tower, but such frequency usually averages to one visit roughly every ninety days on an annualized basis.

Preventive Maintenance – Our customers and their agents conduct periodic preventive maintenance on their equipment which resides on our towers. Examples of this equipment include antennas, mounts and cables.

Inspections – In addition to the routine maintenance performed by APC Towers and its customers, APC Towers also conducts more detailed inspections of its towers. These formal inspections may involve certified inspectors climbing the tower, inspections via non-human means such as drones, or both. The purpose of these inspections is to assess and document the structural integrity of the tower and its appurtenances. This inspection is typically performed once per year.

Please call me at (919) 948-4788 if you have any questions.

Sincerely,

Jonathan Greene

Jonathan Greene
Director of Development
jgreene@apctowers.com,
8601 Six Forks Road, Suite 250,
Raliegh, NC 27615.

MEMO

Charter Township of Comstock Planning Commission
July 23, 2026

From: **Kyle Mucha, Principal Planner**

Re: **Battery Energy Storage System Proposal**

To begin dialogue with Swan Energy & Cygnet Energy on a proposed battery energy storage sytem.

Attachments:
CIP BESS Review #2 2026_0708.pdf
Fire Comments June 25 2026.pdf
Fire Equipment Needs June 25 2026.pdf
Engineering Response 2026_0701.pdf
mem 2026-05-04 [Planning Commission] Swan_Cygnet BESS - SPR.pdf
Exhibit 1.pdf
Exhibit 2.pdf
Exhibit 3.pdf
Exhibit 4.pdf
Exhibit K - Decomissioning Plan.pdf

MCKENNA

Memorandum

TO:	Swan Energy Storage; Cygnet Energy Storage *CC: Comstock Charter Township Planning Commission*
FROM:	Kyle Mucha, AICP, Principal Planner – Comstock Township Planning
SUBJECT:	**91 N 30th Street – Battery Energy Storage System Facility – Review #2**
DATE:	July 8, 2026

To Swan Energy & Cygnet Energy,

On behalf of Comstock Charter Township, McKenna has reviewed the application, site drawing and supporting documentation for the establishment of a *battery energy storage system (BESS)* facility at 91 North 30th Street. The submission material has been reviewed against the provisions of the Township's Zoning Ordinance and Battery Energy Storage System Ordinance.

PROJECT SUMMARY

The applicant seeks to establish a battery energy storage system on two (2) parcels, and to be constructed in two (2) phases. The developed land area will be approximately 49.91 acres of the 140 acre site, based on site plan data. The applicant seeks to construct a facility that has a capacity of 400 MW (megawatt).

The subject parcels are currently zoned R-1C. Per Section V of the Township's BESS Ordinance, a battery energy storage system is considered a special land use in any zoning district on a parcel(s) of at least 140 contiguous acres. "



HEADQUARTERS
235 East Main Street
Suite 105
Northville, Michigan 48167

O 248.596.0920
F 248.596.0930
MCKA.COM

Communities for real life.

FINDINGS OF FACT

The applicant proposes to construct a 400 mega-watt battery energy storage system. Civil plans (site plans), electrical plans, emergency response guide, hazard mitigation, tree preservation and other required documents have been submitted for consideration. McKenna has reviewed the submitted material against the requirements of the Township's Battery Energy Ordinance, Site Plan review criteria and Special Land Use criteria. **Findings** have been identified in bold, with areas that need further clarification and/or additional information have been underlined and are outlined in the table below:

Ordinance Standard	Compliance	Comments
SITE PLAN REVIEW		
Zoning and Use	Waiver requested from Planning Commission	Section 1
Schedule of Regulations	Waiver requested from Planning Commission	Section 1
Landscaping and Screening	Planning Commission determination needed	Section 3
Storm Water Management	See Engineering Review(s)	Section 4
Off-Street Parking	Additional Review due to undetermined nature of open space – Parks and Recreation	Section 4
Exterior Lighting	Complies	Section
BESS STANDARDS		
Height	Complies	Section A
Fencing	Complies	Section B
Sound	Complies – sound walls proposed	Section C
Lighting	Complies	Section D
Signage	Complies - requires review by Fire and Engineering	Section E
Landscaping	Planning Commission determination needed	Section F
Access Maintenance Drives	Confirm use of crushed gravel Additional Review from Fire	Section G
Impermeable Surfaces	Confirm use of crushed gravel	Section H

	Additional Review from Fire	
Stormwater Management	Additional Review by Township Engineer	Section I
Installation and Operational Safety	Additional Review by a 3rd Party	Section J
Repair and Augmentation	Applicant agrees to comply	Section K
Public Safety	Additional Review by Fire	Section L
Environmental	Additional Review due to presence of endangered Indiana Bat	Section M
Decommissioning and Removal	Additional Review by Township Legal Counsel	Section N
Special Land Use and Site Plan Application	Additional Review by Fire and Engineering	Section O
Waiver	Additional Review by Planning Commission	Section P
Modifications	Applicant agrees to comply	Section Q
Community Host Agreement	Provision of monies, an agreement is required	Section R
Building Permit or Construction	Pending dependent on plan approval	Section S
On-Site BESS	Complies	Section T
SPECIAL LAND USE STANDARDS		
Harmony with Zoning Code	Determination to be made by Planning Commission	Section 1
Harmony with Existing Character	Additional Review Considerations	Section 2
Essential Character	Additional Review Considerations	Section 3
Hazardous or Disruptive	Additional Review Considerations	Section 4
Adequate Public Services and Facilities	Additional Review Considerations	Section 5

The proposed project offers significant investment within the community; as such, careful consideration of the site plan review criteria, special land use review criteria and supplemental use criteria is warranted. The Planning

Commission is advised to review the findings listed within the planning analysis, engineering report and fire response and dialogue with the applicant to determine if all provisions have been satisfied in compliance with adopted standards.

Further, there have been hundreds of pages of documents submitted for review; it is not anticipated that the Planning Commission will become experts on the entirety of the submission materials. Should the Commission have questions on any of the review provisions or regulations for approval, those can be further discussed during a public meeting with the applicant.

Respectfully submitted,

McKENNA



Kyle Mucha, AICP
Principal Planner/Township Planning Consultant

Disclaimer: McKenna has been retained by the Charter Township of Comstock to conduct planning and zoning reviews, as well as administer support to the planning & zoning department. McKenna is not associated with the applicant in any manner.

Site Plan Review

SUMMARY

Standards for Site Plan Review are set forth by Section 6.1 of the Township's Zoning Ordinance. The proposed project has been reviewed for compatibility with the Township's Zoning Ordinance, Master Plan, existing site conditions, and sound planning and design principles. We offer the following comments for your consideration; underlined items require additional discussion and/or identify outstanding items to be addressed. A summary of our findings is shown in the table below.

1. ZONING & USE

The subject site's underlying zoning district is R-1C, Cluster Housing. The Township's BESS Ordinance permits the establishment of a facility in the Overlay District. The Overlay District is established wherein a battery energy storage system large off-site [facility] is a special land use in any zoning district on a parcel(s) of at least 140 contiguous acres and meeting the additional requirements in Article 4, Section 4.61. Further, the Overlay District states that "*at least 100 acres must remain open space or can be offered by the applicant for public recreation indoor or outdoor uses. Subject to Township Planning Commission approval, as part of the special land use approval, the open space/public recreation may be split off from the facility parcel with proper assurances but shall still count towards the Township district aggregate".*

Location	Existing Land Use	Zoning District
Subject Site	Recreation	R-1C, Cluster Housing
North	Undeveloped Utility Substation	AGR, Agricultural Residential R-1A, Single Family
South	Low Intensity Manufacturing/Industrial Residential Housing	LM, Light Manufacturing R-1C, Cluster Housing B-33, General Business
East	Residential Housing (large lot)	R-1C, Cluster Housing
West	Residential Housing (large lot)	R-1C, Cluster Housing

Review: the applicant submitted additional materials dated June 8, 2026. The following materials were submitted by Stephen Estey of Zausmer (applicant legal counsel and signed applicant for the project): 1) a narrative with exhibits. 2) An updated Zoning application with a Zoning Compliance Letter and exhibits. In all 502 pages of materials were submitted dated June 8, 2026. The applicant is seeking a waiver to the requirements of 4.61 which require 140 contiguous acres. The Planning Commission should determine at the outset of the

discussion if this waiver should be granted prior to discussion of the other factors of the application. The applicant provided the following information regarding the proposed waiver:

> "Because the Project phasing will result in two 20 acre components owned by separate entities, the Applicant seeks a waiver under Article 4, Section 4.61(B)(21) to allow for establishment of a BESS in a parcel less than 140 contiguous acres as currently required under Article 3, Section 3.1.T. Again, while the total acreage of the Applicant's Property exceeds the 140-acre minimum requirement, the actual BESS facility will sit on 39.22 acres of the Property, split into two components of 16.95 acres (Swan) and 22.27 acres (Cygnet). The Project will designate 105.06 acres of the Property as open space for future recreational use. The Applicant remains committed to working with the Township in good faith to identify the most appropriate recreational use and implementation structure for the space."

2. SCHEDULE OF REGULATIONS

Article 4.61 sets the standards for setback provisions of battery energy storage systems. The following table details the requirements as stipulated by said ordinance standards:

Findings.

Requirement Type	Required	Proposed	Comments
Minimum Lot Size	140 (Contiguous)	Parcel 1: 39.90 Acres Parcel 2A: 78.49 Acres Parcel 2B: 29.10 Acres Total: 147.49	The applicant has requested a waiver to this standard due to the placement of the BESS. The acreage is not contiguous as required.
Minimum Lot Width	No minimum	NA	Existing Parcels
Occupied Community Buildings Setback	300 feet	0.1 Miles (>500 feet)	Per narrative – nearest residential use is approximately 0.1 miles east and south
Public road right-of-way	100 feet	>500 feet	Facility proposed on northern portion of subject site(s)
Property line	50 feet	>100 feet	Units shown to be >100 feet away from property boundaries
Sensitive Land Uses	2,000 feet	>2,000 feet	Site plan notes 2,000 foot radius from sensitive land use outer wall (green dashed line)

3. LANDSCAPING AND SCREENING

Per 5.4(C)(1) Portions of the site not devoted to floor area, parking, access ways or pedestrian use shall be landscaped with live plant material consisting of deciduous canopy and coniferous trees, understory trees, shrubs, ground cover, and grasses and maintained in a neat and orderly manner.

Parking lot landscaping shall be designed and situated to define safe access and circulation routes, provide shade and visual relief, and diminish the scale of large lots.

Landscape features, including end islands, peninsulas, and strips shall be installed in the interior of parking lots to delineate on-site circulation, ensure adequate sight distance at the intersection of aisles and interior roadways, and to prevent diagonal vehicular movement through parking lots. Features shall be designed with sufficient radii to ensure drivers are able to make 90-degree right turns without encroaching upon landscaping or adjacent traffic lanes.

A. Site landscaping.

The application materials include a tree preservation plan (Sheet TP201), noting that there are approximately 7,047 trees on site. The applicant proposes to remove approximately 1,357 trees for site development. The subject site will then retain an approximate 5,690 trees. The following graphic provides a visualization of the tree preservation plan for the subject site. The green coloring notes trees to be saved, with the red coloring those that are proposed to be removed.

Based on the proposed tree retention plan, the application material promotes the spirit of retaining existing trees to the extent possible. Additionally, given the number of trees to be preserved, and in accordance with the Township's Landscaping provisions, tree credits can be awarded; the Planning Commission is encouraged to review the proposed preservation plan and determine if the retention of some 5,690 trees meets the spirit of the ordinance.

B. Parking lot landscaping.

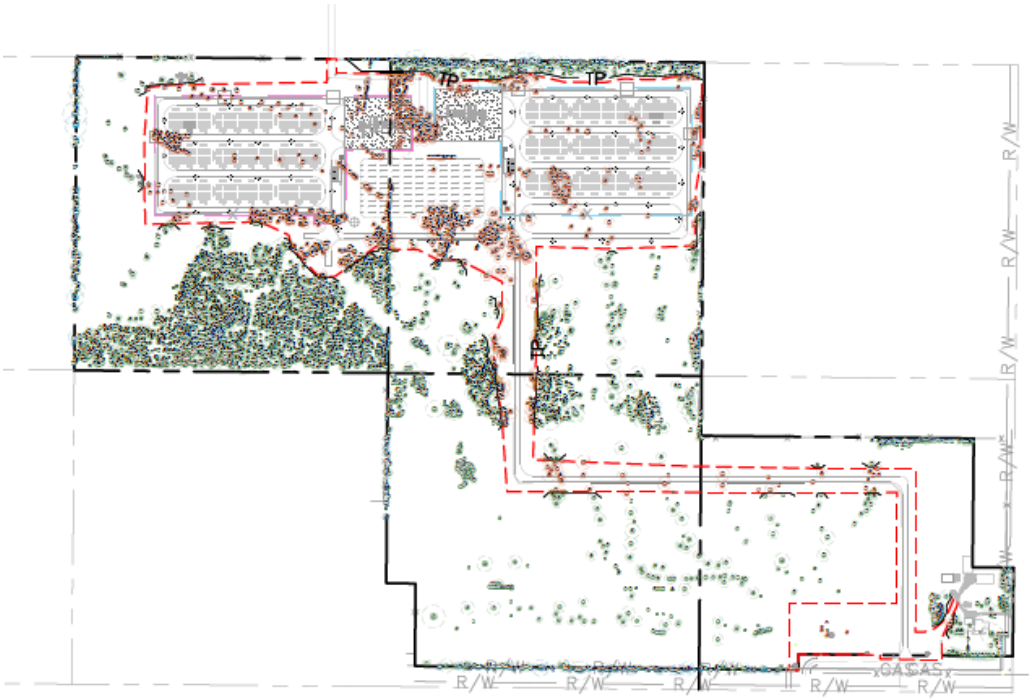
The minimum size of any landscaped area shall be 300 square feet, with a minimum width of 15 feet. Further, parking lot landscaping is based on the number of spaces. Given that the site proposes 10 spaces, 15 square-feet of landscaped area is required per space, with a total of 150 square feet.

The number and type of plantings shall be determined at a rate of one (1) deciduous canopy tree and two (2) low growing shrubs per 300 square feet of interior landscaping.

Findings: It is anticipated that once the two systems are fully operational, the need for on-site parking will be limited to maintenance vehicles and service technicians. Unlike other industrial uses, battery energy facilities do not employ a significant number of staff, as these systems are designed and operated remotely. Therefore, parking for the facility itself is found to be generally not applicable.
Separately however, is the parking requirements for any open space and recreational use. Dependent on the type of recreational use proposed for the remaining acreage, additional landscaping may be required, in accordance with the Ordinance.

Additional parking lot landscaping may be required, subject to determination of the type of open space / recreational use that is proposed. The property most recently was used as a golf course. The application materials do not indicate that there has been a discussion with the Parks and Recreation Department to assume the proposed 105.6 acres of open space. In the application the applicant made the following statement regarding the proposed open space:

> *"At least 100 acres must remain open space or can be offered by the applicant for public recreation indoor or outdoor uses. Subject to Township Planning Commission approval, as part of the special land use approval, the open space/public recreation may be split off from the facility parcel with proper assurances but shall still count towards the Township district aggregate.*
>
> RESPONSE: This requirement is met. The Applicant will be designating 105.06 acres of the Property as open space/recreation or outdoor uses pursuant to the Ordinance. The Applicant recognizes the Township's interest in the meaningful and durable community benefit that this lands provides. The Applicant further remains committed to working with the Township in good faith to identify the most appropriate recreational use, access rights, and implementation structure for this space. The Applicant proposes that the specific details such as type, scope, design, ownership structure, construction timeline, and other implementation details for the recreational use be set through a separate joint development agreement or similar mutual acceptable mechanism after the Project advances through the planning and zoning approval."



4. STORM WATER MANAGEMENT

A. 5.8.A.6 Stormwater management and soil erosion control plans of a site being clear cut shall be subject to review and comment by the Township Engineer. If it is determined that the erosion control measures either proposed or implemented by the applicant do not satisfy the general provisions described below, the Township reserves the right to place additional requirements on the clear cutting permit to rectify such deficiencies.

The applicant is advised that Section 5.8 – Clear cutting of trees – within the Township's Zoning Ordinance is applicable regarding "*any activity that involves the clear cutting of one or more acres of land*".

B. 5.8.B.2 2. To preserve viewsheds along roadways and buffer adjoining properties, a 20-foot-wide buffer area of undisturbed vegetation shall be maintained along roadways and property lines. Clear cutting will not be permitted within buffer areas; however, harvesting of select trees within the buffer area and development of roadways may be permitted with approval from the Planning Commission. This provision shall not apply to sites, that through the site plan review process, are subject to the landscaping provisions of Section 5.4 Landscaping where a minimum 20-foot-wide greenspace will be established along the perimeter of the site.

C. **Run off of surface water.** Per Section 5.6(F)(3) All structures and land uses hereafter established in the Township shall be established in such a manner as to prevent any additional run off of surface water onto adjoining properties.

Per Sheet C300 Erosion and Sediment Control the applicant proposes discharge to the "Michigan Central Railway ROW" with a "final outfall to Marrow Pond".

The applicant has provided the following narrative regarding run off of surface waters:

Response: Sheet C300 is in relation to the Phase 1 Erosion Control Plan - which outlines temporary measures that need to be in place before construction/disturbance starts. The note stating the discharge is being routed to Railway ROW and Morrow Pond is a description of the existing runoff condition and anticipated final outlet point. The proposed stormwater runoff from the BESS yard and substation are routed to the on-site detention basin, where it is managed and controlled before discharging from the basin over 1,700' north of the Railroad ROW. Runoff from the proposed access road is routed to roadside swales with permanent check dam controls.

"Per Section 5.6(F)(3) All structures and land uses hereafter established in the Township shall be established in such a manner as to prevent any additional run off of surface water onto adjoining properties."

We have no control over the runoff in the existing condition, but the stormwater management plan proposed will prevent any additional runoff of surface water to adjoining properties. We call out the discharge location to Railroad ROW and Morrow Pond on the Phase 1 Erosion Control Plan to make the reviewer aware that it is an existing condition. Although off-site runoff is inevitable in the proposed condition (it is typical practice to match the existing discharge location, where possible), there will be onsite management and a reduction in peak runoff rates in comparison to the existing condition.

Further review of storm water management has been conducted by the Township's Engineer. Findings and determination will be presented in a separate memorandum.

5. OFF-STREET PARKING

A. Parking. Per section 5.2(D)(7) Table of Required Off-Street Parking, details the off-street parking requirements for recreational uses. As previously referenced, the primary use of the site is that of battery energy storage, which does not require significant parking spaces for employees. Further, the narrative provided notes that discussion with the Township will be undertaken regarding what type of recreation the remainder of the site will entail.
Given that the recreational component has not been identified/depicted on the site plan, calculating parking requirements is not attainable at this time.

Defining the type of recreational use will need to be undertaken in order to determine compliance with this provision. However, given that the proposed facility does not generate vehicular traffic (as a commercial space may), off-street parking for on-site employees is anticipated to be negligible; the Planning Commission may wish to make a determination that the proposed plan set meets the intent of the ordinance.

B. Layout and Dimensions. Per the Township's Zoning Ordinance Section 5.2(E)(2) Layout, Construction and Design, parking spaces are required to be 9.5 feet wide, and 20 feet deep. Maneuvering lane width for one-way traffic is required to be a minimum of 14 feet for parking patterns that are between 54 degrees to 90 degrees.

Findings: No apparent note to parking has been established at this time. Clarification regarding parking standards will need to be provided.

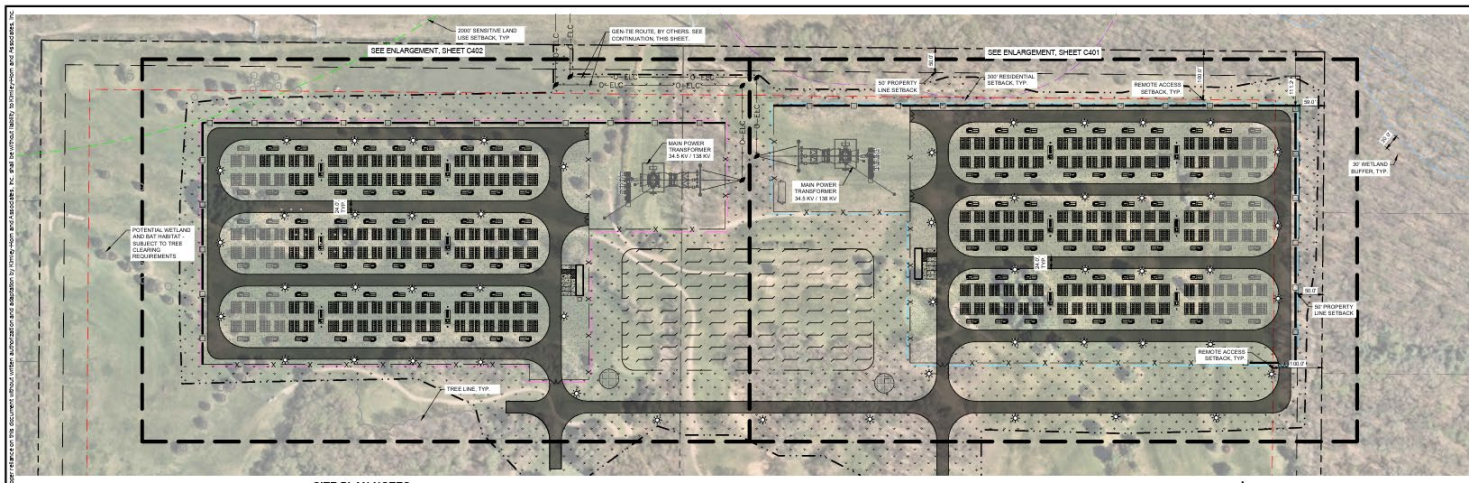
6. EXTERIOR LIGHTING

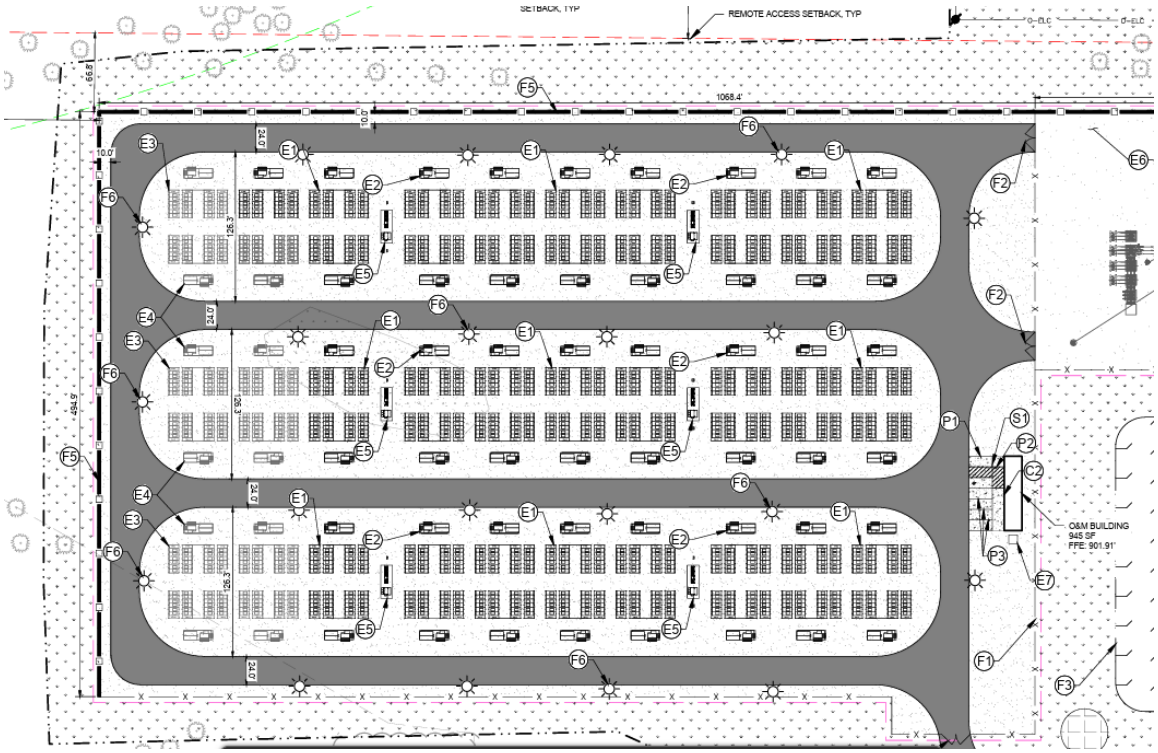
All exterior lighting. The regulations are intended to accomplish the following; Protect the public health, safety and general welfare; Provide for the fair and consistent enforcement of these regulations; Control light spillover and glare; Minimize the detrimental effect of exterior lighting on astronomical observations by the general public; Encourage lighting arrangements which conserve energy; Preserve community character; Provide for nighttime safety, utility, security and productivity.

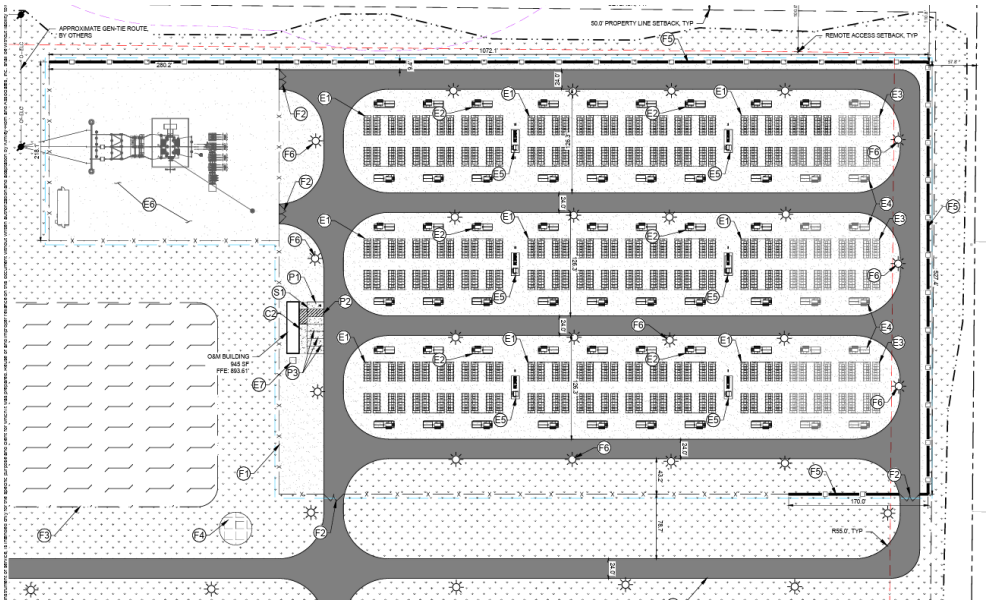
Sufficient lighting shall be required for parking areas, walkways, driveways, building entrances, loading areas and public areas to ensure the security of property and safety of people. Site and area lighting shall be designed so that light levels do not exceed 10.0 footcandles within the site.

Findings: The narrative submitted notes lighting at the front gate, operations & management building, battery yard and substation. The narrative references that additional lighting may be placed throughout the site in the form of motion activation or light sensitive (evening illumination, daytime non-illuminated). The plan set notes general placement of safety lighting along the access aisles and interior circulation system.

The following graphic, provided by the site plan, notes approximate location of lighting (for a larger image, please defer to sheet C400). A photometric plan has also been submitted within the site plan materials.


SEE ENLARGEMENT, SHEET C402
SEE ENLARGEMENT, SHEET C401
200' SENSITIVE LAND USE SETBACK, TYP
GEN-TIE ROUTE, BY OTHERS. SEE CONTINUATION, THIS SHEET
50' PROPERTY LINE SETBACK
200' RESIDENTIAL SETBACK, TYP
REMOTE ACCESS SETBACK, TYP
MAIN POWER TRANSFORMER 34.5 KV / 138 KV
30' WETLAND BUFFER, TYP.
POTENTIAL WETLAND AND BAT HABITAT - SUBJECT TO TREE CLEARING REQUIREMENTS
TREE LINE, TYP.


SETBACK, TYP
REMOTE ACCESS SETBACK, TYP
1068.4'
O&M BUILDING
945 SF
FFE: 901.91'



7. ADDITIONAL AGENCY REVIEWS & CONSIDERATIONS

Additional supplementary reviews from the Township's Engineer, Township's Fire Authority and any additional third-party reviewing agency will be provided separate memorandums, should their review comments be applicable to this project.

Supplemental Considerations

A. Given the scope and size of the proposed facility, McKenna encourages the applicant to engage in a dialogue with the Township's Fire Authority to establish an identifiable grid-like system on both sites. Such grid system would be visible from aerial drones, listing an alphanumeric value along one axis of the site, and Arabic numerals along the other axis of the site. Such system would allow for ease of reference to emergency responders and monitoring call center technicians.

B. In tandem with the proposal above, McKenna further encourages the applicant to place Arabic numerals on the containers themselves, allowing for visual reference when viewing the facility from the exterior of the property or if circumstances warrant, interior access.

C. Per Section 5.6.B.1 stormwater management/soil erosion plan the Kalamazoo County Drain Commissioner review and approval of a stormwater management and soil erosion control plan shall be obtained and proof of a soil erosion and sedimentation control permit from the Kalamazoo County Drain Commissioner's office shall be provided prior to the commencement of any site/earth changes or work.

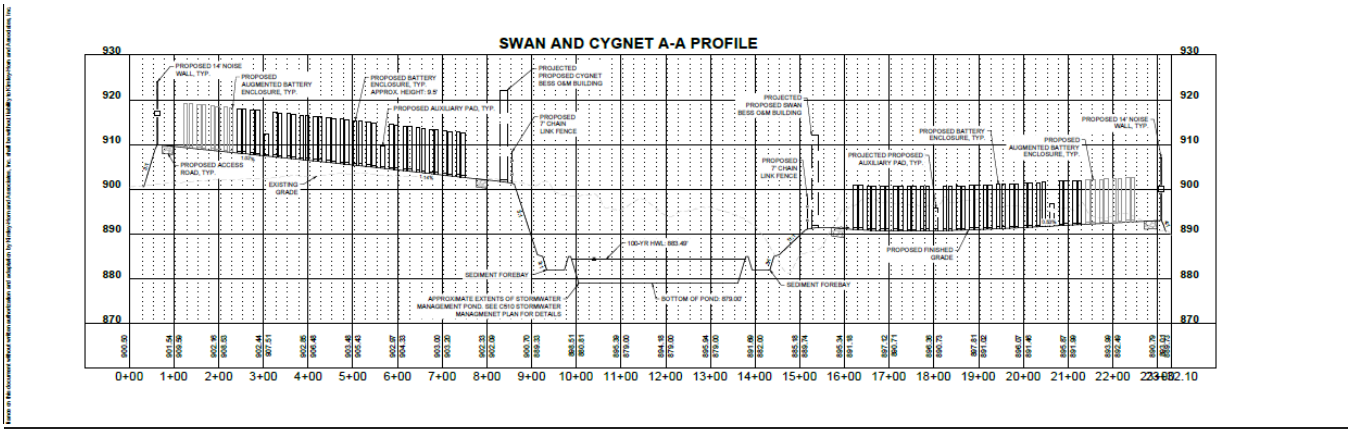
As a reminder to the Planning Commission (and public at large) the level of detail and information required for this type of land use is extensive; it is anticipated that further dialogue regarding material clarification will be warranted.

Battery Energy Ordinance Standards

Section 4.61 details the requirements for a battery energy storage system. Some components have already been addressed within the site plan review criteria (setbacks, lighting, parking). The remainder of the provisions of 4.61 that are applicable to this review have been noted below.

A. ***Height****. The height of battery energy storage system structures, except for electric distribution and transmission poles, shall not exceed a height of fifteen (15) feet as measured from the natural grade of the property beneath the structure.*

Finding: The narrative provided notes "this requirement is met. See Exhibit 3" – please see Sheet C520, a snip of the profile of the BESS is included below. The battery units are less than fourteen (14) feet tall. The proposed sound barrier wall (proposed to be made out of wood) is shown at fourteen (14) feet tall.



B. ***Fencing****. The system shall be completely enclosed with fencing in compliance with the latest version of the National Electrical Safety Code or any applicable successor standard approved by the Michigan Public Service Commission.*

Findings: The applicant proposes fencing to be installed around the perimeter of the battery yard. The fence is shown to be six (6) feet in height, with one (1) additional foot of three-rung barbed wire. Gates are shown to be 24 feet in width. Additionally, the fence diagram calls out a Knox Box – a small, secure container (safe) installed on the outside of buildings, allowing fire departments and emergency services to access keys during emergencies. Based upon the submitted material, this provision appears to be satisfied.

C. ***Sound.*** *The system may not generate a maximum sound in excess of 55 average hourly decibels measured at the property line of an adjacent non-participating property . Decibel modeling shall use the A- weighted scale designed by the American National Standards Institute.*

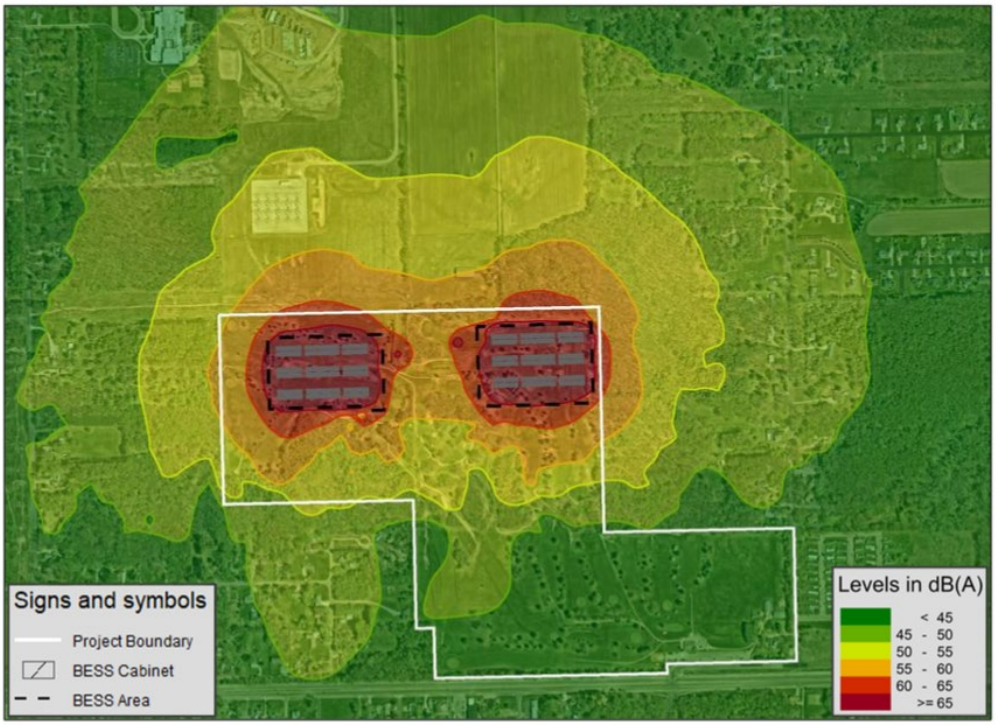
Findings: Sound has been one of the consistent concerns raised by the general public during project overview and introduction; because of this, additional scrutiny is anticipated from the public at-large regarding this specific component of the project. The study provided by *Kimley-Horn*, references "*unmitigated maximum equivalent operational noise levels at the project boundary were estimated to be near or below approximately 63 dB(A) during peak operations; therefore, mitigation is recommended at this time*".

The sound study notes the following projected levels without mitigation measures:

Kimley»Horn of Michigan, Inc.

Swan BESS and Cygnet BESS - Noise Study
March 30, 2026 - Page 7

Figure 3: Anticipated Operational Noise Contours

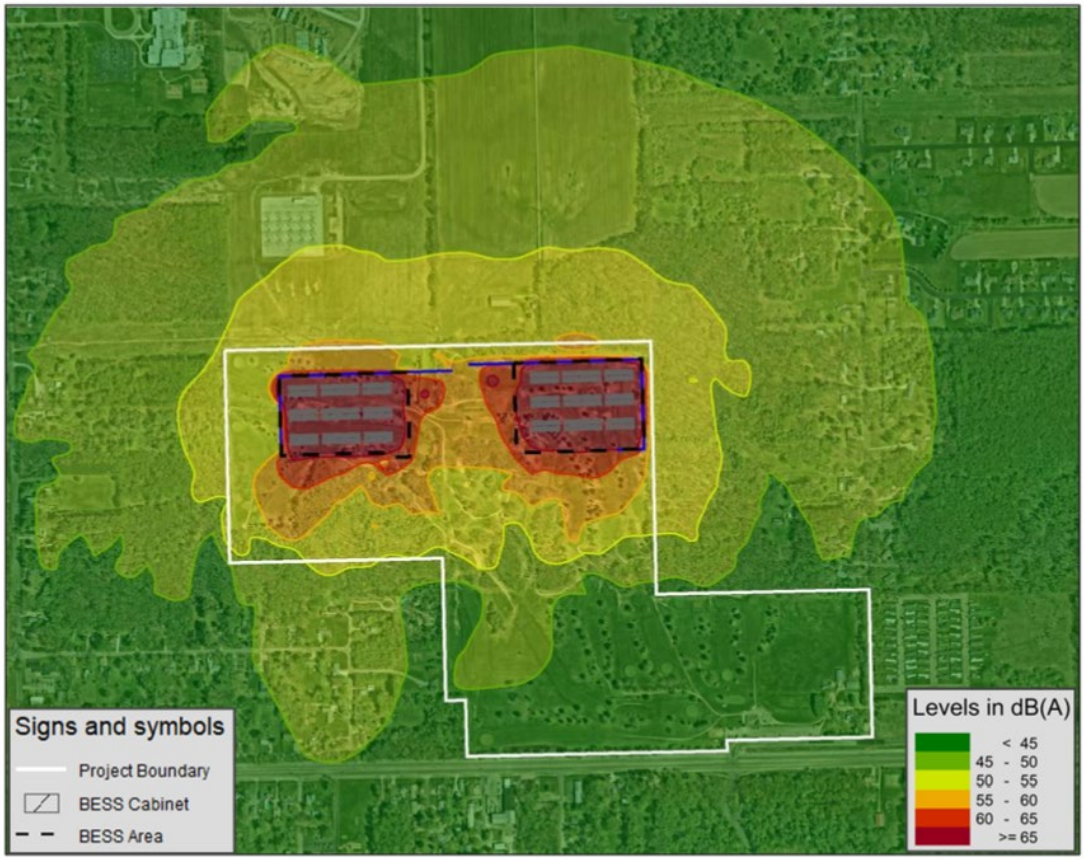


The study further proposes potential mitigation measures in order to reduce the anticipated noise levels from 63 dB(A) to 55 dB(A) or below. The study indicates that *sound walls* along the area would reduce the anticipated on-stie operational noise by up to approximately 9 dB(A) at the closest property line of adjacent non-participating properties. The sound wall is proposed to be 14 feet in height and have an approximate length of 3,370 feet (shown in the below figure). The sound wall is proposed to be made out of wood.

While not part of the battery energy storage structure, the 14-foot height of the sound wall is below the maximum height permitted for storage structures (15 feet). It is also important to note that the applicant has determined that noise mitigation is required and has shown the steps in which such mitigation will be undertaken. Therefore, subject to the sound walls being constructed prior to operation of the facility, this provision can be considered satisfied.

Supplementally, the site plan notes the installation of vegetation along the northern boundary of the western facility, which may also mitigate potential noise trespass from the equipment.

Figure 4: Anticipated Operational Noise Contours with Noise Wall



D. ***Lighting****. The system must implement dark sky-friendly lighting solutions.*

Findings: A photometric plan has been submitted for consideration. The lighting notes provided indicate that light poles will have a height of 25 feet. The narrative provided indicates that on-site lighting will be equipped with sensors, to activate the fixtures during evening hours and discontinue their illumination during daylight hours. The general notes on the lighting plan indicate that illumination levels at the property line will not exceed 0.2 foot-candle.

While minor in nature and not detrimental to this plan review, the lighting plan references compliance with "*Township of Gun Plain Charter, Michigan Jurisdictional Standards"*. Confirmation that the **Comstock Charter Township** standards will be met is desired.

GENERAL NOTES

1. PROPOSED POLE MOUNTED LUMINAIRES TO BE POST TOP MOUNTED ON A 25 FOOT POLE ATOP A CONCRETE BASE FLUSHED MOUNTED WITH THE GROUND UNLESS OTHERWISE SPECIFIED. POLE MOUNTING HEIGHT CHOSEN TO COMPLY WITH THE TOWNSHIP OF GUN PLAIN CHARTER, MICHIGAN JURISDICTIONAL STANDARDS.
2. CALCULATED VALUES ARE DERIVED THROUGH A COMPUTER BASED MODEL WITH LIGHT FIXTURE DATA AS SUPPLIED BY MANUFACTURER THROUGH IES FILES.
3. ANY DEVIATION FROM SPECIFIED FIXTURE MODELS AND MOUNTING HEIGHTS IN THIS EXHIBIT WILL DISCOUNT THE VALIDITY OF THESE CALCULATIONS.
4. NO EXCESS OF 0.2 FOOT-CANDLE MEASURED AT THE PROPERTY LINE.
5. ALL LUMINAIRE SYMBOLS ARE DIAGRAMMATIC ONLY. CONTRACTOR TO FIELD COORDINATE EXACT LOCATIONS AND SETBACKS AGAINST UNDERGROUND UTILITY AND OTHER OBSTRUCTIONS.
6. ALL PROPOSED LUMINAIRES SHALL BE DARK SKY COMPLIANT AND SHALL HAVE A CORRELATED COLOR TEMPERATURE (CCT) OF 3000K OR LOWER. LUMINAIRES SHALL BE DESIGNED AND INSTALLED TO MINIMIZE UPLIGHT, GLARE, AND LIGHT TRESPASS IN ACCORDANCE WITH APPLICABLE LOCAL ORDINANCES.

E. ***Signage.*** *The following requirements shall apply to the entire system, or to designated components of the system, as indicated:*

a. Safety Signage. The system shall post signs in compliance with NFPA 70/70E or any applicable successor code in place at the time of application for approval. Additionally, signage shall be provided per NFPA 855 7.4.4, or any applicable successor code in place at the time of application for approval, including information on the system type and technology, special hazards, fire suppression system and 24-hour emergency contact information, including reach-back phone number. A clearly visible warning sign concerning voltage shall be placed at the base of all pad-mounted transformers and substations.

b. Other Signage: Additional signage may be permitted or required by the Planning Commission as is necessary to ensure the safe operation of the system.

c. The facility shall comply with NFPA 855 "Standard for the installation of Stationary Energy Storage Systems" or any current standard adopted by the Michigan Public Service Commission at time of application submission.

Finding: Submission materials note safety signage to be installed on site. Further review of safety signage will be conducted by the Township Engineer and Fire Department to ensure adequate compliance as it relates to those specific trades. See Sheet C800.

F. ***Landscaping.*** *The Planning Commission may require reasonable measures to minimize visual impacts by preserving existing natural vegetation, requiring new vegetative screening or other appropriate measures. The Planning Commission shall determine such visual screening measures as may be required, if any, on a site- specific basis pursuant to the standards for special land use approval as specified in Section 6.2 the landscaping standards of Section 5.4, and/or the standards for site plan approval as specified in Section 6.1 of this Ordinance, as well as all other applicable sections of this Ordinance. In making this determination the Planning Commission is specifically authorized to consider whether additional visual screening measures are appropriate where a system is proposed to be located on property adjoining any residential zoning district classification or residential use.*

Finding: See the proposed landscaping plan. As indicated in the site plan review, the applicant proposes to retain approximately 81% of the existing trees on site – 5,690 of the 7,047. The landscaping plan also notes the installation of new vegetation along the northern portion of the Swan site, with retention of existing vegetation along the Cygnet facility. The property located immediately north of the Swan portion of the facility is owned and maintained by Consumers Energy, as it is part of the transmission distribution line to the electrical substation. Additional screening and vegetation may not be as advantageous, above and beyond what the applicant has proposed. Long term consideration of such vegetation will need to consider its impact on the transmission lines serving the electrical substation and if the installation of additional vegetation will have a positive or negative impact on the operations of substation. See Sheet L100.

G. ***Access Management Drives.*** *If the system includes an access drive(s) for maintenance purposes, the surface of the access drive(s) shall be permeable (unless on brownfield land or on an already paved surface at the time of application for approval, such as a parking lot or former building foundation.)*

Findings: Based on the provided site plan, the access drive to the facility appears to be composed of permeable materials, based on the symbology. Further documentation references crushed gravel to be utilized throughout the site. Subject to the gravel being reviewed by the Township's Fire Department as meeting the weight standards to support fire apparatus, this provision can be satisfied.

H. ***Impervious Pavement****. Except as otherwise depicted on and subject to approval of the Planning Commission, the area within which the system is located shall not be paved with asphalt/concrete or any other surface material that is impermeable to water other than for slab foundations for structures and equipment. This shall not apply to a system located on brownfield land or on an existing paved area such as a former building slab or in an unused parking area when adequate parking remains for all other uses on the site.*

Finding: See note above – subject to confirmation from the applicant, this provision appears to be satisfied.

I. ***Run-off.*** *All surface water runoff shall be effectively managed on-site.*

Finding: While the Township's Engineer will review the project in greater detail for stormwater management, the application material notes onsite stormwater retention, which is shown to be a shared retention basin, located in the center of the project site. The proposed topography of the site, once fully constructed, notes that surface water will drain towards the retention basin – see Sheet C304. Subject to the final construction of the site, and prior to operation of the facility, this provision appears to have a disclaimer that some runoff will go towards Morrow Lake. This should be further reviewed by the Township's Engineer.

J. ***Installation and Operational Safety.*** *The system shall comply with all of the following requirements:*

a. *The system shall be designed and constructed for interconnection to a Michigan Public Service Commission or Midcontinent Independent System Operator regulated utility electrical power grid and shall be operated with such interconnection.*

b. *The system and all foundation elements shall comply with all applicable building and electrical code requirements, and any applicable federal/state regulations. The manufacturer's engineer or another qualified engineer shall provide written certification that the design, installation (including foundations), and interconnection is compliant with the manufacturer and industry standards, all applicable local construction and electrical codes, and any applicable federal/state regulations.*

c. *Other than transmission or distribution lines for interconnection to the electric power grid, all electrical wiring shall be buried underground; except where the manufacturer's engineer or a qualified engineer employed by the utility that owns/operates the electrical power grid to which the system shall be interconnected certifies an underground wiring installation is not permitted by an applicable code and/or applicable federal/state regulation, with attached complete documentation supporting any such certification.*

d. *The system shall be designed, located, and maintained so as to comply with all applicable codes and regulations.*

Finding: compliance with connection requirements more aligns with review by those specific professions/trades; this review does not validate nor invalidate that this provision has been satisfied. The applicant has provided a narrative that describes their compliance with this provision. The Planning Commission could request further documentation noting compliance with this provision from those who are better aligned to evaluate full compliance.

K. ***Repair and Augmentation.*** *In addition to repairing or replacing facility components to maintain the system, the facility may at any time be augmented without the need to submit a new site plan so long as the augmentation is within the same footprint (e.g., same dedicated use building or on footings/foundations in the same location) as the original permit. If there is a change in the battery chemistry, an updated Hazard Mitigation Analysis, Fire Response Plan, and Emergency Response Plan shall be provided. When a facility is anticipated to be augmented over its lifetime by adding additional components, the applicant shall apply for the final/augmented site arrangement. A*

proposal to increase the size of the project footprint may be considered a new application, subject to the ordinance standards at the time of the request.

L. ***Public Safety.*** *The Emergency Response Plan and Fire Response Plan shall provide reasonable protection of the public health, welfare and safety including but not limited to an emergency shutdown procedure in place and shall provide the local fire department site safety plans to include electrical, fire, smoke, and hazardous materials release, emergency response protocols and identification of typical hazards related to, electrical, fire, smoke and hazardous materials pertinent to the facility. Upon request, all systems shall provide first responder training at the site.*

Finding: The Township Fire Authority will further review this provision for compliance, as they are better trained and equipped to analysis the documents that are applicable to this section.
To further promote the health, safety and welfare of the community, as well as first responders, McKenna encourages that the applicant and fire authority discuss the ability to create a grid-reference system on both facility sites. Such reference system would be visible from aerial drone usage, as well as from those around the perimeter of the site. Numbering and lettering would be placed along the perimeter of the fence line, as well as numbering placed on each battery unit itself.

Notes on the Emergency Response Guide

The Emergency Response Guide (ERG) provides general information, site layout, battery system precautions, fire response guidelines, fire/explosion protection guidelines, site photos and safety data sheets. Page 4 of the ERG does not list contact information, but references that such information will be finalized and provided prior to the implementation of the guide (pg 5).

The ERG references *oil-filled transformers*, but does not note the number of gallons of insulating oil to be utilized for both the auxiliary transformers nor the MV transformers. Additionally, the ERG notes safety data sheets, but without any content. While it is partially McKenna's understanding that this information will be provided upon selection of equipment, the Planning Commission may consider that as a stipulation of approval, this information is provided prior to either building permit authorization or final certificate of occupancy. A 'trigger' requirement to mandate that this information be provided may be appropriate for further consideration.

M. ***Environmental****. An applicant shall submit an environmental impact analysis that identifies potential impacts of the proposed system on the environment and natural resources and how the applicant intends to address and mitigate these impacts.*

Finding: The applicant has provided an environmental impact assessment of the subject property, with callouts related to the below. The study was prepared by SWCA Environmental Consultants, with their findings synopsized herein. For a full analysis of their report, defer to Exhibit O – Environmental.

i. Critical Environmental Issues: no environmental fatal flaws identified.

ii. Cultural Resources: review noted one previously recorded archaeological site within the study area. On site testing was not able to locate said finding nor was the site able to be

verified by the Michigan State Historic Preservation Office (MSHPO). The applicant notes in their environmental letter that a total of 306 shovel test pits were excavated within the survey area (17 acre region) – all of which were negative for pre and post contact artifacts.

iii. Aquatic Resources: the study noted that an aquatic resource was located in the western portion of the site. However, it appears to be a low-quality wetland and is present as an isolated feature on the landscape with no significant aquatic features present within 500 feet of its boundary.

iv. Threatened and Endangered Species Habitat: SWCA concluded that habitat for one listed species, Indiana bat, is present in the potential project area. However, avoiding the large forested area to the west of the proposed project area and limiting large tree clearing to occur between November 1 and March 31, would result in the project not likely to adversely affect listed species.

N. *Decommissioning and Removal. The system shall comply with all of the following requirements:*

a. A Decommissioning Plan, including a Decommissioning Agreement in a form recordable at the Kalamazoo County Register of Deeds, shall be provided and shall address the following:

v. State the anticipated life of the project;

vi. Describe estimated decommissioning costs in current dollars and provide that this figure will be updated every third (3rd) year after commercial operation of the system; Township zoning administrator may administratively review and accept estimated decommissioning costs for periodic review;

iii Be signed by the party responsible for decommissioning, and shall bind all successors, heirs and assigns;

iv. Define the conditions upon which decommissioning will be initiated (e.g.; end of land lease, no power storage for 12 months, etc.);

v. State that all equipment, conduit, structures, fencing, roads, and foundations will be removed to a depth of four (4) feet by the end of the decommissioning period;

vi. Require property to be restored as near as reasonably possible to the condition it was in prior to the development of the system;

vii. Describe the timeframe for completion of decommissioning activities;

viii. Describe any agreement (e.g., lease) with the landowner regarding decommissioning;

ix. State the party currently responsible for decommissioning; and

x. Describe any plans or circumstances requiring an update of the decommissioning plan.

Finding: The decommissioning plan notes an expected project life of 20 years, with the option to reevaluate for continuation or decommissioning at the end of the 20-year period. The plan further outlines the responsibilities, which includes removal of above/below ground cables, equipment, structures, fences and foundations of four (4) feet; restoration of the surface grade; revegetation of restored soil areas; time frame for completion of site restoration work and when the decommissioning plan would take effect.

Page 9 of the decommissioning plan notes that '*all decommissioning activities expected to be completed within 12 months of the project's closure".* Further, page 11 of the plan, under *3.12 – restoration of site* – notes that "*the projects disturbed land will be restored to the original uses before construction. Restoration will consist of re-grading to reestablish the pre-existing topography.* The submission detail notes the area will be returned to a meadow-like state.

b. *A recorded copy of the Decommissioning Agreement shall be executed and recorded upon issuance of a building permit or if a building permit is not required, within 7 days prior to commencement of construction. A proposed draft of the proposed Decommissioning Agreement shall be provided to the Township within 30 days after special land use approval.*

c. *Decommissioning shall be completed within 12 months of determination by the Township Board that the system is no longer being maintained in an operable state of good repair, unless the current responsible party provides substantial evidence to the Planning Commission of the intent to maintain and reinstate operation of the system.*

Finding: the decommissioning plan notes completion by 12 months of the project's closure. This provision appears to be satisfied.

d. *The Decommissioning Plan shall include financial assurance in the form of a trust fund, a bond, or an irrevocable letter of credit as required by the Planning Commission. The amount of the financial assurance shall not be less than the estimated cost of decommissioning the system. Salvage value shall not be included in the estimated cost of decommissioning. The financial assurance must be posted in full (125%) before the start of commercial operation and continuously maintained for the period of the life of the system. The Township must be notified in writing at least 60 days before the bond or other financial surety is set to expire. Failure to provide proper notification and updated bond information is a violation of this ordinance. Notification under this Section must be made to the following Township officials/employees: (1) Supervisor; (2) Clerk; (3) Chair of the Planning Commission; and (4) Superintendent. Notwithstanding anything to the contrary, at all times during construction and prior to commercial operation, financial assurance must be provided in an amount to assure proper decommissioning of the site.*

Finding: The applicant is advised that salvage value shall not be included into the Decommissioning Plan. The Township's Legal Counsel will also review the document for compliance with applicable regulations and to ensure the Township is properly protected from any adverse impacts, should this plan need to be executed.

O. ***Special Land Use Permit and Site Plan Application Requirements****. Applications for special land use permit approval shall comply with Section 6.2 of this Ordinance. A formal application for site plan approval for this land use shall comply with Section 6.1 of this Ordinance. An incomplete application will not be accepted. Each such application shall also be subject to the following additional submission requirements:*

a. The site plan shall be submitted with the special land use permit application.

b. The submission shall include content responsive to all the following, to the extent not otherwise provided pursuant to the above referenced sections:

i. All information and supporting materials relied upon by the applicant to demonstrate compliance with all special land use permit approval standards and site plan approval standards as specified in this Ordinance.

ii. A Fire Response Plan and an Emergency Response Plan.

a). *The Fire Response Plan (FRP) shall include:*

1. *Evidence of consultation or a good faith effort to consult with local fire department representatives to ensure that the FRP is in alignment with acceptable operating procedures, capabilities, resources, etc.*
2. *A description of all on-site equipment and systems to be provided to prevent or handle fire emergencies.*
3. *A description of all contingency plans to be implemented in response to the occurrence of a fire emergency.*
4. *A commitment to review and update the FRP with fire departments, first responders, and county emergency managers at least once every three (3) years.*
5. *An analysis of whether plans to be implemented in response to a fire emergency can be fulfilled by existing local emergency response capacity. The analysis should include identification of any specific equipment or training deficiencies in local emergency response capacity and recommendations for measures to mitigate deficiencies.*
6. *The means by which firefighters and other emergency services personnel can access and shut down the system on an emergency basis. This information shall be provided to the Township or other appropriate agency managing emergency response.*
7. *A 24-hour emergency contact telephone number for use by emergency services providers.*
8. *The FRP must meet all requirements of the Clean and Renewable Energy and Energy Waste Reduction Act, as amended, MCL 460.1001 et. seq*

9. *Other information the applicant finds relevant.*

10. *Other information the Fire Department finds relevant.*

Finding: the applicant has submitted a fire response plan; as McKenna planners do not hold certification in fire safety nor hazardous substance management/response, deferment to the Township's Fire Authority is appropriate.

iii. The Emergency Response Plan (ERP) shall include:

1. *Evidence of consultation or a good faith effort to consult with local first responders and county emergency manager to ensure that the ERP is in alignment with acceptable operating procedures, capabilities, resources, etc.*
2. *An identification of contingencies that would constitute a safety or security emergency (fire emergencies are to be addressed in a separate fire response plan);*
3. *Emergency response measures by contingency;*
4. *Evacuation control measures by contingency;*
5. *Community notification procedures by contingency;*
6. *An identification of potential approach and departure routes to and from the facility site for police, fire, ambulance, and other emergency vehicles;*
7. *A commitment to review and update the ERP with fire departments, first responders, and county emergency managers at least once every three (3) years;*
8. *The means by which firefighters and other emergency services personnel can access and shut down the system on an emergency basis. This information shall be provided to the Township or other appropriate agency managing emergency response.*
9. *A 24-hour emergency contact telephone number for use by emergency services providers.*
10. *An analysis of whether plans to be implemented in response to an emergency can be fulfilled by existing local emergency response capacity, and identification of any specific equipment or training deficiencies in local emergency response capacity;*
11. *Other information the applicant finds relevant.*
12. *Other information the Fire Department and County Emergency Manager finds relevant.*

Finding: The applicant has submitted an emergency response guide; further review and analysis of the submitted documents will be conducted by those entities whom have the expertise and certification to review such plan documents.

iv. A report detailing the sound modeling results along with mitigation plans to ensure that sound

emitted from the system will remain below the required limit throughout the operational life of the system.

Finding: A sound study has been submitted for consideration. As identified within the site plan review of this comprehensive memorandum, the unmitigated maximum equivalent operational noise levels at the project boundary are shown to be estimated to be near or below approximately 63 dB(A) during peak operations. Such *unmitigated noise* will exceed that permitted by the Township's ordinance.

The sound study notes that a 14-foot sound wall, along the BESS areas in the northern portion of the site is recommended for implementation. Confirmation from the applicant that such sound walls will be installed, prior to any operation of the facility is warranted; the Commission may decide that a stipulation of approval (if granted) could be that such sound wall is installed prior to the initial operation of the facility. Note – it may be appropriate to have such condition be tied with the **first** operational container for energy storage and not the full operation of the entirety of the site.

Diagrams and specifications of the proposed sound wall may also be appropriate, prior to the commencement of operations. The noise study references a 'sound wall' but does not appear to further detail the specifications of such wall and its design parameters.

v. *Hazard Mitigation Analysis that complies with NFPA 855, as amended.*

Finding: A Hazard Mitigation Analysis report has been provided for consideration; McKenna defers to the Township Fire Authority for additional review considerations and comments.

vi. *A Groundcover and Vegetation Establishment and Management Plan shall be provided as part of the site plan. Vegetation establishment must include native species and natural seed mixes and may not include invasive plant species or noxious weeds and shall satisfy Section 226(6)(a) and Section 226(6)(b) of Michigan Public Act 233 of 2023.*

Finding: A tree preservation plan and landscaping plan have been provided by the applicant. Landscaping analysis has been conducted during the site plan review process – please defer to comments listed therein.

vii. *Equipment specification sheet(s) for the system components, if available.*

Finding: Equipment specification sheets have been referenced within the submission material, as well as shown in Exhibit M. Prior to building permit authorization, a final equipment specification sheet(s) shall be submitted.

viii. *All proposed changes to the landscape of the existing site, including grading, vegetation removal, fencing and vegetative screening. Views shall be minimized from adjacent properties to the extent reasonably practicable using architectural features, earth berms, landscaping or other screening methods that will harmonize with the character of the property and surrounding area while not interfering with ventilation or exhaust ports.*

Finding: Landscaping plans have been provided for review; defer to the site plan analysis portion of this review for further details.

ix. *Drawings showing the layout of the proposed system, including distances from all existing and proposed structures/buildings and fencing on the site to all lot lines including to all boundaries of a leased site, where applicable, and to all structures/buildings on adjacent nonparticipating properties.*

Findings: Drawings and layout diagrams have been included for review, showing proposed structures and buildings and distances to property boundaries.

x. *Preliminary Augmentation Plan demonstrating the proposed augmentation phases including which structures/components are expected to be installed and in which time frames shall be provided.*

Finding: The applicant's legal counsel has provided a response letter, which notes the following pertaining to this requirement: *"the applicant acknowledges and will comply with this requirement. If necessary, a Preliminary Augmentation Plan will be provided prior to the issuance of a Building Permit".* As this appears to be a specific requirement, the applicant will need to provide the preliminary augmentation plan as part of their submission. McKenna notes that such a plan will be preliminary, and subject to additional modifications as engineering drawings are finalized and prepared.

xi. *The height of all existing and proposed buildings/structures.*

Finding. Please see Sheet C520 for height of the proposed BESS units and the associated fourteen (14) foot tall sound wall. The height for both structures is within the allowed fifteen (15) foot tall height requirement.

xii. *A preliminary electrical schematic plan for the proposed system, including disconnect and overcurrent devices.*

Finding: A preliminary electrical plan has been submitted for consideration. McKenna defers to the Township's Engineer and electrical inspector for confirmation of compliance with regulations and industry standards.

xiii. *Preliminary Decommissioning Plan and Decommissioning Agreement as described above.*

Finding: See note in previous section regarding decommissioning.

P. *Waiver. The Township Planning Commission shall have the authority to review and consider alternatives in both the dimensional and physical requirements contained in this ordinance as part of the special land use review process upon a finding that such change promotes the health, safety and general welfare of the Township. In addition, the Township recognizes the ever-changing technical capabilities of battery storage infrastructure and of new technology in general, and that changing technology may result in future changes to an approved Battery*

Energy Storage System facility. Minor changes within the footprint of an approved Site Plan and/or Special Land Use Permit, such as, without limitation, modifying battery storage equipment with new technologies, may be administratively reviewed and approved by the Zoning Administrator.

Finding: The applicant's narrative notes a waiver is requested for this provision due to dual ownership of the project. Section V of the BESS Ordinance (Article 3, Section 3.1) states that a *Battery Energy Storage System Large Off-Site is a special land use in any zoning district on a parcel(s) of at least 140 contiguous acres and meeting the additional requirements in Article 4 Section 4.61.* Clarification is requested as to the applicant's desire to have this provision waived; would each facility (Swan & Cygnet) be owned and operated by two separate entities, not having a shared ownership? Further explanation is requested.

Q. *Modifications that increase a facility's footprint or total energy capacity by 10% or more require a new site plan and special land use approval by the Planning Commission. Any increase in energy capacity requires written notification to the Township Zoning Administrator and/or designated personnel at least 30 days prior to the increase in energy capacity. All obligations, including but not limited to the community host agreement and decommissioning agreement, must be updated to reflect the increase in energy capacity. The financial surety shall be increased if there is an increase in energy capacity.*

R. *An executed Community Host Agreement in the amount of an annual payment of $825 per megawatt of nameplate capacity for 20 years, which shall be executed prior to commercial operation of the Battery Energy Storage System facility. Payment to the Township shall begin upon commercial operation and it shall be the Township's option to require up to 66% of such total payment up front, not to exceed $2 million.*

Finding: A draft community host agreement has been provided by the applicant. Further review of this document is anticipated to be completed by the Township's legal counsel.

S. ***Building Permit or Construction****. Prior to issuance of a building permit or if a building permit is not required, within 7 days prior to commencement of construction, the following information shall be provided.*

a. *Equipment specification sheets.*

b. *Identification and contact information for the installer(s) of the proposed system.*

c. *Approved Augmentation Plan.*

d. *Approved Decommissioning Plan and Decommissioning Agreement in recordable form and acceptable to the Township Attorney.*

e. *Life expectancy of the system components including the anticipated schedule for battery replacement to maintain megawatts over the system's lifetime.*

f. *Hazard Mitigation Analysis.*

g. *Operation and Maintenance Manual.*

h. *Electrical schematic plan for the system, including disconnect devices.*

i. *An approved FRP and ERP by the Fire Chief.*

j. *Approved Decommissioning Plan, Decommissioning Agreement and proof of financial guarantee for decommissioning.*

Finding: Please defer to earlier sections regarding these requirements; as noted, some documents have not been submitted for preliminary review at this time. Preliminary documents will be needed for consideration.

T. On-Site Battery Energy Storage Systems.

1. *On-Site Battery Energy Storage Systems shall be allowed as permitted use in all zoning districts, subject to the provisions of the Zoning Ordinance.*

2. *A building permit shall be required for all on-site battery energy storage systems.*

3. *On-Site battery energy storage systems with an aggregate energy capacity of more than 1 megawatt are subject to additional regulations in the applicable fire code (NFPA 855, as amended), and required documentation shall be submitted along with the building/electrical permit applications.*

4. *Coverage. Lot coverage shall not exceed the otherwise permissible percentage of lot coverage in the applicable zoning district.*

5. *Setbacks. All battery energy storage system structures and related structural apparatus not physically attached to a building shall satisfy the setback requirements in the applicable zoning district, but in no circumstance may an on-site battery storage system or any related apparatus be less than 25' from a property line.*

Finding: please defer to earlier sections of this review analysis, which discuss these points in greater detail.

Special Land Use Review

The proposed project has been reviewed against Comstock's Zoning Ordinance and Master Plan. The following comments are offered for your consideration; underlined items require additional discussion and/or identify outstanding items to be addressed.

1. HARMONY WITH ZONING CODE

The special land use shall be harmonious with and in accordance with the general objectives, intent and purposes of this Code.

Findings: The intent of the *battery energy storage system ordinance* "*is to establish minimum requirements and regulations for the construction, erection, placement, location, maintenance, modification, operation, and decommissioning of Battery Energy Storage Systems in the Township in a manner that promotes economic development and ensures that the protection of health, safety and welfare while also avoiding adverse impacts to important areas such as agricultural lands, residential areas, endangered species habitats, conservation lands, and other sensitive lands*". As described herein the totality of this report, the proposed facility has been reviewed against the adopted zoning regulations and supplemental use standards. Given the thoroughness of the submission material, it is noted that the proposal generally meets with the intent of the zoning code.

It may be beneficial to note that this project has been reviewed against **adopted** standards and **best practices**. The findings herein do not discourage the opinions and continued expression of thoughts from the general public and any interest person(s); the findings are based on evaluation of the proposed project and its relation to code requirements.

Subject to plan implementation as approved, this provision can be satisfied.

2. HARMONY WITH EXISTING CHARACTER

The special land use shall be designed, constructed, operated and maintained in a manner harmonious with the character of existing and future land uses on adjacent property and the surrounding area.

Findings: The proposed project seeks to modify approximately 49 acres of a 140+ acre parcel of land that, prior to construction, has been utilized for paid active recreation purposes. The site plan notes retention of approximately 5,700 trees on the subject parcel, which will aid in the preservation of the existing character of the area. Further, the plan set notes the installation of additional screening along the northern site boundary, adding further vegetation to the parcels. Sound walls are also proposed, which are designed to mitigate adverse impacts from the facility onto adjacent properties at the boundary line.

The applicant has further noted in their narrative that the remaining acreage, 100+, will be left in an open-space-like state or be further developed for recreational purposes, as stipulated by the supplemental ordinance requirements.

It is anticipated that the greatest impact to the area will be during construction; this is due in part to the equipment and labor-power needed in order to facilitate the erection of the battery storage site. Once the overall project is fully completed, the impact on adjacent land uses is intended to be minimal, due to the nature of the use.

Further, with the adoption of the Battery Energy Storage System Ordinance by the Township Board (7-0 vote), the Township Board has indicated that the overlay district is, partially, harmonious with the existing character of the Township.

Comstock Charter Township Master Plan – Vision 2030

The Vision 2030 plan notes the following as part of the community's goals and objectives:

Sustainability

i. *To provide for renewable energy production, promote marginal lands, brownfields and gray fields for utility-scale solar energy systems in the agricultural and industrial districts near existing infrastructure and allow accessory solar energy systems in all districts while minimizing potential biological, agricultural, visual and other environmental impacts. And, encourage the continued operation and expansion of hydro power generation for nearby residences and businesses.*

   Finding: while the master plan does not directly reference battery energy storage systems (bess), we find that the intent of this statement partially supports the development of such facilities. The facility will be located near an electrical substation, which could be classified as "*near existing infrastructure"* – further supporting this goal of the community.

Recreation

ii. *To provide additional recreation opportunities in developing areas of the Township, amend the subdivision and site condo ordinance to require open space and sidewalks.*

   Finding: the application material notes that the remaining 100(+) acres of property will be retained as either open space or recreation. Subject to the type of recreation proposed by the applicant, this objective of the Master Plan appears to be supported. Full compliance with this objective would come upon completion of the project and operation of the recreational land space. The applicant is encouraged to continue dialogue with the Township on this provision.

3. ESSENTIAL CHARACTER

The special land use shall not change the essential character of the surrounding area.

Findings: This provision can be satisfied, subject to the applicant installing sound walls, additional screening vegetation, and designing the site as proposed. It should be further noted that the Township's Master Plan calls for this area of the Township to be future planned for a higher density of residential use; therefore, it has been visioned that at some future point, this region of the Township would be modified from its current state.

It is noted that a concern may be “the installation will change the character of the surrounding area” – while this development may modify the existing use of the subject sites, in a broader picture, **any** new development would change the character of the surrounding area. This includes the construction of one (1) single home where there are not currently homes; the construction of a commercial operation on a vacant lot, etc. It is important to consider the scale in which this proposed change may happen.

The Township’s BESS Ordinance, as adopted by the full Township Board, permits the development of a BESS facility on acreage greater than 140, but no more than 200, so long as at least 100 acres is maintained for preservation and open space. It is anticipated that this project will impact approximately 33 percent (33%) of the subject site, while 66 percent remains in a state of preservation and recreation. Therefore, while some change in the character of the property is anticipated, the majority of the property will remain undisturbed and compatible with the existing character of the area.

4. HAZARDOUS OR DISRUPTIVE

The special land use shall not be hazardous to adjacent property or involve uses, activities, materials or equipment which, will be detrimental to the health, safety or welfare of persons or property through the excessive production of traffic, noise, smoke, fumes or glare.

Findings: Subject to the applicant maintaining the site in accordance with national, state and local regulations as well as industry best practices, it is not anticipated that this special land use will be any more hazardous to adjacent property than that of other types of special land uses. The applicant has demonstrated at multiple public meetings and within their submission documentation that safety standards will be upheld, and hazardous materials will be mitigated to the extent possible.

If there is a concern on this specific type of land use being ‘more’ hazardous to the area than other uses, the Planning Commission is encouraged to conduct a study on large-scale retail operations, such as home goods and food stuffs and fuel stations, and how those already established uses are less hazardous than what the applicant proposes. The Planning Commission is encouraged to seek third-party expertise on provisions for protecting the health, safety and welfare of the community from those who are qualified to make such claims.

The application materials contain the following statements about the construction activities to build out the project:

> “Construction is anticipated to begin early 2027 and could last up to 18 months. Construction is anticipated to be undertaken in phases that may overlap, including an initial site preparation phase, a phase during which the energy storage system will be installed, and a phase during which the power conversion station and substation will be installed. Following the installation, testing and commissioning will take place. Most of the labor force is expected to come from the surrounding communities within the Kalamazoo Metropolitan Area. There will be an estimated workforce of up to 50-100 full-time employees during construction. Construction equipment will be primarily operated between 7:00 AM and 7:00 PM, Monday through Friday. Depending on schedule demand, working hours in the early morning, evening, nights, and weekends may occur during certain construction phases. However, this is not an expected aspect of project construction. All construction work, including any weekend work, will comply with the policies and requirements established by Comstock Township Zoning Ordinance.”

The applicant has provided the following statement about the as-built condition:

> "To further clarify, no traffic impacts are expected due to the nature of the Project which will not require any day-to-day presence by a workforce after it is constructed and operating. Additionally, no displacement or any impact to the character of the surrounding area is expected to occur for the same reason; the Project will be adequately screened and will be consistent with the character of the area, which is already the site of existing electric grid infrastructure."

Note: ***McKenna is not advocating for or against this particular projec***t; McKenna seeks to identify concerns raised throughout this process regarding Battery Energy Storage Systems and their impact on surrounding land uses compared to other special land uses that have been approved in recent years by the Planning Commission. McKenna further defers to the applicant to address how this special land use will not be hazardous to adjacent property or involve uses that will be detrimental to the health, safety or welfare.

5. ADEQUATE PUBLIC SERVICES AND FACILITIES

The special use shall be required to be served by public sanitary sewer and water supply systems when available or other systems approved by the Health Department, and served adequately by other essential public facilities and services; such as highways, streets, drives, sidewalks, police and fire protection, drainage structures, refuse disposal, or that the persons or agencies responsible for the establishment of the proposed special use shall be able to provide adequately all such services. Further the special use shall not place demands on public services and facilities in excess of current capacity.

Findings: It is McKenna's understanding that this proposed use will not require intensive upgrades to sanitary sewer and water supplies, given that the nature of this particular use is largely monitored and overseen from remote locations. Any need for water and sewer would be limited to service those employees whom may be onsite, once the project is fully online.

The Township's Fire Department will further review the proposal to ensure adequate coverage is able to be maintained, based on the documents submitted for consideration.

Subject to the project being constructed in the manner in which it is approved for, it is not anticipated that additional demands on public services and facilities will exceed current capacity. Please defer to separate review memorandums by the Fire Department and the City Engineer.

Disclaimer: McKenna has been retained by the Charter Township of Comstock to conduct planning and zoning reviews, as well as administer support to the planning & zoning department. McKenna is not associated with the applicant in any manner, nor is McKenna receiving financial benefit from the applicant.

CHARTER TOWNSHIP OF COMSTOCK

Department of Fire & Rescue

MATT BEAUCHAMP
Fire Chief

KEVIN THOMPSON
Deputy Chief

8700 E. Michigan Avenue • P.O. Box 8
Comstock, Michigan 49041

Phone: (269) 345-9244 • Fax: (269) 345-8356

MIKE MEULMAN
Assistant Chief

MICHAEL KESSLER
Fire Marshal

To: Kyle Mucha, Zoning Administration
FROM: Michael Kessler
DATE: June 25, 2026
RE: Project Number 161262002

The Fire Marshal's office has reviewed the site plan for 65 N 30th Street, located in Comstock Township for compliance with NFPA 1 Fire Code 2024 and NFPA 855 Standard for the Installation of Stationary Energy Storage System.

Based upon the documentation provided, the Fire Marshal office has the following recommendation:

Approved
X Approved with Requirements (See below)
Not approved

Requirements:

With approval from the Planning / Zoning Board on the Battery Energy Storge System / Fire Department Equipment needs are meant.

Michael Kessler

Michael Kessler

Fire Marshal

CHARTER TOWNSHIP OF COMSTOCK

Department of Fire & Rescue

Matt Beauchamp
Fire Chief

Mike Meulman
Assistant Chief

8700 E. Michigan Avenue • P.O. Box 8
Comstock, Michigan 49041

Phone: (269) 345-9244 • Fax: (269) 345-8356

Kevin Thompson
Deputy Chief

Michael Kessler
Fire Marshal

Date: June 23, 2026

To: Comstock Planning Commission

Re: Battery Energy Storage System / Fire Department Equipment Needs

A Battery Energy Storage System (BESS) facility introduces specialized fire and hazardous materials risks to the community. These incidents may involve thermal runaway, fire, explosion potential, toxic or flammable gas release, contaminated smoke, extended-duration operations, and evacuation or shelter-in-place decisions.

The following equipment and training needs would strengthen the Fire Department's ability to safely and effectively respond to these hazards. These resources would improve responder safety, support better incident command decisions, and help reduce risk to the public during a BESS-related emergency.

1. Self-Contained Breathing Apparatus (SCBA) Systems

The Department is requesting replacement and upgrade of fifty-six (56) self-contained breathing apparatus (SCBA) units, five (5) rapid intervention team (RIT) air packs, fifty-six (56) spare SCBA cylinders, and one (1) SCBA air compressor/cascade/fill station with new equipment meeting the most current applicable National Fire Protection Association (NFPA) standards. This would outfit all 3 fire stations.

SCBAs and related equipment are the top priority because they allow firefighters to safely breathe in smoke-filled, toxic, or unknown atmospheres. A battery fire or thermal runaway event can produce dangerous gases and smoke that may be immediately dangerous to life and health. Firefighters may need respiratory protection for fire attack, exposure protection, rescue, evacuation support, investigation, overhaul, air monitoring, and extended operations.

This equipment must be replaced as a complete, interoperable system to ensure safe and effective operations. All personnel need compatible facepieces, regulators, air cylinders, personal alert safety systems (PASS), RIT connections, filling connections, and maintenance procedures. Replacing only part of the system creates safety concerns, training issues, and operational confusion during multi-station responses.

SCBA is addressed through NFPA 1970, Standard on Protective Ensembles for Structural and Proximity Firefighting, Work Apparel, Open-Circuit Self-Contained Breathing Apparatus for Emergency Services, and Personal Alert Safety Systems. The previous NFPA 1981 and NFPA 1982 standards addressed SCBA and PASS requirements and remain useful reference points for existing equipment and service-life planning. The requested air compressor/cascade/fill station is also tied to NFPA 1989, Standard on Breathing Air Quality for Fire and Emergency Services Respiratory Protection.

For planning purposes, the Department uses an estimated 15-year replacement cycle for SCBA equipment. The fill station is directly applicable because an extended-duration emergency may require repeated air cylinder changes and refilling. Without local refill capability, the Department's ability to safely continue operations could be limited.

2. Air Monitoring Equipment

The Department is requesting three (3) multi-gas air monitoring meters, three (3) photoionization detectors (PIDs) for detecting volatile organic compounds, three (3) hydrogen fluoride (HF) air monitoring devices, and the necessary calibration equipment to maintain these devices. This would outfit all 3 fire stations.

Air monitoring is the second priority. BESS emergencies may involve toxic, flammable, or otherwise hazardous gases that cannot be safely identified by sight or smell alone. Thermal runaway and battery failure may produce hazardous gases, including hydrogen fluoride, carbon monoxide, hydrogen, and other flammable or toxic products.

Multi-gas meters would allow responders to monitor for common hazardous atmospheres such as oxygen deficiency, carbon monoxide, hydrogen sulfide, and flammable gas levels. Photoionization detectors would allow responders to screen for volatile organic compounds that may be present in smoke, vapors, or other off-gassing conditions. Hydrogen fluoride monitoring is specifically applicable to lithium-ion battery failure because hydrogen fluoride can be produced during thermal runaway and may create a serious inhalation hazard.

Air monitoring gives the Incident Commander real-time information to help determine whether the atmosphere is safe for firefighters and whether additional public protective actions are needed. This capability supports decisions related to responder safety, hazard zones, evacuation or shelter-in-place recommendations, downwind monitoring, safe staging locations, re-entry into the area, and coordination with hazardous materials teams or environmental agencies. These decisions may need to be made early in an incident, before outside technical resources arrive.

NFPA 855, Standard for the Installation of Stationary Energy Storage Systems, addresses energy storage system fire protection, emergency planning, hazard mitigation, and related safety concerns. Air monitoring directly supports those goals by helping the Department identify atmospheric hazards during an emergency.

For planning purposes, the Department uses an estimated 5-year replacement cycle for air monitoring equipment due to sensor life, calibration needs, maintenance, and technology changes. This capability supports time-critical life safety decisions before outside technical resources arrive.

3. Thermal Imaging Cameras (TICs)

The Department is requesting ten (10) NFPA-rated thermal imaging cameras (TICs) with vehicle charging equipment. This would outfit all 3 fire stations.

TICs allow firefighters to evaluate heat conditions from a safer distance. During a battery energy storage emergency, this is especially important because responders may be operating around energized equipment, toxic smoke, flammable gases, and the possibility of delayed re-ignition or fire spread to nearby units.

Thermal imaging capability supports exposure monitoring, surface temperature checks, fire spread assessment, overhaul decisions, and command-level situational awareness. This allows crews to monitor heat conditions while limiting unnecessary exposure to hazardous areas.

The requested quantity is intended to provide two TICs on each engine, with additional units available for ladder, rescue, and special response apparatus. This helps avoid gaps when apparatus respond first-due, are committed to another incident, or are positioned at different access points during a large or extended-duration emergency.

Thermal imaging cameras for fire service use are addressed through NFPA 1801, Standard on Thermal Imagers for the Fire Service. For planning purposes, the Department uses an estimated 10-year replacement cycle for TICs, though replacement may be needed sooner based on damage, reliability, battery life, manufacturer support, or changes in technology.

4. Drone Program

The Department is requesting one (1) public safety drone program package with emergency response capabilities. The package includes two (2) drones: one (1) automated deployment drone and one (1) manually deployed drone, along with initial training for eight (8) operators and annual refresher training to maintain operator proficiency and program readiness.

A drone program would improve scene size-up and responder safety during a facility emergency involving battery energy storage. These sites may involve large areas, limited access, electrical hazards, smoke movement, and possible explosion or projectile hazards. In some situations, getting close enough to visually inspect the site may create unnecessary risk for firefighters.

The automated deployment drone would provide rapid initial situational awareness and allow command staff to begin assessing conditions early in the incident. The manually deployed drone would provide flexibility for extended operations, alternate launch locations, closer coordination with the Incident Commander, or use when the automated system is unavailable or not appropriate for the incident conditions.

This program would assist with identifying visible fire or smoke conditions, monitoring smoke movement, checking access points, identifying exposure concerns, supporting evacuation decisions, and reducing unnecessary firefighter exposure. If BESS equipment is marked or mapped for aerial identification, drone capability would also assist command staff in quickly identifying the involved area or unit.

The drone program is not a replacement for firefighters or required safety equipment, but it is a valuable situational awareness tool that enhances command decision-making while reducing firefighter exposure to unnecessary risk.

For planning purposes, the Department uses an estimated 10-year replacement cycle for the drone program equipment. Annual refresher training is needed to maintain operator skill, safe flight operations, and program readiness. The drone program should also comply with applicable Federal Aviation Administration (FAA) requirements for public safety drone operations.

5. Personal Protective Equipment / Turnout Gear

The Department is requesting twenty-five (25) sets of structural firefighting turnout gear to match current Department specifications. This would outfit half of our current roster.

Turnout gear is the protective clothing worn by firefighters during fire response, including the coat, pants, helmet, gloves, hood, boots, and related protective components. Turnout gear remains essential for operations involving heat, smoke, debris, and contaminated environments. During an energy storage system fire, firefighters may operate near fire conditions, contaminated runoff, damaged equipment, or smoke-impacted areas.

Structural firefighting personal protective equipment (PPE) is addressed through NFPA 1970, Standard on Protective Ensembles for Structural and Proximity Firefighting, Work Apparel, Open-Circuit Self-Contained Breathing Apparatus for Emergency Services, and Personal Alert Safety Systems. Selection, care, cleaning, maintenance, repair, and retirement of firefighting protective clothing are addressed through NFPA 1851, Standard on Selection, Care, and Maintenance of Protective Ensembles for Structural Fire Fighting and Proximity Fire Fighting.

For planning purposes, the Department uses a 10-year replacement cycle for turnout gear, though gear may need to be removed from service sooner if damaged, contaminated, or unable to pass inspection.

This item is ranked below SCBA, air monitoring, and TICs because respiratory protection, atmospheric hazard identification, and temperature assessment are more immediate BESS-specific responder safety needs. However, adequate turnout gear is still necessary to support safe operations, crew rotation, and continued township coverage during a long-duration emergency.

6. Training and Site Familiarization

The Department is requesting initial BESS emergency response training, annual refresher training, site familiarization, and any training materials, props, or other resources needed to prepare responders.

Equipment alone is not enough. The Department also needs training before any BESS facility becomes operational and refresher training throughout the life of the project. Training should include site layout and access points, thermal runaway, battery fire behavior, electrical isolation, air monitoring, TIC use, hazard zones, evacuation and shelter-in-place decisions, defensive fire operations, water supply and runoff concerns, incident command, and coordination with facility representatives and hazardous materials teams.

NFPA 855 supports the need for emergency planning, hazard mitigation, and coordination with local emergency responders for stationary energy storage systems. Training and site familiarization help ensure that the Fire Department can apply emergency response plans in a way that matches local staffing, apparatus, equipment, and operating procedures.

Battery energy storage emergencies are low-frequency, high-risk events. Responders need site-specific training so they understand the hazards, the facility layout, the emergency contacts, and the safest operating procedures before an emergency occurs. Training ensures that personnel can effectively use the requested equipment and apply safe operational strategies during these types of incidents.

Summary

The Department's highest priority response needs are SCBA, air monitoring, and TICs. These directly affect responder safety and the Department's ability to operate in or near a toxic, hazardous, unknown, or heat-impacted environment.

Drone capability, turnout gear, and training also support safe and effective response, but they are secondary to ensuring firefighters can breathe safely, monitor the atmosphere, assess heat conditions, and make informed command decisions during the emergency.

These requests are based on the Department's actual operational needs for safe emergency response across all three stations, not reduced quantities tied to grant limitations. While the Department will continue to respond with the resources available, these improvements would provide a safer, more effective, and more prepared response capability for a BESS-related emergency.

Respectfully Submitted,

Matt Beauchamp
Fire Chief

Outlook

Fw: Comstock - BESS Project

From Gammon, Brian <Brian.Gammon@kimley-horn.com>
Date Wed 07/01/2026 3:24 PM
To Kyle Mucha <kmucha@mcka.com>
Cc Lang, Jordan <Jordan.Lang@kimley-horn.com>; James Hingston <jhin@cipprojects.dk>

You don't often get email from brian.gammon@kimley-horn.com. Learn why this is important

Kyle -

See below for the response we provided Prein & Newhoff in relation to the open stormwater/runoff review comments.

Please let me know if you need any additional clarification. We understand that P&N will need to formally sign off on stormwater comments as the Township Engineer.

Thanks,

Brian Gammon, P.E. (MI, MN)
Kimley-Horn | Eden Prairie, MN
Direct: 612 503 8532

From: Gammon, Brian <Brian.Gammon@kimley-horn.com>
Sent: Tuesday, June 30, 2026 5:34 PM
To: Michael Presta <mpresta@preinnewhof.com>
Cc: James Hingston <jhin@cipprojects.dk>; Lang, Jordan <Jordan.Lang@kimley-horn.com>
Subject: Fw: Comstock - BESS Project

Michael -

Thanks for sparing a few minutes yesterday to discuss the outstanding stormwater comments on Swan BESS. We've re-stated the outstanding comments and provided clarifying responses below. McKenna had a made a comment in relation to stormwater runoff indicating it "fails to comply" but we believe this is just a misinterpretation of the plan and ultimately, I believe they will look to P&N to assess. Would you be able to provide confirmation that the stormwater runoff condition actually complies with Section 5.6(F)(3)? We have a meeting with the Planner tomorrow, July 1st, at 3pm EST.

Engineering Comments (Outstanding from P&N review dated May 4th):
6. The proposed storm water system is composed of a central retention basin and two sediment forebays. The applicant has provided adequate storm water storage volume as required by the Township's Performance Standards.
c. The proposed 12-inch storm sewer running northwest to southeast exiting the retention pond must be removed or raised in elevation above the 100-year high water level.

Response: The proposed stormwater system is composed of a central infiltration detention basin and two sediment forebays (not retention). The proposed 12-inch storm sewer culvert has an invert of 881.2 in order to control runoff rates for the 10-yr and 100-yr 24-hour storms (2-year event is completely infiltrated) while also draining within the required 72 hours.

The proposed stormwater basin still meets the required treatment and storage volumes from a Township and County Perspective:
Required Treatment Volume: 142,891 cf
Proposed Treatment Volume: 148,171 cf. This is achieved through infiltration of the volume below the currently designed culvert elevation. The bottom of pond is 879.00' and the outlet invert is 881.20'. This allows for 148,171 cf of water to infiltrate within 72 hours.

Required Detention Volume: 2-year – 24 hour event 110,432 cf; 10-year – 24 hour event 156,445 cf; 100-year storm event 194,305 cf (volume calculated from Comstock Township Detention Basin Calculation Stormwater Volume: Rational Method.)
Proposed Storage Volume: The detention basin provides 442,663 cf of total live storage, meeting Comstock Townships storage volume requirement.

The culvert (FES STR-12) should remain at the current invert in order to function as designed to provide peak runoff rate control during larger storm events. As shown above, the stormwater volume and runoff requirements are still met with this design.

Planning Comments (stormwater McKenna Review Letter dates 6/26/2026):
C. Run off of surface water. Per Section 5.6(F)(3) All structures and land uses hereafter established in the Township shall be established in such a manner as to prevent any additional run off of surface water onto adjoining properties.
Per Sheet C300 Erosion and Sediment Control the applicant proposes discharge to the "Michigan Central Railway ROW" with a "final outfall to Marrow Pond".
The applicant should provide a narrative to explain this provision on the Erosion and Sediment Control Sheet C300.
Response: Sheet C300 is in relation to the Phase 1 Erosion Control Plan - which outlines temporary measures that need to be in place before construction/disturbance starts. The note stating the discharge is being routed to Railway ROW and Morrow Pond is a description of the existing runoff condition and anticipated final outlet point. The proposed stormwater runoff from the BESS yard and substation are routed to the on-site detention basin, where it is managed and controlled before discharging from the basin over 1,700' north of the Railroad ROW. Runoff from the proposed access road is routed to roadside swales with permanent check dam controls.

"Per Section 5.6(F)(3) All structures and land uses hereafter established in the Township shall be established in such a manner as to prevent any additional run off of surface water onto adjoining properties."

We have no control over the runoff in the existing condition, but the stormwater management plan proposed will prevent any additional runoff of surface water to adjoining properties. We call out the discharge location to Railroad ROW and Morrow Pond on the Phase 1 Erosion Control Plan to make the reviewer aware that it is an existing condition. Although off-site runoff is inevitable in the proposed condition (it is typical practice to match the existing discharge location, where possible), there will be onsite management and a reduction in peak runoff rates in comparison to the existing condition.

Thanks,

Prein&Newhof
Engineers ▪ Surveyors ▪ Environmental ▪ Laboratory

Memorandum

Date:	May 4, 2026
To:	Planning Commission
Company:	Charter Township of Comstock
From:	Michael Presta, P.E.
Project #:	2260436
Re:	Swan BESS & Cygnet BESS – Site Plan Review

We have reviewed the site plan dated 3/31/26 for the proposed Battery Energy Storage System at 65 N 30th Street and have the following comments:

1. The two operations and maintenance building is shown to be served by an on-site sewage disposal system. The two proposed septic systems must be designed and permitted through Kalamazoo County Health & Community Services.
2. The operations and maintenance buildings and 30,000-gallon water storage tanks are shown to be served by on-site private wells. The two proposed private wells and 30,000-gallon elevated storage tanks must be designed and permitted through Kalamazoo County Health & Community Services. Part of this review will be to ensure that there is adequate backflow/cross connection prevention from the tank to the potable water service in the building.
3. There is no information on how the 30,000-gallon tank will be operated and maintained (fresh water, freeze prevention…), or how it will be accessed by emergency services.
4. The applicant must obtain a Soil Erosion and Sedimentation Control permit from the Drain Commissioner of Kalamazoo County.
5. Site grading is generally adequate; storm water is directed to the proposed storm water retention forebays and pond via sheet flow. Temporary and permanent soil erosion control measures will be important to prevent the loss of soils during significant rain events.
6. The proposed storm water system is composed of a central retention basin and two sediment forebays. The applicant has provided adequate storm water storage volume as required by the Township's Performance Standards.
    a. We recommend the proposed vegetative swale contain additional permanent soil erosion control measures to prevent the loss of soils during larger storm events.
    b. We recommend an additional sediment forebay be constructed north of the retention pond to capture the storm water being directed from the north prior to entering the central retention basin.
    c. The proposed 12-inch storm sewer running northwest to southeast exiting the retention pond must be removed or raised in elevation above the 100-year high water level.
7. This site does not lie within a Wellhead Protection area.

EXHIBIT 1

ZAUSMER, P.C.
32255 Northwestern Highway, Suite 225
Farmington Hills, MI 48334-1574
(248) 851-4111 · Fax (248) 851-0100

STEPHEN R. ESTEY
Shareholder
sestey@zausmer.com

June 8, 2026

Charter Township of Comstock
ATTN: Township Zoning Administrator, Khayci Bryant
5858 King Highway
Kalamazoo, MI 49048

UPDATED APPLICATION

Re: Swan Energy Storage LLC and Cygnet Energy Storage LLC's Battery Energy Storage System Facility Special Land Use Permit and Site Plan Application ("Application")

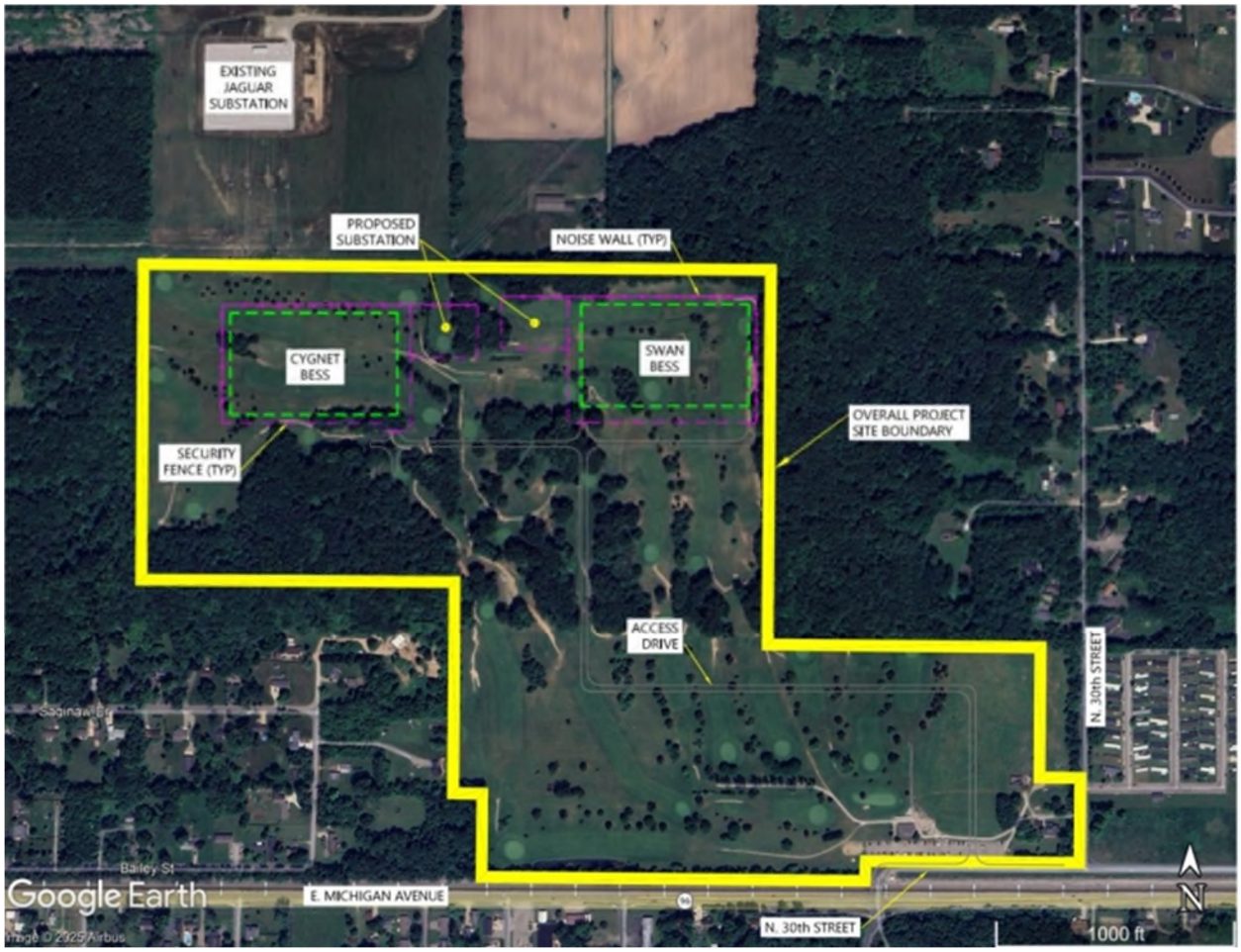
To Whom It May Concern:

Our firm represents Swan Energy Storage LLC ("Swan") and Cygnet Energy Storage LLC ("Cygnet") (collectively, "Applicant"), regarding the aforementioned Application for a battery energy storage system ("BESS") facility ("Project") located on an approximately 144 acre portion of Tax Parcel Nos. 07-16-330-011 and 07-16-455-051, and which is located on 91 N 30th St, Galesburg, MI 49053 (the "Property") in the Charter Township of Comstock ("Township"), in Kalamazoo County. The Project area is within the northeast ¼ of the southwest ¼ of section 16, township 2 south, range 10 west.

The Project is anticipated to be constructed in two (2) phases and owned by two entities: Swan and Cygnet. While the Project in total will be composed of 144.28 acres, 105.06 acres of the Project will be preserved as open space/recreational land with the remaining 39.22 acres utilized for the installation of battery energy storage equipment with Swan owning 16.95 acres and Cygnet owning 22.27 acres. Accordingly, the Applicant requests the approval of a Special Land Use Permit and Site Plan Approval for the Project under a single Application. Because the Project phasing will result in two 20 acre components owned by separate entities, the Applicant seeks a waiver under Article 4, Section 4.61(B)(21) to allow for establishment of a BESS in a parcel less than 140 contiguous acres as currently required under Article 3, Section 3.1.T. Again, while the total acreage of the Applicant's Property exceeds the 140-acre minimum requirement, the actual BESS facility will sit on 39.22 acres of the Property, split into two components of 16.95 acres (Swan) and 22.27 acres (Cygnet). The Project will designate 105.06 acres of the Property as open space for future recreational use. The Applicant remains committed to working with the Township in good faith to identify the most appropriate recreational use and implementation structure for the space.

The Project consists of the construction and operation of a combined 400 megawatt ("MW")/1,600 megawatt-hours ("MWh") BESS, which will provide essential services such as frequency regulation, voltage support and additional capacity during peak demand periods, thus increasing energy availability throughout Kalamazoo County, while also enhancing the resilience of the electric grid and advancing the state's renewable energy goals. Under Michigan law, the Legislature has set a statewide target of having 2,500 MW of energy storage in place by 2030. MCL 460.1101. Once it has been approved and connected to the grid, the Project will aid the state's progress toward meeting that goal. Locally, the Project will help defer expensive transmission and distribution upgrades by storing energy during off-peak hours and discharging during peak demand, allowing the system to improve generation efficiency, reduce costs and manage local peak loads. The Project will also supply backup power to critical infrastructure during emergencies, enhancing energy security for this vital infrastructure.

The Project will be sited on a former golf course and undeveloped land located in the R-1C Cluster Housing ("R-1C") zoning district, and falls under the BESS Large Off-Site Overlay District ("Overlay District") pursuant to Ordinance 564 of the Ordinance, Battery Energy Storage System Ordinance Amendment which was adopted on December 15, 2025 ("BESS Ordinance"). The project will consist of two on-site substations. These substations will interconnect each of the BESS yards via multiple medium voltage underground feeders. Each substation yard will house a Generator Step Up (GSU) transformer that will step up the voltage from the BESS yard, up to the interconnection voltage of 138 kV. Each proposed substation yard will include an electrical control house, an operational building used to control/monitor the substation which will house ancillary equipment for systems necessary for the overall function of the substations. Such systems include control relays, server racks, telecommunications and technical security, an alarm system, smoke detectors and fire safety protocols, and will occupy approximately 588 square feet within the substation yard. A generator intertie will be interconnected at 138 kV from each substation to the point of interconnection at the existing utility substation 0.1 miles to the north. The exact gen-tie route to be determined by others as the project progresses. As shown on the Site Plan, the proposed substations will be enclosed by a 6-foot chain link fence with 1-foot of barbed wire and a 14-foot sound wall, located within the designated building envelope. The Property is well suited for the Project because of its location in an undeveloped area which is in close proximity to the existing electrical infrastructure.



Under the Ordinance, the Project meets the definition of a Large Off-Site BESS because it is a principal use that is designed and built to connect to the transmission grid and has a nameplate capacity of 50 MW or more. The Project is designed to meet or exceed all requirements of the Zoning Ordinance, while mitigating any potential impacts on non-participating properties. The Property is currently zoned R-1C and falls under the BESS Large Off-Site Overlay District, pursuant to the BESS Ordinance. The BESS Ordinance allows Large Off-Site BESS as a special land use, and thus the Project may be approved via a Special Land Use ("SLU") Permit pursuant to the Ordinance. As detailed in the Application and the accompanying supporting materials, the Project meets all requirements for the issuance of a SLU Permit and Site Plan approval.

The Applicant hereby submits the attached Application and supporting documents for consideration by the Township:

1. Updated Narrative Zoning Compliance Letter (this letter) (**Exhibit 1**);

2. A copy of the Completed Signed Application for Special Land Use and Site Plan Review executed by the Applicant and the Property owner (**Exhibit 2**);

3. One (1) Hard Copy and one electronic copy of the Updated Site Plan Drawings for the Property which satisfy the requirements set forth in Sections 6.1, 6.2, and 5.4 of the Zoning Ordinance as applicable to the Project (**Exhibit 3**);

4. Applicant's Updated Project Narrative (**Exhibit 4**);

5. Applicant's Emergency Response Guide (**Exhibit E(A) to Exhibit 4**);

6. Applicant's Hazard Mitigation Analysis (**Exhibit E(B) to Exhibit 4**);

7. Applicant's Stormwater Report (**Exhibit D to Exhibit 4**);

8. Applicant's Environmental Impact Analysis (**Exhibit O to Exhibit 4**);

9. Applicant's Decommissioning Plan (**Exhibit K to Exhibit 4**);

10. Applicant's Noise Study and Mitigation Plan (**Exhibit J to Exhibit 4)**;

11. Applicant's Groundcover and Vegetation Establishment and Management Plan (**Exhibit F to Exhibit 4**);

12. ALTA Survey (**Exhibit B to Exhibit 4**);

13. A copy of Applicant's Check for Application Fee and Review Fee (**Exhibit** 5);

14. Applicant's State/County Environmental Permits Checklist (**Exhibit 6**).

Based on our review of the Ordinance and the information provided below, the Applicant respectfully requests the review and approval of the Application by the Planning Commission. To that end, we request that the Application be reviewed and placed on the Planning Commission's agenda at the first available date. If possible, to expedite this request, we request that a special meeting be scheduled to expedite approval.

I. Site Plan

The Applicant has submitted all materials required under Section 6.1 of the Ordinance (see Signed Application attached as **Exhibit 2**, Updated Site Plan Drawings attached as **Exhibit 3**, and Applicant's Updated Project Narrative attached as **Exhibit 4**.

Site plan review procedures are provided in Section 6.1 of the Ordinance. Specifically:

Section 6.1(A)(c) : A site plan shall, however, contain at a minimum the following information:

(i) A north arrow and notation of the scale used.
(ii) All property lines shall be shown with their dimensions.
(iii) Location and dimensions of all existing and proposed structures on the subject property and any existing buildings on adjacent property within fifty (50) feet of the subject property.
(iv) The date, and the name and address of preparer.

RESPONSE: This requirement is met. See Exhibit 3 (Site Plan Drawings).

Section 6.1(B) Site plan. Except as otherwise provided in this ordinance, the site plan shall contain the following information:

1. *The date, including revision dates if applicable, north arrow and scale. The scale shall not be less that one (1) inch equals twenty (20) feet for property under (3) acres and at least one (1) inch equals one hundred (100) feet for those three (3) acres or more.*

RESPONSE: This requirement is met. See Exhibit 3 (Site Plan Drawings).

2. *All lot and/or property lines are to be shown and dimensioned, including building setback lines.*

RESPONSE: This requirement is met. See Exhibit 3 (Site Plan Drawings).

3. *The location and height of all existing and proposed structures on the site and the location of buildings within one hundred (100) feet of the subject property.*

RESPONSE: This requirement is met. See Exhibit 3 (Site Plan Drawings).

4. *The location and dimensions of all existing and proposed drives, sidewalks, curb openings, signs (showing sign height and, if the sign is a high-rise sign, the base elevation of the sign),*

exterior lighting, parking areas (show dimensions of a typical parking space), loading/unloading areas, and recreation areas.

RESPONSE: This requirement is met. See Exhibit 3 (Site Plan Drawings).

5. *The location and the pavement and right-of-way and/or easement width of all abutting roads, streets, or alleys.*

RESPONSE: This requirement is met. See Exhibit 3 (Site Plan Drawings) and Exhibit B to Exhibit 4 (ALTA Survey).

6. *For buildings, uses, or facilities other than a privately owned one-family or two-family dwelling,*
the site plan shall be prepared by or under the supervision of a professional engineer, architect, architectural engineer, or land surveyor licensed or registered by the State of Michigan. The site plan shall contain the name and firm address of the professional engineer, architect, or land surveyor responsible for the preparation of the site plan, and the professional seal and signature of that person.

RESPONSE: This requirement is met. See Exhibit 3 (Site Plan Drawings).

7. *The name and address of the property owner or petitioner.*

RESPONSE: This requirement is met. See Exhibit 2 (Signed Application) and Exhibit 3 (Site Plan Drawings).

8. *The location of all rubbish receptacles and the location, height, and type of enclosures, fences and walls. Landscaping shall be shown in accordance with the provisions of Section 5.4 Landscaping.*

RESPONSE: This requirement is met. See Exhibit 3 (Site Plan Drawings) and Exhibit F (Groundcover and Vegetation Establishment and Management Plan) to Exhibit 4 (Applicant's Project Narrative).

9. *The location and type of drainage, sanitary sewers, storm sewers, and other utility mains and facilities including location of interior and exterior drains, dry wells, catch basins, retention/ detention areas, sumps and other facilities designed to collect, store or transport storm water or wastewater.*

RESPONSE: This requirement is met. See Exhibit 3 (Site Plan Drawings) and Exhibit D (Stormwater Report) to Exhibit 4 (Applicant's Project Narrative).

10. Location of all fire hydrants, emergency vehicle accessibility.

RESPONSE: This requirement is met. See Exhibit 3 (Site Plan Drawings).

11. A summary schedule should be affixed, if applicable, which gives the following data:
   a. The number of dwelling units proposed, to include the number, size and location (by code if necessary) of one-bedroom units, two-bedroom units, mobile home sites, etc.
   b. The residential area of the site in acres and in square feet, including breakdowns for any subareas or staging areas (excluding all existing rights-of-way).

RESPONSE: N/A. The Project is not a residential proposal.

12. The location of existing and proposed facilities and structures for public and private groundwater supply wells and for septic systems and other wastewater treatment systems.

RESPONSE: This requirement is met. See Exhibit 3 (Site Plan Drawings).

13. Existing and proposed contours shall be shown on all site plans (two [2] feet intervals minimum) as may be required by the Township Engineer.

RESPONSE: This requirement is met. See Exhibit 3 (Site Plan Drawings).

14. For multiple-family development site plans, typical elevation views of the front and side of each type of building proposed, as well as typical dimensioned floor plans for each type of dwelling unit.

RESPONSE: N/A. The Project is not a multiple-family development.

15. The construction specifications, locations, depth, size, and anticipated use for each underground and aboveground storage tank to be used on the site.

RESPONSE: This requirement is met. See Exhibit 3 (Site Plan Drawings).

16. All interior and exterior areas to be used for the storage, use, loading/unloading, recycling, or disposal of hazardous substances.

RESPONSE: This requirement is met. See Exhibit 3 (Site Plan Drawings) and Exhibit E(B) (Hazard Mitigation Plan) to Exhibit 4 (Applicant's Project Narrative).

17. The point of discharge for all drains and pipes on the site.

RESPONSE: This requirement is met. See Exhibit 3 (Site Plan Drawings).

18. Natural features, including the location of existing wetlands and marshlands on the site, woodlots, soil characteristics of the site at least to the detail provided to the U.S. Soil Conservation Service, water bodies, watercourses and floodplains.

RESPONSE: This requirement is met. See Exhibit 3 (Site Plan Drawings).

19. Percentage of land covered by buildings and that reserved for open space.

RESPONSE: This requirement is met. See Exhibit 3 (Site Plan Drawings).

20. A line demarcating the limits of land clearing on a site. Land clearing shall be limited to that needed for the construction of buildings, structures, parking lots, street right(s)-of-way, drainage and utility areas, other site improvements, and any grading necessary to accommodate such construction.

RESPONSE: This requirement is met. See Exhibit 3 (Site Plan Drawings).

21. A fully completed State/County Environmental Permits Checklist.

RESPONSE: This requirement is met. See Exhibit 6 (Applicant's State/County Environmental Permits Checklist).

22. A fully completed Hazardous Substance Reporting Form.

RESPONSE: The Applicant acknowledges and will comply with this requirement. A Hazardous Substance Reporting Form will be provided prior to the issuance of a Building Permit.

23. A fully completed Site Plan Review Checklist.

RESPONSE: This requirement is met. See Exhibit P (Site Plan Review Checklist) to Exhibit 4 (Applicant's Project Narrative).

24. A fully completed Planning and Zoning Application and review fee as determined by resolution of the Township Board.

RESPONSE: This requirement is met. See Exhibit 2 (Signed Application) and Exhibit 5 (Applicant's Check for Application Fee and Review Fee).

I. Site Plan Approval

Section 6.1(D) of the Ordinance authorizes the Planning Commission to review and approve, disapprove or approve with conditions a site plan and provides the standards for approval of a site plan:

> The Planning Commission shall have the function, duty and power to approve or disapprove, or to approve subject to compliance with certain modifications or conditions, the site plan in accordance with the purpose and intent of this Zoning Ordinance and after consideration of the comments and recommendations received from other appropriate Township officials. A public hearing is not required for a permitted use. In reviewing the application and site plan and in approving, disapproving or modifying the same, the Planning Commission shall be governed by the following standards:

1. *That there is a proper relationship between the existing streets and highways within the vicinity and proposed deceleration lanes, service drives, entrance and exit driveways and parking areas to insure the safety and convenience of pedestrian and vehicular traffic.*

RESPONSE: This requirement is met. See Exhibit 3 (Site Plan Drawings) and Exhibit 4 (Applicant's Project Narrative). To further clarify, no traffic impacts are expected due to the nature of the Project which will not require any day-to-day presence by a workforce after it is constructed and operating. Additionally, no displacement or any impact to the character of the surrounding area is expected to occur for the same reason; the Project will be adequately screened and will be consistent with the character of the area, which is already the site of existing electric grid infrastructure.

2. *That the buildings, structures and entryways thereto proposed to be located upon the premises are so situated as to minimize adverse effects therefrom upon owners and occupants of adjacent properties and the neighborhood in general.*

RESPONSE: This requirement is met. See Exhibit 3 (Site Plan Drawings). To further clarify, no displacement or any impact to the character of the surrounding area is expected to occur; the proposed Project is sited on undeveloped land that minimizes new disturbance and will be adequately screened and consistent with the character of the area, which sits in close proximity to existing electric grid infrastructure.

3. *Judicious effort shall be demonstrated to preserve the integrity of the land, existing topography, natural features (i.e., slopes, woodlands, etc.) and natural drainage patterns to the greatest extent feasible. That as many natural features of the landscape shall be retained as possible where they furnish a barrier or buffer between the project and adjoining properties used for dissimilar purposes and where they assist in preserving the general appearance of the neighborhood or help control erosion or the discharge of storm waters.*

RESPONSE: This requirement is met. See Exhibit 3 (Site Plan Drawings) and Exhibit F (Groundcover and Vegetation Establishment and Management Plan) to Exhibit 4 (Applicant's Project Narrative). To further clarify, no displacement or any impact to the character of the surrounding area is expected to occur; the proposed Project is sited on undeveloped land that minimizes new disturbance and will be adequately screened and consistent with the character of the area, which sits in close proximity to existing electric grid infrastructure.

4. *That any adverse effect of the proposed development and activities emanating therefrom upon adjoining residents or owners, shall be minimized by appropriate screening, fencing, landscaping, setback and location of buildings, structures, and entryways thereto.*

RESPONSE: This requirement is met. See Exhibit 3 (Site Plan Drawings).

5. *That all provisions of the Township Zoning Ordinance are complied with unless an appropriate variance therefrom has been granted by the Zoning Board of Appeals.*

RESPONSE: The Applicant will comply with all provisions of the Township Zoning Ordinance that are applicable to the Project and Property. As noted above, the Applicant is seeking a waiver under Article 4, Section 4.61(B)(21) to allow for establishment of a BESS in a parcel less than 140 contiguous acres as currently required under Article 3, Section 3.1.T. Section 4.61(B)(21) provides that the Planning Commission shall have the authority to review and consider alternatives in both the dimensional and physical requirements contained in the Ordinance as part of the special land use review process upon a finding that such a change promotes the health, safety and general welfare of the Township.

6. *That the height and location of all portions of buildings and structures are accessible to emergency vehicles and available equipment.*

RESPONSE: This requirement is met. See Exhibit 3 (Site Plan Drawings), Exhibit E(A) (Emergency Response Guide) and Exhibit E(B) (Hazard Mitigation Analysis) to Exhibit 4 (Applicant's Project Narrative).

7. *That the plan, as approved, is consistent with the intent and purpose of zoning to promote public health, safety, morals and general welfare; to encourage the use of lands in accordance with their character and adaptability; to avoid overcrowding of population; to lessen congestion on the public roads and streets; to reduce hazards to life and property; to facilitate adequate provision for a system of transportation, sewage disposal, safe and adequate water supply, education, recreation, and other public requirements; to conserve the expenditure of funds for public improvements and services; to conform with the most advantageous uses of land, resources and properties; to conserve property values and natural resources; and to give reasonable consideration to the character of a particular area, its peculiar suitability for particular uses and the general and appropriate trend and character of land, building and population development.*

RESPONSE: This requirement is met. See Exhibit 3 (Site Plan Drawings) and Exhibit 4 (Applicant's Project Narrative). Additionally, the Project meets all screening and setback requirements under the Zoning Ordinance, and will be harmonious with the character of the adjacent non-participating properties which are already located near existing electric grid infrastructure. The Project site was specifically chosen due to the proximity to existing electrical infrastructure needed to accommodate the technical, spatial, environmental and access needs of the BESS. As explained in the Application and supporting materials, the site will be developed in a way that will mitigate potential impacts on surrounding non-participating properties and will not impact the uses permitted on these properties.

8. *That the plan as approved is consistent with the Groundwater Protection Standards in Section 5.5 Groundwater protection standards, subsection A of this Ordinance.*

RESPONSE: The Applicant acknowledges and will comply with this requirement if it is determined that the Standards of Section 5.5 regarding hazardous substances are applicable.

9. *That the plan will not result in any additional run off of surface waters onto adjoining properties or streets.*

RESPONSE: This requirement is met. See Exhibit 3 (Site Plan Drawings).

II. Special Land Use Approval

The Applicant has submitted all materials required under Sections 6.1 and 6.2 of the Ordinance (see Site Plan Drawings attached as **Exhibit 3**, this Zoning Compliance Letter, and Applicant's Project Narrative attached as **Exhibit 4**).

In addition, a narrative satisfying Section 6.2 is set forth below:

Section 6.2(C)(2) Special Land Uses provides*:*

In hearing a request for any special land use, the applicant for a special land use shall have the burden of proof, which shall include the burden of going forward with the evidence and the burden of persuasion on all questions of fact which are to be determined by the Commission. the Planning Commission shall be governed by the following principles and conditions:

1. *A special land use may be granted and conditions imposed by the Planning Commission relative to the special use, pursuant to Section 7.6 Imposition of conditions, when the Planning Commission finds from the evidence produced at the hearing and the imposition of conditions that:*

    a. *The proposed use does not affect adversely the General Plan for physical development of the Township as embodied in this ordinance and in any Master Plan or portion thereof adopted by the Township.*

RESPONSE: **This requirement is met. Upon completion, the Project will consist of a BESS facility that will be adequately screened from adjacent non-participating properties. The Project site has been selected because of its proximity to nearby electric grid infrastructure, and thus this use is consistent with the existing uses in the immediate area. Due to the nature of BESS facilities, this will be a low intensity use because there will essentially be no day-to-day activity at the Project site following the completion of construction. Thus, activity at the Project site will be limited to maintenance and repairs. Further, the Township recently enacted a BESS Ordinance, which indicates that the Project is compatible with the general principles and land use configuration of the Township.**

    b. *The proposed use will not affect adversely the health and safety of residents or workers in the area and will not be detrimental to the use or development of adjacent properties or the general neighborhood.*

RESPONSE: **This requirement is met. See Exhibit 3 (Site Plan Drawings) and Exhibit 4 (Applicant's Project Narrative). To further clarify, no displacement or any adverse impact to the character, use or development of the surrounding area and the health and safety of residents or workers is expected to occur; the proposed Project is sited on undeveloped land that minimizes new disturbance and will be adequately screened and consistent with the character of the area, which sits in close proximity to existing electric grid infrastructure.**

III. BESS Ordinance Requirements

The Applicant has submitted all materials required under Article 4 Section 4.61 (see Site Plan Drawings attached as **Exhibit 3**, this Zoning Compliance Letter, and Applicant's Project Narrative attached as **Exhibit 4**) to satisfy the requirements of the Township's BESS Ordinance.

In addition, a narrative satisfying Section 4.61 is set forth below:

Section 4.61

A. Purpose and Intent: The purpose of this Ordinance is to establish minimum requirements and regulations for the construction, erection, placement, location, maintenance, modification, operation, and decommissioning of Battery Energy Storage Systems in the Township in a manner that promotes economic development and ensures the protection of health, safety, and welfare while also avoiding adverse impacts to important areas such as agricultural lands, residential areas, endangered species habitats, conservation lands, and other sensitive lands.

RESPONSE: **The purpose and intent requirements are met. See Exhibit 3 (Site Plan Drawings) and Exhibit 4 (Applicant's Project Narrative). To further clarify, the Project is a BESS facility that will improve the public health, safety, and welfare by enhancing the electric grid and increasing energy security in Kalamazoo County. No displacement or any adverse impact to the character, use or development of the surrounding area and the health and safety of residents or workers is expected to occur; the proposed Project is sited on undeveloped land that minimizes new disturbance and will be adequately screened and consistent with the character of the area, which sits in close proximity to existing electric grid infrastructure. Impacts from the Project on non-participating properties will be mitigated by meeting the screening and setback requirements established by the Zoning Ordinance, and there will be essentially no day-to-day activity on the Property after the Project is operational and placed into service.**

B. Definitions

4. Battery Energy Storage System, Large Off-Site: A Battery Energy Storage System (BESS) that is a principal use (or co-located with a second principal use) and that is designed and built to connect to the transmission grid with a nameplate capacity of 50 megawatts or more.

C. Off-Site Battery Storage Systems: The following requirements shall apply to all off-site battery energy storage systems:

2. *Battery Energy Storage Systems, Large Off-Site shall be allowed as a special land use in the following zoning districts:*

    a. Battery Energy Storage System Large Off-Site Overlay District
    b. LM, Light Manufacturing District
    c. M, Manufacturing District

RESPONSE: **The Project meets the definition of a Large Off-Site BESS. The Property is zoned Battery Energy Storage System Large Off-Site Overlay District.**

3. *The following minimum setbacks shall be required for Light Manufacturing, Manufacturing, and Battery Energy Storage System Large Off-Site Overlay Zoning Districts. Setbacks are measured from the nearest edge of the perimeter fencing of the facility to the nearest point on the associated item:*

    - *Occupied community buildings and dwellings on nonparticipating properties: 300 feet from occupied community buildings and dwellings on nonparticipating properties.*
    - *Public road right-of-way. I00 feet measured from the nearest edge of a public road right-of-way.*
    - *Property Line: 50 feet.*

RESPONSE: **This requirement is met. See Exhibit 3 (Site Plan Drawings).**

4. *A minimum setback of 2000 feet is required from Sensitive Land Uses as defined in this ordinance. For purposes of this Section, the setback shall be measured from the outer fence of the project to the outer wall of the nearest occupied dwelling/structure.*

RESPONSE: **This requirement is met. See Exhibit 3 (Site Plan Drawings).**

5. Height. The height of battery energy storage system structures, except for electric distribution and transmission poles, shall not exceed a height of fifteen (15) feet as measured from the natural grade of the property beneath the structure.

RESPONSE: **This requirement is met. See Exhibit 3 (Site Plan Drawings).**

6. Fencing. The system shall be completely enclosed with fencing in compliance with the latest version of the National Electrical Safety Code or any applicable successor standard approved by the Michigan Public Service Commission.

RESPONSE: **This requirement is met. See Exhibit 3 (Site Plan Drawings).**

7. Sound. The system may not generate a maximum sound in excess of 55 average hourly decibels measured at the property line of an adjacent non-participating property. Decibel modeling shall use the A- weighted scale designed by the American National Standards Institute.

RESPONSE: **This requirement is met. See Exhibit J (Noise Study) attached to Exhibit 4 (Applicant's Project Narrative). To further clarify, noise mitigation measures will be taken by the Applicant to ensure sound levels at the closest property line of adjacent non-participating property are at or below the 55 dB(A) limit.**

8. Lighting. The system must implement dark sky-friendly lighting solutions.

RESPONSE: **This requirement is met. See Exhibit 3 (Site Plan Drawings) and Exhibit H (Photometric Plan) to Exhibit 4 (Applicant's Project Narrative). To further clarify, lighting specific to the Project area will be either motion activated or light sensitive to turn on in the evening and shut off in the morning automatically. Exterior lighting will be shielded downward to prevent any spillover into adjacent properties.**

9. The following requirements shall apply to the entire system, or to designated components of the system, as indicated:

a. Safety Signage. The system shall post signs in compliance with NFPA 70/70E or any applicable successor code in place at the time of application for approval. Additionally, signage shall be provided per NFPA 855 7.4.4, or any applicable successor code in place at the time of application for approval, including information on the system type and technology, special hazards, fire suppression system and 24-hour emergency contact information, including reach-back phone number. A clearly visible warning sign concerning voltage shall be placed at the base of all pad-mounted transformers and substations.

b. Other Signage: Additional signage may be permitted or required by the Planning Commission as is necessary to ensure the safe operation of the system.

c. The facility shall comply with NFPA 855 "Standard for the Installation of Stationary Energy Storage Systems" or any current standard adopted by the Michigan Public Service Commission at time of application submission.

RESPONSE: **These requirements are met. See Exhibit 3 (Site Plan Drawings) and Exhibit E(A) (Emergency Response Guide) and Exhibit E(B) (Hazard Mitigation Plan) to Exhibit 4 (Applicant's Project Narrative). To further clarify, all signage will conform to the Township Ordinance and with NFPA 855 "Standard for the Installation of Stationary Energy Storage Systems" or any applicable successor standard adopted by the Michigan Public Service Commission.**

11 (Ordinance skips #10). The Planning Commission may require reasonable measures to minimize visual impacts by preserving existing natural vegetation, requiring new vegetative screening or other appropriate measures. The Planning Commission shall determine such visual screening measures as may be required, if any, on a site-specific basis pursuant to the standards for special land use approval as specified in Section 6.2, the landscaping standards of Section 5.4, and/or the standards for site plan approval as specified in Section 6.1 of this Ordinance as well as applicable sections of this Ordinance. In making this determination the Planning Commission is specifically authorized to consider whether additional visual screening measures are appropriate where a system is proposed to be located on property adjoining any residential zoning district classification or residential use.

RESPONSE: **The Applicant believes that the satisfaction of existing screening and landscaping requirements should be sufficient here given the location of the Project site in an undeveloped area, as well as the nearby existing electric grid infrastructure. Moreover, the Project is sufficiently distant from existing residential uses such that additional screening is not warranted. The Applicant will comply with any reasonable measures required by the Planning Commission.**

12. If the system includes an access drive(s) for maintenance purposes, the surface of the access drive(s) shall be permeable (unless on brownfield land or on an already paved surface at the time of application for approval, such as a parking lot or former building foundation.)

RESPONSE: **This requirement is met. See Exhibit 3 (Site Plan Drawings). The Project proposes the development of a compacted gravel access drive.**

13. Except as otherwise depicted on and subject to approval of the Planning Commission, the area within which the system is located shall not be paved with asphalt/concrete or any other surface material that is impermeable to water other than for slab foundations for structures and equipment. This shall not apply to a system located on brownfield land or

on an existing paved area such as a former building slab or in an unused parking area when adequate parking remains for all other uses on the site.

RESPONSE: **This requirement is met. See Exhibit 3 (Site Plan Drawings).**

14. All surface water runoff shall be effectively managed on-site.

RESPONSE: **This requirement is met. See Exhibit 3 (Site Plan Drawings) Exhibit 4 (Applicant's Project Narrative). A permanent stormwater basin will be designed and constructed to support site drainage. On-site drainage areas have been delineated, and an infiltration basin is proposed to provide the required storage, rate control and water quality volumes to accommodate runoff volume from the specified storm events. A specific drainage plan for the project intended to meet the requirements of Kalamazoo County Drainage Commission can be found in the Site Plan Drawings attached to this application.**

15. Installation and Operational Safety. The system shall comply with all of the following requirements:

a. The system shall be designed and constructed for interconnection to a Michigan Public Service Commission or Midcontinent Independent System Operator regulated utility electrical power grid and shall be operated with such interconnection.

b. The system and all foundation elements shall comply with all applicable building and electrical code requirements, and any applicable federal/state regulations. The manufacturer's engineer or another qualified engineer shall provide written certification that the design, installation (including foundations), and interconnection is compliant with the manufacturer and industry standards, all applicable local construction and electrical codes, and any applicable federal/state regulations.

c. Other than transmission or distribution lines for interconnection to the electric power grid, all electrical wiring shall be buried underground; except where the manufacturer's engineer or a qualified engineer employed by the utility that owns/operates the electrical power grid to which the system shall be interconnected certifies an underground wiring installation is not permitted by an applicable code and/or applicable federal/state regulation, with attached complete documentation supporting any such certification.

d. The system shall be designed, located, and maintained so as to comply with all applicable codes and regulations.

RESPONSE: **This requirement is met. See Exhibit 3 (Site Plan Drawings) and Exhibit 4 (Applicant's Project Narrative). The Project is comprised of two on-site substations. These substations will interconnect each of the proposed Battery Energy Storage System (BESS) yards via multiple medium voltage underground feeders. Each substation yard will house a GSU transformer that will step up the voltage from the BESS yard, up to the interconnection voltage of 138 kV. Each proposed substation yard will include an electrical control house; an operational building used to control/monitor the substation. It will house ancillary equipment for systems necessary for the overall function of a substation. Such systems include control relays, server racks, telecommunications and technical security, an alarm system, smoke detectors and fire safety protocols, and will occupy approximately 588 square feet within the substation yard. A generator intertie will be interconnected at 138 kV from each substation to the point of interconnection at the existing utility substation 0.1 miles to the north. The exact gen-tie route to be determined by others as the project progresses. The proposed substations will be enclosed by a 6-foot chain link fence with 1-foot of barbed wire and a 14-foot sound wall, located within the designated building envelope.**

16. Repair and Augmentation. In addition to repairing or replacing facility components to maintain the system, the facility may at any time be augmented without the need to submit a new site plan so long as the augmentation is within the same footprint (e.g., same dedicated use building or on footings/foundations in the same location) as the original permit. If there is a change in the battery chemistry, an updated Hazard Mitigation Analysis, Fire Response Plan and Emergency Response Plan shall be provided. When a facility is anticipated to be augmented over its lifetime by adding additional components, the applicant shall apply for the final/augmented site arrangement. A proposal to increase the size of the project footprint may be considered a new application, subject to the ordinance standards at the time of the request.

RESPONSE: **The Applicant acknowledges and will abide by this requirement.**

17. Public Safety. The Emergency Response Plan and Fire Response Plan shall provide reasonable protection of the public health, welfare and safety including but not limited an emergency shutdown procedure in place and shall provide the local fire department site safety plans to include electrical, fire, smoke, and hazardous materials release, emergency response protocols and identification of typical hazards related to, electrical, fire, smoke and hazardous materials pertinent to the facility. Upon request, all systems shall provide first responder training at the site

RESPONSE: **This requirement is met. See Exhibit E(A) (Emergency Response Guide) to Exhibit 4. The Applicant's fire response plan is incorporated into its Emergency Response Guide. As stated in the Emergency Response Guide and the Hazard Mitigation Analysis, the Applicant will coordinate with the local fire department to provide training to local first responders and take a collaborative approach to emergency responses. The Applicant will also implement the following measures during project construction and operation:**

• All applicable Kalamazoo County, Comstock Charter Township standards and requirements will be followed to ensure accessibility and ground clearance of emergency vehicles (e.g., fire engines).

• Smoking will be prohibited at the project site.

• Work crews will be required to park vehicles away from flammable vegetation such as dry grass and brush. At the end of each workday, heavy equipment will be required to be parked over gravel, mineral soil, asphalt, or concrete where available to reduce the risk of fire.

• All heavy equipment will be required to include mechanisms for fire suppression, including spark arresters or turbocharging (which eliminates sparks in exhaust) and fire extinguishers.

• Once operational, the BESS facility will be monitored remotely 24/7, as well as experience routine facility checks by full-time personnel.

18. Environmental. An applicant shall submit an environmental impact analysis that identifies potential impacts of the proposed system on the environment and natural resources and how the applicant intends to address and mitigate these impacts.

RESPONSE: **This requirement is met. See Exhibit O (Environmental Impact Analysis).**

19. Decommissioning and Removal. The system shall comply with all of the following requirements:

a. *A Decommissioning Plan, including a Decommissioning Agreement in a form recordable at the Kalamazoo County Register of Deeds, shall be provided and shall address the following:*

i. State the anticipated life of the project;
ii. Describe estimated decommissioning costs in current dollars and provide that this figure will be updated every third (3rd) year after commercial

operation of the system; Township zoning administrator may administratively review and accept estimated decommissioning costs for periodic review;

iii Be signed by the party responsible for decommissioning, and shall bind all successors, heirs and assigns;

iv. Define the conditions upon which decommissioning will be initiated (e.g.; end of land lease, no power storage for 12 months, etc.);

v. State that all equipment, conduit, structures, fencing, roads, and foundations will be removed to a depth of four (4) feet by the end of the decommissioning period;

vi. Require property to be restored as near as reasonably possible to the condition it was in prior to the development of the system;

vii. Describe the timeframe for completion of decommissioning activities;

viii. Describe any agreement (e.g., lease) with the landowner regarding decommissioning; ix. State the party currently responsible for decommissioning; and

x. Describe any plans or circumstances requiring an update of the decommissioning plan.

b. A recorded copy of the Decommissioning Agreement shall be executed and recorded upon issuance of a building permit or if a building permit is not required, within 7 days prior to commencement of construction. A proposed draft of the proposed Decommissioning Agreement shall be provided to the Township within 30 days after special land use approval.

c. Decommissioning shall be completed within 12 months of determination by the Township Board that the system is no longer being maintained in an operable state of good repair, unless the current responsible party provides substantial evidence to the Planning Commission of the intent to maintain and reinstate operation of the system.

d. The Decommissioning Plan shall include financial assurance in the form of a trust fund, a bond, or an irrevocable letter of credit as required by the Planning Commission. The amount of the financial assurance shall not be less than the estimated cost of decommissioning the system. Salvage value shall not be included in the estimated cost of decommissioning. The financial assurance must be posted in full (125%) before the start of commercial operation and continuously maintained for the period of the life of the system. The Township must be notified in writing at least 60 days before the bond or other financial surety is set to expire. Failure to provide proper notification and updated bond information is a violation of this ordinance. Notification under this Section must be made to the following

Township officials/employees: (1) Supervisor; (2) Clerk; (3) Chair of the Planning Commission; and (4) Superintendent. Notwithstanding anything to the contrary, at all times during construction and prior to commercial operation, financial assurance must be provided in an amount to assure proper decommissioning of the site.

RESPONSE: **The Applicant acknowledges and will comply with this requirement. See also Exhibit K (Decommissioning Plan) to Exhibit 4 (Applicant's Project Narrative).**

20. Special Land Use Permit and Site Plan Application Requirements. Applications for special land use permit approval shall comply with Section 6.2 of this Ordinance. A formal application for site plan approval for this land use shall comply with Section 6.1 of this Ordinance. An incomplete application will not be accepted. Each such application shall also be subject to the following additional submission requirements:

c. The site plan shall be submitted with the special land use permit application.
d. The submission shall include content responsive to all the following, to the extent not otherwise provided pursuant to the above referenced sections:
i. All information and supporting materials relied upon by the applicant to demonstrate compliance with all special land use permit approval standards and site plan approval standards as specified in this Ordinance.
ii. A Fire Response Plan and an Emergency Response Plan.

a). The Fire Response Plan (FRP) shall include:

1. Evidence of consultation or a good faith effort to consult with local fire department representatives to ensure that the FRP is in alignment with acceptable operating procedures, capabilities, resources, etc.
2. A description of all on-site equipment and systems to be provided to prevent or handle fire emergencies.
3. A description of all contingency plans to be implemented in response to the occurrence of a fire emergency.
4. A commitment to review and update the FRP with fire departments, first responders, and county emergency managers at least once every three (3) years.
5. An analysis of whether plans to be implemented in response to a fire emergency can be fulfilled by existing local emergency response capacity. The analysis should include identification of any specific equipment or training deficiencies in local emergency response capacity and recommendations for measures to mitigate deficiencies.

6. The means by which firefighters and other emergency services personnel can access and shut down the system on an emergency basis. This information shall be provided to the Township or other appropriate agency managing emergency response.
7. A 24-hour emergency contact telephone number for use by emergency services providers.
8. The FRP must meet all requirements of the Clean and Renewable Energy and Energy Waste Reduction Act, as amended, MCL 460.1001 et. seq
9. Other information the applicant finds relevant.
10. Other information the Fire Department finds relevant.

iii. The Emergency Response Plan (ERP) shall include:

1. Evidence of consultation or a good faith effort to consult with local first responders and county emergency manager to ensure that the ERP is in alignment with acceptable operating procedures, capabilities, resources, etc.
2. An identification of contingencies that would constitute a safety or security emergency (fire emergencies are to be addressed in a separate fire response plan);
3. Emergency response measures by contingency;
4. Evacuation control measures by contingency;
5. Community notification procedures by contingency;
6. An identification of potential approach and departure routes to and from the facility site for police, fire, ambulance, and other emergency vehicles;
7. A commitment to review and update the ERP with fire departments, first responders, and county emergency managers at least once every three (3) years;
8. The means by which firefighters and other emergency services personnel can access and shut down the system on an emergency basis. This information shall be provided to the Township or other appropriate agency managing emergency response.
9. A 24-hour emergency contact telephone number for use by emergency services providers.
10. An analysis of whether plans to be implemented in response to an emergency can be fulfilled by existing local emergency response capacity, and identification of any specific equipment or training deficiencies in local emergency response capacity;
11. Other information the applicant finds relevant.
12. Other information the Fire Department and County Emergency Manager finds relevant.

RESPONSE: **This requirement is met. See Exhibit E(A) (Emergency Response Guide) to Exhibit 4 (Applicant's Project Narrative) which incorporates an Emergency Response Plan**

and Fire Response Plan into one comprehensive plan addressing requirements for both under the Ordinance. See also Exhibit E(B) (Hazard Mitigation Analysis).

iv. A report detailing the sound modeling results along with mitigation plans to ensure that sound emitted from the system will remain below the required limit throughout the operational life of the system.

RESPONSE: This requirement is met. See Exhibit J (Noise Study) to Exhibit 4 (Project Narrative Report). To further clarify, noise mitigation measures including the building of a 14-foot noise wall along the east, north and west sides of the BESS facility, will be taken by the Applicant to ensure sound levels at the closest property line of adjacent non-participating property are at or below the 55 dB(A) limit set by the Ordinance.

v. Hazard Mitigation Analysis that complies with NFPA 855, as amended.

RESPONSE: This requirement is met. See Exhibit E(B) (Hazard Mitigation Analysis).

vi. A Groundcover and Vegetation Establishment and Management Plan shall be provided as part of the site plan. Vegetation establishment must include native species and natural seed mixes and may not include invasive plant species or noxious weeds and shall satisfy Section 226(6)(a) and Section 226(6)(b) of Michigan Public Act 233 of 2023.

RESPONSE: This requirement is met. See Exhibit 3 (Site Plan Drawings) and Exhibit F (Groundcover and Vegetation Establishment and Management Plan) to Exhibit 4 (Applicant's Project Narrative).

vii. Equipment specification sheet(s) for the system components, if available.

RESPONSE: This requirement is met. See Exhibit M (BESS Specifications) to Exhibit 4 (Applicant's Project Narrative). If equipment specifications change, a supplement to Exhibit M will be provided prior to the issuance of a Building Permit.

viii. All proposed changes to the landscape of the existing site, including grading, vegetation removal, fencing and vegetative screening. Views shall be minimized from adjacent properties to the extent reasonably practicable using architectural features, earth berms, landscaping or other screening methods that will harmonize with the character of the property and surrounding area while not interfering with ventilation or exhaust ports.

RESPONSE: This requirement is met. See Exhibit 3 (Site Plan Drawings) and Exhibit F (Groundcover and Vegetation Establishment and Management Plan) to Exhibit 4 (Applicant's Project Narrative).

ix. Drawings showing the layout of the proposed system, including distances from all existing and proposed structures/buildings and fencing on the site to all lot lines including to all boundaries of a leased site, where applicable, and to all structures/buildings on adjacent nonparticipating properties.

RESPONSE: **This requirement is met. See Exhibit 3 (Site Plan Drawings).**

x. Preliminary Augmentation Plan demonstrating the proposed augmentation phases including which structures/components are expected to be installed and in which time frames shall be provided.

RESPONSE: **The Applicant acknowledges and will comply with this requirement. If necessary, a Preliminary Augmentation Plan will be provided prior to the issuance of a Building Permit.**

xi. The height of all existing and proposed buildings/structures.

RESPONSE: **This requirement is met. See Exhibit 3 (Site Plan Drawings).**

xii. A preliminary electrical schematic plan for the proposed system, including disconnect and overcurrent devices.

RESPONSE: **The requirement is met. See Exhibit C (Preliminary Electrical Plans) to Exhibit 4 (Applicant's Project Narrative).**

xiii. Preliminary Decommissioning Plan and Decommissioning Agreement as described above.

RESPONSE: **This requirement is met. See Exhibit K (Decommissioning Plan) to Exhibit 4 (Applicant's Project Narrative). A Decommissioning Agreement will be provided prior to the issuance of a building permit.**

21. *Waiver. The Township Planning Commission shall have the authority to review and consider alternatives in both the dimensional and physical requirements contained in this ordinance as part of the special land use review process upon a finding that such change promotes the health, safety and general welfare of the Township. In addition, the Township recognizes the ever-changing technical capabilities of battery storage infrastructure and of new technology in general, and that changing technology may result in future changes to an approved Battery Energy Storage System facility. Minor changes within the footprint of an approved Site Plan and/or Special Land Use Permit, such as, without limitation,*

modifying battery storage equipment with new technologies, may be administratively reviewed and approved by the Zoning Administrator.

RESPONSE: As noted herein, the Applicant seeks a waiver under Article 4, Section 4.61(B)(21) to allow for establishment of a BESS in a parcel less than 140 contiguous acres as currently required under Article 3, Section 3.1.T. to allow for dual ownership of the Project. While the total acreage of the Applicant's Property exceeds the 140-acre minimum requirement, the actual BESS facility sits on 39.22 acres of the Property, with 16.95 acres to be owned and operated by Swan and 22.27 acres to be owned and operated by Cygnet.

22. *Modifications that increase a facility's footprint or total energy capacity by 10% or more require a new site plan and special exception land use approval by the Planning Commission. Any increase in energy capacity requires written notification to the Township Zoning Administrator and/or designated personnel at least 30 days prior to the increase in energy capacity. All obligations, including but not limited to the community host agreement and decommissioning agreement, must be updated to reflect the increase in energy capacity. The financial surety shall be increased if there is an increase in energy capacity.*

RESPONSE: The Applicant acknowledges and will comply with this requirement.

23. *An executed Community Host Agreement in the amount of an annual payment of $825 per megawatt of nameplate capacity for 20 years, which shall be executed prior to commercial operation of the Battery Energy Storage System facility. Payment to the Township shall begin upon commercial operation and it shall be the Township's option to require up to 66% of such total payment up front, not to exceed $2 million.*

RESPONSE: The Applicant acknowledges and will comply with this requirement.

24. *Building Permit or Construction. Prior to issuance of a building permit or if a building permit is not required, within 7 days prior to commencement of construction, the following information shall be provided.*

    a. Equipment specification sheets.
    b. Identification and contact information for the installer(s) of the proposed system.
    c. Approved Augmentation Plan.
    d. Approved Decommissioning Plan and Decommissioning Agreement in recordable form and acceptable to the Township Attorney.
    e. Life expectancy of the system components including the anticipated schedule for battery replacement to maintain megawatts over the system's lifetime.
    f. Hazard Mitigation Analysis.
    g. Operation and Maintenance Manual.

h. Electrical schematic plan for the system, including disconnect devices.
i. An approved FRP and ERP by the Fire Chief. j. Approved Decommissioning Plan, Decommissioning Agreement and proof of financial guarantee for decommissioning.

RESPONSE: The Applicant acknowledges and will comply with this requirement. These materials will be provided prior to the issuance of a Building Permit.

D. On-Site Battery Energy Storage Systems.

1. On-Site Battery Energy Storage Systems shall be allowed as a permitted use in all zoning districts, subject to the provisions of the Zoning Ordinance.

2. A building permit shall be required for all on-site battery energy storage systems.

3. On-Site battery energy storage systems with an aggregate energy capacity of more than 1 megawatt are subject to additional regulations in the applicable fire code (NFPA 855, as amended), and required documentation shall be submitted along with the building/electrical permit applications.

4. Coverage. Lot coverage shall not exceed the otherwise permissible percentage of lot coverage in the applicable zoning district.

5. Setbacks. All battery energy storage system structures and related structural apparatus not physically attached to a building shall satisfy the setback requirements in the applicable zoning district, but in no circumstance may an on-site battery storage system or any related apparatus be less than 25' from a property line.

RESPONSE: These requirements are acknowledged and met. See Exhibit 3 (Site Plan Drawings).

Section V of the BESS Ordinance amends Article 3 of the Ordinance by adding subsection 3.1.T which provides:

Section 3.1.T: *BATTERY ENERGY STORAGE SYSTEM LARGE OFF-SITE OVERLAY DISTRICT.*

1. *A Battery Energy Storage System Large Off-Site Overlay District is established wherein a Battery Energy Storage System Large Off-Site is a special land use in any zoning district on a parcel(s) of at least 140 contiguous acres and meeting the additional requirements in Article 4 Section 4.61. At no time shall this district occupy more than 200 acres of land in the Township in the aggregate.*

RESPONSE: **This requirement is met. The Project will be on a parcel of at least 144.28 contiguous acres and meets the additional requirements of Article 4, Section 4.16 as described previously. See Exhibit 2 (Application), Exhibit 3 (Site Plan Drawings) and Exhibit 4 (Applicant's Project Narrative). As noted herein, however, the Applicant seeks a waiver to the extent needed to provide for dual ownership of the Project.**

1. *Site Selection. A Battery Energy Storage System Large Off-Site Overlay Zoning District in the AGR Agricultural Residential District shall not unreasonably diminish farmland, including, but not limited to, prime farmland and, to the extent that evidence of such farmland is available in the evidentiary record, farmland dedicated to the cultivation of specialty crops.*

RESPONSE: This requirement is met. The Project does not unreasonably diminish farmland as it is located on undeveloped land that is not currently being used as farmland.

2. *At least 100 acres must remain open space or can be offered by the applicant for public recreation indoor or outdoor uses. Subject to Township Planning Commission approval, as part of the special land use approval, the open space/public recreation may be split off from the facility parcel with proper assurances but shall still count towards the Township district aggregate.*

RESPONSE: This requirement is met. The Applicant will be designating 105.06 acres of the Property as open space/recreation or outdoor uses pursuant to the Ordinance. The Applicant recognizes the Township's interest in the meaningful and durable community benefit that this lands provides. The Applicant further remains committed to working with the Township in good faith to identify the most appropriate recreational use, access rights, and implementation structure for this space. The Applicant proposes that the specific details such as type, scope, design, ownership structure, construction timeline, and other implementation details for the recreational use be set through a separate joint development agreement or similar mutually acceptable mechanism after the Project advances through the planning and zoning approval.

IV. Applicable Law

Under Michigan law, when a site plan contains the information required by the zoning ordinance and is in compliance with the zoning ordinance, it is to be approved. *See* MCL 125.3501(5); *Hessee realty, Inc. v Ann Arbor*, 61 Mich App 319 (1975); *Keating Int'l Corp v Orion*, 51 Mich App 122 (1974), *aff'd*, 395 Mich 539 (1975). As Applicant has met all criteria under the Zoning Ordinance, the Application should be approved.

V. Conclusion

In conclusion, the Applicant respectfully requests that the foregoing materials be considered by the Township and that the Application and Site Plan be approved. On behalf of the Applicant, we thank you in advance for your timely attention to this matter and look forward to working with the Township throughout the zoning approval process.

Sincerely,

ZAUSMER, P.C.



Stephen R. Estey

SRE
Enclosures
cc: Client

EXHIBIT 2

Docusign Envelope ID: A0129289-7526-45FC-8E93-39CF500A9D43

CHARTER TOWNSHIP OF COMSTOCK
PLANNING & ZONING APPLICATION

Shipping: 5858 King Highway, Kal., MI 49048
Mailing: PO Box 449, Comstock MI 49041-0449
Phone: 269-381-2360 Fax: 269-381-4328

PLEASE PRINT

PROJECT NAME AND ADDRESS: Swan Energy Storage & Cygnet Energy Storage - Galesburg, MI

APPLICANT:

Name: Swan Energy Storage; Cygnet Energy Storage
Company: Swan Energy Storage LLC; Cygnet Energy Storage LLC
Address: 412 West 15th Street
New York, New York 10011
Email: japv@cip-tt
Phone: 4155969537 Fax: _____
Interest in the Property: _____

Township Use:

Fee:
$_____

Escrow:
$_____

Date Paid:
_____
cash/credit card
check # _____

OWNER*:

Name: David L. Dart
Company: Hickory Ridge
Address: 91 N 30TH ST GALESBURG MI 49053
_____
Email: dldart@hotmail.com
Phone: 269-806-0917 Fax: _____

*If different

NATURE OF REQUEST: (Please check all the appropriate item(s))

- ☑ Site Plan Review
- ☐ Administrative Site Plan Review
- ☑ Special Exception Use
- ☐ Site Condominium
- ☐ Subdivision Plat Review
- ☐ PUD/PURD/PMUD
- ☐ Other _____
- ☐ Rezoning
- ☐ Master Plan Amendment
- ☐ Text Amendment
- ☐ Variance
- ☐ Interpretation
- ☐ Planning Escrow

BRIEFLY DESCRIBE YOUR REQUEST (*Use Attachments if Necessary*):
See application materials

Docusign Envelope ID: A0129289-7526-45FC-8E93-39CF500A9D43

LEGAL DESCRIPTION OF PROPERTY (*Use Attachments if Necessary*):
See Attached Project Description

PARCEL NUMBER: 3907 - 07-16-330-011; 07-16-455-051; 07-16-480-050

ADDRESS OF PROPERTY: 91 N 30TH ST GALESBURG MI 49053

PRESENT USE OF THE PROPERTY: Golf Course

PRESENT ZONING: Commercial - R1C **SIZE OF PROPERTY:** 144

NAME(S) & ADDRESS(ES) OF ALL OTHER PERSONS, CORPORATIONS, OR FIRMS HAVING A LEGAL OR EQUITABLE INTEREST IN THE PROPERTY:

Name(s)	Address(es)

SIGNATURES

I (we) the undersigned certify that the information contained on this application form and the required documents attached hereto are to the best of my (our) knowledge true and accurate. By submitting this Planning & Zoning Application, I (we) grant permission for Comstock Township officials and agents to enter the subject property of the applicant as part of completing the reviews necessary to process the application. I (we) as Applicant(s), understand that I (we) am responsible for the reimbursement to the Township of its actual expenses in connection with my (our) application, under the Township's Escrow Fee Policy, and I (we) agree to pay such amounts under the terms of that policy.

Signed by: Dan Powazny AB17F1B41F2C4B4...

Applicant's Signature — April 6, 2026 — **Date**

Owner's Signature authorizing submission of Application — 4-6-2026 — **Date**
(* *If different from Applicant*)

*** * PLEASE ATTACH ALL REQUIRED DOCUMENTS * ***

Copies to:
Planning & Zoning – 1
Applicant – 1
Treasurer - 1
Assessor – 1
Administrative Assistant - Original

Revised: September 2020

EXHIBIT 3

SITE DEVELOPMENT PLANS
FOR
SWAN BESS AND CYGNET BESS

65 N 30TH ST.,
COMSTOCK TOWNSHIP, KALAMAZOO COUNTY, MI

PROJECT TEAM:

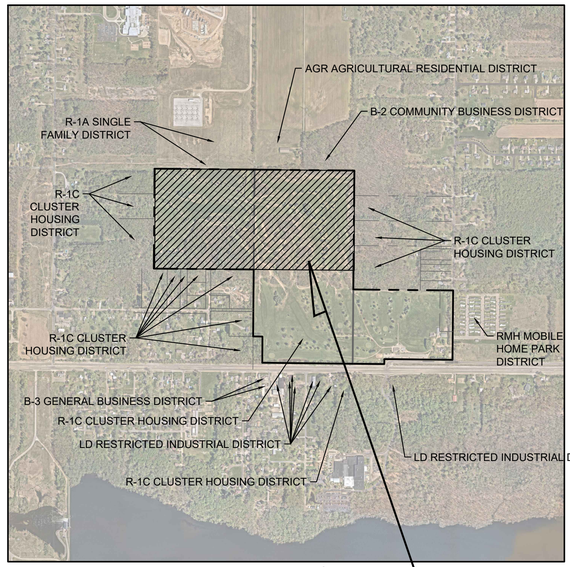
CIVIL ENGINEER
KIMLEY-HORN OF MICHIGAN, INC.
3000 TOWN CTR, STE. 2600
SOUTHFIELD, MI 48075
ENGINEER OF RECORD: BRIAN GAMMON, P.E.
TELEPHONE: (612) 503-8532

LANDSCAPE ARCHITECT
KIMLEY-HORN OF MICHIGAN, INC.
3000 TOWN CTR, STE. 2600
SOUTHFIELD, MI 48075
CONTACT: RYAN HYLLESTED
TELEPHONE: (612) 568-0698

ELECTRICAL ENGINEER
KIMLEY-HORN OF MICHIGAN, INC.
3000 TOWN CTR, STE. 2600
SOUTHFIELD, MI 48075
CONTACT: NICHOLAS ALFONSO, P.E.
TELEPHONE: (914) 368-9203

OWNER / DEVELOPER
SWAN ENERGY STORAGE LLC AND
CYGNET ENERGY STORGAGE LLC
200 S WACKER DRIVE, STE. 1600
CHICAGO, IL 60606
CONTACT: SIMONE MARLETTI
TELEPHONE: (917) 451-0718

SURVEYOR
ROWE PROFESSIONAL SERVICES COMPANY
507 36TH ST SE
GRAND RAPIDS, MI 49548
CONTACT: ROBERT CHURCH, P.S
TELEPHONE: (616) 272-7125



VICINITY
N.T.S.

NORTH

PROJECT INFORMATION

ZONING:	R-1C CLUSTER HOUSING DISTRICT, BATTERY ENERGY STORAGE SYSTEM LARGE OFF-SITE OVERLAY DISTRICT
PROPOSED USE:	BATTERY ENERGY STORAGE SYSTEM
FLOODPLAIN:	ZONE X
PROPERTY LINE SETBACK:	50'
RIGHT-OF-WAY SETBACK:	100'
SENSITIVE LAND USE SETBACK:	2000'
NFPA 855 REMOTE LOCATION BATTERY SETBACK:	100'
OCCUPIED BUILIDNG SETBACK:	300'
PARCEL AREA:	144.28 AC
BESS DEVELOPMENT AREA:	39.22 AC
PARCEL NUMBER:	07-16-455-051 AND 07-166-330-011

PROJECT DESCRIPTION

THE PROJECT CONSISTS OF THE INSTALLATION OF TWO 200 MW / 8000 MWH BATTERY ENERGY STORAGE SYSTEMS. PROJECT AREA (EXCLUDING ALL EXISTING AND PROPOSED PUBLIC RIGHTS-OF-WAY): 48.91 AC

LEGAL DESCRIPTION

LAND IN THE TOWNSHIP OF COMSTOCK, KALAMAZOO COUNTY, MI, DESCRIBED AS FOLLOWS: PARCEL 1: THE NORTHEAST QUARTER OF THE SOUTHWEST QUARTER OF SECTION 16, TOWN 2 SOUTH, RANGE 10 WEST. PARCEL 2A: THE WEST HALF OF THE SOUTHEAST QUARTER OF SECTION 16, TOWN 2 SOUTH, RANGE 10 WEST, EXCEPT BEGINNING AT THE INTERSECTION OF THE NORTH AND SOUTH QUARTER LINE OF SAID SECTION WITH THE NORTH LINE OF THE RIGHT OF WAY OF THE MICHIGAN CENTRAL RAILROAD AND RUNNING THENCE NORTH 0 DEGREES 8 MINUTES WEST ALONG SAID QUARTER LINE 347 FEET, THENCE SOUTH 89 DEGREES 58 MINUTES EAST PARALLEL TO THE NORTH LINE OF SAID RIGHT OF WAY 123.47 FEET; THENCE SOUTH 0 DEGREES 8 MINUTES EAST PARALLEL TO SAID QUARTER LINE 347 FEET TO THE NORTH LINE OF SAID RAILROAD RIGHT OF WAY; THENCE NORTH 89 DEGREES 58 MINUTES WEST ALONG THE NORTH LINE OF SAID RIGHT OF WAY 123.47 FEET TO THE PLACE OF BEGINNING; ALSO EXCEPT THE RIGHT OF WAY OF THE MICHIGAN CENTRAL RAILROAD AS LOCATED OVER AND ACROSS THE FIRST ABOVE DESCRIBED PARCEL OF LAND. PARCEL 2B: PART OF THE EAST 1/2 OF THE SOUTHEAST 1/4 OF SECTION 16 OF TOWN 2 SOUTH, RANGE 10 WEST, DESCRIBED AS COMMENCING AT THE INTERSECTION OF THE EAST LINE OF SAID SECTION 16 WITH THE NORTH LINE OF THE RIGHT OF WAY OF THE MICHIGAN CENTRAL RAILROAD; THENCE NORTH ON THE EAST SECTION LINE 980 FEET; THENCE WEST PARALLEL WITH THE NORTH LINE OF SAID RIGHT OF WAY OF THE MICHIGAN CENTRAL RAILROAD TO THE NORTH AND SOUTH 1/8 LINE OF SAID SOUTHEAST 1/4 OF SECTION 16, THENCE SOUTH THEREON 980 FEET TO THE NORTH LINE OF SAID MICHIGAN CENTRAL RAILROAD RIGHT OF WAY; THENCE EAST THEREON TO THE PLACE OF BEGINNING, EXCEPT THE SOUTH 66 FEET OF THE EAST 900 FEET THEREOF.

NOTES:

1. CONTRACTOR SHALL CONFIRM THAT THE EXISTING CONDITIONS FOR THE SITE MATCH WHAT IS SHOWN ON THE DRAWINGS INCLUDED PRIOR TO CONSTRUCTION.
2. IF REPRODUCED, THE SCALES SHOWN ON THESE PLANS ARE BASED ON A 22" x 34" SHEET.
3. ALL NECESSARY INSPECTIONS AND/OR CERTIFICATIONS REQUIRED BY CODES AND/OR UTILITY SERVICES COMPANIES SHALL BE PERFORMED PRIOR TO ANNOUNCED BUILDING POSSESSION AND THE FINAL CONNECTION OF SERVICES.
4. ALL GENERAL CONTRACTOR WORK TO BE COMPLETED (EARTHWORK, FINAL UTILITIES, AND FINAL GRADING) BY THE MILESTONE DATE IN PROJECT DOCUMENTS.

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ISSUED FOR PERMIT - NOT FOR CONSTRUCTION

No.	REVISIONS	DATE	BY
1	ENTITLEMENT SET	06/08/2026	BPG

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CIP
Copenhagen Infrastructure Partners

STATE OF MICHIGAN
BRIAN GAMMON
ENGINEER
NO. 6201312904
PROFESSIONAL ENGINEER

Brian Gammon

KHA PROJECT	161282002
DATE	06/08/2026
SCALE	AS SHOWN
DESIGNED BY	JLL
DRAWN BY	CJC
CHECKED BY	BPG

COVER SHEET

SWAN BESS AND CYGNET BESS
PREPARED FOR
SWAN ENERGY STORAGE LLC AND CYGNET ENERGY STORGAGE LLC
COMSTOCK TOWNSHIP
MI

SHEET NUMBER
C000

K:\TCW_LDEV\Copenhagen Infrastructure Partners\Swan BESS_MI\2 Design\CAD\PlanSheets\C0-COVER SHEET.dwg June 08, 2026 - 12:26pm

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K:\TCW_LDEV\Copenhagen Infrastructure Partners\Swan BESS_MI\2 Design\CAD\PlanSheets\C1-GENERAL NOTES.dwg June 08, 2026 - 12:26pm
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GENERAL CONSTRUCTION NOTES

1. THE CONTRACTOR AND SUBCONTRACTORS SHALL OBTAIN A COPY OF THE LATEST EDITION OF THE STANDARD SPECIFICATIONS OF THE LOCAL JURISDICTION AND STATE DEPARTMENT OF TRANSPORTATION AND BECOME FAMILIAR WITH THE CONTENTS PRIOR TO COMMENCING WORK. UNLESS OTHERWISE NOTED, ALL WORK SHALL CONFORM AS APPLICABLE TO THESE STANDARDS AND SPECIFICATIONS.
3. PERFORM ALL WORK IN COMPLIANCE WITH APPLICABLE TOWNSHIP REGULATIONS, STATE CODES, AND O.S.H.A. STANDARDS. THE CONTRACTOR IS RESPONSIBLE FOR FURNISHING THE NECESSARY MATERIALS & LABOR TO CONSTRUCT THE FACILITY AS SHOWN AND DESCRIBED IN THE CONSTRUCTION DOCUMENTS, AND IN ACCORDANCE WITH THE SPECIFICATIONS AND REQUIREMENTS OF THE APPROPRIATE APPROVING AUTHORITIES.
4. CONTRACTOR SHALL CLEAR AND GRUB ALL AREAS UNLESS OTHERWISE INDICATED, REMOVING TREES, STUMPS, ROOTS, MUCK, EXISTING PAVEMENT AND ALL OTHER DELETERIOUS MATERIAL.
5. THE EXISTING SUBSURFACE UTILITY INFORMATION IN THIS PLAN IS QUALITY LEVEL "D" UNLESS OTHERWISE NOTED. THIS QUALITY LEVEL WAS DETERMINED ACCORDING TO THE GUIDELINES OF CI/ACSE 38/02, ENTITLED STANDARD GUIDELINES FOR THE COLLECTION AND DEPICTION OF SUBSURFACE QUALITY DATA BY THE FHA. EXISTING UTILITIES SHOWN ARE LOCATED ACCORDING TO THE INFORMATION AVAILABLE TO THE ENGINEER AT THE TIME OF THE TOPOGRAPHIC SURVEY AND HAVE NOT BEEN INDEPENDENTLY VERIFIED BY THE OWNER OR THE ENGINEER. GUARANTEE IS NOT MADE THAT ALL EXISTING UNDERGROUND UTILITIES ARE SHOWN OR THAT THE LOCATION OF THOSE SHOWN ARE ENTIRELY ACCURATE. FINDING THE ACTUAL LOCATION OF ANY EXISTING UTILITIES IS THE CONTRACTOR'S RESPONSIBILITY AND SHALL BE DONE BEFORE COMMENCING ANY WORK IN THE VICINITY. FURTHERMORE, THE CONTRACTOR SHALL BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES DUE TO THE CONTRACTOR'S FAILURE TO EXACTLY LOCATE AND PRESERVE ANY AND ALL UNDERGROUND UTILITIES. THE OWNER OR ENGINEER WILL ASSUME NO LIABILITY FOR ANY DAMAGES SUSTAINED OR COST INCURRED BECAUSE OF THE OPERATIONS IN THE VICINITY OF EXISTING UTILITIES OR STRUCTURES, NOR FOR TEMPORARY BRACING AND SHORING OF SAME. IF IT IS NECESSARY TO SHORE, BRACE, SWING OR RELOCATE A UTILITY, THE UTILITY COMPANY OR DEPARTMENT AFFECTED SHALL BE CONTACTED AND THEIR PERMISSION OBTAINED REGARDING THE METHOD TO USE FOR SUCH WORK.
6. IT IS THE CONTRACTOR'S RESPONSIBILITY TO CONTACT THE VARIOUS UTILITY COMPANIES WHICH MAY HAVE BURIED OR AERIAL UTILITIES WITHIN OR NEAR THE CONSTRUCTION AREA BEFORE COMMENCING WORK. THE CONTRACTOR SHALL PROVIDE 48 HOURS MINIMUM NOTICE TO ALL UTILITY COMPANIES PRIOR TO BEGINNING CONSTRUCTION.
7. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL REQUIRED CONSTRUCTION PERMITS AND BONDS IF REQUIRED PRIOR TO CONSTRUCTION.
8. THE CONTRACTOR SHALL HAVE AVAILABLE AT THE JOB SITE AT ALL TIMES ONE COPY OF THE CONSTRUCTION DOCUMENTS INCLUDING PLANS, SPECIFICATIONS, GEOTECHNICAL REPORT AND SPECIAL CONDITIONS AND COPIES OF ANY REQUIRED CONSTRUCTION PERMITS.
9. ANY DISCREPANCIES ON THE DRAWINGS SHALL BE IMMEDIATELY BROUGHT TO THE ATTENTION OF THE OWNER AND ENGINEER BEFORE COMMENCING WORK. NO FIELD CHANGES OR DEVIATIONS FROM DESIGN ARE TO BE MADE WITHOUT PRIOR APPROVAL OF THE OWNER AND NOTIFICATION TO THE ENGINEER.
10. ALL COPIES OF COMPACTION, CONCRETE AND OTHER REQUIRED TEST RESULTS ARE TO BE SENT TO THE OWNER DIRECTLY FROM THE TESTING AGENCY.
11. THE CONTRACTOR SHALL BE RESPONSIBLE FOR DOCUMENTING AND MAINTAINING AS-BUILT INFORMATION WHICH SHALL BE RECORDED AS CONSTRUCTION PROGRESSES OR AT THE COMPLETION OF APPROPRIATE CONSTRUCTION INTERVALS AND SHALL BE RESPONSIBLE FOR PROVIDING AS-BUILT DRAWINGS TO THE OWNER FOR THE PURPOSE OF CERTIFICATION TO JURISDICTIONAL AGENCIES AS REQUIRED. ALL AS-BUILT DATA SHALL BE COLLECTED BY A STATE PROFESSIONAL LAND SURVEYOR WHOSE SERVICES ARE ENGAGED BY THE CONTRACTOR.
12. ANY WELLS DISCOVERED ON SITE THAT WILL HAVE NO USE MUST BE PLUGGED BY A LICENSED WELL DRILLING CONTRACTOR IN A MANNER APPROVED BY ALL JURISDICTIONAL AGENCIES. CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ANY WELL ABANDONMENT PERMITS REQUIRED.
13. ANY WELL DISCOVERED DURING EARTH MOVING OR EXCAVATION SHALL BE REPORTED TO THE APPROPRIATE JURISDICTIONAL AGENCIES WITHIN 24 HOURS AFTER DISCOVERY IS MADE.
14. THE CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING THAT THE PROPOSED IMPROVEMENTS SHOWN ON THE PLANS DO NOT CONFLICT WITH ANY KNOWN EXISTING OR OTHER PROPOSED IMPROVEMENTS. IF ANY CONFLICTS ARE DISCOVERED, THE CONTRACTOR SHALL NOTIFY THE OWNER PRIOR TO INSTALLATION OF ANY PORTION OF THE SITE WORK THAT WOULD BE AFFECTED. FAILURE TO NOTIFY OWNER OF AN IDENTIFIABLE CONFLICT PRIOR TO PROCEEDING WITH INSTALLATION RELIEVES OWNER OF ANY OBLIGATION TO PAY FOR A RELATED CHANGE ORDER.
15. SHOULD CONTRACTOR ENCOUNTER ANY DEBRIS LADEN SOIL, STRUCTURES NOT IDENTIFIED IN THE DOCUMENTS, OR OTHER SOURCE OF POTENTIAL CONTAMINATION, THEY SHALL IMMEDIATELY CONTACT THE ENGINEER AND OWNER.
16. CONTRACTOR SHALL NOTIFY OWNER AND/OR ENGINEER 48 HOURS IN ADVANCE OF THE FOLLOWING ACTIVITIES: PRE-CONSTRUCTION MEETING, SUBGRADE PREPARATION, BASE INSTALLATION, ASPHALT INSTALLATION, UNDERGROUND PIPING AND UTILITIES INSTALLATION, INSTALLATION OF STRUCTURES, CHECK VALVES, HYDRANTS, METERS, ETC., SIDEWALK INSTALLATION, CONNECTIONS TO WATER AND SEWER MAINS, TESTS OF UTILITIES.

THIRD PARTY SUPPLEMENTAL INFORMATION

KIMLEY-HORN ASSUMES NO LIABILITY FOR ANY ERRORS, INACCURACIES, OR OMISSIONS CONTAINED WITHIN SUPPLEMENTAL INFORMATION PROVIDED BY THIRD PARTY CONSULTANTS.

1. **BOUNDARY & TOPOGRAPHIC SURVEY**
   PERFORMED BY: ROWE PROFESSIONAL SERVICES COMPANY
   ADDRESS: 507 36TH ST SE, GRAND RAPIDS, MI 49548
   PHONE: (616) 272-7125
   DATED: 05/22/2026
2. **CONSTRUCTION TESTING**
   TEST REPORTS REQUIRED FOR CLOSE OUT INCLUDE, BUT ARE NOT LIMITED TO:
   - DENSITY TEST REPORTS
   - BACTERIOLOGICAL TESTS OF WATER SYSTEM
   - PRESSURE TEST OF WATER/SEWER
   - LEAK TESTS ON SEWER SYSTEM AND GREASE TRAPS
   - ANY OTHER TESTING REQUIRED BY THE AGENCY/MUNICIPALITY

EROSION CONTROL NOTES

1. THE STORM WATER POLLUTION PREVENTION PLAN ("SWPPP") IS COMPRISED OF THE EROSION CONTROL PLAN, THE STANDARD DETAILS, THE PLAN NARRATIVE, ATTACHMENTS INCLUDED IN THE SPECIFICATIONS OF THE SWPPP, PLUS THE PERMIT AND ALL SUBSEQUENT REPORTS AND RELATED DOCUMENTS.
2. ALL CONTRACTORS AND SUBCONTRACTORS INVOLVED WITH STORM WATER POLLUTION PREVENTION SHALL OBTAIN A COPY OF THE STORM WATER POLLUTION PREVENTION PLAN AND THE STATE NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM GENERAL PERMIT (NPDES PERMIT) AND BECOME FAMILIAR WITH THEIR CONTENTS.
3. BEST MANAGEMENT PRACTICES (BMP'S) AND CONTROLS SHALL CONFORM TO FEDERAL, STATE, OR LOCAL REQUIREMENTS OR MANUAL OF PRACTICE, AS APPLICABLE. THE CONTRACTOR SHALL IMPLEMENT ADDITIONAL CONTROLS AS DIRECTED BY THE PERMITTING AGENCY OR OWNER.
4. THE CONTRACTOR IS SOLELY RESPONSIBLE FOR COMPLYING WITH THE REQUIREMENTS OF THE AUTHORITIES HAVING JURISDICTION, AND SHALL MAINTAIN COMPLIANCE WITH APPLICABLE LAWS AND REGULATIONS FOR THE DURATION OF CONSTRUCTION.
5. THE CONTRACTOR SHALL FIELD ADJUST AND/OR PROVIDE ADDITIONAL EROSION CONTROL BMP'S AS NEEDED TO PREVENT EROSION AND OFF-SITE SEDIMENT DISCHARGE FROM THE CONSTRUCTION SITE. LOG AND RECORD ANY ADJUSTMENTS AND DEVIATIONS FROM THE APPROVED EROSION CONTROL PLANS WITHIN THE SWPPP DOCUMENTS STORED IN THE JOB SITE TRAILER.
6. BMPS SHOWN ON THE EROSION AND SEDIMENT CONTROL PLAN, AND IN THE STORM WATER POLLUTION PREVENTION PLAN, SHALL BE MAINTAINED IN FULLY FUNCTIONAL CONDITION AS REQUIRED BY ALL JURISDICTIONS UNTIL NO LONGER REQUIRED FOR A COMPLETED PHASE OF WORK OR FINAL STABILIZATION OF THE SITE. ALL EROSION AND SEDIMENTATION CONTROL MEASURES SHALL BE CHECKED BY A CERTIFIED PERSON AT LEAST ONCE EVERY 7 CALENDAR DAYS AND WITHIN 24 HOURS OF THE END OF A 0.5-INCH OR GREATER RAINFALL EVENT.
7. EROSION & SEDIMENT CONTROL BMPS SHALL BE MAINTAINED IN ACCORDANCE WITH THE FOLLOWING:
   7.1. INLET PROTECTION DEVICES AND BARRIERS SHALL BE REPAIRED OR REPLACED IF THEY SHOW SIGNS OF UNDERMINING OR DETERIORATION.
   7.2. ALL SEEDED AREAS SHALL BE CHECKED REGULARLY TO VERIFY THAT A HEALTHY STAND OF VEGETATION IS MAINTAINED. SEEDED AREAS SHOULD BE FERTILIZED, WATERED AND RE-SEEDED AS NEEDED. REFER TO THE LANDSCAPE PLAN AND PROJECT SPECIFICATIONS.
   7.3. SILT FENCES SHALL BE REPAIRED TO THEIR ORIGINAL CONDITIONS IF DAMAGED. SEDIMENT SHALL BE REMOVED FROM THE SILT FENCES WHEN IT REACHES ONE-THIRD THE HEIGHT OF THE SILT FENCE.
   7.4. THE ROCK CONSTRUCTION ENTRANCE(S) SHALL BE MAINTAINED IN A CONDITION WHICH WILL PREVENT TRACKING OR FLOW OF MUD ONTO PUBLIC RIGHTS-OF-WAY. THIS MAY REQUIRE PERIODIC ADDITIONS OF ROCK TOP DRESSING AS CONDITIONS DEMAND.
   7.5. THE TEMPORARY PARKING AND STORAGE AREA SHALL BE KEPT IN GOOD CONDITION (SUITABLE FOR PARKING AND STORAGE). THIS MAY REQUIRE PERIODIC ADDITIONS OF TOP DRESSING IF THE TEMPORARY PARKING CONDITIONS DEMAND.
   7.6. PERFORM ALL MAINTENANCE OPERATIONS IN A TIMELY MANNER BUT IN NO CASE LATER THAN 2 CALENDAR DAYS FOLLOWING THE INSPECTION.

PAVING AND STRIPING NOTES

1. ALL PAVING, CONSTRUCTION, MATERIALS, AND WORKMANSHIP WITHIN JURISDICTION'S RIGHT-OF-WAY SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF THE LOCAL TOWNSHIP OR COUNTY SPECIFICATIONS AND STANDARDS, OR THE STATE DOT SPECIFICATIONS AND STANDARDS IF NOT COVERED BY LOCAL TOWNSHIP OR COUNTY REGULATIONS.
2. ALL SIGNS, PAVEMENT MARKINGS, AND OTHER TRAFFIC CONTROL DEVICES SHALL CONFORM TO MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (M.U.T.C.D) AND TOWNSHIP STANDARDS.
3. CONTRACTOR SHALL FURNISH ALL PAVEMENT MARKINGS FOR FIRE LANES, ROADWAY LANES, PARKING STALLS, ACCESSIBLE PARKING SYMBOLS, ACCESS AISLES, STOP BARS AND SIGNS, AND MISCELLANEOUS STRIPING WITHIN THE PARKING LOT AS SHOWN ON THE PLANS.
4. ALL EXPANSION JOINTS SHALL EXTEND THROUGH THE CURB.
5. THE MINIMUM LENGTH OF OFFSET JOINTS AT RADIUS POINTS SHALL BE 2 FEET.
6. ALL JOINTS, INCLUDING EXPANSION JOINTS WITH REMOVABLE TACK STRIPS, SHALL BE SEALED WITH JOINT SEALANT.
7. THE MATERIALS AND PROPERTIES OF ALL CONCRETE SHALL MEET THE APPLICABLE REQUIREMENTS IN THE A.C.I. (AMERICAN CONCRETE INSTITUTE) MANUAL OF CONCRETE PRACTICE.
8. CONTRACTOR SHALL APPLY A SECOND COATING OVER ALL PAVEMENT MARKINGS PRIOR TO ACCEPTANCE BY OWNER FOLLOWED BY A COAT OF GLASS BEADS AS APPLICABLE PER THE PROJECT DOCUMENTS.
9. ANY EXISTING PAVEMENT, CURBS AND/OR SIDEWALKS DAMAGED OR REMOVED WILL BE REPAIRED BY THE CONTRACTOR AT HIS EXPENSE TO THE SATISFACTION OF THE ENGINEER AND OWNER.
10. BEFORE PLACING PAVEMENT, CONTRACTOR SHALL VERIFY SUITABLE ACCESSIBLE ROUTES (PER A.D.A). GRADING FOR ALL SIDEWALKS AND ACCESSIBLE ROUTES INCLUDING CROSSING DRIVEWAYS SHALL CONFORM TO CURRENT ADA STATE/NATIONAL STANDARDS. IN NO CASE SHALL ACCESSIBLE RAMP SLOPES EXCEED 1 VERTICAL TO 12 HORIZONTAL. IN NO CASE SHALL SIDEWALK CROSS SLOPES EXCEED 2%. IN NO CASE SHALL LONGITUDINAL SIDEWALK SLOPES EXCEED 5%. IN NO CASE SHALL ACCESSIBLE PARKING STALLS OR AISLES EXCEED 2% (1.5% TARGET) IN ALL DIRECTIONS. SIDEWALK ACCESS TO EXTERNAL BUILDING DOORS AND GATES SHALL BE ADA COMPLIANT. CONTRACTOR SHALL NOTIFY ENGINEER IMMEDIATELY IF ADA CRITERIA CANNOT BE MET IN ANY LOCATION PRIOR TO PAVING. NO CONTRACTOR CHANGE ORDERS WILL BE ACCEPTED FOR A.D.A COMPLIANCE ISSUES.
11. MAXIMUM JOINT SPACING IS TWICE THE DEPTH OF THE CONCRETE PAVEMENT IN FEET.

GRADING AND DRAINAGE NOTES

1. GENERAL CONTRACTOR AND ALL SUBCONTRACTORS SHALL VERIFY THE SUITABILITY OF ALL EXISTING AND PROPOSED SITE CONDITIONS INCLUDING GRADES AND DIMENSIONS BEFORE START OF CONSTRUCTION. THE ENGINEER SHALL BE NOTIFIED IMMEDIATELY OF ANY DISCREPANCIES.
2. THE CONTRACTOR SHALL GRADE THE SITE TO THE ELEVATIONS INDICATED AND SHALL ADJUST BMP'S AS NECESSARY AND REGRADE WASHOUTS WHERE THEY OCCUR AFTER EVERY RAINFALL UNTIL A GRASS STAND IS WELL ESTABLISHED OR ADEQUATE STABILIZATION OCCURS.
3. CONTRACTOR SHALL ENSURE THERE IS POSITIVE DRAINAGE FROM THE PROPOSED BUILDINGS SO THAT SURFACE RUNOFF WILL DRAIN BY GRAVITY TO NEW OR EXISTING DRAINAGE OUTLETS. CONTRACTOR SHALL ENSURE NO PONDING OCCURS IN PAVED AREAS AND SHALL NOTIFY ENGINEER IF ANY GRADING DISCREPANCIES ARE FOUND IN THE EXISTING AND PROPOSED GRADES PRIOR TO PLACEMENT OF PAVEMENT OR UTILITIES.
4. CONTRACTOR SHALL PROTECT ALL MANHOLE COVERS, VALVE COVERS, VAULT LIDS, FIRE HYDRANTS, POWER POLES, GUY WIRES, AND TELEPHONE BOXES THAT ARE TO REMAIN IN PLACE AND UNDISTURBED DURING CONSTRUCTION. EXISTING CASTINGS AND STRUCTURES TO REMAIN SHALL BE ADJUSTED TO MATCH THE PROPOSED FINISHED GRADES.
5. BACKFILL FOR UTILITY LINES SHALL BE PLACED PER DETAILS, STANDARDS, AND SPECIFICATIONS SO THAT THE UTILITY WILL BE STABLE. WHERE UTILITY LINES CROSS THE PARKING LOT, THE TOP 6 INCHES SHALL BE COMPACTED SIMILARLY TO THE REMAINDER OF THE LOT. UTILITY DITCHES SHALL BE VISUALLY INSPECTED DURING THE EXCAVATION PROCESS TO ENSURE THAT UNDESIRABLE FILL IS NOT USED.
6. CONTRACTOR IS RESPONSIBLE FOR THE REMOVAL AND REPLACEMENT OF 4" OF TOPSOIL AT COMPLETION OF WORK. ALL UNPAVED AREAS IN EXISTING RIGHTS-OF-WAY DISTURBED BY CONSTRUCTION SHALL BE REGRADED AND SODDED.
7. AFTER PLACEMENT OF SUBGRADE AND PRIOR TO PLACEMENT OF PAVEMENT, CONTRACTOR SHALL TEST AND OBSERVE PAVEMENT AREAS FOR EVIDENCE OF PONDING. ALL AREAS SHALL ADEQUATELY DRAIN TOWARDS THE INTENDED STRUCTURE TO CONVEY STORM RUNOFF. CONTRACTOR SHALL IMMEDIATELY NOTIFY OWNER AND ENGINEER IF ANY DISCREPANCIES ARE DISCOVERED.
8. WHERE EXISTING PAVEMENT IS INDICATED TO BE REMOVED AND REPLACED, THE CONTRACTOR SHALL SAW CUT FULL DEPTH FOR A SMOOTH AND STRAIGHT JOINT AND REPLACE THE PAVEMENT WITH THE SAME TYPE AND DEPTH OF MATERIAL AS EXISTING OR AS INDICATED.
9. THE CONTRACTOR SHALL INSTALL PROTECTION OVER ALL DRAINAGE STRUCTURES FOR THE DURATION OF CONSTRUCTION AND UNTIL ACCEPTANCE OF THE PROJECT BY THE OWNER. ALL DRAINAGE STRUCTURES SHALL BE CLEANED OF DEBRIS AS REQUIRED DURING AND AT THE END OF CONSTRUCTION TO PROVIDE POSITIVE DRAINAGE FLOWS.
10. IF DEWATERING IS REQUIRED, THE CONTRACTOR SHALL OBTAIN ANY APPLICABLE REQUIRED PERMITS. THE CONTRACTOR IS TO COORDINATE WITH THE OWNER AND THE DESIGN ENGINEER PRIOR TO ANY EXCAVATION.
11. FIELD DENSITY TESTS SHALL BE TAKEN AT INTERVALS IN ACCORDANCE WITH THE LOCAL JURISDICTIONAL AGENCY OR TO STATE DOT STANDARDS. IN THE EVENT THAT THE CONTRACT DOCUMENTS AND THE JURISDICTIONAL AGENCY REQUIREMENTS ARE NOT IN AGREEMENT, THE MOST STRINGENT SHALL GOVERN.
12. ALL SLOPES AND AREAS DISTURBED BY CONSTRUCTION SHALL BE GRADED AS PER PLANS. THE AREAS SHALL THEN BE SODDED OR SEEDED AS SPECIFIED IN THE PLANS, FERTILIZED, MULCHED, WATERED AND MAINTAINED UNTIL GROWTH IS ESTABLISHED TO MINIMUM COVERAGE OF 70% IN ALL AREAS. ANY AREAS DISTURBED FOR ANY REASON PRIOR TO FINAL ACCEPTANCE OF THE JOB SHALL BE CORRECTED BY THE CONTRACTOR AT NO ADDITIONAL COST TO THE OWNER. ALL EARTHEN AREAS WILL BE SODDED OR SEEDED AND MULCHED AS SHOWN ON THE LANDSCAPING PLAN.
13. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE CONTROL OF DUST AND DIRT RISING AND SCATTERING IN THE AIR DURING CONSTRUCTION AND SHALL PROVIDE WATER SPRINKLING OR OTHER SUITABLE METHODS OF CONTROL. THE CONTRACTOR SHALL COMPLY WITH ALL GOVERNING REGULATIONS PERTAINING TO ENVIRONMENTAL PROTECTION.
14. SOD, WHERE CALLED FOR, MUST BE INSTALLED AND MAINTAINED ON EXPOSED SLOPES WITHIN 48 HOURS OF COMPLETING FINAL GRADING, AND AT ANY OTHER TIME AS NECESSARY, TO PREVENT EROSION, SEDIMENTATION OR TURBID DISCHARGES.
15. THE CONTRACTOR SHALL ENSURE THAT LANDSCAPE ISLAND PLANTING AREAS AND OTHER PLANTING AREAS ARE NOT COMPACTED AND DO NOT CONTAIN ROAD BASE MATERIALS. THE CONTRACTOR SHALL ALSO EXCAVATE AND REMOVE ALL UNDESIRABLE MATERIAL FROM ALL AREAS ON THE SITE TO BE PLANTED AND PROPERLY DISPOSED OF IN A LEGAL MANNER.
16. THE CONTRACTOR SHALL INSTALL ALL UNDERGROUND STORM WATER PIPING PER MANUFACTURER'S RECOMMENDATIONS AND STATE DOT SPECIFICATIONS.
17. PAVEMENTS SHALL BE INSTALLED IN ACCORDANCE WITH THE RECOMMENDATION OF THE SITE SPECIFIC GEOTECHNICAL EVALUATION REPORT AND TOWNSHIP & STATE DOT SPECIFICATIONS.
18. SPOT ELEVATIONS REPRESENT THE FINISHED SURFACE GRADE OR FLOWLINE OF CURB UNLESS OTHERWISE NOTED.
19. LIMITS OF CONSTRUCTION ARE TO THE PROPERTY LINE UNLESS OTHERWISE SPECIFIED ON THE PLAN.
20. IMMEDIATELY REPORT TO THE OWNER ANY DISCREPANCIES FOUND BETWEEN ACTUAL FIELD CONDITIONS AND CONSTRUCTION DOCUMENTS.
21. THE CONTRACTOR IS RESPONSIBLE FOR LOCATING AND PROTECTING EXISTING UTILITIES, AND SHALL REPAIR ALL DAMAGE TO EXISTING UTILITIES THAT OCCUR DURING CONSTRUCTION WITHOUT COMPENSATION.
22. BLEND NEW EARTHWORK SMOOTHLY TO TRANSITION BACK TO EXISTING GRADE.
23. ALL PROPOSED GRADES ONSITE SHALL BE 3:1 OR FLATTER UNLESS OTHERWISE INDICATED ON THE PLANS. ANY SLOPES STEEPER THAN 4:1 REQUIRE EROSION AND SEDIMENT CONTROL BLANKET.
24. ADHERE TO ALL TERMS AND CONDITIONS AS NECESSARY IN THE GENERAL N.P.D.E.S. PERMIT AND STORMWATER POLLUTION PREVENTION PLAN (SWPPP) FOR STORMWATER DISCHARGE ASSOCIATED WITH CONSTRUCTION ACTIVITIES.
25. ADJUST AND/OR CUT EXISTING PAVEMENT AS NECESSARY TO ASSURE A SMOOTH FIT AND CONTINUOUS GRADE.

WATER STORM SEWER & SANITARY SEWER NOTES

1. THE CONTRACTOR SHALL CONSTRUCT GRAVITY SEWER LATERALS, MANHOLES, GRAVITY SEWER LINES, AND DOMESTIC WATER AND FIRE PROTECTION SYSTEM AS SHOWN ON THESE PLANS. THE CONTRACTOR SHALL FURNISH ALL NECESSARY MATERIALS, EQUIPMENT, MACHINERY, TOOLS, MEANS OF TRANSPORTATION AND LABOR NECESSARY TO COMPLETE THE WORK IN FULL AND COMPLETE ACCORDANCE WITH THE SHOWN, DESCRIBED AND REASONABLY INTENDED REQUIREMENTS OF THE CONTRACT DOCUMENTS AND JURISDICTIONAL AGENCY REQUIREMENTS. IN THE EVENT THAT THE CONTRACT DOCUMENTS AND THE JURISDICTIONAL AGENCY REQUIREMENTS ARE NOT IN AGREEMENT, THE MOST STRINGENT SHALL GOVERN.
2. ALL EXISTING UNDERGROUND UTILITY LOCATIONS SHOWN ARE APPROXIMATE. THE CONTRACTOR SHALL COMPLY WITH ALL REQUIREMENTS FOR UTILITY LOCATION AND COORDINATION IN ACCORDANCE WITH THE NOTES CONTAINED IN THE GENERAL CONSTRUCTION SECTION OF THIS SHEET.
3. THE CONTRACTOR SHALL RESTORE ALL DISTURBED VEGETATION IN KIND, UNLESS SHOWN OTHERWISE.
4. DEFLECTION OF PIPE JOINTS AND CURVATURE OF PIPE SHALL NOT EXCEED THE MANUFACTURER'S SPECIFICATIONS. SECURELY CLOSE ALL OPEN ENDS OF PIPE AND FITTINGS WITH A WATERTIGHT PLUG WHEN WORK IS NOT IN PROGRESS. THE INTERIOR OF ALL PIPES SHALL BE CLEAN AND JOINT SURFACES WIPED CLEAN AND DRY AFTER THE PIPE HAS BEEN LOWERED INTO THE TRENCH. VALVES SHALL BE PLUMB AND LOCATED ACCORDING TO THE PLANS.
5. ALL PIPE AND FITTINGS SHALL BE CAREFULLY STORED FOLLOWING MANUFACTURER'S RECOMMENDATIONS. CARE SHALL BE TAKEN TO AVOID DAMAGE TO THE COATING OR LINING IN ANY D.I. PIPE FITTINGS. ANY PIPE OR FITTING WHICH IS DAMAGED OR WHICH HAS FLAWS OR IMPERFECTIONS WHICH, IN THE OPINION OF THE ENGINEER OR OWNER, RENDERS IT UNFIT FOR USE, SHALL NOT BE USED. ANY PIPE NOT SATISFACTORY FOR USE SHALL BE CLEARLY MARKED AND IMMEDIATELY REMOVED FROM THE JOB SITE, AND SHALL BE REPLACED AT THE CONTRACTOR'S EXPENSE.
6. WATER FOR FIRE FIGHTING SHALL BE MADE AVAILABLE FOR USE BY THE CONTRACTOR PRIOR TO COMBUSTIBLES BEING BROUGHT ON SITE.
7. ALL UTILITY AND STORM DRAIN TRENCHES LOCATED UNDER AREAS TO RECEIVE PAVING SHALL BE COMPLETELY BACK FILLED IN ACCORDANCE WITH THE GOVERNING JURISDICTIONAL AGENCY'S SPECIFICATIONS. IN THE EVENT THAT THE CONTRACT DOCUMENTS AND THE JURISDICTIONAL AGENCY REQUIREMENTS ARE NOT IN AGREEMENT, THE MOST STRINGENT SHALL GOVERN.
8. UNDERGROUND UTILITY LINES SHALL BE SURVEYED BY A STATE LICENSED PROFESSIONAL LAND SURVEYOR PRIOR TO BACK FILLING.
9. CONTRACTOR SHALL PERFORM, AT THEIR OWN EXPENSE, ANY AND ALL TESTS REQUIRED BY THE SPECIFICATIONS AND/OR ANY AGENCY HAVING JURISDICTION. THESE TESTS MAY INCLUDE, BUT MAY NOT BE LIMITED TO, INFILTRATION AND EXFILTRATION, TELEVISION INSPECTION AND A MANDREL TEST ON GRAVITY SEWER. A COPY OF THE TEST RESULTS SHALL BE PROVIDED TO THE UTILITY PROVIDER, OWNER AND JURISDICTIONAL AGENCY AS REQUIRED.
10. BETWEEN WATER AND SEWER MANHOLES AND PIPES, CONTRACTOR SHALL PROVIDE FOR A MINIMUM HORIZONTAL CLEARANCE OF 10-FEET AND A MINIMUM VERTICAL SEPARATION OF 18-INCHES.
11. IF ANY EXISTING STRUCTURES TO REMAIN ARE DAMAGED DURING CONSTRUCTION IT SHALL BE THE CONTRACTORS RESPONSIBILITY TO REPAIR AND/OR REPLACE THE EXISTING STRUCTURE AS NECESSARY TO RETURN IT TO EXISTING CONDITIONS OR BETTER.
12. ALL STORM PIPE ENTERING STRUCTURES SHALL BE GASKETED AND/OR GROUTED TO ASSURE CONNECTION AT STRUCTURE IS WATERTIGHT UNLESS OTHERWISE STATED BY TOWNSHIP AND STATE DESIGN STANDARDS AND SPECIFICATIONS.
13. UNLESS OTHERWISE STATED IN TOWNSHIP AND STATE DESIGN STANDARDS AND SPECIFICATIONS, ALL STORM SEWER MANHOLES IN PAVED AREAS SHALL BE FLUSH WITH PAVEMENT, AND SHALL HAVE TRAFFIC BEARING RING & COVERS. MANHOLES IN UNPAVED AREAS SHALL BE 6" ABOVE FINISH GRADE. LIDS SHALL BE LABELED "STORM SEWER". EXISTING CASTINGS AND STRUCTURES WITHIN PROJECT LIMITS SHALL BE ADJUSTED TO MEET THESE CONDITIONS AND THE PROPOSED FINISHED GRADE.
14. TOPOGRAPHIC INFORMATION IS TAKEN FROM A TOPOGRAPHIC SURVEY BY LAND SURVEYORS. IF THE CONTRACTOR DOES NOT ACCEPT EXISTING TOPOGRAPHY AS SHOWN ON THE PLANS, WITHOUT EXCEPTION, THEN THE CONTRACTOR SHALL SUPPLY, AT THEIR EXPENSE, A TOPOGRAPHIC SURVEY BY A REGISTERED LAND SURVEYOR TO THE OWNER FOR REVIEW.
15. CONSTRUCTION SHALL COMPLY WITH ALL APPLICABLE GOVERNING CODES AND BE CONSTRUCTED TO SAME.
16. ALL STORM STRUCTURES SHALL HAVE A SMOOTH UNIFORM POURED MORTAR FROM INVERT IN TO INVERT OUT.
17. ROOF DRAINS SHALL BE CONNECTED TO STORM SEWER BY PREFABRICATED WYES OR AT STORM STRUCTURES. ROOF DRAINS AND TRUCK WELL DRAIN SHALL RUN AT A MINIMUM 2.0% SLOPE, UNLESS NOTED OTHERWISE, AND TIE IN AT THE CENTERLINE OF THE STORM MAIN.
18. PROVIDE INSULATION OF UNDERGROUND ROOF DRAINS AND SANITARY SEWER SERVICES IF ADEQUATE FROST DEPTH CANNOT BE PROVIDED.
19. THE CONTRACTOR SHALL PROTECT EXISTING UNDERGROUND UTILITIES AND APPURTENANCES THAT ARE TO REMAIN FROM DAMAGE DURING CONSTRUCTION OPERATIONS.
20. THE LOCATION OF EXISTING UTILITIES, STORM DRAINAGE STRUCTURES AND OTHER ABOVE AND BELOW-GRADE IMPROVEMENTS ARE APPROXIMATE AS SHOWN. IT IS THE CONTRACTOR'S RESPONSIBILITY TO DETERMINE THE EXACT LOCATION, SIZE AND INVERT ELEVATIONS OF EACH PRIOR TO THE START OF CONSTRUCTION.
21. A MINIMUM SEPARATION OF 5-FEET IS REQUIRED BETWEEN UNDERGROUND UTILITIES AND TREES UNLESS A ROOT BARRIER IS UTILIZED.
22. GAS, PHONE AND ELECTRIC SERVICES SHOWN FOR INFORMATIONAL PURPOSES ONLY. DRY UTILITY COMPANIES MAY ALTER THE DESIGN LAYOUT DURING THEIR REVIEW. CONTRACTOR TO COORDINATE FINAL DESIGN AND INSTALLATION WITH UTILITY COMPANIES.
23. COORDINATE UTILITY INSTALLATION WITH IRRIGATION DESIGN AND INSTALLATION.
24. ALL DIMENSIONS ARE TO FLOW LINE OF CURB UNLESS OTHERWISE NOTED. PERIMETER WALL DIMENSIONS ARE TO INSIDE WALL FACE. REFERENCE ARCHITECTURAL PLANS FOR EXACT WALL WIDTH AND SPECIFICATIONS.
25. REFERENCE ARCHITECTURAL PLANS (BY OTHERS) FOR EXACT BUILDING DIMENSIONS, MATERIALS SPECIFICATIONS.
26. REFERENCE M.E.P. PLANS (BY OTHERS) FOR MECHANICAL EQUIPMENT DIMENSIONS AND SPECIFICATIONS.
27. CONTRACTOR SHALL REFERENCE STRUCTURAL PLANS (BY OTHERS) FOR FOOTING AND FOUNDATION PAD PREPARATION SPECIFICATIONS.
28. CONTRACTOR SHALL REFERENCE M.E.P PLANS (BY OTHERS) FOR ROUTING OF PROPOSED ELECTRICAL & COMMUNICATIONS SERVICES AND SITE LIGHTING LAYOUT.

MISS DIG 811

ISSUED FOR PERMIT - NOT FOR CONSTRUCTION

No.	REVISIONS	DATE	BY
1	ENTITLEMENT SET	06/09/2026	BPG

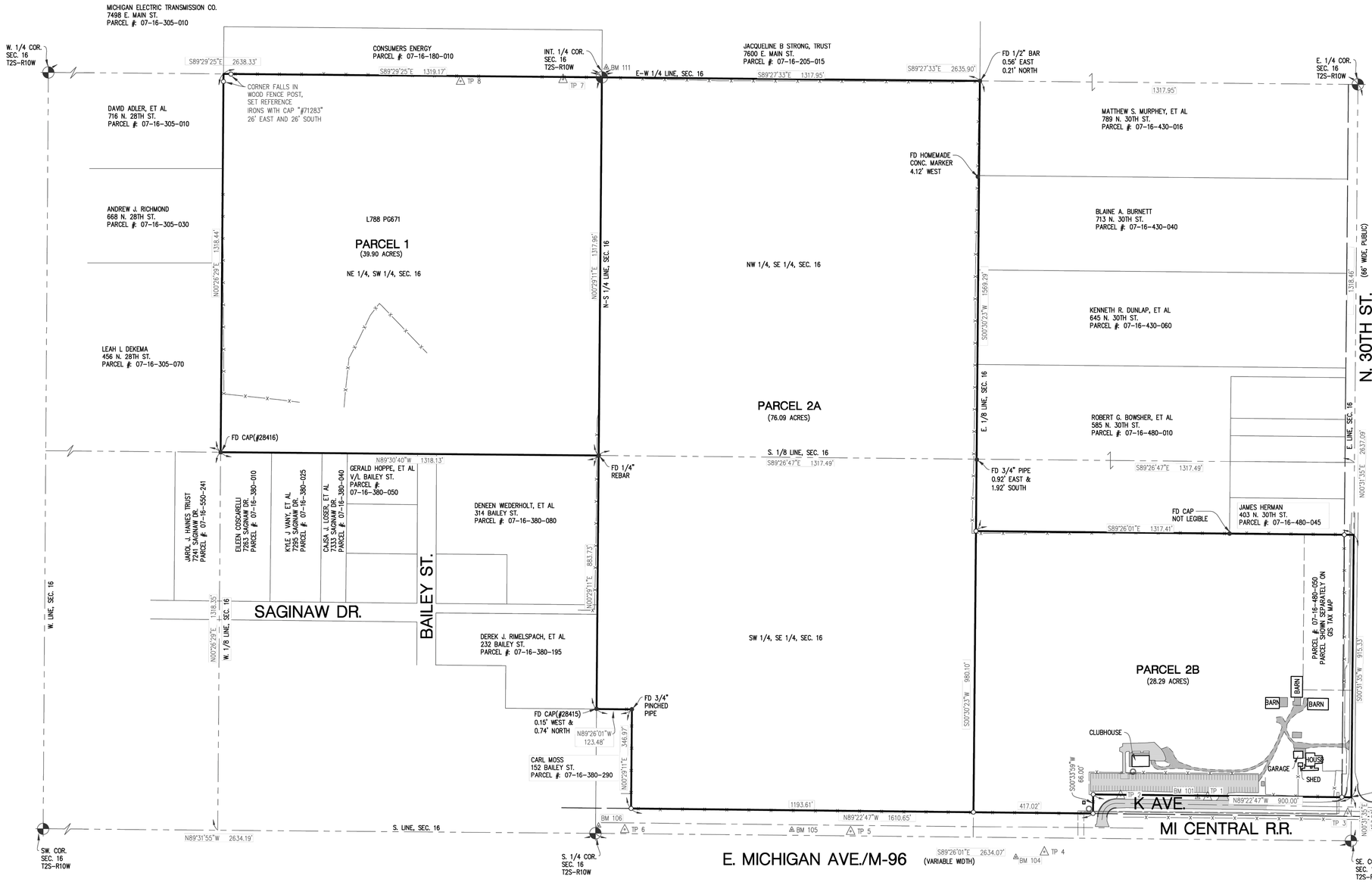
Kimley»Horn of Michigan, Inc.
© 2026 KIMLEY-HORN OF MICHIGAN
3000 TOWN CENTER, SUITE 2600
SOUTHFIELD, MI 48075
(312) 726 9445

CIP Copenhagen Infrastructure Partners

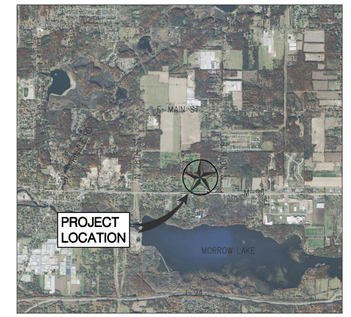
STATE OF MICHIGAN — BRIAN GAMMON — ENGINEER — 6201372401 — PROFESSIONAL ENGINEER

Brian Gammon

KHA PROJECT 161282002
DATE 06/09/2026
SCALE AS SHOWN
DESIGNED BY JLL
DRAWN BY CJC



LOCATION MAP: N.T.S.





LEGEND

- TRAVERSE POINT
- BENCHMARK
- SET IRON
- FOUND IRON
- SECTION & 1/4 CORNER
- WATER WELL
- ONE POST TRAFFIC SIGN
- GUY WIRE
- UTILITY POLE
- ROUND CATCHBASIN
- CENTERLINE OF ROAD
- FENCE
- BUILDING
- SECTION LINE
- PROPERTY LINE (APPROX)
- U.G. GAS LINE
- EDGE OF CONCRETE
- EDGE OF ASPHALT
- EDGE OF GRAVEL

CERTIFICATION:

TO:
KIMLEY HORN OF MICHIGAN, INC
CI IV MASTER DEVCO, LLC
FIRST AMERICAN TITLE INSURANCE COMPANY

THIS IS TO CERTIFY THAT THIS MAP OR PLAT AND THE SURVEY ON WHICH IT IS BASED WERE MADE IN ACCORDANCE WITH THE 2021 MINIMUM STANDARD DETAIL REQUIREMENTS FOR ALTA/NSPS LAND TITLE SURVEYS, JOINTLY ESTABLISHED AND ADOPTED BY ALTA AND NSPS, AND INCLUDES ITEMS 1, 3, 4, 5, 8, 9, 11, 13 AND 16 OF TABLE A THEREOF. THE FIELDWORK WAS COMPLETED ON FEBRUARY 24, 2026.

DATE OF PLAT OR MAP [2026-03-06] [ROBERT A. CHURCH & 4001071293]

PRELIMINARY: MAY 22, 2026

PLAN DATE: 3/6/26
PROJECT MGR: RAC
REVIEWER: RAC
SCALE: 1" = 200'

ROWE PROFESSIONAL SERVICES COMPANY
507 36th Street SE
Grand Rapids, MI 49548
O: (616) 272-7125
www.rowepsc.com

ALTA/NSPS LAND TITLE SURVEY PREPARED FOR
CI IV MASTER DEVCO, LLC.
SWAN BESS PROJECT
PART OF SECTION 16, T2S, R10W
COMSTOCK TOWNSHIP, KALAMAZOO COUNTY, MICHIGAN

REV:
V100
SHT# 1 OF 2
JOB No: 2600026

PLOTTED: 5/22/2026 10:17 AM R:\Projects\2600026\Survey\SV-2600026-ALTA.dwg

LEGAL DESCRIPTION PER FIRST AMERICAN TITLE INSURANCE COMPANY COMMITMENT NO. NCS-FA500MI27-NRG, DATED DECEMBER 02, 2025 AT 8:00AM

RECORD LEGAL DESCRIPTION:

LAND IN THE TOWNSHIP OF COMSTOCK, KALAMAZOO COUNTY, MI, DESCRIBED AS FOLLOWS:

PARCEL 1:

THE NORTHEAST QUARTER OF THE SOUTHWEST QUARTER OF SECTION 16, TOWN 2 SOUTH, RANGE 10 WEST.

PARCEL 2A:

THE WEST HALF OF THE SOUTHEAST QUARTER OF SECTION 16, TOWN 2 SOUTH, RANGE 10 WEST, EXCEPT BEGINNING AT THE INTERSECTION OF THE NORTH AND SOUTH QUARTER LINE OF SAID SECTION WITH THE NORTH LINE OF THE RIGHT OF WAY OF THE MICHIGAN CENTRAL RAILROAD AND RUNNING THENCE NORTH 0 DEGREES 8 MINUTES WEST ALONG SAID QUARTER LINE 347 FEET, THENCE SOUTH 89 DEGREES 58 MINUTES EAST PARALLEL TO THE NORTH LINE OF SAID RIGHT OF WAY 123.47 FEET; THENCE SOUTH 0 DEGREES 8 MINUTES EAST PARALLEL TO SAID QUARTER LINE 347 FEET TO THE NORTH LINE OF SAID RAILROAD RIGHT OF WAY; THENCE NORTH 89 DEGREES 58 MINUTES WEST ALONG THE NORTH LINE OF SAID RIGHT OF WAY 123.47 FEET TO THE PLACE OF BEGINNING; ALSO EXCEPT THE RIGHT OF WAY OF THE MICHIGAN CENTRAL RAILROAD AS LOCATED OVER AND ACROSS THE FIRST ABOVE DESCRIBED PARCEL OF LAND.

PARCEL 2B:

PART OF THE EAST 1/2 OF THE SOUTHEAST 1/4 OF SECTION 16 OF TOWN 2 SOUTH, RANGE 10 WEST, DESCRIBED AS COMMENCING AT THE INTERSECTION OF THE EAST LINE OF SAID SECTION 16 WITH THE NORTH LINE OF THE RIGHT OF WAY OF THE MICHIGAN CENTRAL RAILROAD; THENCE NORTH ON THE EAST SECTION LINE 980 FEET; THENCE WEST PARALLEL WITH THE NORTH LINE OF SAID RIGHT OF WAY OF THE MICHIGAN CENTRAL RAILROAD TO THE NORTH AND SOUTH 1/8 LINE OF SAID SOUTHEAST 1/4 OF SECTION 16, THENCE SOUTH THEREON 980 FEET TO THE NORTH LINE OF SAID MICHIGAN CENTRAL RAILROAD RIGHT OF WAY; THENCE EAST THEREON TO THE PLACE OF BEGINNING, EXCEPT THE SOUTH 66 FEET OF THE EAST 900 FEET THEREOF.

UTILITY INFORMATION:

PER MISS DIG TICKET NUMBER: 202600900273-000, SUBMITTED ON 2/9/2026

MISS DIG TICKET RESPONDERS (AS OF 3/6/2026):

ATT	MAP PROVIDED-SITE CLEAR
CONSUMERS ENERGY ELECTRIC	MAP PROVIDED-SITE CLEAR
CONSUMERS ENERGY GAS	MAPS PROVIDED-APPROXIMATE LOCATIONS SHOWN HEREON
KALAMAZOO CITY WATER	MAP PROVIDED-SITE CLEAR, MAIN IN M-96 RIGHT OF WAY
LEVEL 3(LUMEN) FIBER OPTICS	MAP PROVIDED-SITE CLEAR, LINES IN M-96 RIGHT OF WAY

MISS DIG TICKET NON-RESPONDERS (AS OF 3/6/2026):
COMSTOCK CHARTER TWP SANITARY SEWER
CHARTER CABLE TV
U.S. SIGNAL CORPS FIBER OPTICS

THERE MAY BE ABOVE GROUND AND BELOW GROUND UTILITIES THAT WERE NOT GRAPHICALLY SHOWN ON THE DRAWING DUE TO MISS DIG TICKET MEMBERS NOT RESPONDING TO THE ABOVE MENTIONED TICKET.

TRAVERSE POINTS:

TP #1
SET 1/2" X 18" REROD WITH ROWE TRAV CAP 30'± WEST OF CENTERLINE OF DRIVE TO GOLF COURSE 18'± NORTH OF CENTERLINE K AVE
NORTHING = 289448.390
EASTING = 12823526.635

TP #2
SET 1/2" X 18" REROD WITH ROWE TRAV CAP 25'± NORTH OF CENTERLINE K AVE 20'± EAST OF POWER POLE
NORTHING = 289453.838
EASTING = 12823223.140

TP #3
SET 1/2" X 18" REROD WITH ROWE TRAV CAP 20'± NORTH OF CENTERLINE K AVE 10'± WEST OF K AVE AND 30TH ST SIGN
NORTHING = 289391.579
EASTING = 12824015.001

TP #4
SET 1/2" X 18" REROD WITH ROWE TRAV CAP 40'± SOUTH OF M-96 CENTERLINE 100'± WEST OF CENTERLINE 30TH AVE
NORTHING = 289257.421
EASTING = 12822957.361

TP #5
SET 1/2" X 18" REROD WITH ROWE TRAV CAP 18'± NORTH OF M-96 CENTERLINE 110'± EAST OF LANDALE ST TO SOUTH
NORTHING = 289328.435
EASTING = 12822281.747

TP #6
SET 1/2" X 18" REROD WITH ROWE TRAV CAP 20'± NORTH OF M-96 CENTERLINE 75'± WEST OF CENTERLINE ELLIOT ST CENTERLINE
NORTHING = 289334.845
EASTING = 12821494.400

TP #7
SET 1/2" X 18" REROD WITH ROWE TRAV CAP 7'± SOUTH OF EAST-WEST FENCE 40'± WEST OF NORTH-SOUTH TREE LINE
NORTHING = 291949.894
EASTING = 12821279.511

TP #8
SET 1/2" X 18" REROD WITH ROWE TRAV CAP 15'± SOUTH OF EAST-WEST FENCE 15'± S15W OF 4X4 POST
NORTHING = 291943.852
EASTING = 12823491.749

ALL COORDINATE VALUES ARE GRID.

SCHEDULE B, PART II, EXCEPTIONS, PER FIRST AMERICAN TITLE INSURANCE COMPANY COMMITMENT NO. NCS-FA500MI27-NRG, DATED DECEMBER 02, 2025 AT 8:00AM

1. ANY DEFECT, LIEN, ENCUMBRANCE, ADVERSE CLAIM, OR OTHER MATTER THAT APPEARS FOR THE FIRST TIME IN THE PUBLIC RECORDS OR IS CREATED, ATTACHES, OR IS DISCLOSED BETWEEN THE COMMITMENT DATE AND THE DATE ON WHICH ALL OF THE SCHEDULE B, PART I—REQUIREMENTS ARE MET.
   LEGAL IN NATURE, NOT A MATTER OF SURVEYING
2. ANY FACTS, RIGHTS, INTERESTS OR CLAIMS THAT ARE NOT SHOWN BY THE PUBLIC RECORDS BUT THAT COULD BE ASCERTAINED BY AN INSPECTION OF THE LAND OR BY MAKING INQUIRY OF PERSONS IN POSSESSION OF THE LAND.
   LEGAL IN NATURE, NOT A MATTER OF SURVEYING
3. EASEMENTS, LIENS OR ENCUMBRANCES, OR CLAIMS THEREOF, NOT SHOWN BY THE PUBLIC RECORDS.
   LEGAL IN NATURE, NOT A MATTER OF SURVEYING
4. ANY ENCROACHMENT, ENCUMBRANCE, VIOLATION, VARIATION, OR ADVERSE CIRCUMSTANCE AFFECTING THE TITLE INCLUDING DISCREPANCIES, CONFLICTS IN BOUNDARY LINES, SHORTAGE IN AREA, OR ANY OTHER FACTS THAT WOULD BE DISCLOSED BY AN ACCURATE AND COMPLETE LAND SURVEY OF THE LAND, AND THAT ARE NOT SHOWN IN THE PUBLIC RECORDS.
   NONE OBSERVED DURING FIELD SURVEY OR DISCOVERED AS A RESULT OF FURTHER RESEARCH
5. TAXES AND ASSESSMENTS NOT DUE AND PAYABLE AT COMMITMENT DATE.
   LEGAL IN NATURE, NOT A MATTER OF SURVEYING
6. ANY LIEN OR RIGHT TO A LIEN, IMPOSED BY LAW, AS A RESULT OF SERVICES, LABOR, AND/OR MATERIALS USED, OR TO BE USED, FOR IMPROVEMENT TO THE LAND.
   LEGAL IN NATURE, NOT A MATTER OF SURVEYING
7. WATER RIGHTS, CLAIMS OR TITLE TO WATER, WHETHER OR NOT SHOWN BY THE PUBLIC RECORDS.
   LEGAL IN NATURE, NOT A MATTER OF SURVEYING
8. ANY CLAIM TO (A) OWNERSHIP OF OR RIGHTS TO MINERALS AND SIMILAR SUBSTANCES, INCLUDING BUT NOT LIMITED TO ORES, METALS, COAL, LIGNITE, OIL, GAS, URANIUM, CLAY, ROCK, SAND, AND GRAVEL LOCATED IN, ON, OR UNDER THE LAND OR PRODUCED FROM THE LAND, WHETHER SUCH OWNERSHIP OR RIGHTS ARISE BY LEASE, GRANT, EXCEPTION, CONVEYANCE, RESERVATION, OR OTHERWISE; AND (B) ANY RIGHTS, PRIVILEGES, IMMUNITIES, RIGHTS OF WAY, AND EASEMENTS ASSOCIATED THEREWITH OR APPURTENANT THERETO, WHETHER OR NOT THE INTERESTS OR RIGHTS EXCEPTED IN (A) OR (B) APPEAR IN THE PUBLIC RECORDS OR ARE SHOWN IN SCHEDULE B.
   LEGAL IN NATURE, NO SUCH CLAIMS OR INTERESTS DISCOVERED AS A RESULT OF THIS SURVEY
9. ALL TAX MAP NUMBERS REFERRED TO IN THE TITLE REPORT AND FINAL POLICY ARE FOR INFORMATIONAL PURPOSES ONLY AND FIRST AMERICAN TITLE INSURANCE COMPANY DOES NOT INSURE, NOR LIMIT THE EXCEPTIONS, TO THE TAX MAP NUMBERS INDICATED.
   ADJOINING PARCEL LINES AND OWNER INFORMATION SHOWN PER AVAILABLE GIS/TAX MAP AND ARE APPROXIMATE
10. COVENANTS, CONDITIONS, TERMS AND/OR RESTRICTIONS CONTAINED IN A WARRANTY DEED RECORDED MARCH 29, 1962 IN/AS LIBER 788, PAGE 671, OF KALAMAZOO COUNTY RECORDS.
    DEED INCLUDES PARCEL 1, DEEDED RESTRICTIONS DO NOT APPLY TO THE SUBJECT PARCEL
11. EASEMENT DEED BY COURT ORDER IN SETTLEMENT OF LANDOWNER ACTION BY AND BETWEEN DAVID K DART AND DEBRA L DART AND SPRINT COMMUNICATIONS COMPANY L.P., QWEST COMMUNICATIONS COMPANY, LLC, LEVEL 3 COMMUNICATIONS, LLC, AND WILTEL COMMUNICATIONS, LLC CREATED BY INSTRUMENT RECORDED SEPTEMBER 17, 2013 IN/AS INSTRUMENT NO. 2013-038710, OF KALAMAZOO COUNTY RECORDS. (AFFECTS PARCEL 2A AND 2B)
    EASEMENT NOT PLOTTABLE DUE TO LACK OF INFORMATION REGARDING UNDERGROUND CABLES
12. INTEREST OF OTHERS IN OIL, GAS AND MINERAL RIGHTS, IF ANY, WHETHER OR NOT RECORDED IN THE PUBLIC RECORDS.
    LEGAL IN NATURE, NOT A MATTER OF SURVEYING
13. INTEREST, IF ANY, OF THE UNITED STATES, STATE OF MICHIGAN, OR ANY POLITICAL SUBDIVISION THEREOF, IN THE OIL, GAS AND MINERALS IN AND UNDER AND THAT MAY BE PRODUCED FROM THE LAND.
    LEGAL IN NATURE, NOT A MATTER OF SURVEYING
14. RIGHTS OF TENANTS UNDER UNRECORDED LEASES.
    LEGAL IN NATURE, NOT A MATTER OF SURVEYING
15. TO THE EXTENT A TRACT IS BOUNDED BY A PUBLIC ROAD, RIGHTS OF OTHERS IN AND TO ANY PORTION OF THE PROPERTY THAT LIES WITHIN SAID ROAD.
    RIGHTS OF WAY SHOWN HEREON

SURVEYOR'S NOTES:

1. VERTICAL DATUM IS NAVD88.
2. HORIZONTAL DATUM IS MICHIGAN STATE PLANE COORDINATE SYSTEM, SOUTH ZONE NAD83 (2011).
3. GRID DISTANCE / 0.999932637 = GROUND DISTANCE.
4. BEARINGS ARE BASED UPON MICHIGAN STATE PLANE COORDINATE SYSTEM, SOUTH ZONE NAD83 (2011).
5. THE SUBJECT PROPERTY IS THE SAME AS THE PROPERTY DESCRIBED IN SCHEDULE A OF THE PROVIDED TITLE COMMITMENT.
6. THE LEGAL DESCRIPTION PROVIDED IN SCHEDULE C OF THE PROVIDED TITLE COMMITMENT CONTAINS PROPERTY MEASUREMENTS AS RECORDED.
8. ALL PROPERTY BOUNDARY MEASUREMENTS SHOWN HEREON ARE MEASURED, DISTANCES AND AREAS HAVE BEEN CONVERTED TO GROUND DISTANCES (REFER TO NOTE 3).
9. ALL SECTION CORNERS SHOWN HEREON WERE FOUND IN GOOD CONDITION
10. ALL TITLE DOCUMENTS ARE SHOWN AND/OR NOTED HEREON, INCLUDING THOSE FOR OFFSITE FEATURES/EASEMENTS, IF PROVIDED TO ROWE.
11. RAILROAD RIGHT OF WAY SHOWN BASED ON BEST FIT CENTERLINE OF FIELD OBSERVATIONS, AND QUIT CLAIM DEED AS RECORDED IN LIBER M, PAGE 16, KALAMAZOO COUNTY RECORDS

ALTA STANDARDS - TABLE A NOTES:

1. MONUMENTS PLACED (OR A REFERENCE MONUMENT OR WITNESS TO THE CORNER) AT ALL MAJOR CORNERS OF THE BOUNDARY OF THE SURVEYED PROPERTY, UNLESS ALREADY MARKED OR REFERENCED BY EXISTING MONUMENTS OR WITNESSES IN CLOSE PROXIMITY TO THE CORNER.
   ALL CORNERS HAVE BEEN SET
3. FLOOD ZONE CLASSIFICATION (WITH PROPER ANNOTATION BASED ON FEDERAL FLOOD INSURANCE RATE MAPS OR THE STATE OR LOCAL EQUIVALENT) DEPICTED BY SCALED MAP LOCATION AND GRAPHIC PLOTTING ONLY.
   THE SUBJECT PARCEL(S) IS FULLY WITHIN FLOOD ZONE X (AREA OF MINIMAL FLOOD HAZARD) PER FEMA FIRM MAP 26077C0215E EFFECTIVE 7/31/2024
4. GROSS LAND AREA (AND OTHER AREAS IF SPECIFIED BY THE CLIENT).
   PARCEL 1 = 39.90 ACRES
   PARCEL 2A = 76.09 ACRES
   PARCEL 2B = 28.29 ACRES
   TOTAL = 144.28 ACRES
5. VERTICAL RELIEF WITH THE SOURCE OF INFORMATION (E.G., GROUND SURVEY, AERIAL MAP), CONTOUR INTERVAL, DATUM, WITH ORIGINATING BENCHMARK, WHEN APPROPRIATE.
   VERTICAL RELIEF DETERMINED BY AERIAL LiDAR AND GROUND SURVEY
8. SUBSTANTIAL FEATURES OBSERVED IN THE PROCESS OF CONDUCTING THE FIELDWORK (IN ADDITION TO THE IMPROVEMENTS AND FEATURES REQUIRED PURSUANT TO SECTION 5 ABOVE) (E.G., PARKING LOTS, BILLBOARDS, SIGNS, SWIMMING POOLS, LANDSCAPED AREAS, SUBSTANTIAL AREAS OF REFUSE).
   ALL IMPROVEMENTS OBSERVED DURING SURVEY ARE SHOWN HEREON.
9. NUMBER AND TYPE (E.G., DISABLED, MOTORCYCLE, REGULAR, AND OTHER MARKED SPECIALIZED TYPES) OF CLEARLY IDENTIFIABLE PARKING SPACES ON SURFACE PARKING AREAS, LOTS, AND IN PARKING STRUCTURES. STRIPING OF CLEARLY IDENTIFIABLE PARKING SPACES ON SURFACE PARKING AREAS AND LOTS.
   115 TOTAL PARKING SPACES (112 STANDARD, 3 HANDICAPPED)
11. EVIDENCE OF UNDERGROUND UTILITIES EXISTING ON OR SERVING THE SURVEYED PROPERTY (IN ADDITION TO THE OBSERVED EVIDENCE OF UTILITIES REQUIRED PURSUANT TO SECTION 5.E.IV.) AS DETERMINED BY:
    a. PLANS AND/OR REPORTS PROVIDED BY CLIENT (WITH REFERENCE AS TO THE SOURCES OF INFORMATION)
    PLANS AND INFORMATION RECEIVED VIA MISS DIG DESIGN TICKET NO. 202602090027 3-000 SHOWN AND NOTED HEREON AS APPLICABLE
    b. MARKINGS COORDINATED BY THE SURVEYOR PURSUANT TO A PRIVATE UTILITY LOCATE REQUEST.
    VISIBLE UTILITIES SHOWN HEREON, MICHIGAN MISS DIG DOES NOT MARK UTILITIES FOR SURVEYING OR ENGINEERING PURPOSES

NOTE TO THE CLIENT, INSURER, AND LENDER – WITH REGARD TO TABLE A, ITEM 11, INFORMATION FROM THE SOURCES CHECKED ABOVE WILL BE COMBINED WITH OBSERVED EVIDENCE OF UTILITIES PURSUANT TO SECTION 5.E.IV. TO DEVELOP A VIEW OF THE UNDERGROUND UTILITIES. HOWEVER, LACKING EXCAVATION, THE EXACT LOCATION OF UNDERGROUND FEATURES CANNOT BE ACCURATELY, COMPLETELY, AND RELIABLY DEPICTED. IN ADDITION, IN SOME JURISDICTIONS, 811 OR OTHER SIMILAR UTILITY LOCATE REQUESTS FROM SURVEYORS MAY BE IGNORED OR RESULT IN AN INCOMPLETE RESPONSE, IN WHICH CASE THE SURVEYOR SHALL NOTE ON THE PLAT OR MAP HOW THIS AFFECTED THE SURVEYOR'S ASSESSMENT OF THE LOCATION OF THE UTILITIES. WHERE ADDITIONAL OR MORE DETAILED INFORMATION IS REQUIRED, THE CLIENT IS ADVISED THAT EXCAVATION MAY BE NECESSARY.

13. NAMES OF ADJOINING OWNERS ACCORDING TO CURRENT TAX RECORDS. IF MORE THAN ONE OWNER, IDENTIFY THE FIRST OWNER'S NAME LISTED IN THE TAX RECORDS FOLLOWED BY "ET AL."
    ADJOINER NAME AND PARCEL NUMBER SHOWN HEREON
16. EVIDENCE OF RECENT EARTH MOVING WORK, BUILDING CONSTRUCTION, OR BUILDING ADDITIONS OBSERVED IN THE PROCESS OF CONDUCTING THE FIELDWORK.
    NO RECENT ACTIVITY OBSERVED DURING FIELD SURVEY

BENCHMARKS:

BM #101
SET SPIKE IN NORTH SIDE OF POWER POLE 100'± WEST OF CENTERLINE DRIVE TO GOLF COURSE
NORTHING = 289447
EASTING = 12823491
ELEVATION = 805.68

BM #104
SET SPIKE IN NORTH SIDE OF POWER POLE 150'± WEST OF CENTERLINE K AVE AT RR CROSSING
NORTHING = 289238
EASTING = 12822857
ELEVATION = 802.64

BM #105
SET SPIKE IN SOUTH SIDE OF GUY POLE 15'± WEST OF CENTERLINE LANDALE ST
NORTHING = 289333
EASTING = 12822076
ELEVATION = 798.95

BM #106
CHISELED SQUARE IN SOUTHEAST CORNER OF HEADWALL 115'± WEST OF CENTERLINE ELLIOT ST 25'± NORTH OF CENTERLINE M-96
NORTHING = 289348
EASTING = 12821403
ELEVATION = 797.35

BM #111
CHISELED 'X' IN WEST SIDE OF CONCRETE BASE OF METAL POLE #8611
NORTHING = 291991
EASTING = 12821430
ELEVATION = 901.83

ALL COORDINATE VALUES ARE GRID

PRELIMINARY: MAY 22, 2026

PLAN DATE: 3/6/2026
PROJECT MGR: RAC
REVIEWER: RAC
SCALE: N/A

ROWE PROFESSIONAL SERVICES COMPANY
507 36th Street SE
Grand Rapids, MI 49548
O: (616) 272-7125
www.rowepsc.com

ALTA/NSPS LAND TITLE SURVEY PREPARED FOR
CI IV MASTER DEVCO, LLC.
SWAN BESS PROJECT
PART OF SECTION 16, T2S, R10W
COMSTOCK TOWNSHIP, KALAMAZOO COUNTY, MICHIGAN

REV:

SHT# V101
JOB No: 2600026

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PLOTTED: 5/22/2026 10:17 AM

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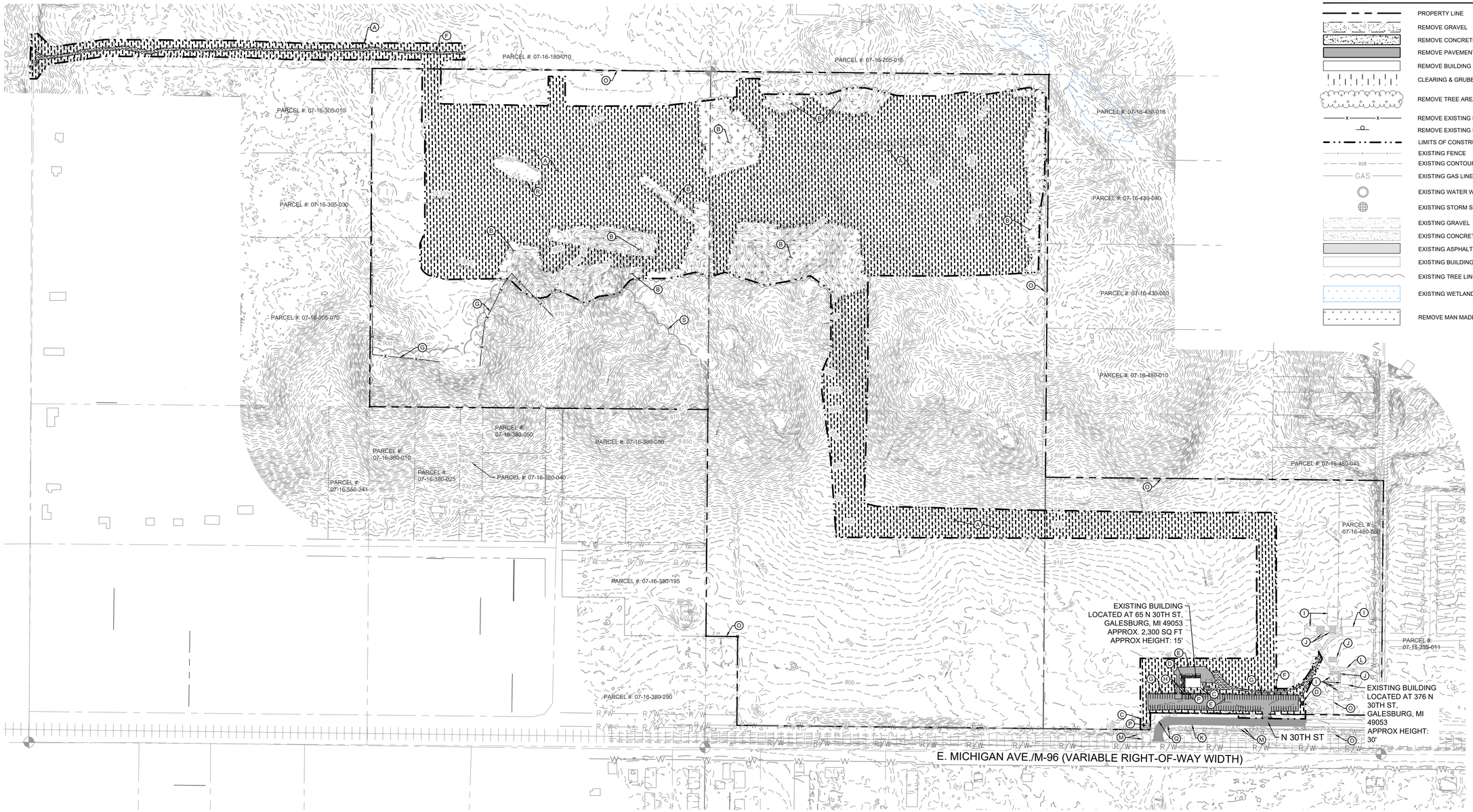

LEGEND

- PROPERTY LINE
- REMOVE GRAVEL
- REMOVE CONCRETE SURFACE
- REMOVE PAVEMENT
- REMOVE BUILDING
- CLEARING & GRUBBING
- REMOVE TREE AREA
- REMOVE EXISTING FENCE
- REMOVE EXISTING SIGN
- LIMITS OF CONSTRUCTION
- EXISTING FENCE
- EXISTING CONTOUR
- EXISTING GAS LINE
- EXISTING WATER WELL
- EXISTING STORM STRUCTURE
- EXISTING GRAVEL
- EXISTING CONCRETE
- EXISTING ASPHALT
- EXISTING BUILDING
- EXISTING TREE LINE
- EXISTING WETLAND
- REMOVE MAN MADE POND

DEMOLITION PLAN NOTES

1. THE CONTRACTOR IS RESPONSIBLE FOR THE DEMOLITION, REMOVAL, AND DISPOSAL (IN A LOCATION APPROVED BY ALL GOVERNING AUTHORITIES) OF ALL STRUCTURES, PADS, WALLS, FLUMES, FOUNDATIONS, PARKING, DRIVES, DRAINAGE STRUCTURES, UTILITIES, ETC. SUCH THAT THE IMPROVEMENTS ON THE PLANS CAN BE CONSTRUCTED. FACILITIES TO BE REMOVED SHALL BE UNDERCUT TO SUITABLE MATERIAL AND BROUGHT TO GRADE WITH SUITABLE COMPACTED FILL MATERIAL PER THE PROJECT DOCUMENTS.
2. THE CONTRACTOR IS RESPONSIBLE FOR REMOVING ALL DEBRIS FROM THE SITE AND DISPOSING OF THE DEBRIS IN A LAWFUL MANNER AND IN ACCORDANCE WITH LOCAL AND STATE REGULATIONS. THE CONTRACTOR SHALL OBTAIN ANY REQUIRED PERMITS FOR DEMOLITION AND DISPOSAL FROM THE APPROPRIATE LOCAL AND STATE AGENCIES. CONTRACTOR SHALL PROVIDE COPIES OF THE PERMIT AND RECEIPTS OF DISPOSAL OF MATERIALS TO THE OWNER AND OWNERS REPRESENTATIVE, INCLUDING THE TYPE OF DEBRIS AND LOCATION WHERE IT WAS DISPOSED.
3. THE CONTRACTOR SHALL MAINTAIN UTILITY SERVICES TO ADJACENT PROPERTIES AT ALL TIMES. UTILITY SERVICES SHALL NOT BE INTERRUPTED WITHOUT APPROVAL FROM THE CONSTRUCTION MANAGER AND COORDINATION WITH THE ADJACENT PROPERTIES AND/OR THE TOWNSHIP.
4. THE CONTRACTOR SHALL COORDINATE WITH RESPECTIVE UTILITY COMPANIES PRIOR TO THE REMOVAL AND/OR RELOCATION OF UTILITIES. THE CONTRACTOR SHALL COORDINATE WITH THE UTILITY COMPANY CONCERNING PORTIONS OF WORK WHICH MAY BE PERFORMED BY THE UTILITY COMPANY'S FORCES AND ANY FEES WHICH ARE TO BE PAID TO THE UTILITY COMPANY FOR THEIR SERVICES. THE CONTRACTOR IS RESPONSIBLE FOR PAYING ALL FEES AND CHARGES.
5. THE LOCATIONS OF EXISTING UTILITIES SHOWN ON THE PLAN HAVE BEEN DETERMINED FROM THE BEST INFORMATION AVAILABLE AND ARE GIVEN FOR THE CONVENIENCE OF THE CONTRACTOR. THE ENGINEER ASSUMES NO RESPONSIBILITY FOR THEIR ACCURACY. PRIOR TO THE START OF ANY DEMOLITION ACTIVITY, THE CONTRACTOR SHALL NOTIFY THE AFFECTED UTILITY COMPANIES TO PROVIDE LOCATIONS OF EXISTING UTILITIES WITHIN PROPOSED WORK AREA.
6. EXISTING SEWERS, PIPING AND UTILITIES SHOWN ARE BASED ON AVAILABLE RECORD PLAN DATA AND/OR FIELD UTILITY MARKINGS AND ARE NOT TO BE INTERPRETED AS THE EXACT LOCATION. ADDITIONAL UNMARKED OBSTACLES MAY EXIST ON THE SITE. VERIFY EXISTING CONDITIONS AND PROCEED WITH CAUTION AROUND ANY ANTICIPATED UNDERGROUND FEATURES. GIVE NOTICE TO AFFECTED UTILITY COMPANIES REGARDING REMOVAL OF SERVICE LINES AND CAP ANY ABANDONED LINES BEFORE PRECEDING WITH THE PROPOSED WORK.
7. ELECTRICAL, TELEPHONE, CABLE, WATER, FIBER OPTIC, AND/OR GAS LINES NEEDING TO BE REMOVED OR RELOCATED SHALL BE COORDINATED WITH THE AFFECTED UTILITY COMPANY. ADEQUATE TIME SHALL BE PROVIDED FOR RELOCATION AND CLOSE COORDINATION WITH THE UTILITY COMPANY IS NECESSARY TO PROVIDE A SMOOTH TRANSITION IN UTILITY SERVICE. CONTRACTOR SHALL PAY CLOSE ATTENTION TO EXISTING UTILITIES WITHIN ANY ROAD RIGHT-OF-WAY DURING CONSTRUCTION.
8. CONTRACTOR MUST PROTECT THE PUBLIC AT ALL TIMES WITH FENCING, BARRICADES, ENCLOSURES, ETC. (AND OTHER APPROPRIATE BEST MANAGEMENT PRACTICES) AS APPROVED BY THE CONSTRUCTION MANAGER. MAINTENANCE OF TRAFFIC CONTROL SHALL BE COORDINATED IN ACCORDANCE WITH COMSTOCK TOWNSHIP, KALAMAZOO COUNTY, AND MICHIGAN DOT AS NECESSARY.
9. CONTRACTOR SHALL MAINTAIN ACCESS TO ADJACENT PROPERTIES DURING CONSTRUCTION, AND SHALL NOTIFY ADJACENT PROPERTY OWNERS IF ACCESS WILL BE INTERRUPTED OR ALTERED AT ANY TIME DURING CONSTRUCTION.
10. PRIOR TO THE START OF DEMOLITION, INSTALL EROSION CONTROL BMP'S IN ACCORDANCE WITH THE EROSION & SEDIMENT CONTROL PLANS / SWPPP.
11. CONTRACTOR MAY LIMIT SAW-CUT AND PAVEMENT REMOVAL TO ONLY THOSE AREAS WHERE IT IS REQUIRED AS SHOWN ON THESE CONSTRUCTION PLANS BUT IF ANY DAMAGE IS INCURRED ON ANY OF THE SURROUNDING PAVEMENT OR CURB, THE CONTRACTOR SHALL BE RESPONSIBLE FOR ITS REMOVAL AND REPAIR.
12. THE CONTRACTOR SHALL COORDINATE WATER MAIN WORK WITH THE TOWNSHIP WATER AND FIRE DEPARTMENTS TO ENSURE ADEQUATE FIRE PROTECTION IS CONSTANTLY AVAILABLE TO THE SITE AND SURROUNDING PROPERTIES THROUGH ALL PHASES OF CONSTRUCTION. CONTRACTOR WILL BE RESPONSIBLE FOR ARRANGING/PROVIDING ANY REQUIRED WATER MAIN SHUT OFFS WITH COMSTOCK TOWNSHIP. ANY COSTS ASSOCIATED WITH WATER MAIN SHUT OFFS WILL BE THE RESPONSIBILITY OF THE CONTRACTOR AND NO EXTRA COMPENSATION WILL BE PROVIDED.
13. IN THE EVENT A WELL IS FOUND, THE CONTRACTOR SHALL CONTACT THE ENGINEER AND OWNER IMMEDIATELY. ALL WELLS SHALL BE SEALED BY A LICENSED WELL CONTRACTOR IN ACCORDANCE WITH STATE REQUIREMENTS.
14. IN THE EVENT THAT UNKNOWN CONTAINERS OR TANKS ARE ENCOUNTERED, THE CONTRACTOR SHALL CONTACT THE OWNER AND/OR OWNERS REPRESENTATIVE IMMEDIATELY. ALL CONTAINERS SHALL BE DISPOSED OF AT A PERMITTED LANDFILL PER THE PROJECT DOCUMENTS.
15. CONTRACTOR SHALL NOTIFY THE ENGINEER IF ANY EXISTING DRAINTILE IS ENCOUNTERED ON SITE; ACTIVE DRAINTILE SHALL NOT BE REMOVED WITHOUT APPROVAL FROM THE ENGINEER.
16. IF CONTAMINATED MATERIAL IS ENCOUNTERED ON THE PROJECT SITE, THE CONTRACTOR SHALL STOP WORK AND NOTIFY THE OWNER AND ENGINEER IMMEDIATELY.
17. REFER TO TREE INVENTORY AND TREE PRESERVATION PLANS FOR DETAIL ON TREE REMOVALS.

KEYNOTE LEGEND

- (A) CLEARING AND GRUBBING
- (B) REMOVE EXISTING TREES
- (C) REMOVE EXISTING BUILDING
- (D) REMOVE EXISTING CONCRETE
- (E) REMOVE EXISTING ASPHALT
- (F) REMOVE EXISTING GRAVEL
- (G) REMOVE EXISTING FENCE
- (H) REMOVE EXISTING SIGN
- (I) PROTECT EXISTING BUILDING
- (J) PROTECT EXISTING CONCRETE
- (K) PROTECT EXISTING ASPHALT
- (L) PROTECT EXISTING GRAVEL
- (M) PROTECT EXISTING GAS LINE
- (N) PROTECT EXISTING STORM STRUCTURE
- (O) PROTECT EXISTING FENCE
- (P) PROTECT EXISTING WATER WELL
- (Q) PROTECT EXISTING CURB AND GUTTER
- (R) REMOVE EXISTING MAN MADE POND
- (S) PROTECT EXISTING TREE LINE

NORTH

GRAPHIC SCALE IN FEET
0 100 200 400

MISS DIG 811

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(312) 726 9445

CIP
Copenhagen Infrastructure Partners

STATE OF MICHIGAN
BRIAN GAMMON
ENGINEER
NO.
6201312424
PROFESSIONAL ENGINEER

Brian Gammon

KHA PROJECT 161262002
DATE 06/08/2026
SCALE AS SHOWN
DESIGNED BY JLL
DRAWN BY CJC
CHECKED BY BPG

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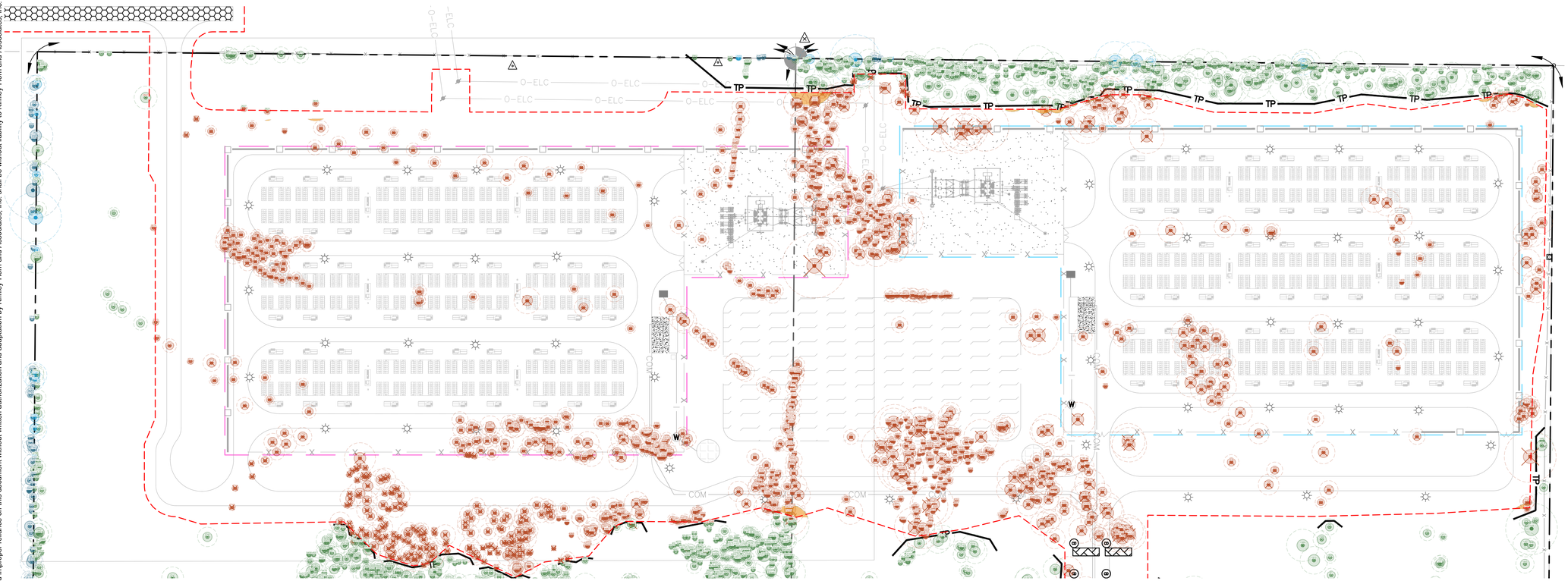
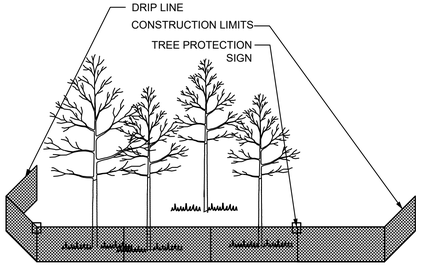
EXISTING CONDITIONS AND SITE DEMOLITION PLAN

SWAN BESS AND CYGNET BESS
PREPARED FOR
SWAN ENERGY STORAGE LLC AND CYGNET ENERGY STORGAGE LLC
COMSTOCK TOWNSHIP
MI

SHEET NUMBER
C200





FURNISH AND INSTALL TEMPORARY FENCE AT THE TREE'S DRIPLINE
OR CONSTRUCTION LIMITS AS SPECIFIED, PRIOR TO ANY CONSTRUCTION.
WHEN POSSIBLE PLACE FENCE 25 FEET BEYOND THE DRIP LINE.
PLACE PROTECTION SIGNS ALONG FENCE AT 20' INTERVALS.

1 TEMPORARY TREE PROTECTION FENCE PLACEMENT

SCALE: N.T.S. TP201

TREE PROTECTION NOTES

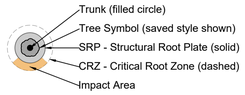
1. PRUNING WILL BE DONE BY PROFESSIONALS DURING APPROPRIATE PRUNING SEASON.
2. NO STORAGE OF MATERIALS, OPERATION OF MACHINERY, OR DEVELOPMENT OF ANY SORT WILL OCCUR WITHIN THE FENCE-LINE WITHOUT APPROVAL IN WRITING FROM THE TOWNSHIP.
3. SITE GRADING TO BE DONE ONLY AFTER PROTECTIVE MEASURES HAVE BEEN TAKEN, TOWNSHIP HAS APPROVED FENCING LOCATIONS, AND ALL CONTRACTORS HAVE BEEN BREIFED ON TREE PRESERVATION TECHNIQUES.
4. EXISTING TREES TO REMAIN OR REMOVED TO BE CLEARLY IDENTIFIED, WITHIN DISTURBANCE LIMITS AND 10' OUTSIDE OF THE DISTURBANCE LIMITS.
5. TREE PRESERVATION TO BE APPROVED BY OWNER AND PER LOCAL GOVERNMENTAL AUTHORITY.

TREE MITIGATION DATA

TOTAL TREES ONSITE:	7,047 TREES
TOTAL TREES REMOVED:	1,521 TREES
TOTAL TREES SAVED:	5,526 TREES

LEGEND

- PROPERTY LINE
- LIMITS OF CONSTRUCTION
- TREE PROTECTION FENCE

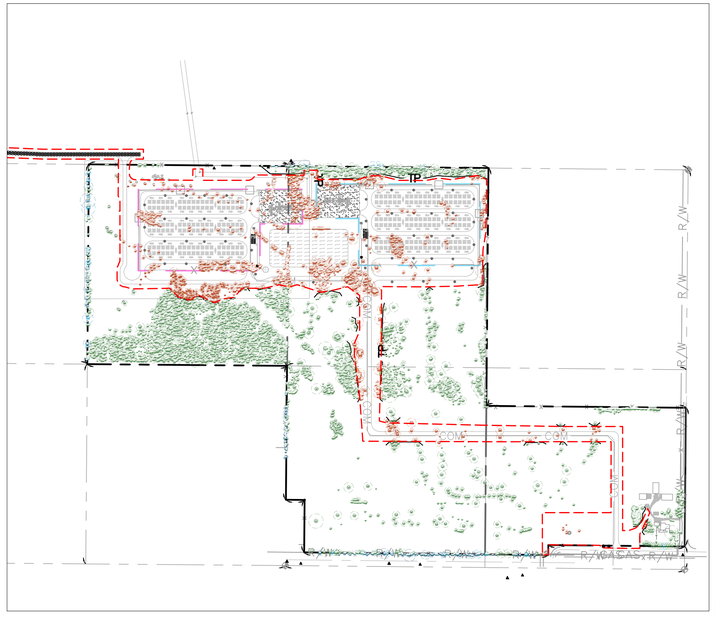


TREE TYPES:

- **SITE SAVED**
- **BOUNDARY SAVED**
- **CO-OWNED SAVED**
- **REMOVED** (Uses Removal X Symbol color)

KEYNOTE LEGEND

- (A) EXISTING TREE TO BE SAVED (TYP.)
- (B) EXISTING TREE TO BE REMOVED (TYP.)
- (C) LIMITS OF CONSTRUCTION (TYP.)
- (D) TREE PROTECTION FENCE (SEE DETAIL) (TYP.)



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SOUTHFIELD, MI 48075
(312) 726 9445

CIP Copenhagen Infrastructure Partners

STATE OF MICHIGAN BRIAN GAMMON ENGINEER NO. 6201312464 PROFESSIONAL ENGINEER

Brian Gammon

KHA PROJECT	161282002
DATE	06/08/2026
SCALE	########
DESIGNED BY	JLL
DRAWN BY	EAS
CHECKED BY	BPG

OVERALL TREE PRESERVATION PLAN

SWAN BESS AND CYGNET BESS
PREPARED FOR
SWAN ENERGY STORAGE LLC AND CYGNET ENERGY STORGAGE LLC
COMSTOCK TOWNSHIP
MI

SHEET NUMBER
TP201

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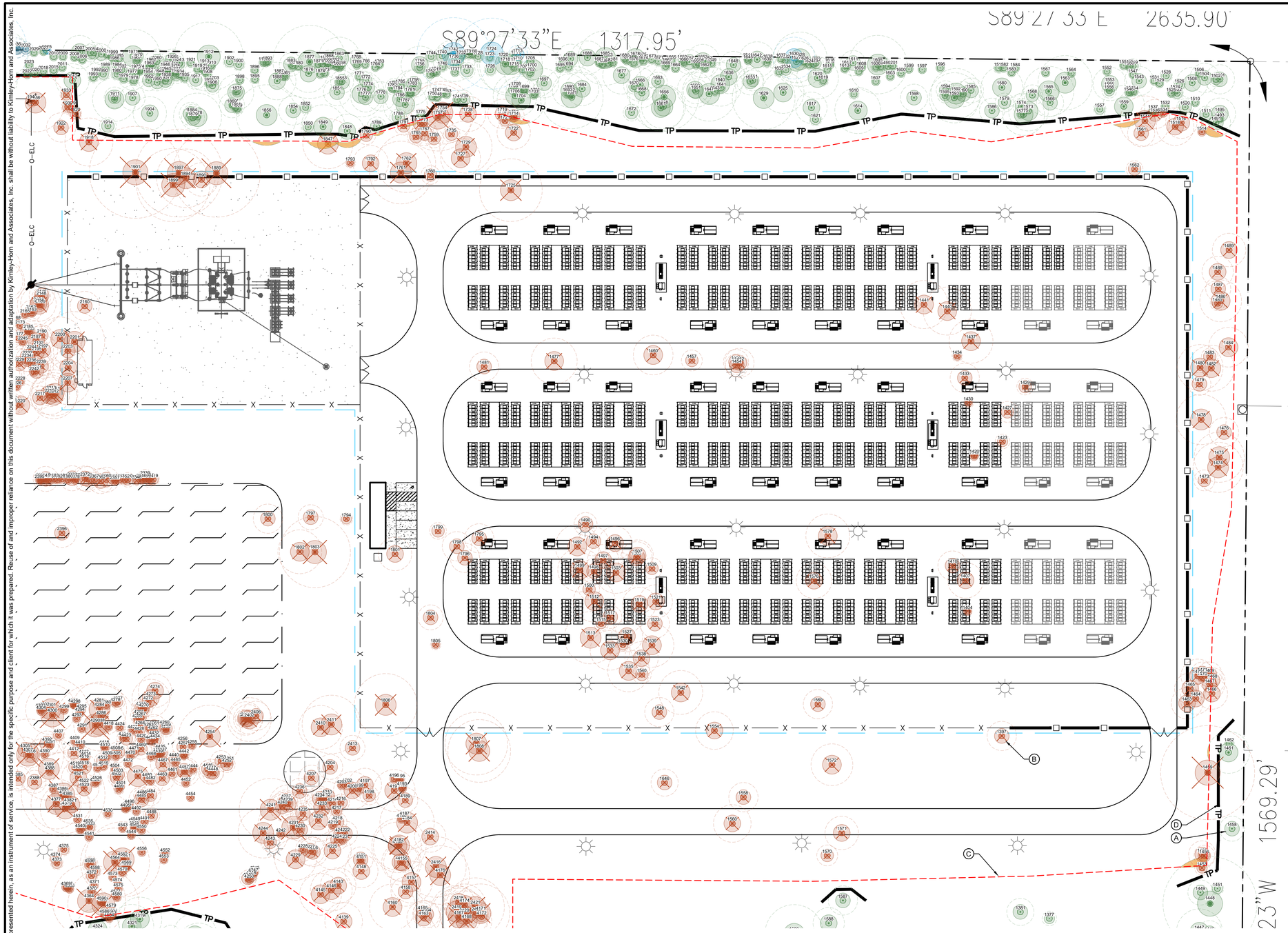
S89°27'33"E 1317.95'
S89°27'33"E 2635.90'
O-ELC
O-ELC
TP
TP
TP

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S89°29'25"E 1319.17'

N00°26'29"E 1318.44'

N00°29'11"E 1317.96'

LEGEND

- PROPERTY LINE
- LIMITS OF CONSTRUCTION
- TREE PROTECTION FENCE

Trunk (filled circle)
Tree Symbol (saved style shown)
SRP - Structural Root Plate (solid)
CRZ - Critical Root Zone (dashed)
Impact Area

TREE TYPES:

- **SITE SAVED**
- **BOUNDARY SAVED**
- **CO-OWNED SAVED**
- **REMOVED** (Uses Removal X Symbol color)

KEYNOTE LEGEND

- (A) EXISTING TREE TO BE SAVED (TYP.)
- (B) EXISTING TREE TO BE REMOVED (TYP.)
- (C) LIMITS OF CONSTRUCTION (TYP.)
- (D) TREE PROTECTION FENCE (SEE DETAIL) (TYP.)

GRAPHIC SCALE IN FEET
0 25 50 100

NORTH

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CIP
Copenhagen Infrastructure Partners

STATE OF MICHIGAN
BRIAN GAMMON
ENGINEER
NO. 6201312404
PROFESSIONAL ENGINEER

Brian Gammon

KHA PROJECT	161262002
DATE	06/08/2026
SCALE	AS SHOWN
DESIGNED BY	CPK
DRAWN BY	CPK
CHECKED BY	BPG

TREE PRESERVATION ENLARGEMENT

SWAN BESS AND CYGNET BESS
PREPARED FOR
SWAN ENERGY STORAGE LLC AND
CYGNET ENERGY STORGAGE LLC
COMSTOCK
TOWNSHIP
MI

SHEET NUMBER
TP203

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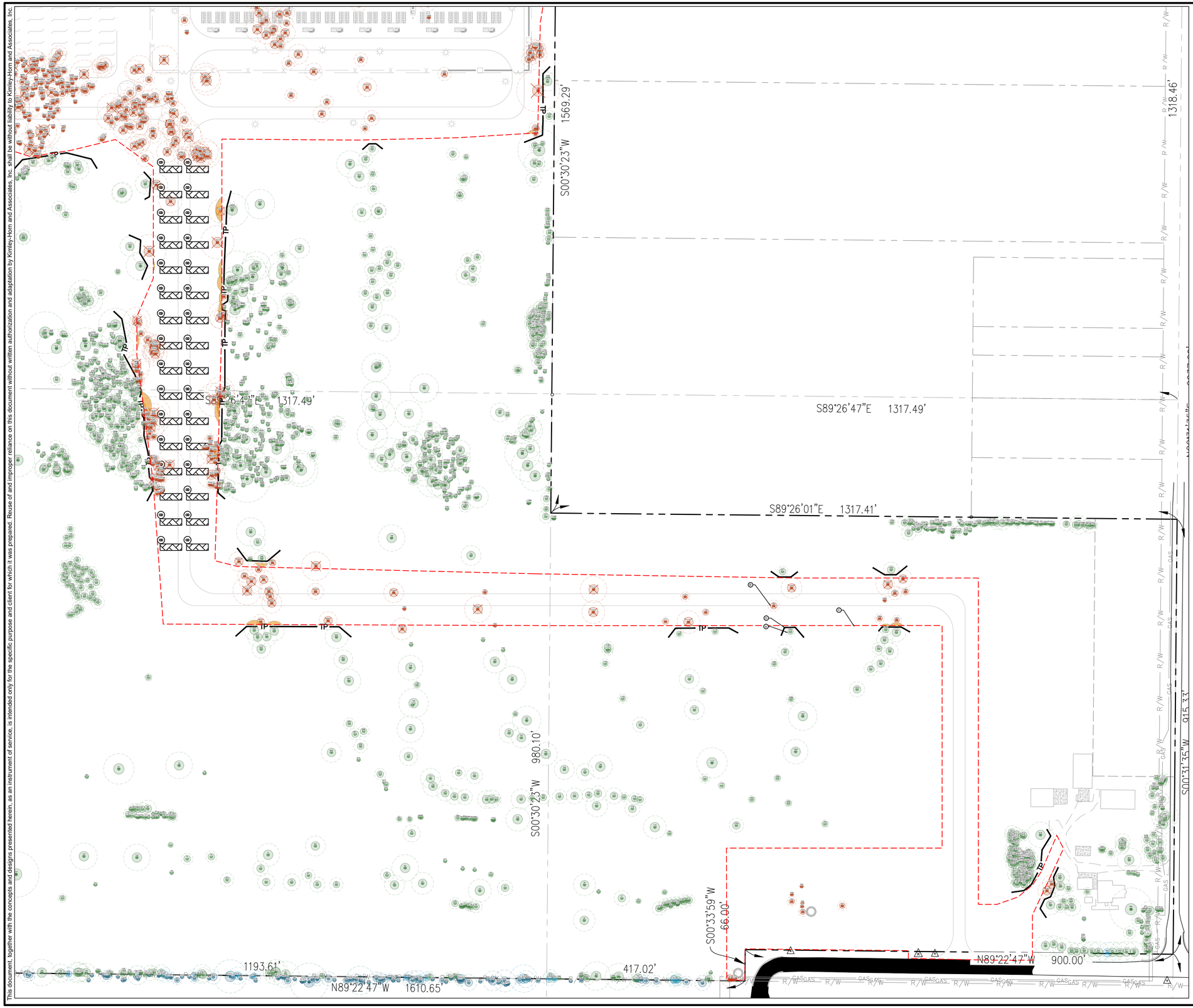

LEGEND

- PROPERTY LINE
- LIMITS OF CONSTRUCTION
- TREE PROTECTION FENCE

Trunk (filled circle)
Tree Symbol (saved style shown)
SRP - Structural Root Plate (solid)
CRZ - Critical Root Zone (dashed)
Impact Area

TREE TYPES:

- **SITE SAVED**
- **BOUNDARY SAVED**
- **CO-OWNED SAVED**
- **REMOVED** (Uses Removal X Symbol color)

KEYNOTE LEGEND

- (A) EXISTING TREE TO BE SAVED (TYP.)
- (B) EXISTING TREE TO BE REMOVED (TYP.)
- (C) LIMITS OF CONSTRUCTION (TYP.)
- (D) TREE PROTECTION FENCE (SEE DETAIL) (TYP.)

GRAPHIC SCALE IN FEET
0 25 50 100

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STATE OF MICHIGAN
BRIAN GAMMON
ENGINEER
6201012404
PROFESSIONAL ENGINEER

Brian Gammon

KHA PROJECT	161282002
DATE	06/08/2026
SCALE	AS SHOWN
DESIGNED BY	CFK
DRAWN BY	CFK
CHECKED BY	BPG

SWAN BESS AND CYGNET BESS
PREPARED FOR
SWAN ENERGY STORAGE LLC AND CYGNET ENERGY STORGAGE LLC
COMSTOCK TOWNSHIP MI

TREE PRESERVATION ENLARGEMENT

SHEET NUMBER
TP204

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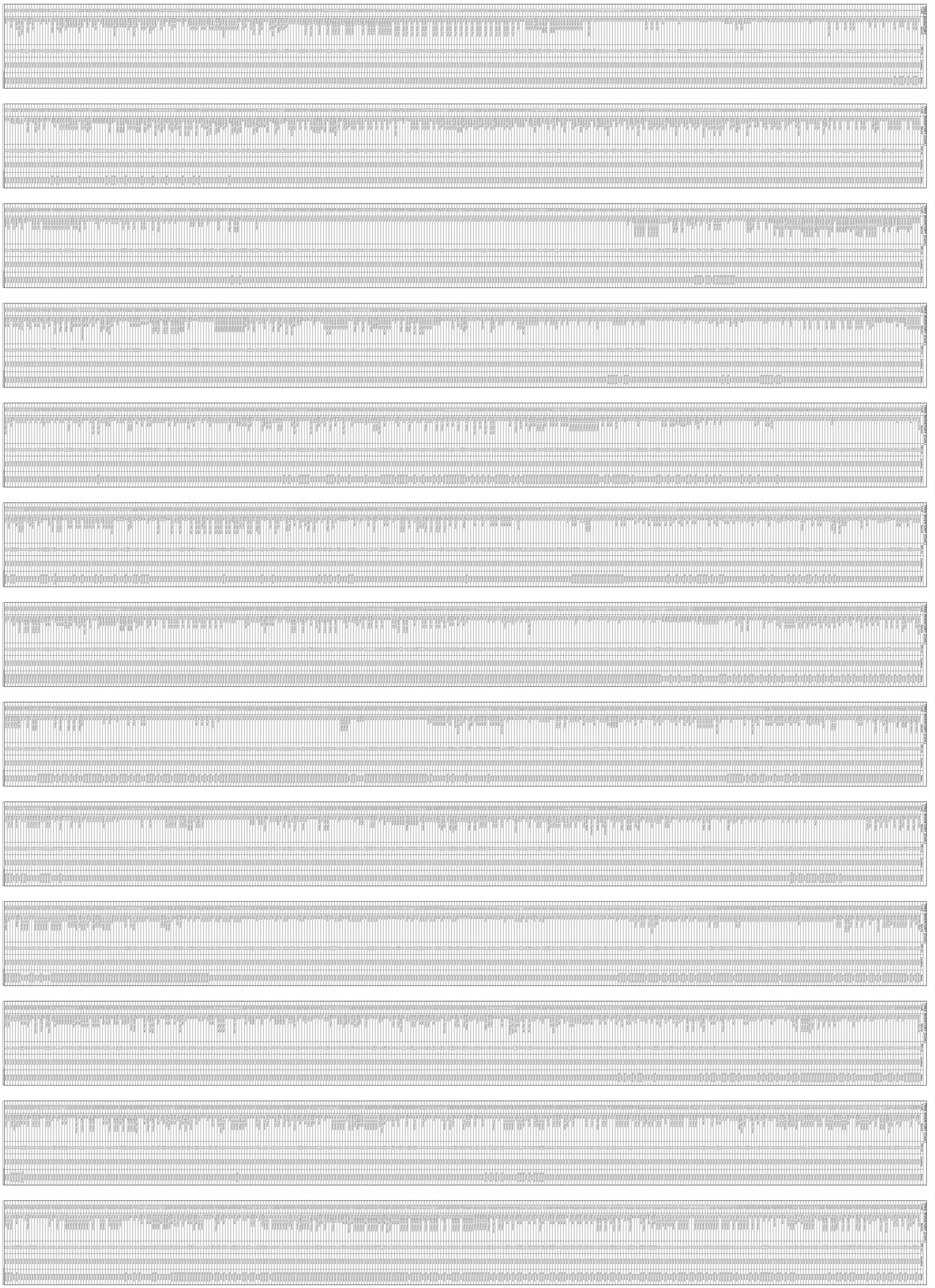

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TP205

SWAN BESS AND CYGNET BESS

PREPARED FOR
SWAN ENERGY STORAGE LLC AND
CYGNET ENERGY STORGAGE LLC
COMSTOCK
TOWNSHIP MI

TREE INVENTORY

KHA PROJECT	161262002
DATE	06/08/2026
SCALE	########
DESIGNED BY	JLL
DRAWN BY	EAS
CHECKED BY	BPG

Brian Gannon

STATE OF MICHIGAN
BRIAN GANNON
LICENSED PROFESSIONAL ENGINEER
NO. 6201-73043

CIP
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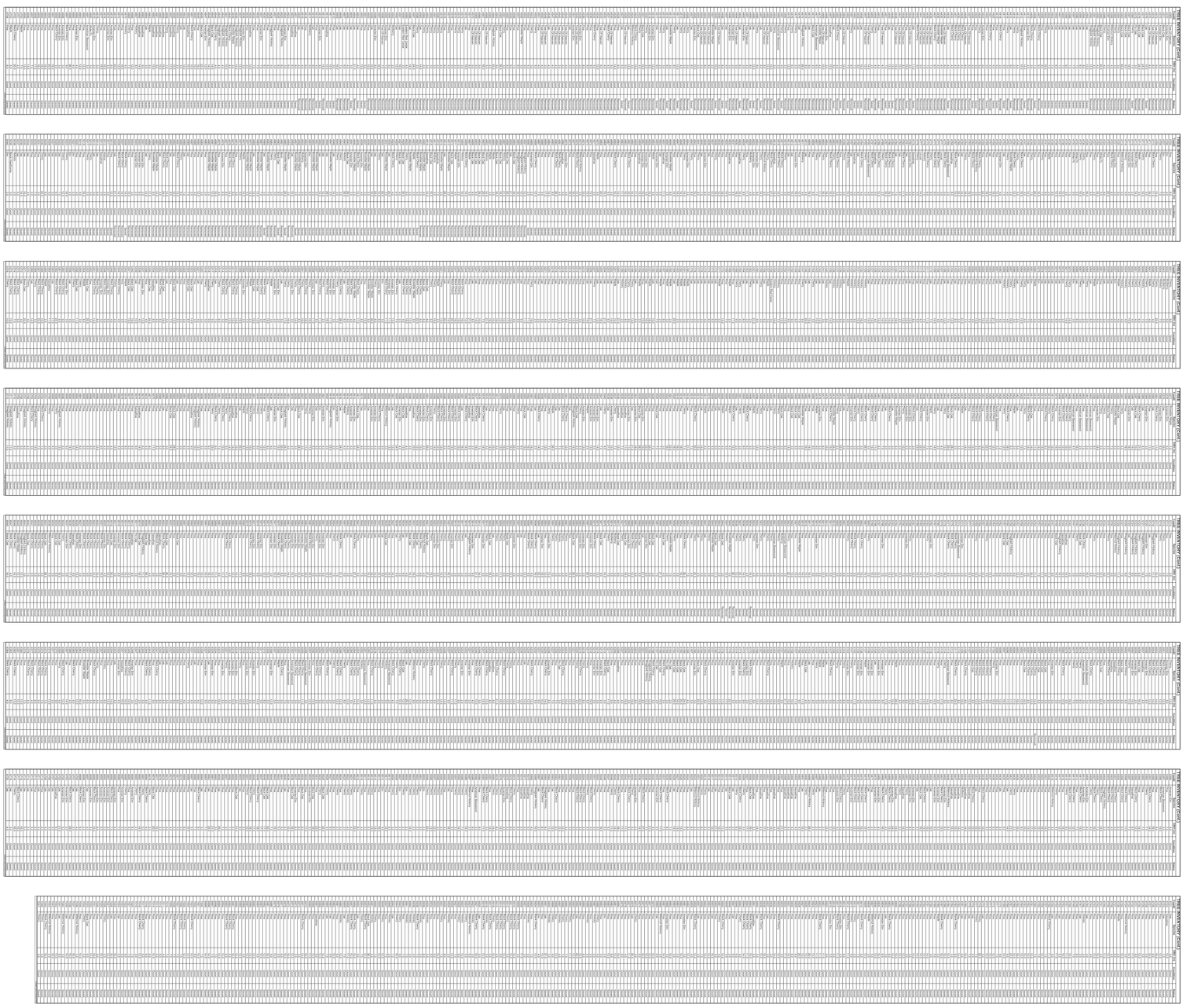

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TP206

SWAN BESS AND CYGNET BESS

PREPARED FOR
SWAN ENERGY STORAGE LLC AND
CYGNET ENERGY STORGAGE LLC
COMSTOCK
TOWNSHIP MI

TREE INVENTORY

KHA PROJECT	161262002
DATE	06/08/2026
SCALE	########
DESIGNED BY	JLL
DRAWN BY	EAS
CHECKED BY	BPG

Brian Gannon

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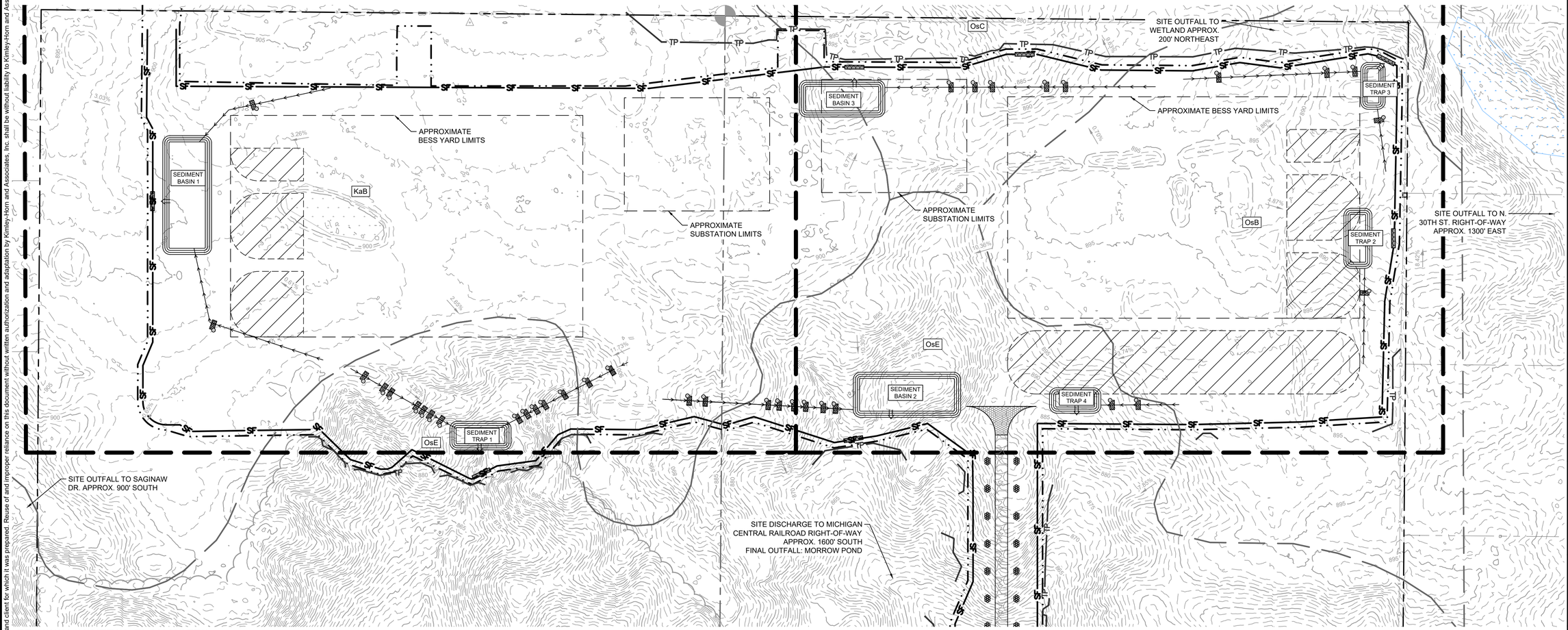
207



EROSION CONTROL PLAN NOTES

1. THE STORM WATER POLLUTION PREVENTION PLAN ("SWPPP") IS COMPRISED OF THE EROSION CONTROL PLAN, THE STANDARD DETAILS, THE PLAN NARRATIVE, ATTACHMENTS INCLUDED IN THE SPECIFICATIONS OF THE SWPPP, PLUS THE PERMIT AND ALL SUBSEQUENT REPORTS AND RELATED DOCUMENTS.
2. ALL CONTRACTORS AND SUBCONTRACTORS INVOLVED WITH LAND DISTURBING ACTIVITIES SHALL OBTAIN A COPY OF THE SWPPP AND NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) GENERAL PERMIT, AND BECOME FAMILIAR WITH THEIR CONTENTS.
3. BEST MANAGEMENT PRACTICES (BMP'S) AND CONTROLS SHALL CONFORM TO FEDERAL, STATE AND LOCAL REQUIREMENTS, AS APPLICABLE. THE CONTRACTOR SHALL IMPLEMENT ADDITIONAL CONTROLS AS DIRECTED BY THE PERMITTING AGENCY, ENGINEER OR OWNER.
4. SITE ENTRY AND EXIT LOCATIONS SHALL BE MAINTAINED IN A CONDITION THAT WILL PREVENT THE TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC ROADWAYS. SEDIMENT SPILLED, DROPPED, WASHED, OR TRACKED ONTO A PUBLIC ROADWAY FROM THE CONSTRUCTION SITE MUST BE REMOVED AS SOON AS PRACTICABLE. WHEN WASHING IS REQUIRED TO REMOVE SEDIMENT PRIOR TO ENTRANCE ONTO A PUBLIC ROADWAY, IT SHALL BE DONE IN AN AREA STABILIZED WITH CRUSHED STONE WHICH DRAINS INTO AN APPROVED SEDIMENT BASIN. ANY FINES IMPOSED FOR DISCHARGING SEDIMENT ONTO A PUBLIC RIGHT OF WAY SHALL BE PAID BY THE CONTRACTOR.
5. TEMPORARY SEEDING OR OTHER APPROVED METHODS OF STABILIZATION SHALL BE INITIATED WITHIN 7 DAYS OF THE LAST DISTURBANCE ON ANY AREA OF THE SITE.
6. THE CONTRACTOR SHALL MINIMIZE LAND DISTURBANCE AND CLEARING TO THE MAXIMUM EXTENT PRACTICAL OR AS REQUIRED BY THE GENERAL PERMIT.
7. CONTRACTOR SHALL DENOTE ON THE PLAN THE TEMPORARY PARKING AND STORAGE AREA WHICH SHALL ALSO BE USED AS THE EQUIPMENT MAINTENANCE AND CLEANING AREA, EMPLOYEE PARKING AREA, AND AREA FOR LOCATING PORTABLE FACILITIES, OFFICE TRAILERS, AND TOILET FACILITIES.
8. ALL WASH WATER FROM THE CONSTRUCTION SITE (CONCRETE TRUCKS, VEHICLE CLEANING, EQUIPMENT CLEANING, ETC.) SHALL BE DETAINED AND PROPERLY TREATED BEFORE DISPOSAL.
9. SUFFICIENT OIL AND GREASE ABSORBING MATERIALS AND FLOTATION BOOMS SHALL BE MAINTAINED ON SITE OR READILY AVAILABLE TO CONTAIN AND CLEAN-UP FUEL OR CHEMICAL SPILLS AND LEAKS.
10. THE CONTRACTOR SHALL BE RESPONSIBLE FOR DUST CONTROL ON SITE. THE USE OF MOTOR OILS AND OTHER PETROLEUM BASED OR TOXIC LIQUIDS FOR DUST SUPPRESSION OPERATIONS IS PROHIBITED.
11. RUBBISH, TRASH, GARBAGE, LITTER, OR OTHER SUCH MATERIALS SHALL BE DEPOSITED INTO SEALED CONTAINERS. MATERIALS SHALL BE PREVENTED FROM LEAVING THE PREMISES THROUGH THE ACTION OF WIND OR STORM WATER DISCHARGE INTO DRAINAGE DITCHES OR WATERS OF THE STATE.
12. STAGING AREAS, STOCKPILES, SPOILS, ETC. SHALL BE LOCATED OUTSIDE OF DRAINAGE WAYS SUCH THAT STORM WATER RUNOFF WILL NOT BE ADVERSELY AFFECTED. PROVIDE STABILIZATION MEASURES SUCH AS PERIMETER EROSION CONTROL BMP'S, SEEDING, OR OTHER COVERING AS NECESSARY TO PREVENT EROSION.
13. CONTRACTOR SHALL BE RESPONSIBLE FOR RE-ESTABLISHING ANY EROSION CONTROL BMP DISTURBED DURING CONSTRUCTION OPERATIONS. NOTIFY THE OWNER'S REPRESENTATIVE OF ANY DEFICIENCIES IN THE ESTABLISHED EROSION CONTROL MEASURES THAT MAY LEAD TO UNAUTHORIZED DISCHARGE OF STORM WATER POLLUTANTS. UNAUTHORIZED POLLUTANTS INCLUDE (BUT ARE NOT LIMITED TO) EXCESS CONCRETE DUMPING, CONCRETE RESIDUE, PAINTS, SOLVENTS, GREASES, FUELS, LUBRICANT OILS, PESTICIDES, AND SOLID WASTE MATERIALS.
14. EROSION CONTROL BMP'S SHOWN ON THESE PLANS SHALL BE INSTALLED PRIOR TO THE START OF LAND-DISTURBING ACTIVITIES ON THE PROJECT, AND INITIATED AS SOON AS PRACTICABLE.
15. THE CONTRACTOR IS SOLELY RESPONSIBLE FOR COMPLYING WITH THE REQUIREMENTS OF THE AUTHORITIES HAVING JURISDICTION, AND SHALL MAINTAIN COMPLIANCE WITH APPLICABLE LAWS AND REGULATIONS FOR THE DURATION OF CONSTRUCTION.
16. THE CONTRACTOR SHALL FIELD ADJUST AND/OR PROVIDE ADDITIONAL EROSION CONTROL BMP'S AS NEEDED TO PREVENT EROSION AND OFF-SITE SEDIMENT DISCHARGE FROM THE CONSTRUCTION SITE. LOG AND RECORD ANY ADJUSTMENTS AND DEVIATIONS FROM THE APPROVED EROSION CONTROL PLANS WITHIN THE SWPPP DOCUMENTS STORED IN THE JOB SITE TRAILER.

SWPPP UPDATES & AMENDMENTS

THE CONTRACTOR MUST UPDATE THE SWPPP BY NOTING ON THE SITE MAPS IN THE JOB SITE BINDER TO REFLECT THE PROGRESS OF CONSTRUCTION ACTIVITIES AND GENERAL CHANGES TO THE PROJECT SITE FOR THE DURATION OF LAND DISTURBING ACTIVITIES. AT A MINIMUM, UPDATES SHALL BE MADE DAILY TO TRACK CONSTRUCTION PROGRESS DESCRIBED IN THE SEQUENCE OF CONSTRUCTION. THE CONTRACTOR IS RESPONSIBLE FOR NOTING THE LOCATION OF THE JOB SITE TRAILER, TEMPORARY PARKING & LAYDOWN AREAS, PORTA-POTTY, WHEEL WASH, CONCRETE WASHOUT, FUEL & MATERIAL STORAGE, SOLID WASTE CONTAINERS, AND OTHER CONSTRUCTION RELATED FACILITIES THAT MAY IMPACT STORMWATER RUNOFF.

PHASE 1 SEQUENCE OF CONSTRUCTION

1. INSTALL PERIMETER EROSION CONTROL (I.E. SILT FENCE) AND INLET PROTECTION AT EXISTING STORMWATER INLETS.
2. CONSTRUCT STABILIZED CONSTRUCTION ENTRANCE AND CONCRETE WASHOUT
3. PREPARE TEMPORARY PARKING AND STORAGE AREA.
4. CONSTRUCT AND STABILIZE DIVERSIONS AND TEMPORARY SEDIMENT BASINS.
5. CLEAR AND GRUB THE SITE.
6. BEGIN MASS SITE GRADING AND ROUGH GRADE SITE SUFFICIENTLY TO ESTABLISH PROPOSED DRAINAGE PATTERNS.
7. START CONSTRUCTION OF THE BUILDING PAD AND STRUCTURES.
8. TEMPORARILY SEED, THROUGHOUT CONSTRUCTION, DISTURBED AREAS THAT WILL BE INACTIVE FOR 14 DAYS OR MORE OR AS REQUIRED BY THE NPDES AND/OR TOWNSHIP GRADING PERMIT(S).

NOTE: THE SEQUENCE OF CONSTRUCTION IS INTENDED TO CONVEY THE GENERAL CONCEPTS OF THE EROSION CONTROL DESIGN AND SHOULD NOT BE RELIED UPON FOR CONSTRUCTION PURPOSES. THE CONTRACTOR IS SOLELY RESPONSIBLE FOR DETAILED PHASING AND CONSTRUCTION SEQUENCING NECESSARY TO CONSTRUCT THE PROPOSED IMPROVEMENTS. THE CONTRACTOR SHALL NOTIFY THE ENGINEER IN WRITING IMMEDIATELY, PRIOR TO AND/OR DURING CONSTRUCTION IF ANY ADDITIONAL INFORMATION ON THE CONSTRUCTION SEQUENCE IS NECESSARY.

LEGEND

		MDTMB SESC KEYING SYSTEM NO.
	ROCK CONSTRUCTION ENTRANCE	S53
SF	SILT FENCE	S51
	LIMITS OF DISTURBANCE	
TP	TREE PROTECTION FENCE	
	SILT FENCE ROCK OUTLET	
	DIVERSION DITCH	ES37
	LAYDOWN YARD	
	ROCK CHECK DAM	ES31
	INLET PROTECTION	S58
	TEMPORARY ACCESS ROAD	

SOILS LEGEND	
KALAMAZOO LOAM, 2 TO 6 PERCENT SLOPES	KaB
OSHTEMO SANDY LOAM, 0 TO 6 PERCENT SLOPS	OsB
OSHTEMO SANDY LOAM, 6 TO 12 PERCENT SLOPS	OsC
OSHTEMO SANDY LOAM, 18 TO 35 PERCENT SLOPS	OsE

PHASE I BMP QUANTITIES

SILT FENCE	± 11,213 LF
SILT FENCE ROCK OUTLET	7 EA
ROCK CONSTRUCTION ENTRANCE	1 EA
DIVERSION DITCH	± 3,226 LF
ROCK CHECK DAM	46 EA
TREE PROTECTION FENCE	± 5,640 LF
INLET PROTECTION	2 EA

SEDIMENT BASIN/TRAP SIZING TABLE

	DRAINAGE AREA (AC)	TOTAL REQUIRED VOLUME (CF)	MIN. DEPTH (FT)	MIN. BOTTOM LENGTH (FT)	MIN. BOTTOM WIDTH (FT)
BASIN 1	11.58	± 41,688	3.00	205	70
BASIN 2	9.45	± 34,030	3.00	183	63
BASIN 3	5.34	± 19,224	3.00	140	47
TRAP 1	4.78	± 8,604	3.00	94	31
TRAP 2	4.52	± 8,136	3.00	92	30
TRAP 3	2.51	± 4,518	3.00	66	23
TRAP 4	2.93	± 5,274	3.00	75	25

NORTH

GRAPHIC SCALE IN FEET
0 50 100 200

MISS DIG 811

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BRIAN GAMMON
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6201312424
PROFESSIONAL ENGINEER

Brian Gammon

KHA PROJECT	161262002
DATE	06/08/2026
SCALE	AS SHOWN
DESIGNED BY	JLL
DRAWN BY	EAS
CHECKED BY	BPG

OVERALL SOIL EROSION AND SEDIMENT CONTROL PLAN - PHASE 1

SWAN BESS AND CYGNET BESS

PREPARED FOR
SWAN ENERGY STORAGE LLC AND CYGNET ENERGY STORGAGE LLC
COMSTOCK TOWNSHIP
MI

SHEET NUMBER
C300

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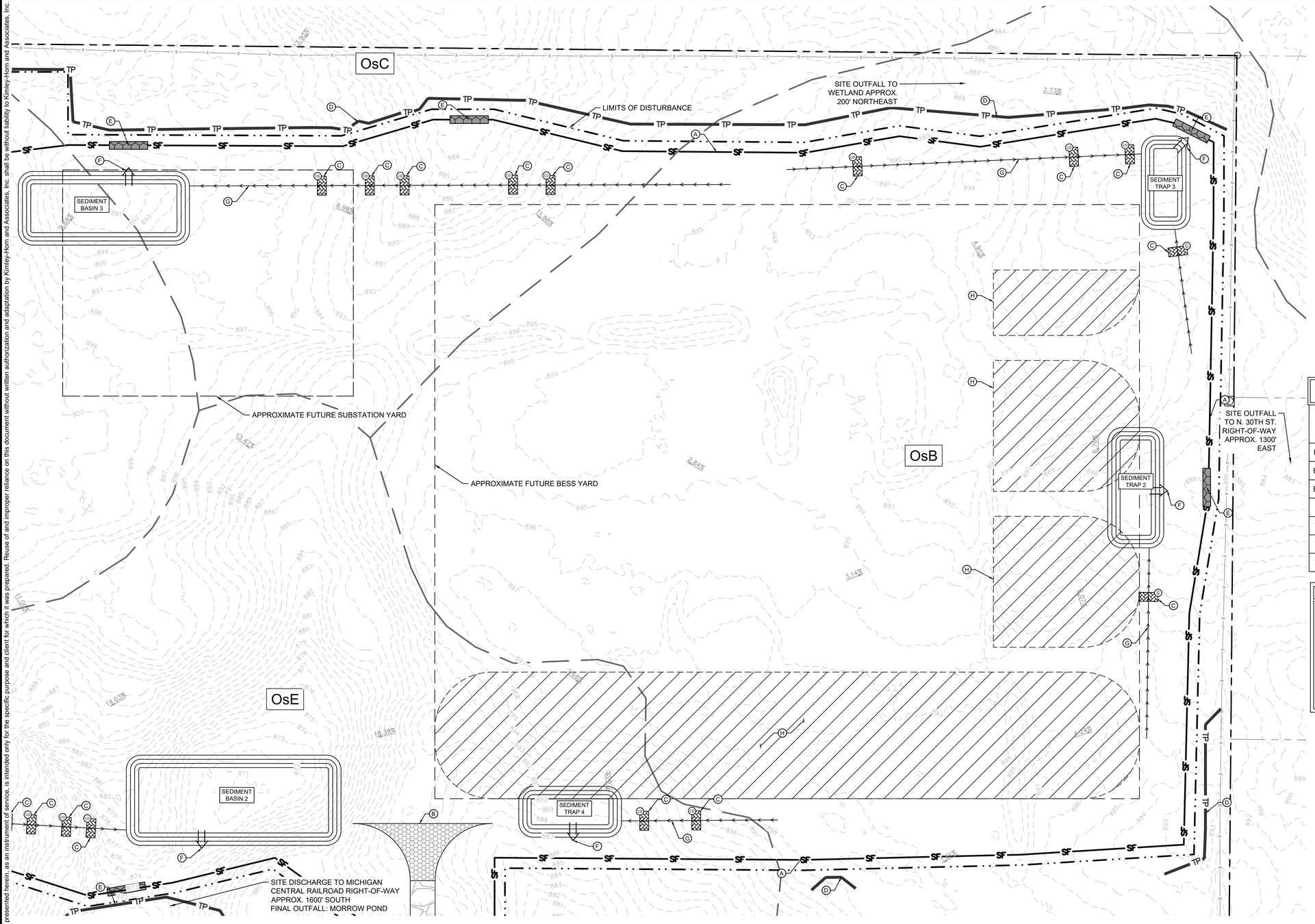

LEGEND

MDTMB SESC KEYING SYSTEM NO.

ROCK CONSTRUCTION ENTRANCE	S53
SILT FENCE	S51
LIMITS OF DISTURBANCE	
TREE PROTECTION FENCE	
SILT FENCE ROCK OUTLET	
DIVERSION DITCH	ES37
LAYDOWN YARD	
ROCK CHECK DAM	ES31
INLET PROTECTION	S58
TEMPORARY ACCESS ROAD	

KEYNOTE LEGEND

A	SILT FENCE
B	ROCK CONSTRUCTION ENTRANCE
C	ROCK CHECK DAM
D	TREE PROTECTION FENCE
E	SILT FENCE ROCK OUTLET
F	TEMPORARY SEDIMENT BASIN/TRAP OUTFALL
G	DIVERSION DITCH
H	LAYDOWN YARD
I	INLET PROTECTION

SEDIMENT BASIN/TRAP SIZING TABLE

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SOILS LEGEND	
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OSHTEMO SANDY LOAM, 0 TO 6 PERCENT SLOPS	OsB
OSHTEMO SANDY LOAM, 6 TO 12 PERCENT SLOPS	OsC
OSHTEMO SANDY LOAM, 18 TO 35 PERCENT SLOPS	OsE

NORTH

GRAPHIC SCALE IN FEET
0 25 50 100

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CIP Copenhagen Infrastructure Partners

STATE OF MICHIGAN BRIAN GAMMON ENGINEER NO. E201312904 LICENSED PROFESSIONAL ENGINEER

Brian Gammon

KHA PROJECT 161262002
DATE 06/08/2026
SCALE AS SHOWN
DESIGNED BY JLL
DRAWN BY EAS
CHECKED BY BPG

SOIL EROSION AND SEDIMENT CONTROL PLAN - PHASE 1 ENLARGEMENT

SWAN BESS AND CYGNET BESS
PREPARED FOR
SWAN ENERGY STORAGE LLC AND CYGNET ENERGY STORGAGE LLC
COMSTOCK TOWNSHIP MI

SHEET NUMBER
C301

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LIMITS OF DISTURBANCE

SEDIMENT BASIN 1

KaB

EXISTING MAN MADE POND

APPROXIMATE FUTURE SUBSTATION YARD

APPROXIMATE FUTURE BESS YARD

SITE OUTFALL TO SAGINAW DR. APPROX. 1100' SOUTH

OsE

SEDIMENT TRAP 1

SITE DISCHARGE TO MICHIGAN CENTRAL RAILROAD RIGHT-OF-WAY APPROX. 2200' SOUTH FINAL OUTFALL: MORROW POND

LEGEND

MDTMB SESC KEYING SYSTEM NO.

	ROCK ENTRANCE	S53
SF	SILT FENCE	S51
	LIMITS OF DISTURBANCE	
TP	TREE PROTECTION FENCE	
	SILT FENCE ROCK OUTLET	
	DIVERSION DITCH	ES37
	LAYDOWN YARD	
	ROCK CHECK DAM	ES31
	INLET PROTECTION	S58
	TEMPORARY ACCESS ROAD	

KEYNOTE LEGEND

A	SILT FENCE
B	ROCK CONSTRUCTION ENTRANCE
C	ROCK CHECK DAM
D	TREE PROTECTION FENCE
E	SILT FENCE ROCK OUTLET
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SEDIMENT BASIN/TRAP SIZING TABLE

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NORTH

GRAPHIC SCALE IN FEET
0 25 50 100

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ENGINEER
NO. 6201312904
PROFESSIONAL ENGINEER

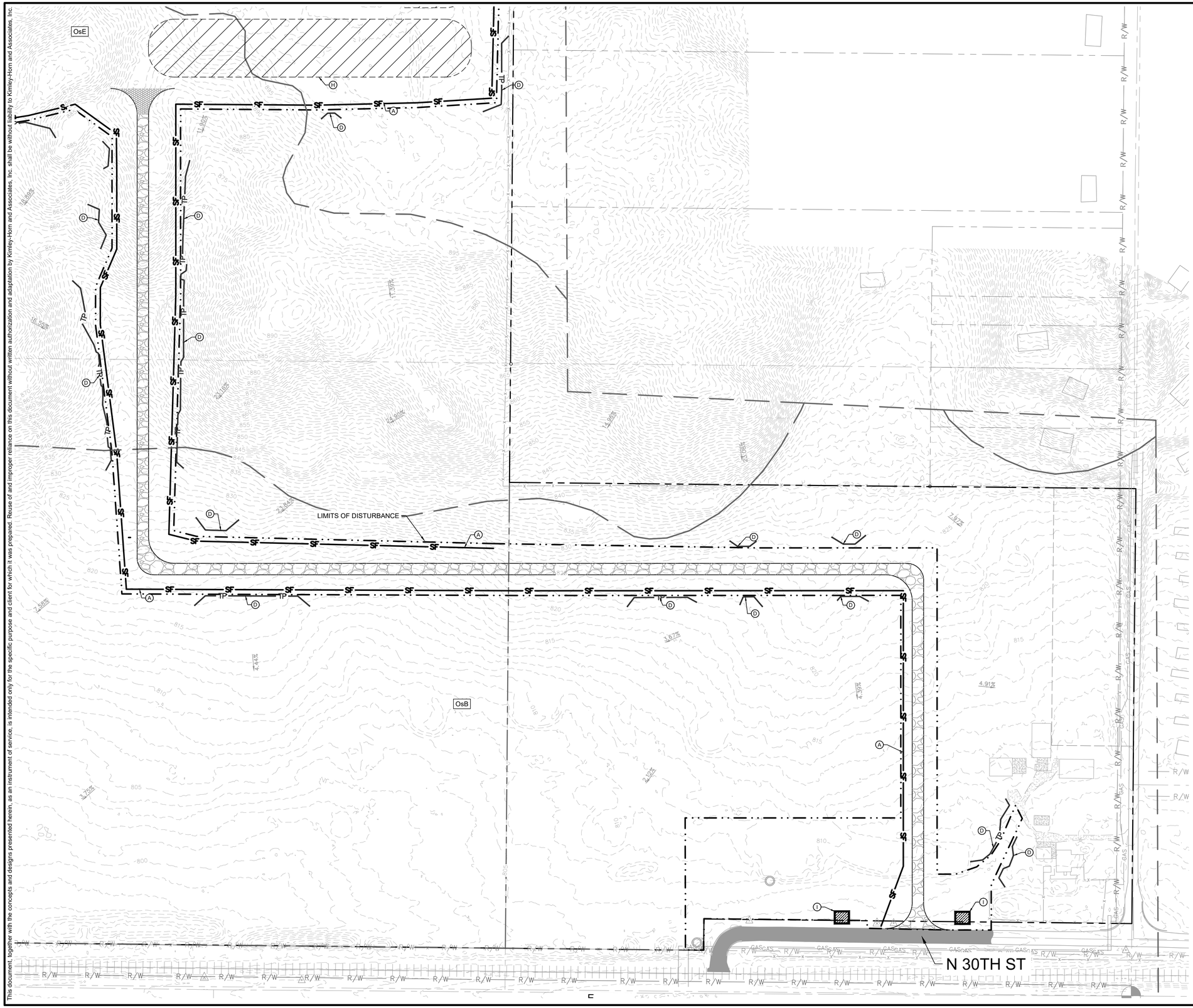
Brian Gammon

KHA PROJECT 161282002
DATE 06/08/2026
SCALE AS SHOWN
DESIGNED BY JLL
DRAWN BY EAS
CHECKED BY BPG

SOIL EROSION AND SEDIMENT CONTROL PLAN - PHASE 1 ENLARGEMENT

SWAN BESS AND CYGNET BESS
PREPARED FOR
SWAN ENERGY STORAGE LLC AND CYGNET ENERGY STORGAGE LLC
COMSTOCK TOWNSHIP
MI

SHEET NUMBER
C302



LEGEND

MDTMB SESC KEYING SYSTEM NO.

	ROCK ENTRANCE	S53
SF	SILT FENCE	S51
	LIMITS OF DISTURBANCE	
TP	TREE PROTECTION FENCE	
	SILT FENCE ROCK OUTLET	
	DIVERSION DITCH	ES37
	LAYDOWN YARD	
	ROCK CHECK DAM	ES31
	INLET PROTECTION	S58
	TEMPORARY ACCESS ROAD	

KEYNOTE LEGEND

A	SILT FENCE
B	ROCK CONSTRUCTION ENTRANCE
C	ROCK CHECK DAM
D	TREE PROTECTION FENCE
E	SILT FENCE ROCK OUTLET
F	TEMPORARY SEDIMENT BASIN/TRAP OUTFALL
G	DIVERSION DITCH
H	LAYDOWN YARD
I	INLET PROTECTION

SEDIMENT BASIN/TRAP SIZING TABLE

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OSHTEMO SANDY LOAM, 0 TO 6 PERCENT SLOPS	OsB
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OSHTEMO SANDY LOAM, 18 TO 35 PERCENT SLOPS	OsE

NORTH

GRAPHIC SCALE IN FEET
0 50 100 200

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STATE OF MICHIGAN BRIAN GAMMON ENGINEER NO. E201312904 LICENSED PROFESSIONAL ENGINEER

Brian Gammon

KHA PROJECT 161262002
DATE 06/08/2026
SCALE AS SHOWN
DESIGNED BY JLL
DRAWN BY EAS
CHECKED BY BPG

SOIL EROSION AND SEDIMENT CONTROL PLAN - PHASE 1 ENLARGEMENT

SWAN BESS AND CYGNET BESS
PREPARED FOR
SWAN ENERGY STORAGE LLC AND CYGNET ENERGY STORGAGE LLC
COMSTOCK TOWNSHIP MI

SHEET NUMBER
C303

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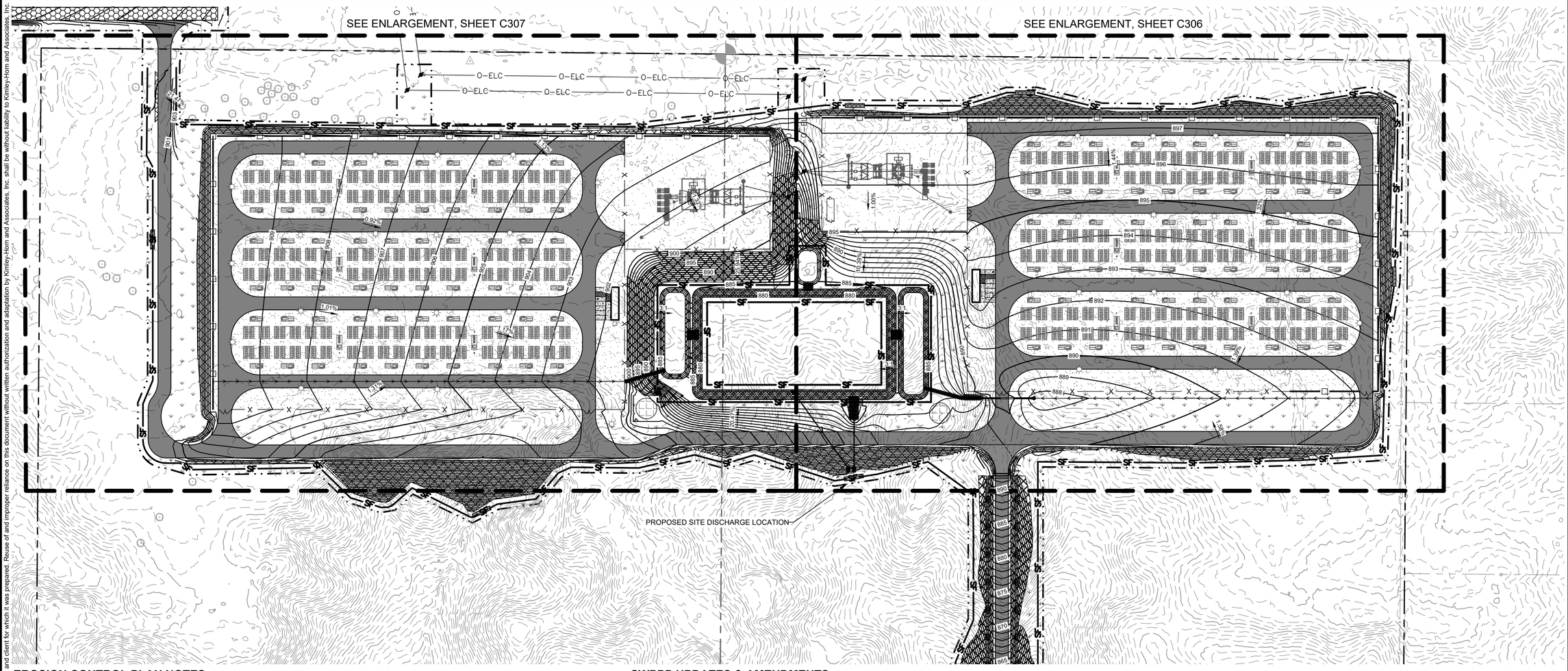
SEE ENLARGEMENT, SHEET C307
SEE ENLARGEMENT, SHEET C306
O-ELC
PROPOSED SITE DISCHARGE LOCATION
SF
0.92%
1.01%
1.37%
1.44%
1.33%
1.00%
1.08%
1.68%
1.68%
1.68

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LEGEND

		MDTMB SESC KEYING SYSTEM NO.
	ROCK ENTRANCE	S53
	EROSION CONTROL BLANKET	E9
	INLET PROTECTION	S58
SF	SILT FENCE	S51
	LIMITS OF DISTURBANCE	
	SILT FENCE ROCK OUTLET	
	ROCK CHECK DAM	ES31
	SWALE	ES37
	RIPRAP	E12
	BIOROLL	

KEYNOTE LEGEND

A	SILT FENCE
B	INLET PROTECTION
C	ROCK CONSTRUCTION ENTRANCE
D	SILT FENCE ROCK OUTLET
E	EROSION CONTROL BLANKET
F	RIPRAP
G	SWALE
H	BIOROLL
I	ROCK CHECK DAM

NORTH

GRAPHIC SCALE IN FEET
0 25 50 100

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Brian Gammon

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DATE 06/08/2026
SCALE AS SHOWN
DESIGNED BY JLL
DRAWN BY EAS
CHECKED BY BPG

SOIL EROSION AND SEDIMENT CONTROL PLAN - PHASE 2 ENLARGEMENT

SWAN BESS AND CYGNET BESS
PREPARED FOR
SWAN ENERGY STORAGE LLC AND CYGNET ENERGY STORGAGE LLC
COMSTOCK TOWNSHIP
MI

SHEET NUMBER
C306

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LEGEND

MDTMB SESC KEYING SYSTEM NO.

	ROCK ENTRANCE	S53
	EROSION CONTROL BLANKET	E9
	INLET PROTECTION	S58
SF	SILT FENCE	S51
	LIMITS OF DISTURBANCE	
	SILT FENCE ROCK OUTLET	
	ROCK CHECK DAM	ES31
	SWALE	ES37
	RIPRAP	E12
	BIOROLL	

KEYNOTE LEGEND

A	SILT FENCE
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C	ROCK CONSTRUCTION ENTRANCE
D	SILT FENCE ROCK OUTLET
E	EROSION CONTROL BLANKET
F	RIPRAP
G	SWALE
H	BIOROLL

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0 25 50 100

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PROFESSIONAL ENGINEER

Brian Gammon

KHA PROJECT 161262002
DATE 06/08/2026
SCALE AS SHOWN
DESIGNED BY JLL
DRAWN BY EAS
CHECKED BY BPG

SOIL EROSION AND SEDIMENT CONTROL PLAN - PHASE 2 ENLARGEMENT

SWAN BESS AND CYGNET BESS

PREPARED FOR
SWAN ENERGY STORAGE LLC AND
CYGNET ENERGY STORGAGE LLC
COMSTOCK
TOWNSHIP

MI

SHEET NUMBER
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LEGEND

MDTMB SESC KEYING SYSTEM NO.

	ROCK ENTRANCE	S53
	EROSION CONTROL BLANKET	E9
	INLET PROTECTION	S58
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	LIMITS OF DISTURBANCE	
	SILT FENCE ROCK OUTLET	
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	SWALE	ES37
	RIPRAP	E12
	BIOROLL	

KEYNOTE LEGEND

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E	EROSION CONTROL BLANKET
F	RIPRAP
G	SWALE
H	BIOROLL
I	ROCK CHECK DAM

N 30TH ST

NORTH

GRAPHIC SCALE IN FEET
0 50 100 200

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Copenhagen Infrastructure Partners

STATE OF MICHIGAN
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KHA PROJECT 161262002
DATE 06/08/2026
SCALE AS SHOWN
DESIGNED BY JLL
DRAWN BY EAS
CHECKED BY BPG

SOIL EROSION AND SEDIMENT CONTROL PLAN - PHASE 2 ENLARGEMENT

SWAN BESS AND CYGNET BESS
PREPARED FOR
SWAN ENERGY STORAGE LLC AND CYGNET ENERGY STORGAGE LLC
COMSTOCK TOWNSHIP
MI

SHEET NUMBER
C308

K:\TCW_LDE\Copenhagen Infrastructure Partners\Swan BESS_MI2 Design\CAD\PlanSheets\C305 EROSION CONTROL DETAILS.dwg June 08, 2026 - 12:30pm
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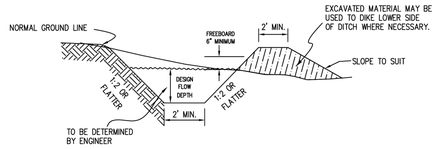
ES37

DIVERSION DITCH



CUT SECTION FOR DITCHES

NOTES:
- ALL STRUCTURAL BEST MANAGEMENT PRACTICES TO BE DESIGNED BY A REGISTERED ENGINEER OR LANDSCAPE ARCHITECT.
- ALL DIVERSIONS SHOULD BE FLAT BOTTOM. AVOID "V" PROFILES.
- MAY USE VEGETATED CHANNELS (SEE E11).

STANDARD SYMBOL

STATE OF MICHIGAN
DEPARTMENT OF TECHNOLOGY, MANAGEMENT AND BUDGET
STATE FACILITIES ADMINISTRATION

ES37

DIVERSION DITCH SPECIFICATIONS

When
- Temporarily diverts runoff around disturbed construction areas, highly erodible soils and other sensitive areas such as steep slopes.

Why
- To reduce erosion and sedimentation and route surface flows away from vulnerable areas, to divert flows to proposed sediment basins, and to prevent slope failures.

Where
- Where diversion of upslope runoff is necessary to prevent damage to unstabilized or disturbed construction areas and other vulnerable areas such as steep slopes.

How
1. Review site plan to determine areas subject to erosive surface runoff, construction areas needing protection from runoff, or collection and conveyance areas requiring runoff be directed into sediment basins or traps.
2. Locate diversion ditches prior to excavation of area to be protected and with consideration of pre-construction drainage patterns and capacities.
3. Temporary diversion ditches should be sized to carry at least a 10-year 24 hour storm event, unless local ordinances require greater capacity.
4. Permanent diversion ditches should be sized by a professional engineer.
5. Ditches should be located above, not on, a cut or fill slope and should run essentially perpendicular to the direction of runoff.
6. Ditch should have a minimum 2' wide bottom, a minimum 18" depth, with side slopes 1:2 or flatter.
7. Ditch grade minimum is usually 1%, maximum grade is dependent upon ditch armoring, capacity and diversion outlet (generally not greater than 10%).
8. Ditches may be vegetated or stabilized with rock riprap or matting.

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ES37

DIVERSION DITCH SPECIFICATIONS

How (cont.)
9. Care should be taken to prevent placement of material from ditch excavation into waterbodies, wetlands, or other sensitive areas.
10. Excavated material sidecast along diversion ditch should be compacted and stabilized.
11. Seed and mulch ditches with less than 5% grade; riprap and sod ditches with greater than 5% grade.

Maintenance
- Diversion should be inspected after every rainfall.
- Sediment should be removed from the diversion ditch and repairs made as necessary.
- Mow to remove excess growth of woody vegetation (design consideration).
- Except for maintenance, keep vehicles out of the ditch.

Limitations
- Diversion ditches should not adversely impact upstream or downstream properties.
- Use may be limited by quantity of diverted runoff.
- Seeding ditches will delay use until cover established.

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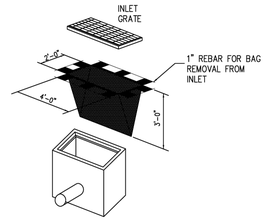
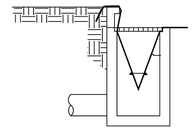
S58

INLET PROTECTION – FABRIC DROP



ISOMETRIC VIEW



INSTALLATION DETAIL

STANDARD SYMBOL

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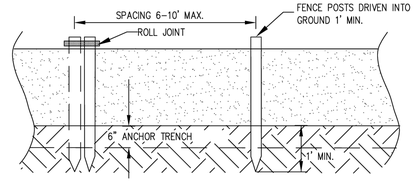
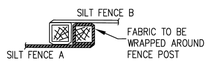
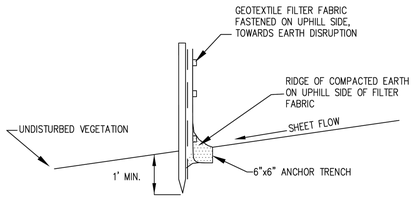
S51

SILT FENCE





ROLL JOINTS



STANDARD SYMBOL

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S51

SILT FENCE SPECIFICATIONS

When
- A temporary measure for preventing sediment movement.

Why
- Used to prevent sediment suspended in runoff from leaving an earth change area.

Where
- Use adjacent to critical areas, wetlands, base of slopes, and watercourses.

How
1. Install parallel to a contour.
2. The silt fence should be made of woven geotextile fabric.
3. Silt fence should accomodate no more than 1/2 to 1 acre of drainage per 100' of fence.
4. Dig a 6" trench along the area where the fence is to be installed.
5. Place 6" of the silt fence bottom flap into the trench.
6. Backfill the trench with soil and compact the soil on both sides. Create a small ridge on the up-slope side of the fence.
7. Install wooden stakes 6 – 10' apart and drive into the ground a minimum of 12".
8. Staple the geotextile fabric to the wooden stakes.
9. Join sections of silt fence by wrapping ends together (See drawing).

Maintenance
- Inspect frequently and immediately after each storm event. Check several times during prolonged storm events. If necessary, repair immediately.
- If the sediment has reached 1/3 the height of the fence, the soil should be removed and disposed of in a stable upland site.
- The fence should be re-installed if water is seeping underneath it or if the fence has become ineffective.
- Silt fence should be removed once vegetation is established and up-slope area has stabilized.

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SILT FENCE SPECIFICATIONS

Limitations
- Silt fence may cause temporary ponding and could fail if too much water flows through the area.
- Do not use in areas with concentrated flows.
- Chance of failure increases if fence is installed incorrectly or if sediment accumulation is not removed.

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S58

INLET PROTECTION – FABRIC DROP SPECIFICATIONS

When
- When sediment laden stormwater requires treatment before entering a stormwater drainage system.

Why
- To prevent sediment from entering stormwater systems.

Where
- Use in or at stormwater inlets, especially at construction sites or in streets.

How
1. A filter fabric bag is hung inside the inlet, beneath the grate.
2. Replace grate, which will hold bag in place.
3. Anchor filter bag with 1" rebar for removal from inlet.
4. Flaps of bag that extend beyond the bag can be buried in soil in earth areas.

Maintenance
- Drop inlet filters should be inspected routinely and after each major rain event.
- Damaged filter bags should be replaced.
- Clean and/or replace filter bag when 1/2 full.
- Replace clogged fabric immediately.
- If needed, initiate repairs immediately upon inspection.
- Remove entire protective mechanism when upgradient areas are stabilized and streets have been swept.

Limitations
- Can only accommodate small flow quantities.
- Requires frequent maintenance.
- Ponding may occur around storm drains if filter is clogged.

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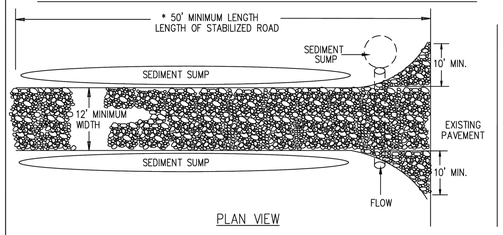
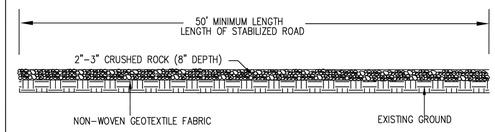
S53

STABILIZED CONSTRUCTION ACCESS



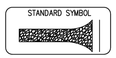
PLAN VIEW



PROFILE

NOTES:
1. Establish stabilized construction entrance prior to the initiation of site construction activities.
2. Care should be taken to prevent material movement into adjacent wetlands/waterbodies.
3. Care should be taken to maintain existing roadside drainage via culvert installation, with sediment sump placed downflow of culvert.

STANDARD SYMBOL



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S53

STABILIZED CONSTRUCTION ACCESS SPECIFICATIONS

When
- Construction traffic is expected to leave a construction site.
- Stabilization of interior construction roads is desired.

Why
- To minimize tracking of sediment onto public roadways and to minimize disturbance of vegetation.

Where
- Stabilized construction entrances shall be located at every point where construction traffic enters or leaves a construction site. Vehicles leaving the site must be routed over the rock ingress/egress corridor.

How
1. Stabilized construction access road should be established at the onset of the construction activities and maintained in place for the duration of the construction project.
2. Installation of this practice should be the responsibility of the site clearing or excavating contractor.
3. Access location should be cleared of woody vegetation.
4. Non-woven geotextile fabric shall be placed over the existing ground prior to placing stone.
5. Access size should be a minimum of 50'. (30' for single residence lot).
6. Access width should be 12' minimum, flared at the existing road to provide a turning radius.
7. Crushed aggregate (2" to 3"), or reclaimed or recycled concrete equivalent, shall be placed at least 8" deep over the length and width of the ingress/egress corridor.

Maintenance
- Periodic inspection and needed maintainence shall be provided after each rain event.
- Stabilized entrances shall be repaired and rock added as necessary.

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STABILIZED CONSTRUCTION ACCESS SPECIFICATIONS

Maintenance (cont.)
- Sediment deposited on public rights-of-way shall be removed immediately and returned to the construction site.
- If soils are such that washing of tires is required, it shall be done in a wash rack area, stabilized with stone, immediately prior to the construction access stabilized corridor.
- At the project completion, rock access road should be removed and disposed of unless utilized as subgrade for final road.

Limitations
- Effectiveness limited, sediment may be tracked onto roads requiring additional action.

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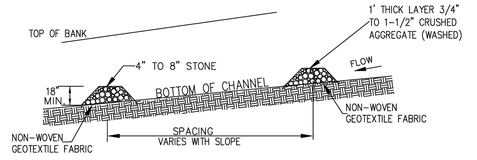
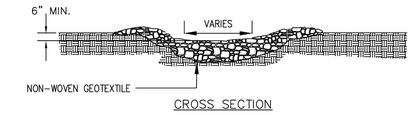
ES31

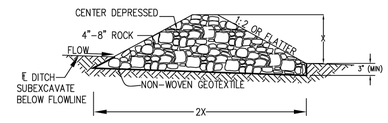
CHECK DAM



PROFILE



CROSS SECTION



PROFILE

NOTE: BASE WIDTH SHOULD BE AT LEAST 2X THE HEIGHT

STANDARD SYMBOL



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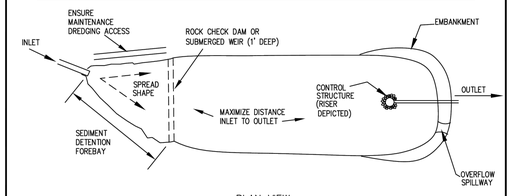
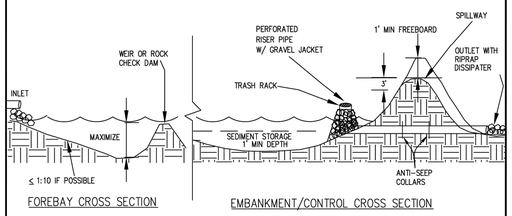
S55

SEDIMENT BASIN



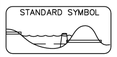
PLAN VIEW



FOREBAY CROSS SECTION

EMBANKMENT/CONTROL CROSS SECTION

STANDARD SYMBOL



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S55

SEDIMENT BASIN SPECIFICATIONS

When
- When site runoff is sediment-laden and/or runoff release rate is required.

Why
- To detain runoff sufficiently to allow excessive sediment to settle out before stormwater leaves construction site.

Where
- At the outlet of any disturbed area or at the ultimate site outlet.
- Should be used in association with dikes, temporary channels, and pipes to divert stormwater from the disturbed areas into the basin.
- May be combined with permanent detention basin.

How
1. Basin to be designed by engineer to ensure adequate storage volume from the contributing drainage area.
2. Basins should be constructed before clearing and grading work begins.
3. Basins should be located at the stormwater outlet for the site and multiple basins may be located throughout the site.
4. Basin location should ensure suitable access for maintenance and cleanout.
5. Do not locate in a stream.
6. All basin sites should be located where embankment failure will not result in loss of life or property damage.
7. The basin volume should be designed to handle the volume of stormwater expected from the disturbed acreage for a minimum 10-year storm event.
8. The basin volume consists of two zones
   - A sediment storage zone to a 1' minimum depth.
   - A settling zone at least 2 feet deep.

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SEDIMENT BASIN SPECIFICATIONS

How (cont.)
9. Design should contain sufficient capacity to detain runoff for 24-48 hours, maximizing sediment settlement potential.
10. Length to width ratio should be greater than 4:1 to allow for sufficient settlement time.
11. Utilize a well anchored riser pipe with anti-seep collars as the principal outlet, along with an emergency overflow spillway for major events.

Maintenance
- Inspect weekly and after each major storm event.
- Check the depth of sediment deposit to insure capacity of basin storage is adequate for stormwater and sediment deposition.
- Remove sediment when the forebay or basin design depth is 50% full of sediment.

Limitations
- Liability concerns based on failure of the basin and flooding of adjacent properties.
- May become an attractive nuisance to children and waterfowl.
- Typically, permanent basins are used for drainage of 5 acres or more.
- Effective in removing sediment down to the medium silt size fraction, however, not effective with fine silt and clay without extending detention time.

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ES31

CHECK DAM SPECIFICATIONS

When
- To reduce surface flow velocities.

Why
- To minimize erosion in flow corridors.

Where
- Within constructed flow corridors to reduce velocity until permanent stabilization is achieved.
- Within existing flow corridors to address or prevent velocity-caused erosion.

How
1. The check dam shall be constructed of rock only.
2. The rock shall be placed on non-woven geotextile fabric.
3. Remove woody vegetation prior to placing non-woven geotextile fabric.
4. Non-woven geotextile fabric shall be inset a minimum of 3" below adjacent grades.
5. The check dam shall be constructed of 4"-8" stone. The stone shall be placed to completely cover the width of the flow corridor and shall be keyed into adjacent banks.
6. The middle of the check dam shall be lower than the outer edges, such that no flow goes around the structure.
7. The up-stream side of the check dam can be lined with smaller crushed aggregate to improve efficiency.
8. Slopes of check dam should be 1:2 or flatter.

Maintenance
- Check dams should be inspected after each runoff event.
- Clogged stone should be periodically cleaned.
- Needed repairs should be initiated immediately after inspection.
- Accumulated upflow sediment should be periodically removed.
- If check dam is intended as temporary structure, remove after stablization is achieved.

Limitations
- Use only in small open channels which drain 10 acres or less.
- Not to be used in live streams.

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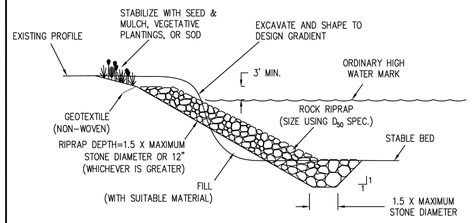
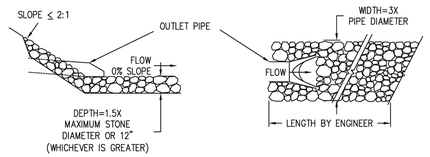
E12 RIPRAP

STREAM BANK APPLICATION



OUTLET POINT APPLICATION



STANDARD SYMBOL

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E12 RIPRAP SPECIFICATIONS

When
- When concentrated water flows have the potential to create scour, down-cutting, or lateral cutting.

Why
- To prevent loss of land or damage to utilities or structures. In aquatic applications, riprap is used to control channel meander and maintain capacity, protect against wave attack, and reduce sediment load.

Where
- In natural or constructed channels with areas susceptible to erosion from the action of water, ice, or debris, or to damage by livestock or vehicular traffic.
- In shoreline areas where the erosion problem may be solved through simple structural measures.
- On slopes with profiles measuring 1:1.5 or less.

How
1. Review subject site to identify areas subject to concentrated flows or wave/current attack.
2. The appropriateness and extent of riprap placement is site specific and should be determined in the field.
3. The area under review for riprap placement must be shaped and contoured appropriately by grading prior to material placement.
4. Non-woven geotextile fabric should be installed prior to riprap placement, with upper end and toe end of fabric buried or anchored to prevent movement.
5. Riprap placement should be started at a stabilized location and ended at a stabilized or contoured point.
6. Material selected for riprap should be hard, angular, and resistant to weathering. Appropriate material size depends on expected water energy and intended function of the material.

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E12 RIPRAP SPECIFICATIONS

How (cont.)
7. Riprap mixture should be an even mixture of stone sizes based on the average, or D_{50}. This means 50% of the stone, by size, will be larger than the diameter specified, and 50% will be smaller than the size specified. The diameter of the largest stone should not be more than 1.5 times the D_{50} stone size.
8. See table on the following page for typical riprap stone sizes.
9. Rock shall be placed so that larger rocks are uniformly distributed and in contact with one another. Smaller rocks should fill the voids.
10. When in contact with moving water, riprap will tie into a stable bank at the downstream end and will be keyed into the bank at the upstream end. Riprap should extend 3 ft. above the ordinary high water mark or to the top of the bank on short slopes. Extend riprap a minimum 10 ft. beyond active erosion area.

Maintenance
- All installations should be inspected immediately after the first rainfall to confirm the stability of the placed material. Follow-up inspections should occur regularly and provisions made for prompt repair if needed.

Limitations
- Area is cleared prior to the addition of riprap, therefore no areas are preserved with native vegetation.

SIZE OF TYPICAL RIPRAP STONES

Weight (lbs.)	Average Spherical Diameter (in.) D_{50}	Typical Rectangular Shape Length (in.)	Width/Height (in.)
50	10	18	6
100	13	21	7
150	14	24	8
300	18	30	10
500	22	36	12
1000	27	45	15
1500	31	52	17
2000	34	57	19
4000	43	72	24
6000	49	83	28
8000	54	90	30

Source: Adapted from USDA NRCS

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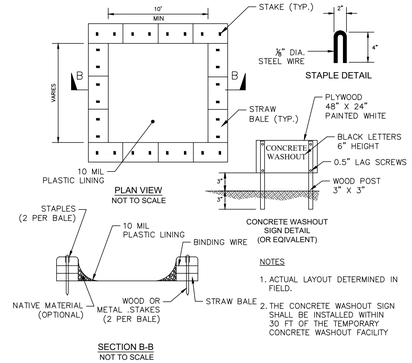
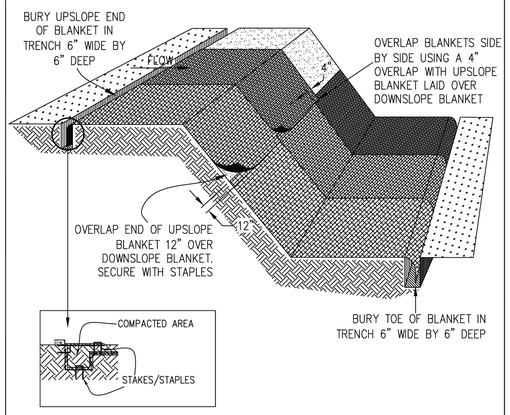


1 CONCRETE WASHOUT DETAIL

NO SCALE

E9 MULCH BLANKETS



NOTES:
1. PLACE MULCH BLANKET PARALLEL TO FLOW AND ANCHOR SECURELY.
2. WHEN BLANKETS ARE USED IN FLOWING DITCH, BLANKETS SHOULD NOT OVERLAP IN DITCH CENTER PARALLEL TO FLOW.
3. STAPLES INSTALLED/SECURED ACCORDING TO MANUFACTURER'S SPECIFICATIONS.
4. WHERE POSSIBLE, CONSTRUCT WITH BIODEGRADABLE MATERIAL.

STANDARD SYMBOL



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E9 MULCH BLANKETS SPECIFICATIONS

When
- When seeded areas are subject to erosive surface flows, severe wind, or to protect non-vegetated slopes or areas during the winter.

Why
- Protects seeded areas and slopes against erosion from rain or wind. Holds soil moisture to allow for seed germination and reduces wind dessication of germinated seeds.

Where
- Use on exposed slopes, newly seeded areas, new ditch bottoms, and other areas subject to erosion.

How
1. Prepare subgrade to proper grade and compaction requirements.
2. Remove ruts, roots, soil clods, or other debris from surface subject to mulch blanket installation.
3. Spread or drill seed.
4. Consult with erosion control material supplier to select mulch blanket based on slope gradient, expected surface run-off, and protection term necessary (long or short term).
5. Position selected mulch blanket as close as possible to intended use location.
6. Install blanket at top of slope, first anchoring toe in trench 6" wide X 6" deep, progressing down-slope or down-gradient with approximately 12" of blanket extended beyond the up-slope portion of the trench.
7. Anchor the blanket with staples/stakes placed approximately 12" apart in the bottom of the trench. Backfill and compact the trench after securing.
8. Apply seed to compacted soil and fold the 12" portion of the blanket over compacted area and secure with a row of staples/stakes placed 12" apart across the width of the blanket.
9. Unroll the blankets down or horizontally across the slope.

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E9 MULCH BLANKETS SPECIFICATIONS

How (cont.)
10. Overlap blanket edges by a minimum of 4" and blanket ends by a minimum of 12". Overlaps should be in the direction of expected flow with the up-slope blanket placed over the down-slope blanket edge.
11. Secure down-slope end of blanket with staples/stakes and trench in.

Maintenance
- Check after a rain event to ensure the blanket is still in place.
- Keep eroded soil, vehicular and pedestrian traffic, and concentrated runoff away from the blanketed area.

Limitations
- Mulch blankets and anchors may inhibit mowing.

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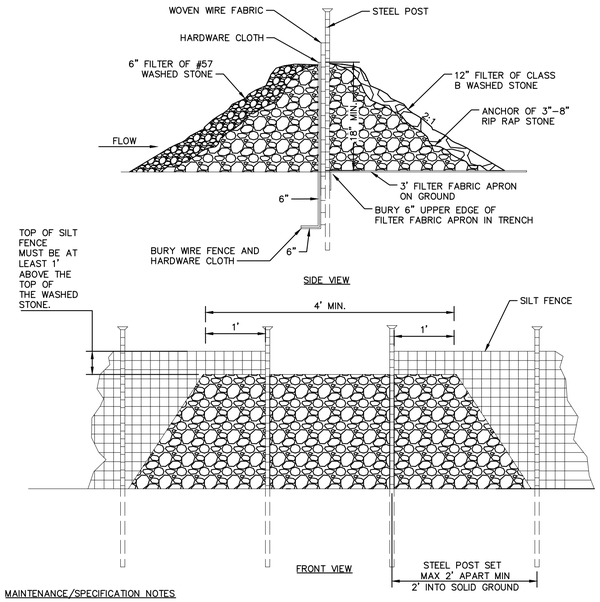

MAINTENANCE/SPECIFICATION NOTES

1. REMOVE SEDIMENT WHEN HALF OF STONE OUTLET IS COVERED.
2. REPLACE STONE AS NEEDED TO ENSURE DEWATERING.
3. SILT FENCE OUTLETS SHOULD NOT BE LOCATED WHERE THE OUTFLOW WILL ERODE THE SOIL BELOW.

2 SILT FENCE ROCK OUTLET DETAIL

NO SCALE

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Brian Gammon

KHA PROJECT 161262002
DATE 06/08/2026
SCALE AS SHOWN
DESIGNED BY JLL
DRAWN BY EAS
CHECKED BY BPG

SOIL EROSION AND SEDIMENT CONTROL DETAILS

SWAN BESS AND CYGNET BESS
PREPARED FOR
SWAN ENERGY STORAGE LLC AND CYGNET ENERGY STORGAGE LLC
COMSTOCK TOWNSHIP
MI

SHEET NUMBER
C312

K:\TCW_LDEV\Copenhagen Infrastructure Partners\Swan BESS_MI\2 Design\CAD\PlanSheets\C305 EROSION CONTROL DETAILS.dwg June 08, 2026 - 12:27pm
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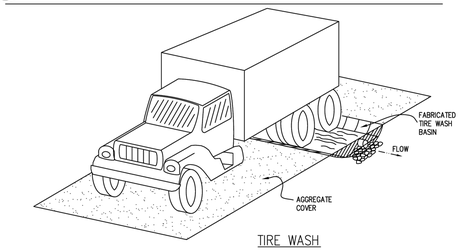
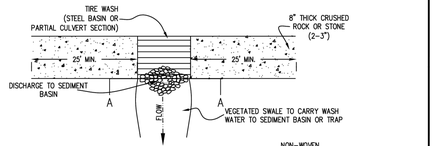
S54

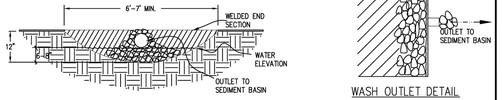
TIRE WASH



TIRE WASH



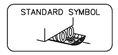
PLAN VIEW



CROSS SECTION A-A

WASH OUTLET DETAIL

STANDARD SYMBOL



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S54

TIRE WASH SPECIFICATIONS

When
- Whenever traffic will be entering or leaving a construction site with soil capable of clinging onto construction vehicles; resulting in tracking of mud onto paved roads.

Why
- Reduces excessive sediment tracking of soil onto paved roads.

Where
- As an addition to aggregate construction entrances.

How
1. Construct tire wash on level ground at minimum length of 6'-7', a minimum of 10' wide to match width of aggregate road.
2. Construct 25' minimum approaches to tire wash with minimum 8" thickness of 2-3" stone.
3. Construct tire wash of partial culvert section or fabricated metal. Weld metal plates to culvert ends to contain water.
4. Provide outlet on one end of tire wash to allow excess water to drain. Outlet invert should be located 6-8" above bottom of tire wash.
5. Within tire wash structure, protect outlet pipe with non-woven geotextile fabric and 2-3" stone to prevent sediment discharge.
6. Protect swale with 2-3" stone on non-woven geotextile fabric.
7. Fill tire wash basin with water daily or when water depth is reduced to 1/2 the distance between basin bottom and outlet point.
8. Wash rack discharges should be directed into a sediment basin through a vegetated channel.
9. Remove sediment accumulation daily.

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S54

TIRE WASH SPECIFICATIONS

Maintenance
- Sediment accumulation in wash shall be removed regularly and placed into proper disposal location.
- Maintain to specified dimensions by adding approach rock when necessary each day.
- Monitor water levels throughout working hours.
- Discharge swale should be inspected regularly to ensure tire wash discharge path is maintained to receiving sediment basin.
- Damage to tire wash shall be repaired prior to additional use of rack.

Limitations
- Requires daily maintenance.
- May not clean tire tread completely.

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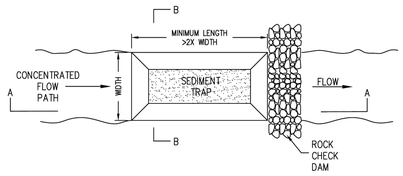
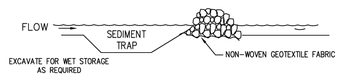
S56

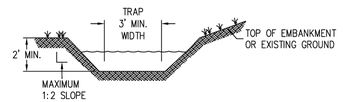
SEDIMENT TRAP



PLAN VIEW

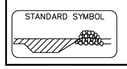


CROSS SECTION AA



CROSS SECTION BB

STANDARD SYMBOL



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S56

SEDIMENT TRAP SPECIFICATIONS

When
- When runoff from construction sites contains suspended sediment.

Why
- Should be used as a temporary measure.
- To collect and store sediment from sites cleared and/or graded during construction.

Where
- In small drainage areas with less than 5 acres of contributing drainage.
- Along the construction site perimeter where runoff is discharged offsite.
- Above check dams and/or upslope of drain inlet protection measures.

How
1. Prior to construction initiation, identify stormwater drainage routes likely to carry construction site runoff.
2. Build sediment traps in site runoff corridors before clearing, grubbing, and grading begin.
3. Install traps in natural depressions or in small drainageways to minimize vegetation removal.
4. A sediment trap is intended as a temporary measure.
5. In-stream applications should be designed by a professional engineer, with consideration for the type of soil, size of drainage area, and desired sediment removal efficiency.
6. Locate where the trap can be easily cleared of sediment.
7. Collection channels should enter the trap from the upslope side.
8. The sediment trap should have a minimum length to width ratio of 2:1.
9. The outlet of the trap must be stabilized with rock, vegetation, or another suitable material.

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S56

SEDIMENT TRAP SPECIFICATIONS

Maintenence
- Sediment shall be removed and trap restored to its original dimensions when the sediment has accumulated to 1/2 the design depth of the trap. Removed sediment shall be deposited in an upland area in such a manner that it will not erode.
- The structure shall be inspected after each rain event and repairs made as needed.
- The sediment trap shall be removed and the area stabilized when the contributory drainage area has been properly stabilized. The swale sediment trap will be properly backfilled and the swale or ditch reconstructed.

Limitations
- Only use for drainage areas up to 5 acres.
- Removes coarse sediment only (medium silt size or larger) unless trap area is sized similar to a sediment basin with extended residence time.

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SOIL EROSION AND SEDIMENT CONTROL DETAILS

SWAN BESS AND CYGNET BESS
PREPARED FOR
SWAN ENERGY STORAGE LLC AND CYGNET ENERGY STORGAGE LLC
COMSTOCK TOWNSHIP
MI

SHEET NUMBER
C313

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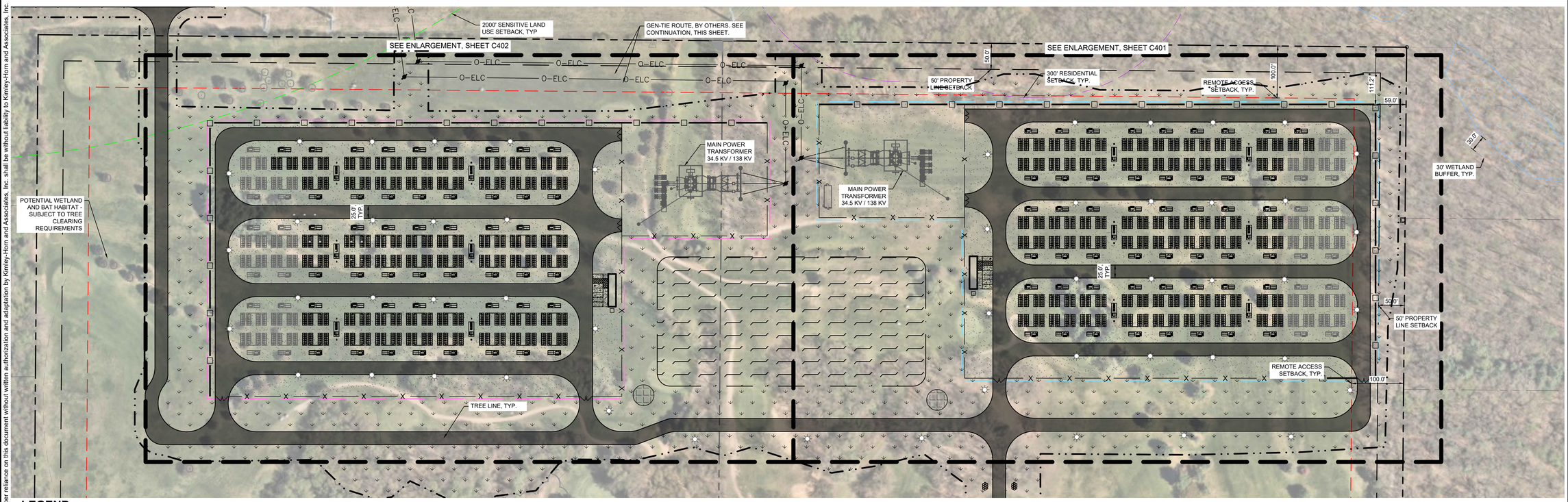

LEGEND

- PROPERTY BOUNDARY
- INTERNAL PARCEL PROPERTY LINE
- ADJACENT PARCEL PROPERTY LINE
- PROPERTY SETBACK LINE
- NFPA 855 REMOTE LOCATION SETBACK LINE
- SENSITIVE LAND USE SETBACK LINE
- OCCUPIED BUILDING SETBACK
- RIGHT-OF-WAY SETBACK
- EX. JURISDICTIONAL WETLAND (PER USSH)
- EX. MAN MADE POND (PER USSH)
- WETLAND SETBACK
- POTENTIAL WETLAND AND BAT HABITAT - SUBJECT TO TREE CLEARING REQUIREMENTS
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- PROPOSED NOISE WALL
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- BATTERY ENCLOSURE
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- PROPOSED ACCESS ROAD - COMPACTED AGGREGATE
- PROPOSED IMPROVED ACCESS ROAD
- PROPOSED LANDSCAPING, SEE LANDSCAPING PLANS
- BESS YARD ROCK, SIZE AND DEPTH TBD
- SUBSTATION YARD ROCK, SIZE AND DEPTH TBD
- CONCRETE PAVEMENT
- PROPOSED STORM WATER POND
- SWAN BESS LIMITS
- CYGNET BESS LIMITS
- FIRE WATER TANK
- LIGHT FIXTURE
- EXISTING TREE

SITE PLAN NOTES

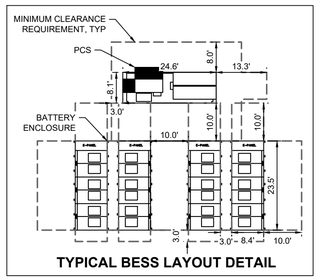
1. REFER TO THE ARCHITECTURAL PLANS FOR EXACT LOCATIONS AND DIMENSIONS OF STOOPS, TRUCK DOCKS, TRASH ENCLOSURES & PRECISE BUILDING DIMENSIONS. REFER TO THE SITE ELECTRICAL PLAN FOR LOCATIONS OF PROPOSED LIGHT POLES, CONDUITS, AND ELECTRICAL EQUIPMENT.
2. REFER TO CERTIFIED SITE SURVEY OR PLAT FOR EXACT LOCATION OF EXISTING EASEMENTS, PROPERTY BOUNDARY DIMENSIONS, AND ADJACENT RIGHT-OF-WAY & PARCEL INFORMATION.
3. DIMENSIONS AND RADII ARE DRAWN TO THE FACE OF CURB, UNLESS OTHERWISE NOTED. DIMENSIONS ARE ROUNDED TO THE NEAREST TENTH FOOT, AND AREAS ARE ROUNDED TO THE NEAREST SQUARE FOOT.
4. UNLESS OTHERWISE NOTED, THE CONTRACTOR SHALL BE RESPONSIBLE FOR RELOCATING EXISTING SITE IMPROVEMENTS THAT CONFLICT WITH THE PROPOSED WORK, INCLUDING BUT NOT LIMITED TO TRAFFIC SIGNS, LIGHT POLES, ABOVEGROUND UTILITIES, ETC. PERFORM WORK IN ACCORDANCE WITH GOVERNING AUTHORITIES REQUIREMENTS AND PROJECT SITE WORK SPECIFICATIONS. COST SHALL BE INCLUDED IN BASE BID.
5. TYPICAL PARKING STALL DIMENSIONS SHALL BE 9.0-FEET IN WIDTH AND 20-FEET IN LENGTH UNLESS OTHERWISE INDICATED.
6. MONUMENT SIGN(S) ARE DETAILED ON THE ARCHITECTURAL PLANS AND ARE SHOWN FOR GRAPHICAL & INFORMATIONAL PURPOSES ONLY. CONTRACTOR TO VERIFY SIGN DIMENSIONS, LOCATION AND REQUIRED PERMITS WITH THE OWNER.
7. TYPICAL BESS EQUIPMENT HEIGHTS SHALL BE 9.5-FEET FOR BATTERIES AND 9.0-FEET FOR PCS UNITS.

PROPERTY SUMMARY	
TOTAL PROPERTY AREA	+/- 144.28 AC
CONSTRUCTION DISTURBED AREA	+/- 53.79 AC
BESS DEVELOPMENT AREA	+/- 39.22 AC
OPEN SPACE	+/- 105.06 AC
SITE DATA	
EXISTING ZONING	R-1C
PROPOSED ZONING	R-1C (WITHIN BATTERY ENERGY SOTRAGE SYSTEM LARGE OFF-SITE OVERLAY DISTRICT)
PROPOSED LAND USE	INDUSTRIAL/UTILITY
TOWNSHIP OF COMSTOCK SETBACKS	PROPERTY LINE = 50'
	RIGHT-OF-WAY = 100'
	SENSITIVE LAND USE = 2000'
	OCCUPIED BUILDINGS = 300'
NFPA 855 SETBACK	REMOTE LOCATION = 100'
PARKING STALLS REQUIRED/PROVIDED	6/10*
ADA PARKING STALLS REQUIRED/PROVIDED	1/1

*THERE IS NO PARKING REQUIREMENT ASSOCIATED WITH THE COMSTOCK TOWNSHIP ORDINANCE FOR BATTERY ENERGY STORAGE SYSTEMS FOR O&M BUILDINGS. PARKING STALL REQUIREMENT WAS DERIVED FROM INSTITUTE OF TRANSPORTATION ENGINEERS' RATES OF 2.5 TO 3 PARKING SPACES PER 1,000 SQFT FOR "SMALL UTILITY BUILDINGS". THE PROPOSED O&M BUILDING HAS AN AREA OF 945 SQFT, THE EXPECTED PARKING DEMAND IS APPROXIMATELY 3 VEHICLES.

SWAN BESS SUMMARY		
POWER [MW]		200 MW
ENERGY [MWh]		800 MWh
TOTAL NO. OF BATTERY ENCLOSURES (BOL)		196
NO. OF SKID (PSC + MVTR) (BOL)		49
NO. OF SKIDS (PCS + MVTR)		11
NO. OF BATTERY ENCLOSURE		44
1ST AUGMENTATION	YEAR	5
	NO. OF SKID	5
	NO. OF BATTERY ENCLOSURE	20
2ND AUGMENTATION	YEAR	11
	NO. OF SKID	6
	NO. OF BATTERY ENCLOSURE	24
CUMULATIVE NO. OF BATTERY ENCLOSURE (EOL)		240
CUMULATIVE NO. OF SKID (PCS + MVTR) (EOL)		60

CYGNET BESS SUMMARY		
POWER [MW]		200 MW
ENERGY [MWh]		800 MWh
TOTAL NO. OF BATTERY ENCLOSURES (BOL)		196
NO. OF SKID (PSC + MVTR) (BOL)		49
NO. OF SKIDS (PCS + MVTR)		11
NO. OF BATTERY ENCLOSURE		44
1ST AUGMENTATION	YEAR	5
	NO. OF SKID	5
	NO. OF BATTERY ENCLOSURE	20
2ND AUGMENTATION	YEAR	11
	NO. OF SKID	6
	NO. OF BATTERY ENCLOSURE	24
CUMULATIVE NO. OF BATTERY ENCLOSURE (EOL)		240
CUMULATIVE NO. OF SKID (PCS + MVTR) (EOL)		60



TYPICAL BESS LAYOUT DETAIL

NORTH

GRAPHIC SCALE IN FEET
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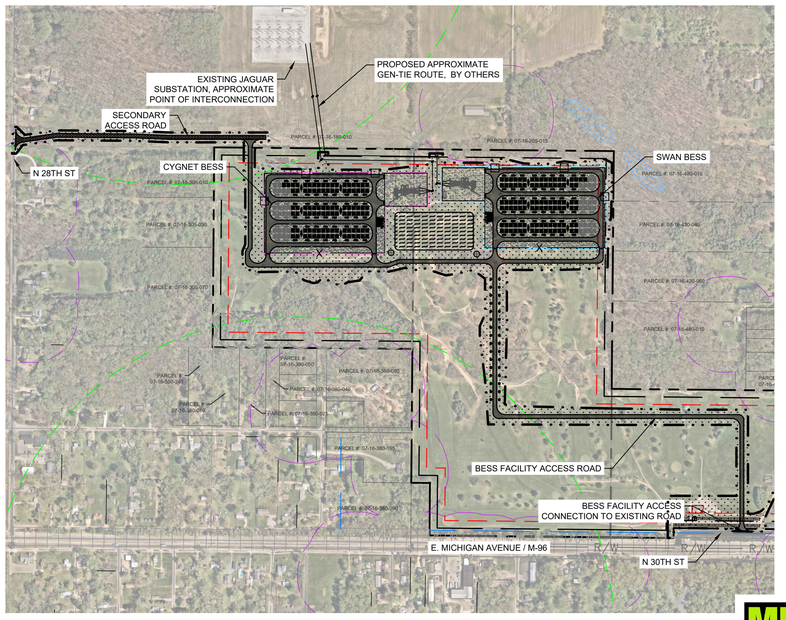

APPROXIMATE GEN-TIE ROUTE, BY OTHERS
APPROXIMATE BESS FACILITY ACCESS ROAD

NORTH

GRAPHIC SCALE IN FEET
0 250 500 1000

MISS DIG 811

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SCALE	AS SHOWN
DESIGNED BY	JLL
DRAWN BY	CJC
CHECKED BY	BPG

OVERALL SITE PLAN AND AUGMENTATION PLAN

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SWAN BESS AND CYGNET BESS
PREPARED FOR
SWAN ENERGY STORAGE LLC AND CYGNET ENERGY STORGAGE LLC
COMSTOCK TOWNSHIP
MI

SHEET NUMBER
C400

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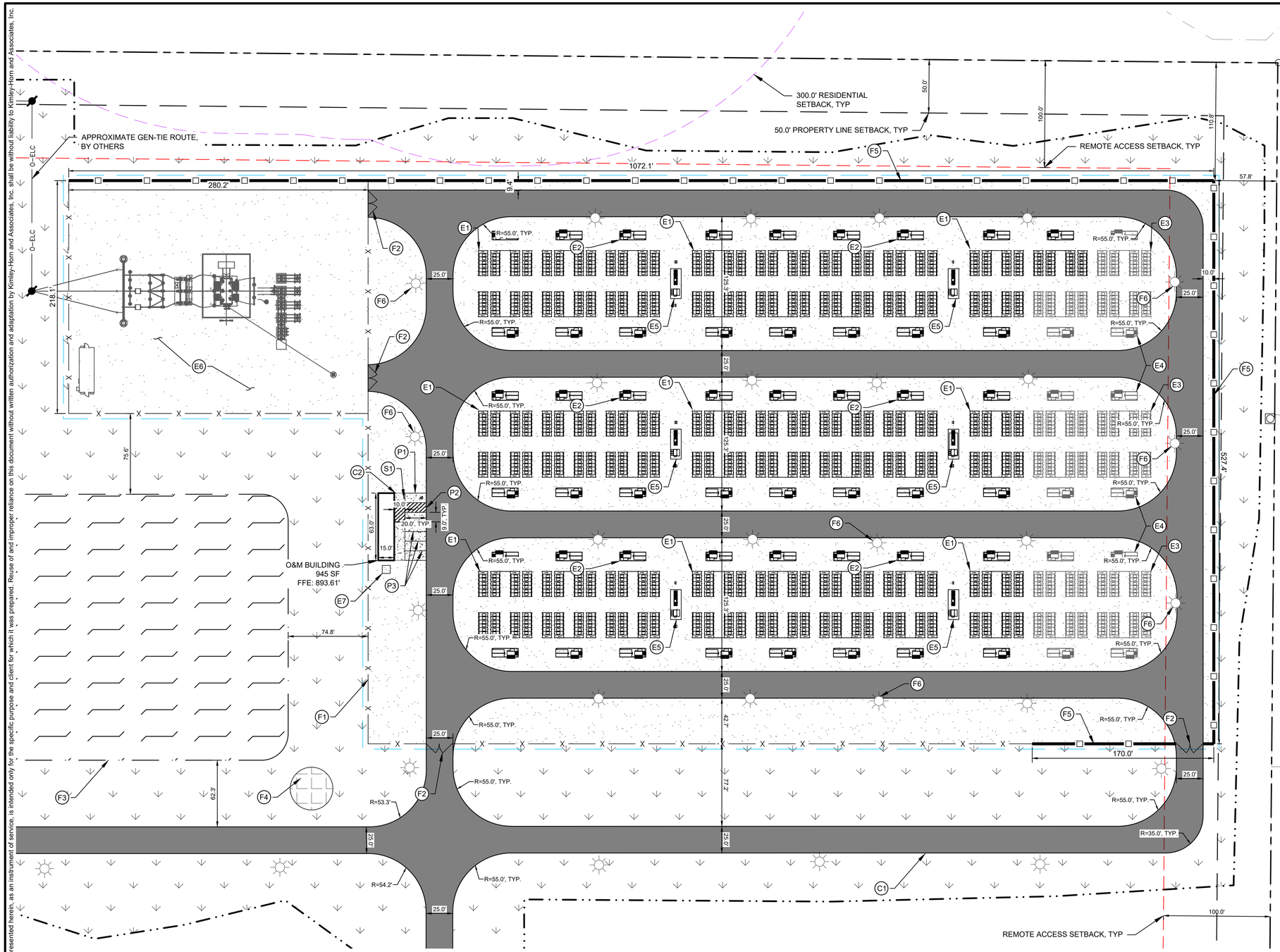

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- LIGHT FIXTURE
- EXISTING TREE

KEYNOTE LEGEND

EQUIPMENT

- (E1) BATTERY ENCLOSURE
- (E2) PCS
- (E3) FUTURE AUGMENTATION BATTERY ENCLOSURE
- (E4) FUTURE AUGMENTATION PCS
- (E5) AUXILIARY PAD
- (E6) SUBSTATION ENCLOSURE, BY OTHERS
- (E7) O&M BUILDING AUX PAD, BY OTHERS

CURB, SIDEWALK & PAVEMENT

- (C1) ACCESS ROAD - SEE DETAIL 9, SHEET C701
- (C2) CONCRETE PAVEMENT - SEE DETAIL 7, SHEET C701

SITE FIXTURES

- (F1) 6' CHAIN-LINK FENCE WITH 1' BARBED WIRE - SEE DETAIL 1, SHEET C700
- (F2) CHAIN-LINK FENCE SWING GATE - SEE DETAIL 2, SHEET C700
- (F3) STORMWATER MANAGEMENT AREA
- (F4) 30,000 GALLON WATER TANK, BY OTHERS
- (F5) 14' NOISE WALL - SEE DETAIL 3, SHEET C700
- (F6) LIGHT FIXTURE

PAVEMENT MARKINGS

- (P1) ACCESSIBLE PARKING SYMBOL & LOADING AREA - SEE DETAIL 4, SHEET C701
- (P2) STRIPED WHITE CROSS-HATCH AREA 4" SOLID LINES @ 45° 2' O.C.
- (P3) 4" WIDE WHITE PAINTED SOLID PARKING LOT LINE

SIGNAGE

- (S1) ADA PARKING SIGN IN BOLLARD - SEE DETAIL 1, SHEET C701

NORTH

GRAPHIC SCALE IN FEET
0 25 50 100

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DESIGNED BY	JLL
DRAWN BY	CJC
CHECKED BY	BPG

SITE PLAN ENLARGEMENT

SWAN BESS AND CYGNET BESS
PREPARED FOR
SWAN ENERGY STORAGE LLC AND CYGNET ENERGY STORGAGE LLC
COMSTOCK TOWNSHIP
MI

SHEET NUMBER
C401

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50.0' PROPERTY LINE SETBACK, TYP

2000.0' SENSITIVE LAND USE SETBACK, TYP

REMOTE ACCESS SETBACK, TYP

O-ELC

APPROXIMATE GEN-TIE ROUTE, BY OTHERS

POTENTIAL WETLAND AND BAT HABITAT - SUBJECT TO TREE CLEARING REQUIREMENTS

TREE LINE, TYP

O&M BUILDING
945 SF
FFE: 901.91'

332.5'
166.8'
526.9'
1073.7'
280.2'
218.1'
68.3'
63.0'
68.4'
62.3'
41.6'
125.3'
25.0'
10.0'
5.5'
20.0', TYP.
9.0', TYP.
15.0'
3.0'
25.0'

R=55.0', TYP.
R=35.0'
R=35.0', TYP.
R=55.0'

LEGEND

- PROPERTY BOUNDARY
- INTERNAL PARCEL PROPERTY LINE
- ADJACENT PARCEL PROPERTY LINE
- PROPERTY SETBACK LINE
- NFPA 855 REMOTE LOCATION SETBACK LINE
- SENSITIVE LAND USE SETBACK LINE
- OCCUPIED BUILDING SETBACK
- RIGHT-OF-WAY SETBACK
- EX. JURISDICTIONAL WETLAND (PER USSH)
- EX. MAN MADE POND (PER USSH)
- WETLAND SETBACK
- POTENTIAL WETLAND AND BAT HABITAT - SUBJECT TO TREE CLEARING REQUIREMENTS
- TREE LINE BOUNDARY
- PROPOSED SITE FENCE
- PROPOSED NOISE WALL
- PROPOSED GATE
- BATTERY ENCLOSURE
- BATTERY ENCLOSURE (AUGMENTED)
- PROPOSED ACCESS ROAD - COMPACTED AGGREGATE
- PROPOSED IMPROVED ACCESS ROAD
- PROPOSED LANDSCAPING, SEE LANDSCAPING PLANS
- BESS YARD ROCK, SIZE AND DEPTH TBD
- SUBSTATION YARD ROCK, SIZE AND DEPTH TBD
- CONCRETE PAVEMENT
- PROPOSED STORM WATER POND
- SWAN BESS LIMITS
- CYGNET BESS LIMITS
- FIRE WATER TANK
- LIGHT FIXTURE
- EXISTING TREE

KEYNOTE LEGEND

EQUIPMENT
- (E1) BATTERY ENCLOSURE
- (E2) PCS
- (E3) FUTURE AUGMENTATION BATTERY ENCLOSURE
- (E4) FUTURE AUGMENTATION PCS
- (E5) AUXILIARY PAD
- (E6) SUBSTATION ENCLOSURE, BY OTHERS
- (E7) O&M BUILDING AUX PAD, BY OTHERS

CURB, SIDEWALK & PAVEMENT
- (F1) ACCESS ROAD - SEE DETAIL 9, SHEET C701
- (F2) CONCRETE PAVEMENT - SEE DETAIL 7, SHEET C701

SITE FIXTURES
- (F3) 6' CHAIN-LINK FENCE WITH 1' BARBED WIRE - SEE DETAIL 1, SHEET C700
- (F4) CHAIN-LINK FENCE SWING GATE - SEE DETAIL 2, SHEET C700
- (F5) STORMWATER MANAGEMENT AREA
- (F6) 30,000 GALLON WATER TANK, BY OTHERS
- (F7) 14' NOISE WALL - SEE DETAIL 3, SHEET C700
- (F8) LIGHT FIXTURE

PAVEMENT MARKINGS
- (P1) ACCESSIBLE PARKING SYMBOL & LOADING AREA - SEE DETAIL 4, SHEET C701
- (P2) STRIPED WHITE CROSS-HATCH AREA 4" SOLID LINES @ 45° 2' O.C.
- (P3) 4" WIDE WHITE PAINTED SOLID PARKING LOT LINE

SIGNAGE
- (S1) ADA PARKING SIGN IN BOLLARD - SEE DETAIL 1 SHEET C701

GRAPHIC SCALE IN FEET
0 25 50 100

NORTH

MISS DIG 811

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No.	REVISIONS	DATE	BY
1	ENTITLEMENT SET	06/08/2026	BPG

Kimley»Horn of Michigan, Inc.
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3000 TOWN CENTER, SUITE 2600
SOUTHFIELD, MI 48075
(312) 726 9445

CIP Copenhagen Infrastructure Partners

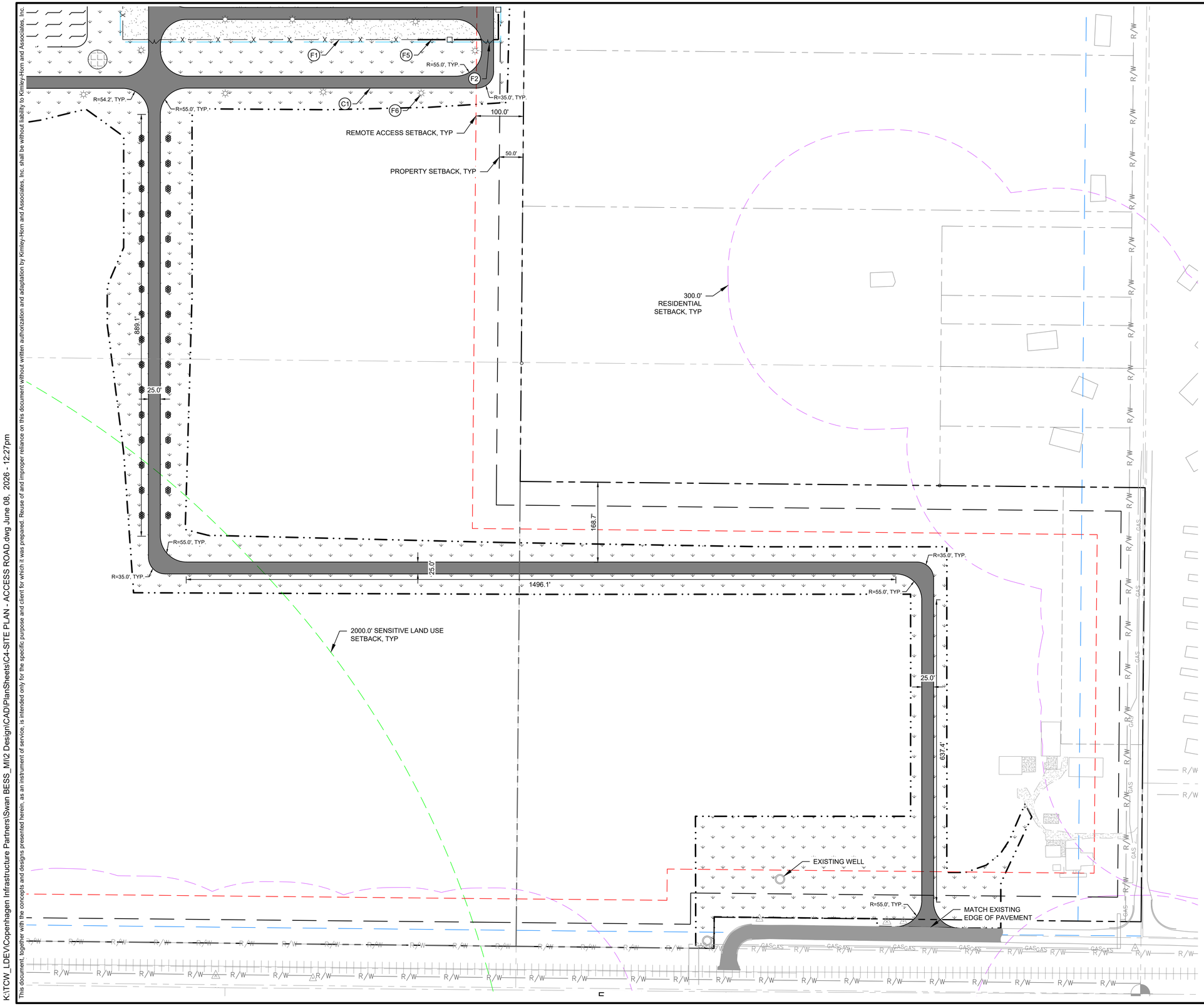
STATE OF MICHIGAN
BRIAN GAMMON
ENGINEER
NO. 6201312454
PROFESSIONAL ENGINEER
Brian Gammon

KHA PROJECT 161262002
DATE 06/08/2026
SCALE AS SHOWN
DESIGNED BY JLL
DRAWN BY CJC
CHECKED BY BPG

SITE PLAN ENLARGEMENT

SWAN BESS AND CYGNET BESS
PREPARED FOR
SWAN ENERGY STORAGE LLC AND CYGNET ENERGY STORGAGE LLC
COMSTOCK TOWNSHIP
MI

SHEET NUMBER
C402



LEGEND

- PROPERTY BOUNDARY
- INTERNAL PARCEL PROPERTY LINE
- ADJACENT PARCEL PROPERTY LINE
- PROPERTY SETBACK LINE
- NFPA 855 REMOTE LOCATION SETBACK LINE
- SENSITIVE LAND USE SETBACK LINE
- OCCUPIED BUILDING SETBACK
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- EX. JURISDICTIONAL WETLAND (PER USSH)
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- WETLAND SETBACK
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- BATTERY ENCLOSURE
- BATTERY ENCLOSURE (AUGMENTED)
- PROPOSED ACCESS ROAD - COMPACTED AGGREGATE
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- PROPOSED LANDSCAPING, SEE LANDSCAPING PLANS
- BESS YARD ROCK, SIZE AND DEPTH TBD
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- CONCRETE PAVEMENT
- PROPOSED STORM WATER POND
- SWAN BESS LIMITS
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- FIRE WATER TANK
- LIGHT FIXTURE
- EXISTING TREE

KEYNOTE LEGEND

EQUIPMENT

- (E1) BATTERY ENCLOSURE
- (E2) PCS
- (E3) FUTURE AUGMENTATION BATTERY ENCLOSURE
- (E4) FUTURE AUGMENTATION PCS
- (E5) AUXILIARY PAD
- (E6) SUBSTATION ENCLOSURE, BY OTHERS

CURB, SIDEWALK & PAVEMENT

- (C1) ACCESS ROAD
- (C2) CONCRETE PAVEMENT

SITE FIXTURES

- (F1) 6' CHAIN-LINK FENCE WITH 1' BARBED WIRE - SEE DETAIL 1, SHEET C700
- (F2) CHAIN-LINK FENCE SWING GATE - SEE DETAIL 2, SHEET C700
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- (P2) STRIPED WHITE CROSS-HATCH AREA 4" SOLID LINES @ 45° 2' O.C.
- (P3) 4" WIDE WHITE PAINTED SOLID PARKING LOT LINE

SIGNAGE

- (S1) ADA PARKING SIGN IN BOLLARD - SEE DETAIL 1, SHEET C701

NORTH

GRAPHIC SCALE IN FEET
0 50 100 200

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CIP
Copenhagen Infrastructure Partners

STATE OF MICHIGAN
BRIAN GAMMON
ENGINEER
NO. 6201312474
PROFESSIONAL ENGINEER

Brian Gammon

KHA PROJECT	161282002
DATE	06/08/2026
SCALE	AS SHOWN
DESIGNED BY	JLL
DRAWN BY	EAS
CHECKED BY	BPG

SITE PLAN ENLARGEMENT

SWAN BESS AND CYGNET BESS
PREPARED FOR
SWAN ENERGY STORAGE LLC AND CYGNET ENERGY STORGAGE LLC
COMSTOCK TOWNSHIP MI

SHEET NUMBER
C403

MISS DIG 811

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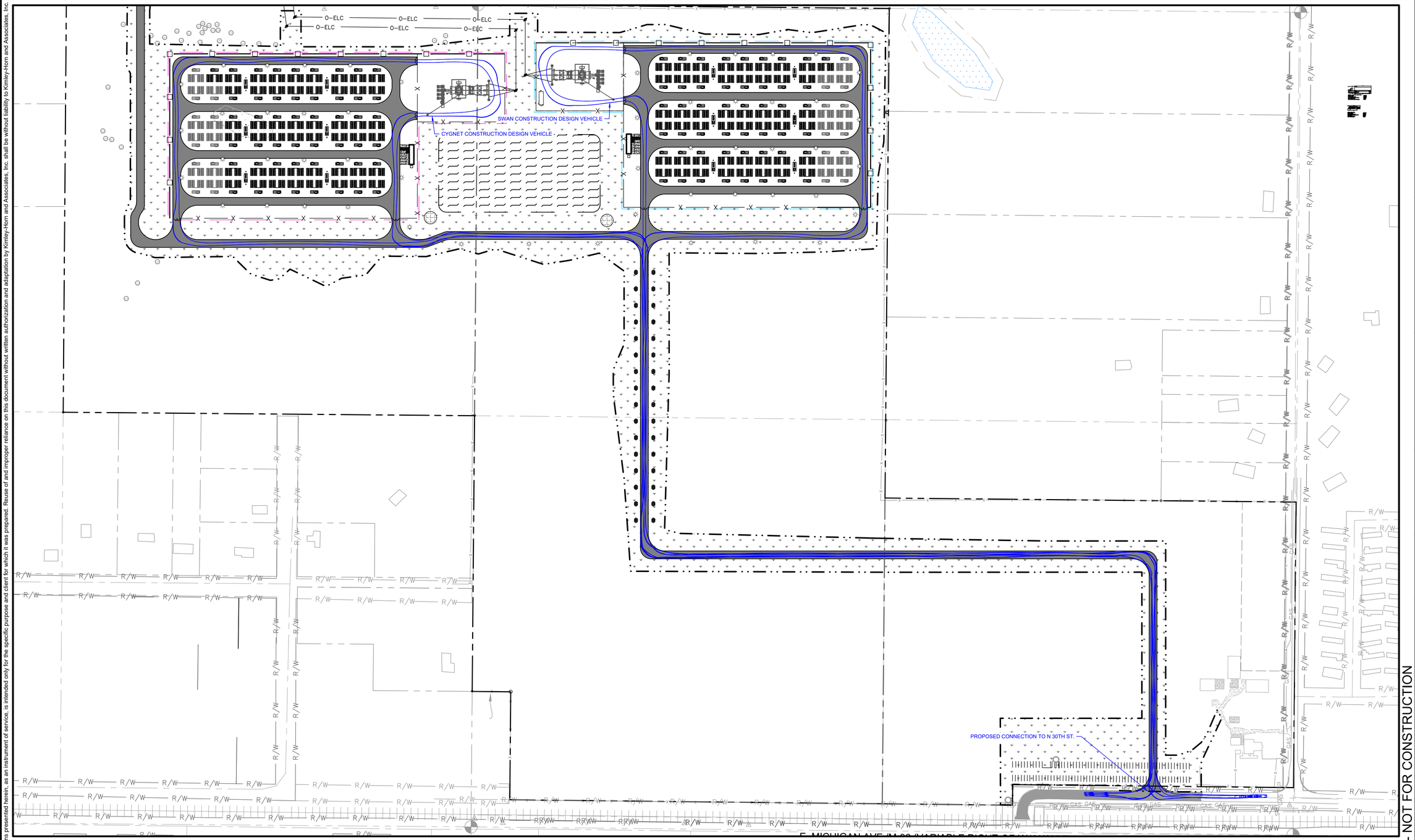
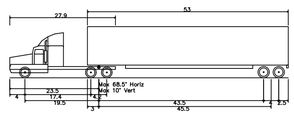


CONSTRUCTION DESIGN VEHICLE



WB-67 - Interstate Semi-Trailer	
Overall Length	73.501ft
Overall Width	8.500ft
Overall Body Height	13.500ft
Min Body Ground Clearance	1.334ft
Max Track Width	8.500ft
Lock-to-lock time	6.00s
Max Steering Angle (Virtual)	28.40°

THE VEHICLE MANEUVERING IDENTIFIED ON THIS PLAN WAS PREPARED USING VEHICLE TRACKING SOFTWARE AND DOES NOT NECESSARILY REPRESENT ACTUAL CONDITIONS NOR DOES IT ACCOUNT FOR EXTERNAL FACTORS. THIS ANALYSIS SHOULD NOT BE USED AS THE SOLE BASIS FOR THE CLIENT'S DECISION MAKING

NORTH

GRAPHIC SCALE IN FEET
0 75 150 300

MISS DIG 811

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BRIAN DAMON GAMMON
ENGINEER
6201312904
PROFESSIONAL ENGINEER

Brian Gammon

KHA PROJECT 161262002
DATE 06/08/2026
SCALE AS SHOWN
DESIGNED BY JLL
DRAWN BY EAS
CHECKED BY BPG

CONSTRUCTION VEHICLE CIRCULATION PLAN

SWAN BESS AND CYGNET BESS
PREPARED FOR
SWAN ENERGY STORAGE LLC AND CYGNET ENERGY STORGAGE LLC
COMSTOCK TOWNSHIP
MI

SHEET NUMBER
C410

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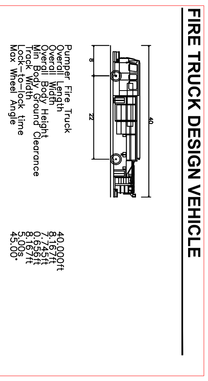
FIRE TRUCK DESIGN VEHICLE



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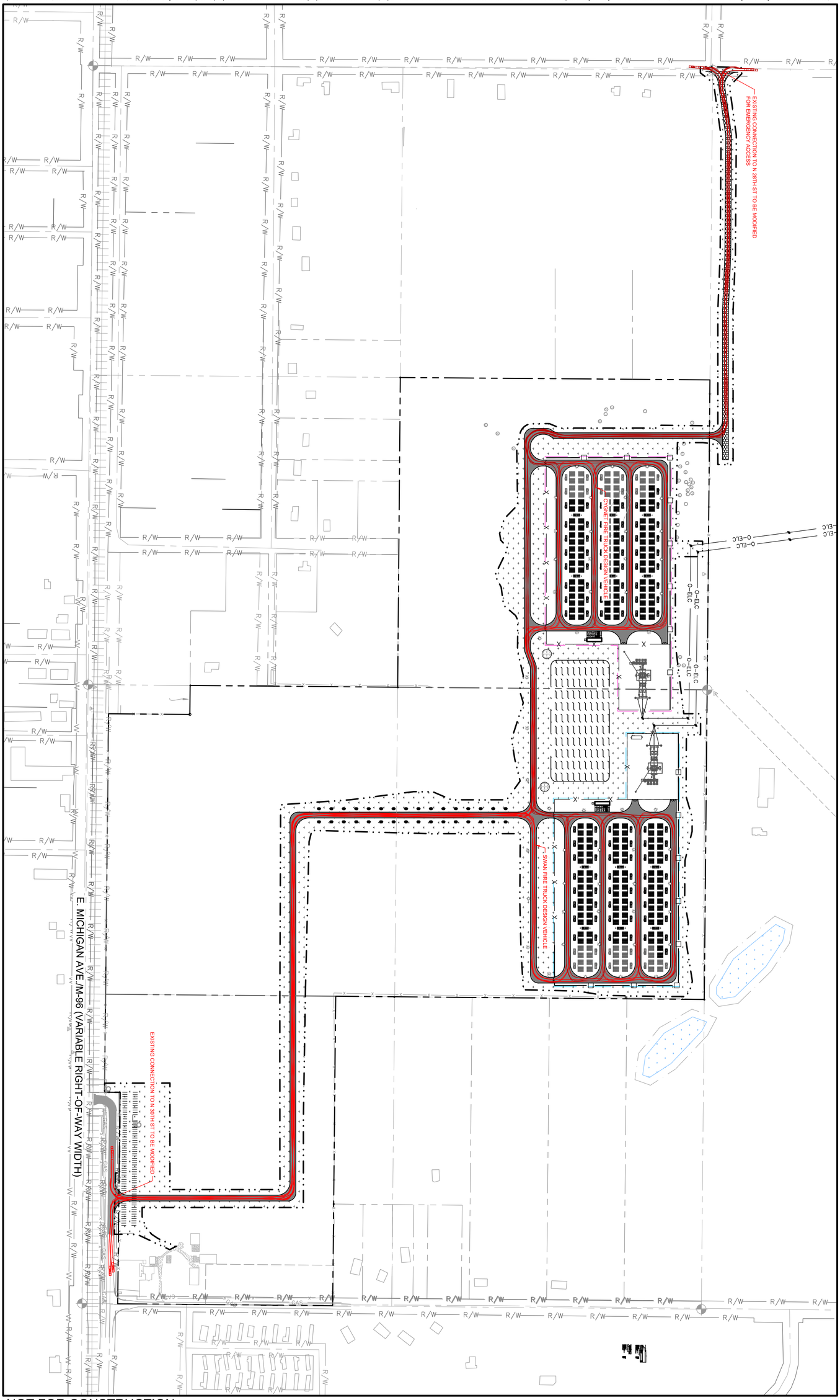

GRAPHIC SCALE IN FEET
0 100 200 400

NORTH

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SHEET NUMBER C411	SWAN BESS AND CYGNET BESS PREPARED FOR SWAN ENERGY STORAGE LLC AND CYGNET ENERGY STORGAGE LLC COMSTOCK TOWNSHIP MI	EMERGENCY VEHICLE CIRCULATION PLAN	KHA PROJECT 161262002 DATE 06/08/2026 SCALE AS SHOWN DESIGNED BY JLL DRAWN BY EAS CHECKED BY BPG	Brian Gannon STATE OF MICHIGAN BRIAN GANNON LICENSED PROFESSIONAL ENGINEER NO. 6201371204	CIP Copenhagen Infrastructure Partners	Kimley»Horn of Michigan, Inc. © 2026 KIMLEY-HORN OF MICHIGAN 3000 TOWN CENTER, SUITE 2600 SOUTHFIELD, MI 48075 (312) 726 9445	

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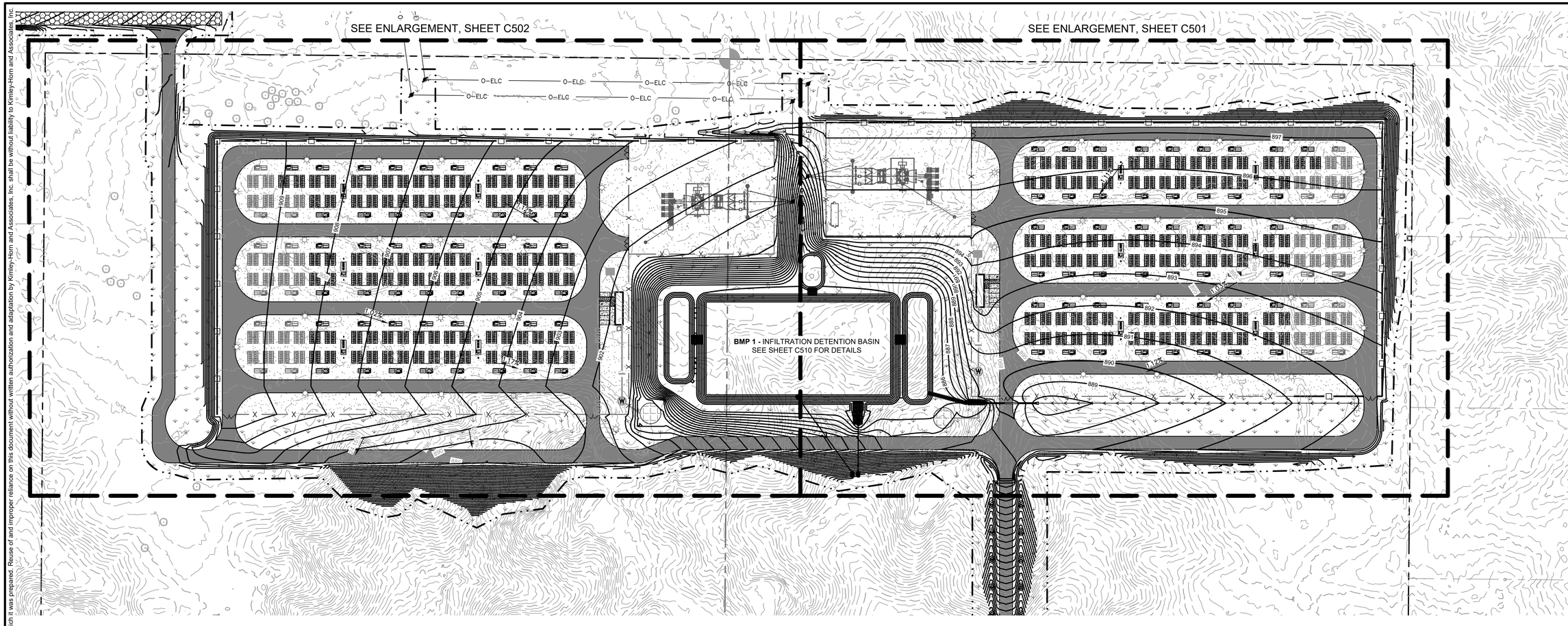
SEE ENLARGEMENT, SHEET C502

SEE ENLARGEMENT, SHEET C501



GRADING PLAN NOTES

1. PERFORM GRADING WORK IN ACCORDANCE WITH APPLICABLE TOWNSHIP SPECIFICATIONS AND BUILDING PERMIT REQUIREMENTS.
2. CONTACT STATE 811 CALL-BEFORE-YOU-DIG LOCATING SERVICE AT LEAST TWO WORKING DAYS PRIOR TO EXCAVATION FOR UNDERGROUND UTILITY LOCATIONS.
3. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL HORIZONTAL AND VERTICAL CONTROL.
4. FIELD VERIFY THE LOCATIONS AND ELEVATIONS OF EXISTING UTILITIES AND TOPOGRAPHIC FEATURES PRIOR TO THE START OF LAND DISTURBING ACTIVITIES. NOTIFY THE PROJECT ENGINEER OF ANY DISCREPANCIES OR VARIATIONS IMPACTING THE PROPOSED DESIGN OF THE PROJECT.
5. IN PAVED AREAS, ROUGH GRADE TO SUBGRADE ELEVATION AND LEAVE THE SITE READY FOR SUB-BASE.
6. SUBGRADE EXCAVATION SHALL BE BACKFILLED IMMEDIATELY AFTER EXCAVATION TO HELP OFFSET ANY STABILITY PROBLEMS DUE TO WATER SEEPAGE OR STEEP SLOPES. WHEN PLACING NEW SURFACE MATERIAL ADJACENT TO EXISTING PAVEMENT, THE EXCAVATION SHALL BE BACKFILLED PROMPTLY TO AVOID UNDERMINING OF EXISTING PAVEMENT.
7. ELEVATIONS SHOWN REPRESENT FINISHED SURFACE GRADES. SPOT ELEVATIONS ALONG CURB & GUTTER REPRESENT THE FLOW LINE UNLESS OTHERWISE NOTED
8. EXCESS MATERIAL, BITUMINOUS SURFACING, CONCRETE ITEMS, ABANDONED UTILITY ITEMS, AND OTHER UNSTABLE MATERIALS SHALL BECOME THE PROPERTY OF THE CONTRACTOR AND SHALL BE DISPOSED OF OFF THE CONSTRUCTION SITE.
9. CONTRACTOR IS RESPONSIBLE FOR CONSTRUCTION OF PAVEMENTS AND CURB AND GUTTER WITH SMOOTH UNIFORM SLOPES THAT PROVIDE POSITIVE DRAINAGE TO COLLECTION POINTS. MAINTAIN A MINIMUM SLOPE OF 1.25% IN ASPHALT PAVEMENT AREAS AND A MINIMUM SLOPE OF 0.50% IN CONCRETE PAVEMENT AREAS.
10. MAINTAIN A MINIMUM SLOPE OF 0.50% ALONG CURB & GUTTER. REVIEW PAVEMENT GRADIENT AND CONSTRUCT "INFALL" CURB WHERE PAVEMENT DRAINS TOWARD THE GUTTER, AND "OUTFALL" CURB WHERE PAVEMENT DRAINS AWAY FROM THE GUTTER.
11. INSTALL A MINIMUM OF 4-INCHES OF AGGREGATE BASE MATERIAL UNDER PROPOSED CONCRETE CURB & GUTTER, SIDEWALKS, AND TRAILS UNLESS OTHERWISE DETAILED.
12. GRADING FOR SIDEWALKS AND ACCESSIBLE ROUTES, INCLUDING CROSSING DRIVEWAYS, SHALL CONFORM TO CURRENT STATE & NATIONAL ADA STANDARDS:

    ACCESSIBLE RAMP SLOPES SHALL NOT EXCEED 8.3% (1:12).
    SIDEWALK CROSS-SLOPES SHALL NOT EXCEED 2.0%.
    LONGITUDINAL SIDEWALK SLOPES SHALL NOT EXCEED 5.0%.
    ACCESSIBLE PARKING STALLS AND ACCESS AISLES SHALL NOT EXCEED 2.0% IN ANY DIRECTION. A MAXIMUM SLOPE OF 1.50% IS PREFERRED.

    SIDEWALK ACCESS TO EXTERNAL BUILDING DOORS AND GATES SHALL BE ADA COMPLIANT. NOTIFY ENGINEER IMMEDIATELY IF ADA CRITERIA CANNOT BE MET IN ANY LOCATION PRIOR TO PAVEMENT INSTALLATION. CHANGE ORDERS WILL NOT BE ACCEPTED FOR ADA COMPLIANCE ISSUES.
13. UPON COMPLETION OF LAND DISTURBING ACTIVITIES, RESTORE ADJACENT OFFSITE AREAS DISTURBED BY CONSTRUCTION TO MATCH OR EXCEED THE ORIGINAL CONDITION. LANDSCAPE AREAS SHALL BE RE-VEGETATED WITH A MINIMUM OF 4-INCHES OF TOPSOIL.
14. EXCAVATE DRAINAGE TRENCHES TO FOLLOW PROPOSED STORM SEWER ALIGNMENTS. REFER TO THE UTILITY PLANS FOR LAYOUT AND ELEVATIONS FOR PROPOSED SANITARY SEWER, WATER MAIN, AND OTHER BUILDING UTILITY SERVICE CONNECTIONS.

STORM SEWER NOTES

1. INSTALL STORM SEWER IN ACCORDANCE WITH APPLICABLE TOWNSHIP OR STATE SPECIFICATIONS, STATE PLUMBING CODE, AND BUILDING PERMIT REQUIREMENTS.
2. CONTACT STATE 811 CALL-BEFORE-YOU-DIG LOCATING SERVICE AT LEAST TWO WORKING DAYS PRIOR TO EXCAVATION FOR UNDERGROUND UTILITY LOCATIONS.
3. STORM SEWER PIPE SHALL BE AS FOLLOWS:
    RCP: ASTM C-76
    HDPE: ASTM F-714, F-894
    PVC: ASTM D-2729
    PVC SCH40: ASTM D-1785, D-2665, F-794
   DRAIN TILE SHALL BE AS FOLLOWS:
    PE: ASTM F-6667
    PVC: ASTM D-2729
   FITTINGS SHALL BE AS FOLLOWS:
    RCP: ASTM C-76, JOINTS PER ASTM C-361, C-990, AND C-443
    HDPE: ASTM D-3212
    PVC: ASTM D-2729, JOINTS PER ASTM D-3212
    PVC SCH40: ASTM D-2665, F-794, F-1866
4. CONTRACTOR IS RESPONSIBLE FOR ALL HORIZONTAL AND VERTICAL CONTROL.
5. FIELD VERIFY THE LOCATIONS AND ELEVATIONS OF EXISTING UTILITIES AND TOPOGRAPHIC FEATURES PRIOR TO THE START OF LAND DISTURBING ACTIVITIES. NOTIFY THE PROJECT ENGINEER OF ANY DISCREPANCIES OR VARIATIONS IMPACTING THE PROPOSED DESIGN OF THE PROJECT.
6. EXCAVATE DRAINAGE TRENCHES TO FOLLOW PROPOSED STORM SEWER ALIGNMENTS. REFER TO THE UTILITY PLANS FOR LAYOUT AND ELEVATIONS FOR PROPOSED SANITARY SEWER, WATER MAIN, AND OTHER BUILDING UTILITY SERVICE CONNECTIONS. REFER TO THE GRADING PLAN FOR DETAILED SURFACE ELEVATIONS.
7. EXCESS MATERIAL, BITUMINOUS SURFACING, CONCRETE ITEMS, ABANDONED UTILITY ITEMS, AND OTHER UNSTABLE MATERIALS SHALL BECOME THE PROPERTY OF THE CONTRACTOR AND SHALL BE DISPOSED OF OFF THE CONSTRUCTION SITE.
8. COORDINATE WITH THE PLUMBING PLANS FOR THE LOCATION, SIZE AND ELEVATION OF THE PROPOSED UNDERGROUND ROOF DRAIN CONNECTIONS.
9. WHERE STORM SEWER ROOF DRAINS HAVE LESS THAN 4-FEET OF COVER IN PAVED AREAS OR 3-FEET OF COVER IN LANDSCAPE AREAS, PROVIDE 3-INCH THICK INSULATION A MINIMUM OF 5-FEET IN WIDTH, CENTERED ON THE PIPE.
10. ALL STORM SEWER PIPE JOINTS SHALL BE WATER-TIGHT CONNECTIONS.
11. ALL STORM SEWER PIPE CONNECTIONS TO MANHOLES SHALL BE GASKETED AND WATER TIGHT. BOOTED COUPLERS AT THE STRUCTURE OR A WATER STOP WITH NON-SHRINK GROUT MAY BE USED IN ACCORDANCE WITH LOCAL CODES.
12. CONTRACTOR SHALL AIR TEST ALL STORM SEWER PIPE IN ACCORDANCE WITH LOCAL CODE REQUIREMENTS.

INFILTRATION BMP NOTES

1. TO THE EXTENT PRACTICABLE, LIMIT USE OF HEAVY CONSTRUCTION EQUIPMENT WITHIN THE BOUNDARIES OF THE PROPOSED INFILTRATION BMP. UTILIZE AN EXCAVATOR WITH A TOOTHED BUCKET TO AVOID COMPACTING OR SMEARING OF SOILS.
2. AFTER INITIAL EXCAVATION AND ROUGH GRADING, PROVIDE A MINIMUM OF TWO (2) DOUBLE RING INFILTROMETER TESTS WITHIN THE INFILTRATION AREA AT THE ELEVATION OF THE BASIN BOTTOM. PROVIDE THE RESULTS TO THE ENGINEER OF RECORD FOR REVIEW AND APPROVAL PRIOR TO COMPLETING INSTALLATION OF THE BASIN OR UNDERGROUND SYSTEM.
3. IF CLAY SOILS ARE ENCOUNTERED, OVER-EXCAVATE AS NECESSARY TO REACH NATIVE SANDY/SILTY SOIL. BACKFILL THE ADDITIONAL EXCAVATION WITH SUITABLE ENGINEERED FILL MATERIAL.
4. IF NATIVE SUBGRADE SOILS AT THE BOTTOM OF THE PROPOSED INFILTRATION AREA ARE DETERMINED TO NOT BE CONDUCIVE TO THE DESIGN INFILTRATION REQUIREMENTS, REMOVE AND REPLACE THE POORLY INFILTRATION SOILS TO A DEPTH WHERE THE EXISTING NATIVE SUBGRADE SOILS MEET OR EXCEED THE DESIGN INFILTRATION REQUIREMENTS AS REVIEWED BY THE ENGINEER.
5. FINAL EXCAVATION OF THE INFILTRATION AREA AND INSTALLATION OF ANY ENGINEERED SOIL MUST OCCUR IN DRY CONDITIONS TO PREVENT SMEARING AND COMPACTION.
6. REMOVE ANY EXCESS SOILS THAT ENTER THE INFILTRATION BASIN PRIOR TO FINAL STABILIZATION.
7. UPON COMPLETION OF THE INFILTRATION/FILTRATION SYSTEM INSTALLATION AND FINAL STABILIZATION OF THE TRIBUTARY AREA, PROVIDE DOCUMENTATION THAT THE BMP DRAINS DOWN WITHIN 48 HOURS.

LEGEND

- PROPERTY LINE
- 928 — EXISTING CONTOUR
- 925 — PROPOSED CONTOUR
- PROPOSED SWALE
- PROPOSED STORM MANHOLE (SOLID CASTING)
- PROPOSED STORM MANHOLE (ROUND INLET CASTING)
- PROPOSED FLARED END SECTION
- PROPOSED RIPRAP
- PROPOSED STORM SEWER
- 100.00 — PROPOSED SPOT ELEVATION
- FL: 0.0 — PROPOSED FLOW LINE ELEVATION
- 0.0% — PROPOSED DRAINAGE DIRECTION

NORTH

GRAPHIC SCALE IN FEET
0 50 100 200

MISS DIG 811

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No.	REVISIONS	DATE	BY
1	ENTITLEMENT SET	06/30/2026	BPG

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CIP
Copenhagen Infrastructure Partners

STATE OF MICHIGAN
BRIAN GAMMON
ENGINEER
NO. 6201312464
PROFESSIONAL ENGINEER

Brian Gammon

KHA PROJECT	161262002
DATE	06/30/2026
SCALE	AS SHOWN
DESIGNED BY	JLL
DRAWN BY	CJC
CHECKED BY	BPG

OVERALL GRADING AND DRAINAGE PLAN

SWAN BESS AND CYGNET BESS
PREPARED FOR
SWAN ENERGY STORAGE LLC AND CYGNET ENERGY STORGAGE LLC
COMSTOCK TOWNSHIP
MI

SHEET NUMBER
C500

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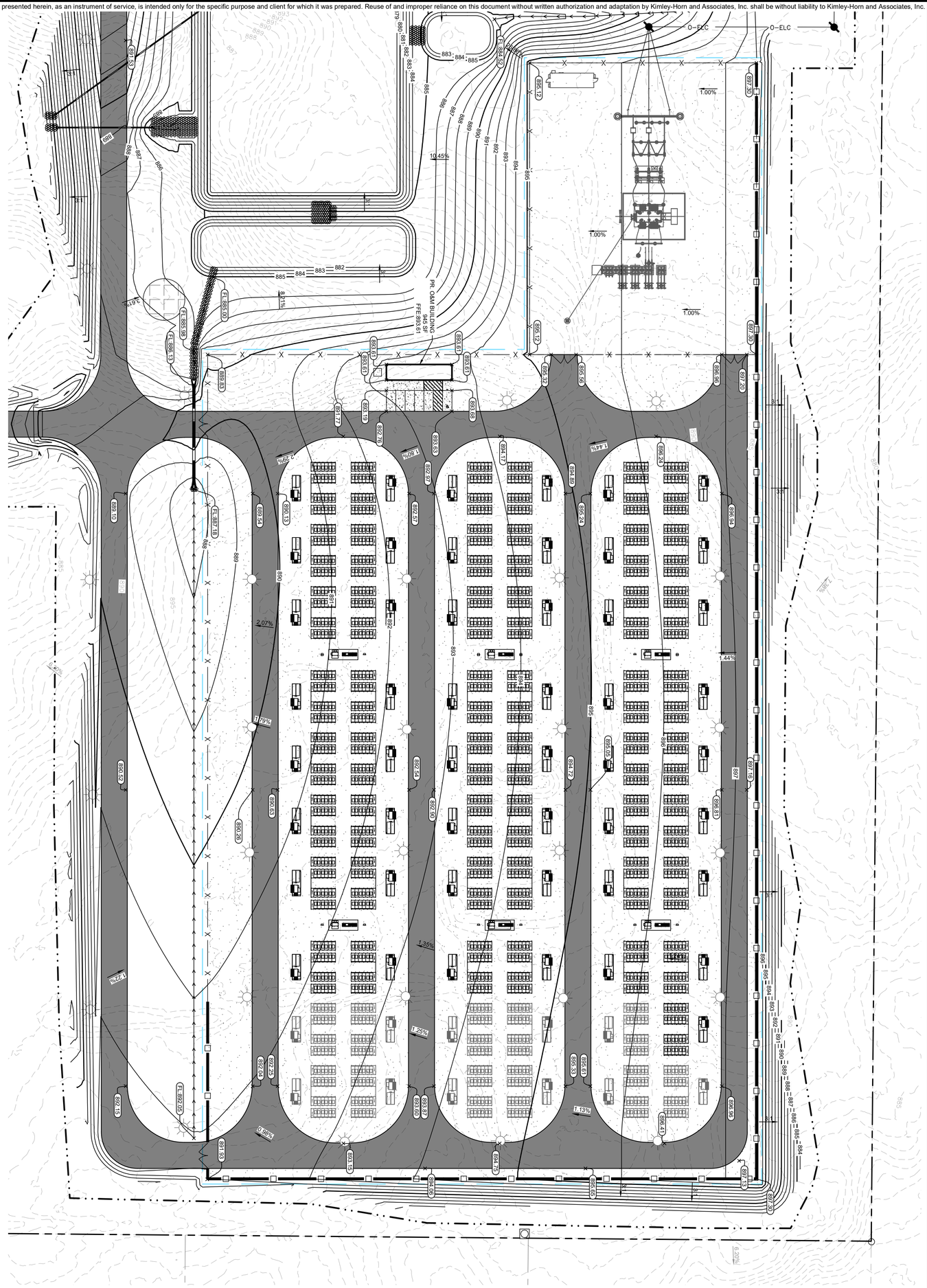
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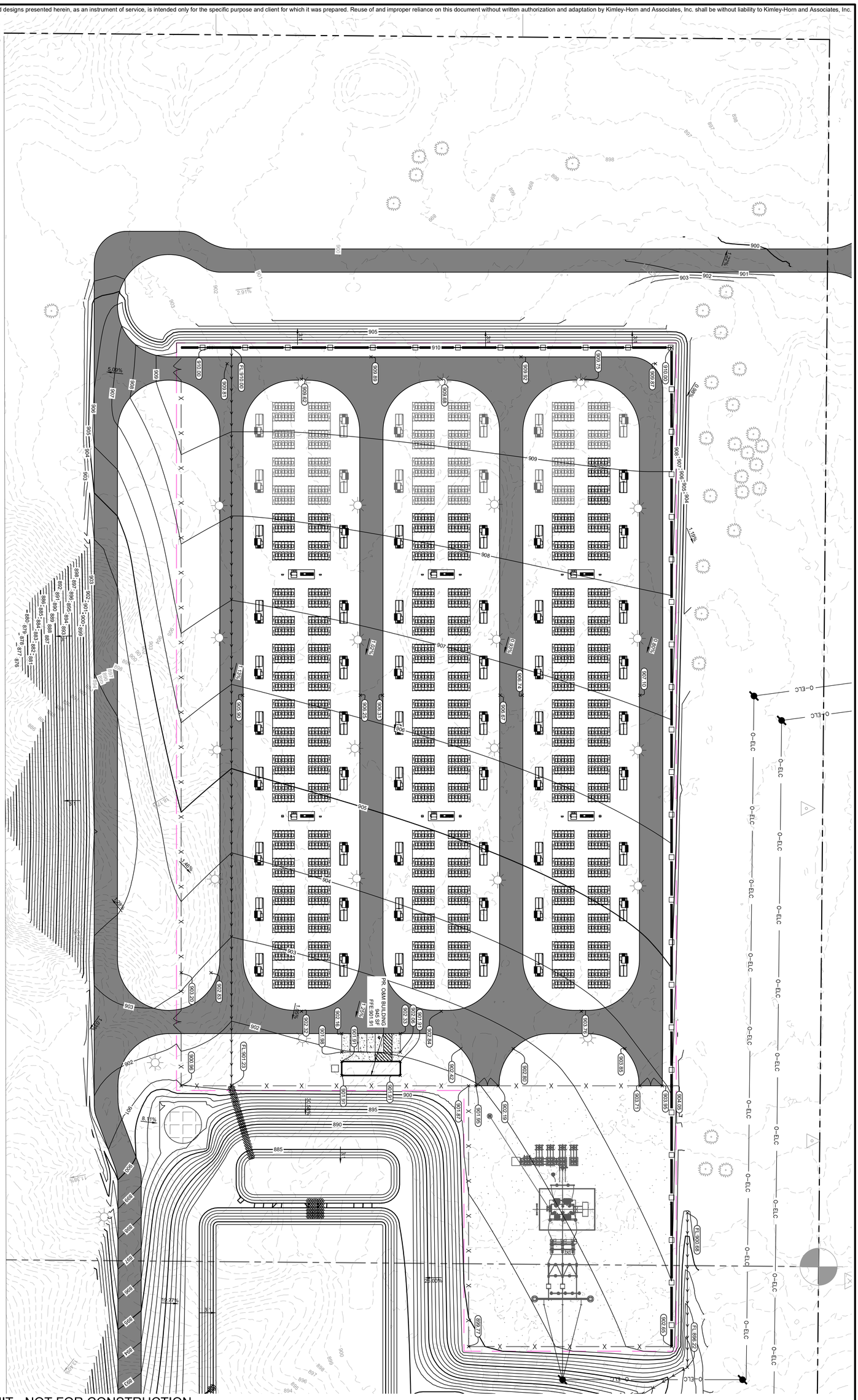
LEGEND

- PROPERTY LINE
- EXISTING CONTOUR
- PROPOSED CONTOUR
- PROPOSED SWALE
- PROPOSED STORM MANHOLE (SOLID CASTING)
- PROPOSED STORM MANHOLE (ROUND INLET CASTING)
- PROPOSED FLARED END SECTION
- PROPOSED RIPRAP
- PROPOSED STORM SEWER
- PROPOSED SPOT ELEVATION
- PROPOSED FLOW LINE ELEVATION
- PROPOSED DRAINAGE DIRECTION
- PROPOSED ROCK CHECK DAM



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SHEET NUMBER C502

SWAN BESS AND CYGNET BESS

PREPARED FOR
SWAN ENERGY STORAGE LLC AND CYGNET ENERGY STORGAGE LLC
COMSTOCK TOWNSHIP MI

GRADING PLAN ENLARGEMENT

KHA PROJECT	161262002
DATE	06/08/2026
SCALE	AS SHOWN
DESIGNED BY	JLL
DRAWN BY	CJC
CHECKED BY	BPG

Brian Gannon

CIP Copenhagen Infrastructure Partners

Kimley»Horn of Michigan, Inc.

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(312) 726 9445

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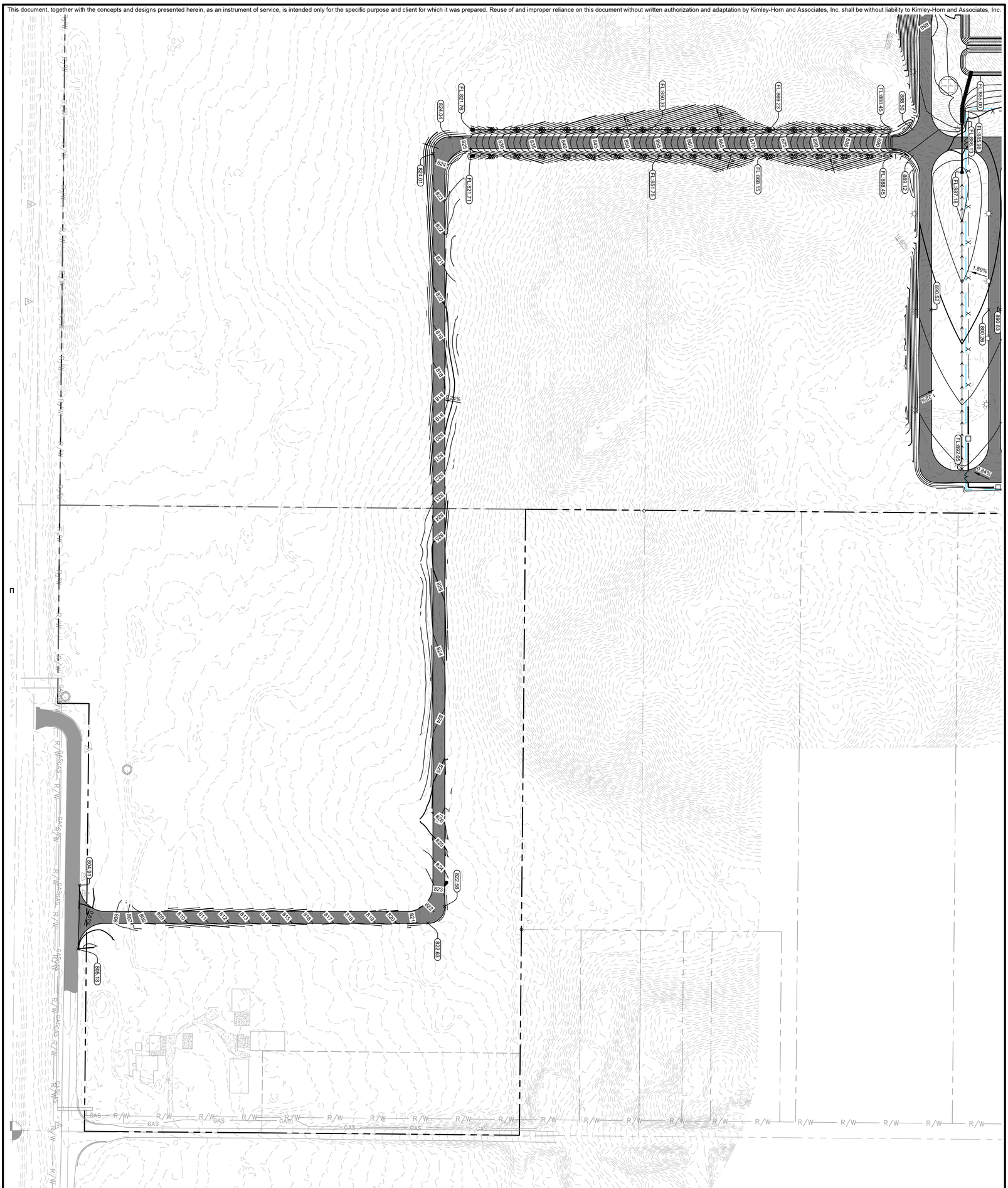
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EL 889.32
1.89%
1.34%
R=42.00'
R=30.00'
R=30.00'
R=30

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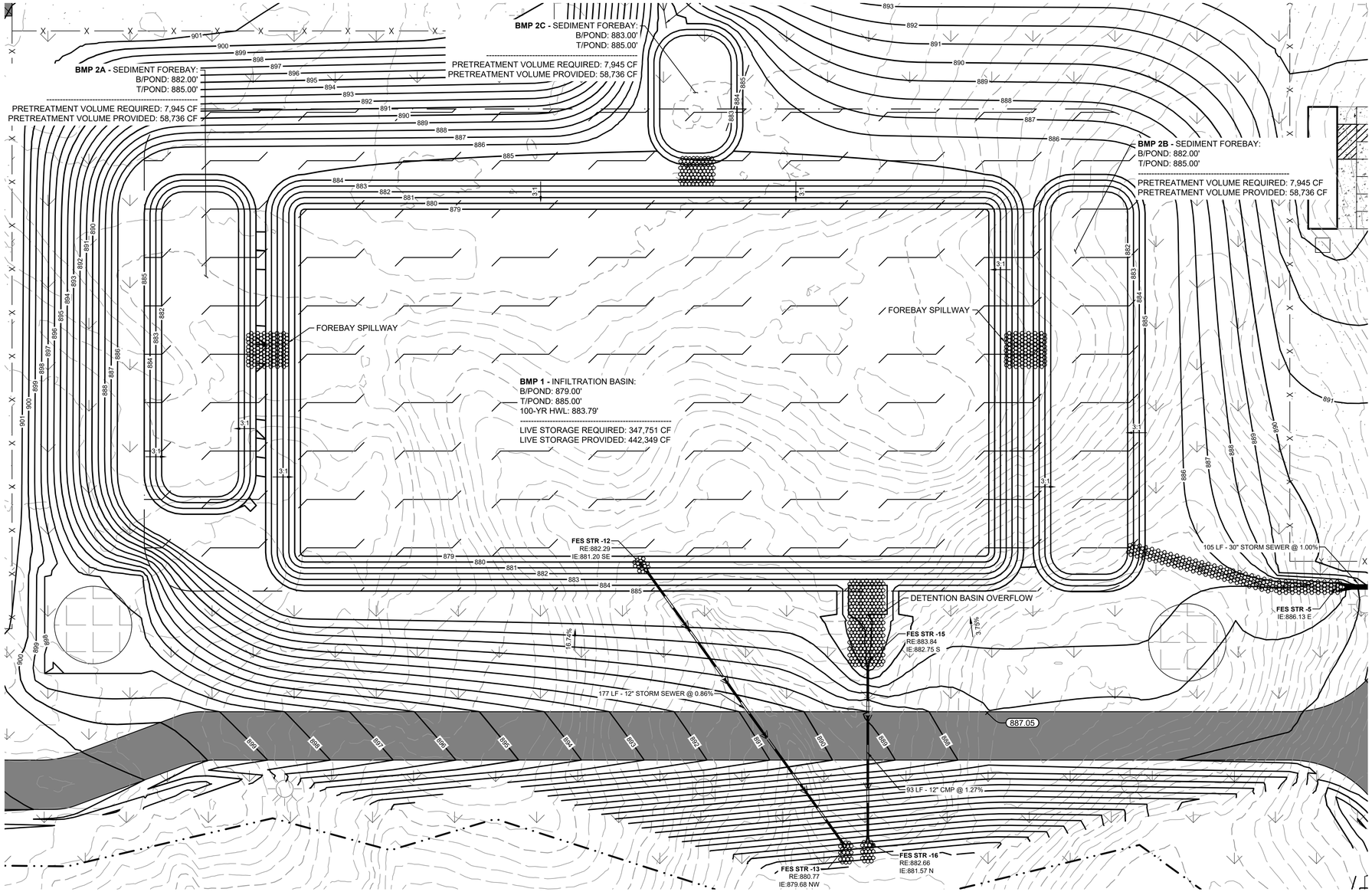
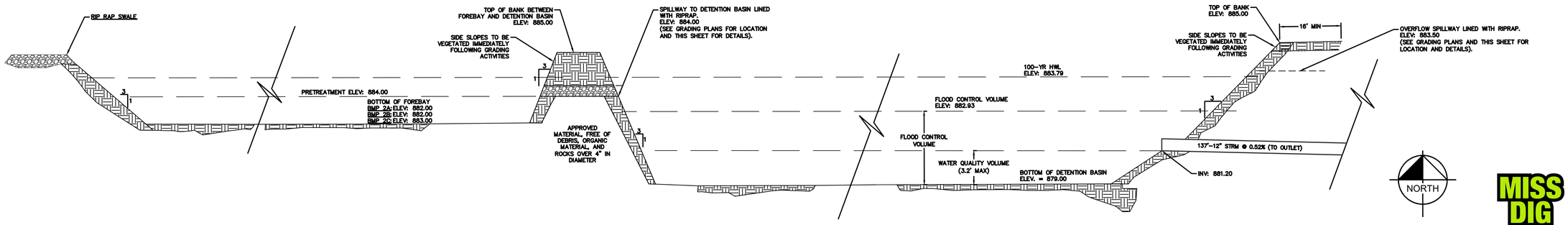


LEGEND

- PROPERTY LINE
- EXISTING CONTOUR
- PROPOSED CONTOUR
- PROPOSED SWALE
- PROPOSED STORM MANHOLE (SOLID CASTING)
- PROPOSED STORM MANHOLE (ROUND INLET CASTING)
- PROPOSED FLARED END SECTION
- PROPOSED RIPRAP
- PROPOSED STORM SEWER
- PROPOSED DRAINAGE DIRECTION

STORM SEWER NOTES

1. INSTALL STORM SEWER IN ACCORDANCE WITH APPLICABLE TOWNSHIP OR STATE SPECIFICATIONS, STATE PLUMBING CODE, AND BUILDING PERMIT REQUIREMENTS.
2. CONTACT STATE 811 CALL-BEFORE-YOU-DIG LOCATING SERVICE AT LEAST TWO WORKING DAYS PRIOR TO EXCAVATION FOR UNDERGROUND UTILITY LOCATIONS.
3. STORM SEWER PIPE SHALL BE:
   RCP: ASTM C-76
   HDPE: ASTM F-714, F-894
   PVC: ASTM D-2729
   PVC SCH40: ASTM D-1785, D-2665, F-794
   DRAIN TILE SHALL BE:
   PE: ASTM F-6667
   PVC: ASTM D-2729
   FITTINGS SHALL BE:
   RCP: ASTM C-76, JOINTS PER ASTM C-361, C-990, AND C-443
   HDPE: ASTM D-3212
   PVC: ASTM D-2729, JOINTS PER ASTM D-3212
   PVC SCH40: ASTM D-2665, F-794, F-1866
4. CONTRACTOR IS RESPONSIBLE FOR ALL HORIZONTAL AND VERTICAL CONTROL.
5. FIELD VERIFY THE LOCATIONS AND ELEVATIONS OF EXISTING UTILITIES AND TOPOGRAPHIC FEATURES PRIOR TO THE START OF LAND DISTURBING ACTIVITIES. NOTIFY THE PROJECT ENGINEER OF ANY DISCREPANCIES OR VARIATIONS IMPACTING THE PROPOSED DESIGN OF THE PROJECT.
6. EXCAVATE DRAINAGE TRENCHES TO FOLLOW PROPOSED STORM SEWER ALIGNMENTS. REFER TO THE UTILITY PLANS FOR LAYOUT AND ELEVATIONS FOR PROPOSED SANITARY SEWER, WATER MAIN, AND OTHER BUILDING UTILITY SERVICE CONNECTIONS. REFER TO THE GRADING PLAN FOR DETAILED SURFACE ELEVATIONS.
7. EXCESS MATERIAL, BITUMINOUS SURFACING, CONCRETE ITEMS, ABANDONED UTILITY ITEMS, AND OTHER UNSTABLE MATERIALS SHALL BECOME THE PROPERTY OF THE CONTRACTOR AND SHALL BE DISPOSED OF OFF THE CONSTRUCTION SITE.
8. COORDINATE WITH THE PLUMBING PLANS FOR THE LOCATION, SIZE AND ELEVATION OF THE PROPOSED UNDERGROUND ROOF DRAIN CONNECTIONS.
9. WHERE STORM SEWER ROOF DRAINS HAVE LESS THAN 4-FEET OF COVER IN PAVED AREAS OR 3-FEET OF COVER IN LANDSCAPE AREAS, PROVIDE 3-INCH THICK INSULATION A MINIMUM OF 5-FEET IN WIDTH, CENTERED ON THE PIPE.
10. ALL STORM SEWER PIPE JOINTS SHALL BE WATER-TIGHT CONNECTIONS.
11. ALL STORM SEWER PIPE CONNECTIONS TO MANHOLES SHALL BE GASKETED AND WATER TIGHT. BOOTED COUPLERS AT THE STRUCTURE OR A WATER STOP WITH NON-SHRINK GROUT MAY BE USED IN ACCORDANCE WITH LOCAL CODES.
12. CONTRACTOR SHALL AIR TEST ALL STORM SEWER PIPE IN ACCORDANCE WITH LOCAL CODE REQUIREMENTS.



SEDIMENT FOREBAY W/ SPILLWAY DETAIL
N.T.S.

INFILTRATION BASIN W/ OUTLET CONTROL DETAIL
N.T.S.

NORTH

GRAPHIC SCALE IN FEET
0 15 30 60

MISS DIG 811

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ENGINEER
NO. 6201312404
PROFESSIONAL ENGINEER

Brian Gammon

KHA PROJECT	161262002
DATE	06/08/2026
SCALE	AS SHOWN
DESIGNED BY	JLL
DRAWN BY	EAS
CHECKED BY	BPG

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STORMWATER MANAGEMENT PLAN

SWAN BESS AND CYGNET BESS
PREPARED FOR
SWAN ENERGY STORAGE LLC AND CYGNET ENERGY STORGAGE LLC
COMSTOCK TOWNSHIP
MI

SHEET NUMBER
C510

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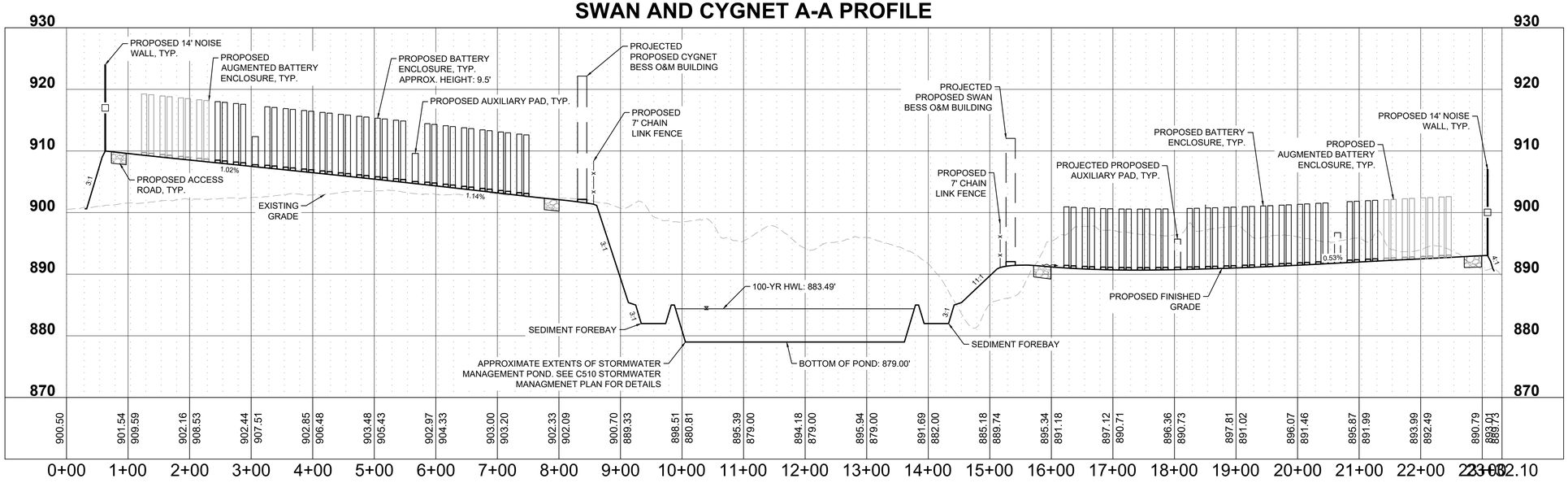
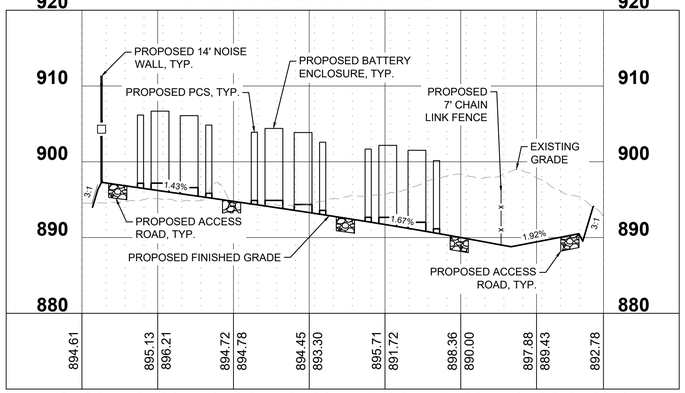
SWAN AND CYGNET A-A PROFILE



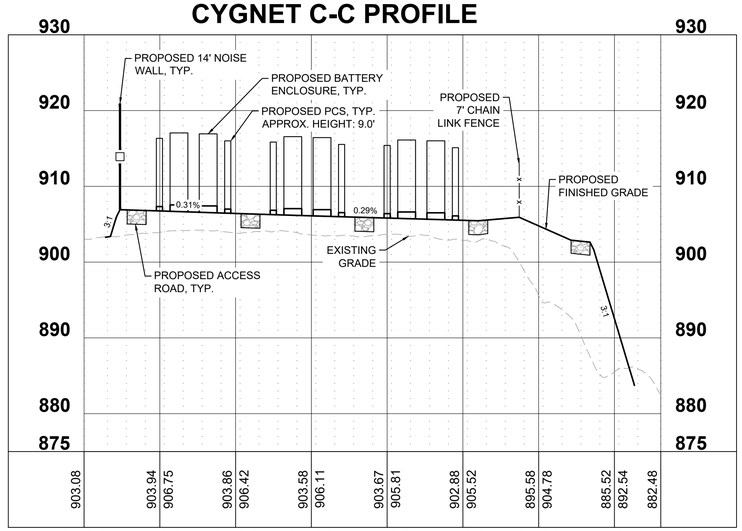
SWAN B-B PROFILE

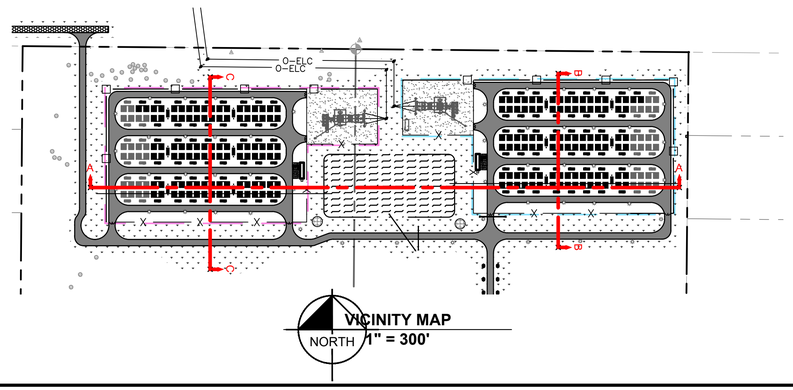


GRAPHIC SCALE IN FEET
0 50 100 200
HORIZONTAL

VERTICAL
20
10
5
0

CYGNET C-C PROFILE





VICINITY MAP
NORTH 1" = 300'

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ENGINEER
NO. 6201312904
PROFESSIONAL ENGINEER

Brian Gammon

KHA PROJECT 161282002			
DATE	06/08/2026		
SCALE	########	DESIGNED BY	JLL
		DRAWN BY	CJC
		CHECKED BY	BPG

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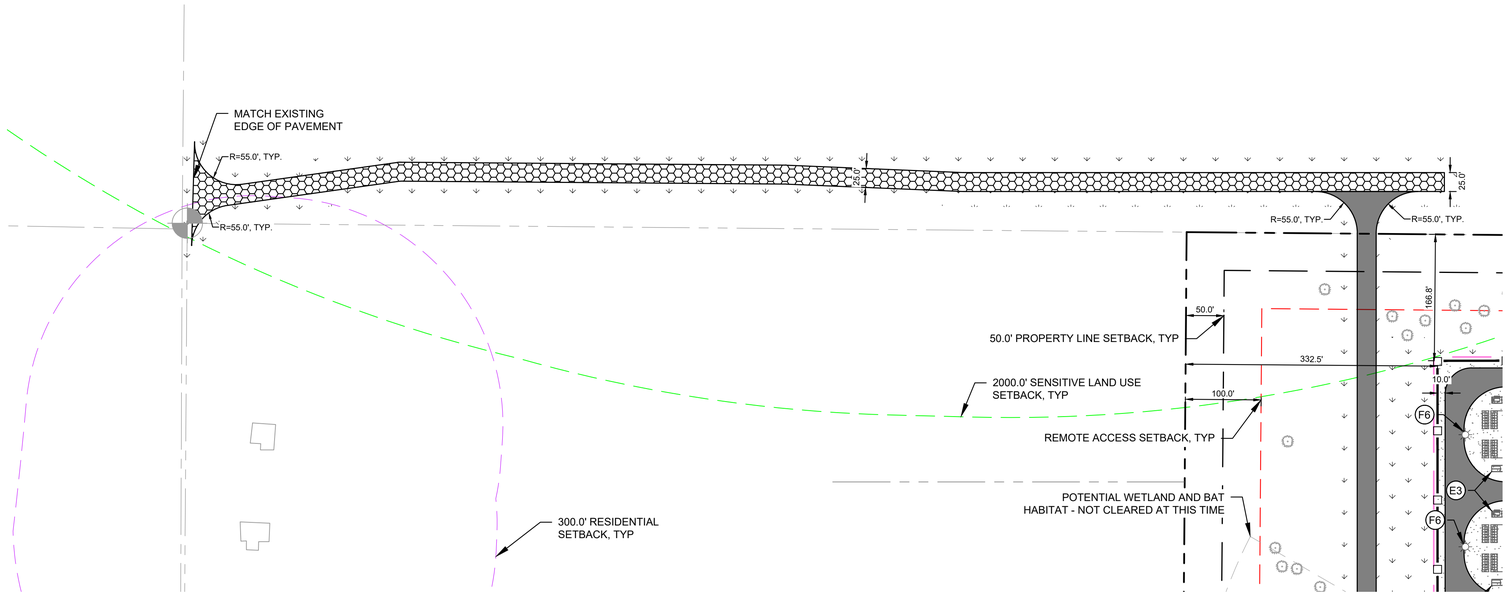
SITE PROFILES

SWAN BESS AND CYGNET BESS
PREPARED FOR
SWAN ENERGY STORAGE LLC AND CYGNET ENERGY STORGAGE LLC
COMSTOCK TOWNSHIP
MI

SHEET NUMBER
C520

MISS DIG 811



LEGEND

- PROPERTY BOUNDARY
- INTERNAL PARCEL PROPERTY LINE
- ADJACENT PARCEL PROPERTY LINE
- PROPERTY SETBACK LINE
- NFPA 855 REMOTE LOCATION SETBACK LINE
- SENSITIVE LAND USE SETBACK LINE
- OCCUPIED BUILDING SETBACK
- RIGHT-OF-WAY SETBACK
- EX. JURISDICTIONAL WETLAND (PER USSH)
- EX. MAN MADE POND (PER USSH)
- WETLAND SETBACK
- POTENTIAL WETLAND AND BAT HABITAT - SUBJECT TO TREE CLEARING REQUIREMENTS
- TREE LINE BOUNDARY
- PROPOSED SITE FENCE
- PROPOSED NOISE WALL
- PROPOSED GATE
- BATTERY ENCLOSURE
- BATTERY ENCLOSURE (AUGMENTED)
- PROPOSED ACCESS ROAD - COMPACTED AGGREGATE
- PROPOSED IMPROVED ACCESS ROAD
- PROPOSED LANDSCAPING, SEE LANDSCAPING PLANS
- BESS YARD ROCK, SIZE AND DEPTH TBD
- SUBSTATION YARD ROCK, SIZE AND DEPTH TBD
- CONCRETE PAVEMENT
- PROPOSED STORM WATER POND
- SWAN BESS LIMITS
- CYGNET BESS LIMITS
- FIRE WATER TANK
- LIGHT FIXTURE
- EXISTING TREE

KEYNOTE LEGEND

EQUIPMENT

- (E1) BATTERY ENCLOSURE
- (E2) PCS
- (E3) FUTURE AUGMENTATION BATTERY ENCLOSURE
- (E4) FUTURE AUGMENTATION PCS
- (E5) AUXILIARY PAD
- (E6) SUBSTATION ENCLOSURE, BY OTHERS

CURB, SIDEWALK & PAVEMENT

- (C1) ACCESS ROAD
- (C2) CONCRETE PAVEMENT

SITE FIXTURES

- (F1) 6' CHAIN-LINK FENCE WITH 1' BARBED WIRE - SEE DETAIL 1, SHEET C700
- (F2) CHAIN-LINK FENCE SWING GATE - SEE DETAIL 2, SHEET C700
- (F3) STORMWATER MANAGEMENT AREA
- (F4) 30,000 GALLON WATER TANK, BY OTHERS
- (F5) 14' NOISE WALL - SEE DETAIL 3, SHEET C700
- (F6) LIGHT FIXTURE

PAVEMENT MARKINGS

- (P1) ACCESSIBLE PARKING SYMBOL & LOADING AREA - SEE DETAIL 4, SHEET C701
- (P2) STRIPED WHITE CROSS-HATCH AREA 4" SOLID LINES @ 45° 2' O.C.
- (P3) 4" WIDE WHITE PAINTED SOLID PARKING LOT LINE

SIGNAGE

- (S1) ADA PARKING SIGN IN BOLLARD - SEE DETAIL 1, SHEET C701

NORTH

GRAPHIC SCALE IN FEET
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MISS DIG 811

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BRIAN GAMMON
ENGINEER
NO. 6201312454
PROFESSIONAL ENGINEER

Brian Gammon

KHA PROJECT	161262002
DATE	06/08/2026
SCALE	AS SHOWN
DESIGNED BY	JLL
DRAWN BY	EAS
CHECKED BY	BPG

OFFSITE ROAD IMPROVEMENT PLAN

SWAN BESS AND CYGNET BESS
PREPARED FOR
SWAN ENERGY STORAGE LLC AND CYGNET ENERGY STORGAGE LLC
COMSTOCK TOWNSHIP
MI

SHEET NUMBER
C530

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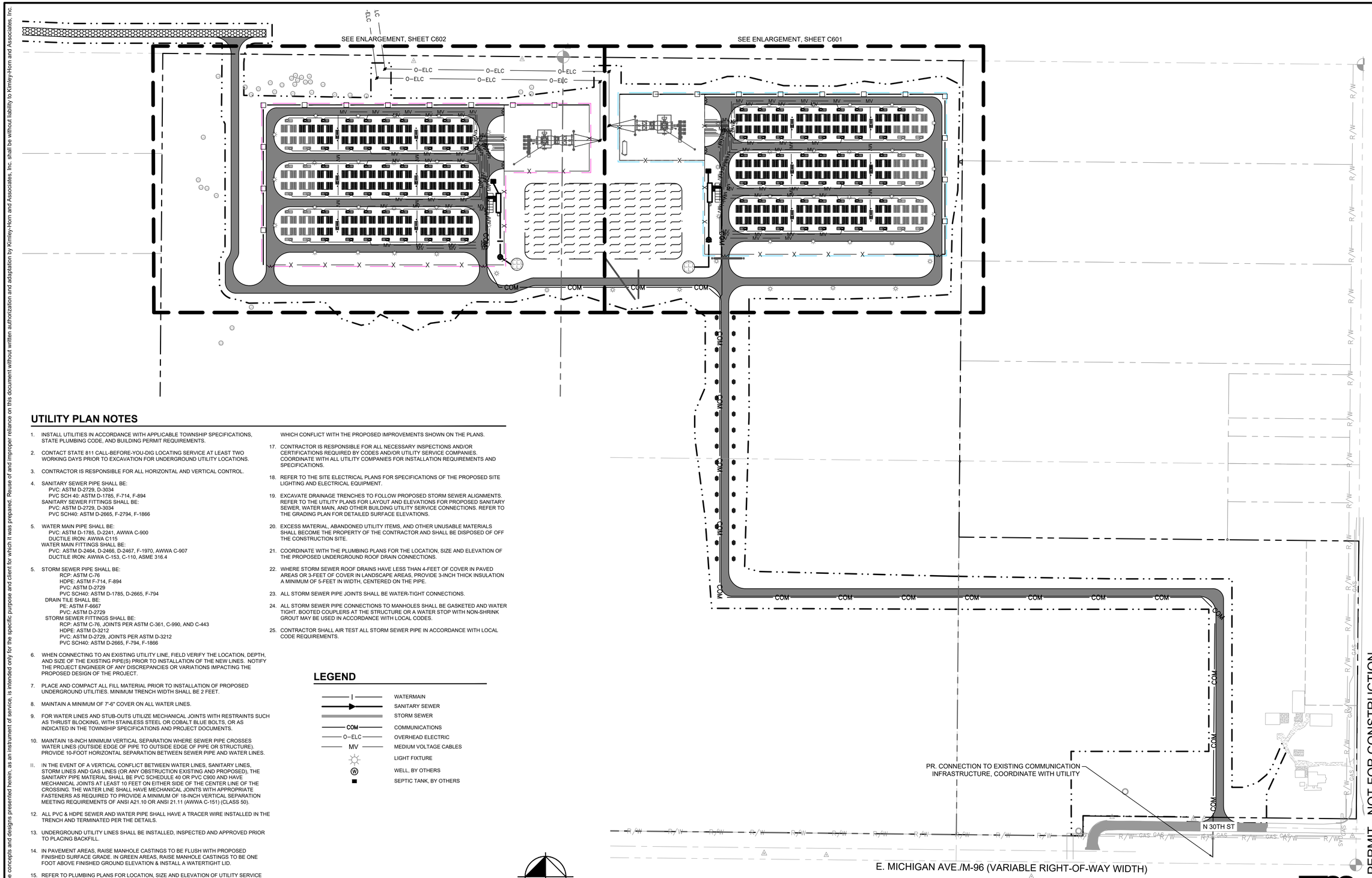

UTILITY PLAN NOTES

1. INSTALL UTILITIES IN ACCORDANCE WITH APPLICABLE TOWNSHIP SPECIFICATIONS, STATE PLUMBING CODE, AND BUILDING PERMIT REQUIREMENTS.
2. CONTACT STATE 811 CALL-BEFORE-YOU-DIG LOCATING SERVICE AT LEAST TWO WORKING DAYS PRIOR TO EXCAVATION FOR UNDERGROUND UTILITY LOCATIONS.
3. CONTRACTOR IS RESPONSIBLE FOR ALL HORIZONTAL AND VERTICAL CONTROL.
4. SANITARY SEWER PIPE SHALL BE:
   PVC: ASTM D-2729, D-3034
   PVC SCH 40: ASTM D-1785, F-714, F-894
   SANITARY SEWER FITTINGS SHALL BE:
   PVC: ASTM D-2729, D-3034
   PVC SCH40: ASTM D-2665, F-2794, F-1866
5. WATER MAIN PIPE SHALL BE:
   PVC: ASTM D-1785, D-2241, AWWA C-900
   DUCTILE IRON: AWWA C115
   WATER MAIN FITTINGS SHALL BE:
   PVC: ASTM D-2464, D-2466, D-2467, F-1970, AWWA C-907
   DUCTILE IRON: AWWA C-153, C-110, ASME 316.4
5. STORM SEWER PIPE SHALL BE:
   RCP: ASTM C-76
   HDPE: ASTM F-714, F-894
   PVC: ASTM D-2729
   PVC SCH40: ASTM D-1785, D-2665, F-794
   DRAIN TILE SHALL BE:
   PE: ASTM F-6667
   PVC: ASTM D-2729
   STORM SEWER FITTINGS SHALL BE:
   RCP: ASTM C-76, JOINTS PER ASTM C-361, C-990, AND C-443
   HDPE: ASTM D-3212
   PVC: ASTM D-2729, JOINTS PER ASTM D-3212
   PVC SCH40: ASTM D-2665, F-794, F-1866
6. WHEN CONNECTING TO AN EXISTING UTILITY LINE, FIELD VERIFY THE LOCATION, DEPTH, AND SIZE OF THE EXISTING PIPE(S) PRIOR TO INSTALLATION OF THE NEW LINES. NOTIFY THE PROJECT ENGINEER OF ANY DISCREPANCIES OR VARIATIONS IMPACTING THE PROPOSED DESIGN OF THE PROJECT.
7. PLACE AND COMPACT ALL FILL MATERIAL PRIOR TO INSTALLATION OF PROPOSED UNDERGROUND UTILITIES. MINIMUM TRENCH WIDTH SHALL BE 2 FEET.
8. MAINTAIN A MINIMUM OF 7'-6" COVER ON ALL WATER LINES.
9. FOR WATER LINES AND STUB-OUTS UTILIZE MECHANICAL JOINTS WITH RESTRAINTS SUCH AS THRUST BLOCKING, WITH STAINLESS STEEL OR COBALT BLUE BOLTS, OR AS INDICATED IN THE TOWNSHIP SPECIFICATIONS AND PROJECT DOCUMENTS.
10. MAINTAIN 18-INCH MINIMUM VERTICAL SEPARATION WHERE SEWER PIPE CROSSES WATER LINES (OUTSIDE EDGE OF PIPE TO OUTSIDE EDGE OF PIPE OR STRUCTURE). PROVIDE 10-FOOT HORIZONTAL SEPARATION BETWEEN SEWER PIPE AND WATER LINES.
11. IN THE EVENT OF A VERTICAL CONFLICT BETWEEN WATER LINES, SANITARY LINES, STORM LINES AND GAS LINES (OR ANY OBSTRUCTION EXISTING AND PROPOSED), THE SANITARY PIPE MATERIAL SHALL BE PVC SCHEDULE 40 OR PVC C900 AND HAVE MECHANICAL JOINTS AT LEAST 10 FEET ON EITHER SIDE OF THE CENTER LINE OF THE CROSSING. THE WATER LINE SHALL HAVE MECHANICAL JOINTS WITH APPROPRIATE FASTENERS AS REQUIRED TO PROVIDE A MINIMUM OF 18-INCH VERTICAL SEPARATION MEETING REQUIREMENTS OF ANSI A21.10 OR ANSI 21.11 (AWWA C-151) (CLASS 50).
12. ALL PVC & HDPE SEWER AND WATER PIPE SHALL HAVE A TRACER WIRE INSTALLED IN THE TRENCH AND TERMINATED PER THE DETAILS.
13. UNDERGROUND UTILITY LINES SHALL BE INSTALLED, INSPECTED AND APPROVED PRIOR TO PLACING BACKFILL.
14. IN PAVEMENT AREAS, RAISE MANHOLE CASTINGS TO BE FLUSH WITH PROPOSED FINISHED SURFACE GRADE. IN GREEN AREAS, RAISE MANHOLE CASTINGS TO BE ONE FOOT ABOVE FINISHED GROUND ELEVATION & INSTALL A WATERTIGHT LID.
15. REFER TO PLUMBING PLANS FOR LOCATION, SIZE AND ELEVATION OF UTILITY SERVICE CONNECTIONS AND ROOF DRAINS TO THE INTERIOR BUILDING SYSTEMS. BACKFLOW DEVICES (DDCV AND PRZ ASSEMBLIES) & METERS ARE LOCATED INSIDE THE BUILDING.
16. CONTRACTOR IS SPECIFICALLY CAUTIONED THAT THE LOCATION AND/OR ELEVATION OF EXISTING UTILITIES AS SHOWN ON THESE PLANS IS BASED ON RECORDS OF THE VARIOUS UTILITY COMPANIES, AND WHERE POSSIBLE, MEASUREMENTS TAKEN IN THE FIELD. THE INFORMATION IS NOT TO BE RELIED ON AS BEING EXACT OR COMPLETE. THE CONTRACTOR MUST CALL THE APPROPRIATE UTILITY COMPANIES AT LEAST 72 HOURS BEFORE ANY EXCAVATION TO REQUEST EXACT FIELD LOCATION OF UTILITIES. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO RELOCATE ALL EXISTING UTILITIES WHICH CONFLICT WITH THE PROPOSED IMPROVEMENTS SHOWN ON THE PLANS.
17. CONTRACTOR IS RESPONSIBLE FOR ALL NECESSARY INSPECTIONS AND/OR CERTIFICATIONS REQUIRED BY CODES AND/OR UTILITY SERVICE COMPANIES. COORDINATE WITH ALL UTILITY COMPANIES FOR INSTALLATION REQUIREMENTS AND SPECIFICATIONS.
18. REFER TO THE SITE ELECTRICAL PLANS FOR SPECIFICATIONS OF THE PROPOSED SITE LIGHTING AND ELECTRICAL EQUIPMENT.
19. EXCAVATE DRAINAGE TRENCHES TO FOLLOW PROPOSED STORM SEWER ALIGNMENTS. REFER TO THE UTILITY PLANS FOR LAYOUT AND ELEVATIONS FOR PROPOSED SANITARY SEWER, WATER MAIN, AND OTHER BUILDING UTILITY SERVICE CONNECTIONS. REFER TO THE GRADING PLAN FOR DETAILED SURFACE ELEVATIONS.
20. EXCESS MATERIAL, ABANDONED UTILITY ITEMS, AND OTHER UNUSABLE MATERIALS SHALL BECOME THE PROPERTY OF THE CONTRACTOR AND SHALL BE DISPOSED OF OFF THE CONSTRUCTION SITE.
21. COORDINATE WITH THE PLUMBING PLANS FOR THE LOCATION, SIZE AND ELEVATION OF THE PROPOSED UNDERGROUND ROOF DRAIN CONNECTIONS.
22. WHERE STORM SEWER ROOF DRAINS HAVE LESS THAN 4-FEET OF COVER IN PAVED AREAS OR 3-FEET OF COVER IN LANDSCAPE AREAS, PROVIDE 3-INCH THICK INSULATION A MINIMUM OF 5-FEET IN WIDTH, CENTERED ON THE PIPE.
23. ALL STORM SEWER PIPE JOINTS SHALL BE WATER-TIGHT CONNECTIONS.
24. ALL STORM SEWER PIPE CONNECTIONS TO MANHOLES SHALL BE GASKETED AND WATER TIGHT. BOOTED COUPLERS AT THE STRUCTURE OR A WATER STOP WITH NON-SHRINK GROUT MAY BE USED IN ACCORDANCE WITH LOCAL CODES.
25. CONTRACTOR SHALL AIR TEST ALL STORM SEWER PIPE IN ACCORDANCE WITH LOCAL CODE REQUIREMENTS.

LEGEND

- WATERMAIN
- SANITARY SEWER
- STORM SEWER
- COMMUNICATIONS
- OVERHEAD ELECTRIC
- MEDIUM VOLTAGE CABLES
- LIGHT FIXTURE
- WELL, BY OTHERS
- SEPTIC TANK, BY OTHERS

NORTH

GRAPHIC SCALE IN FEET
0 75 150 300

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PROFESSIONAL ENGINEER

Brian Gammon

KHA PROJECT 161262002
DATE 06/08/2026
SCALE AS SHOWN
DESIGNED BY JLL
DRAWN BY CJC
CHECKED BY BPG

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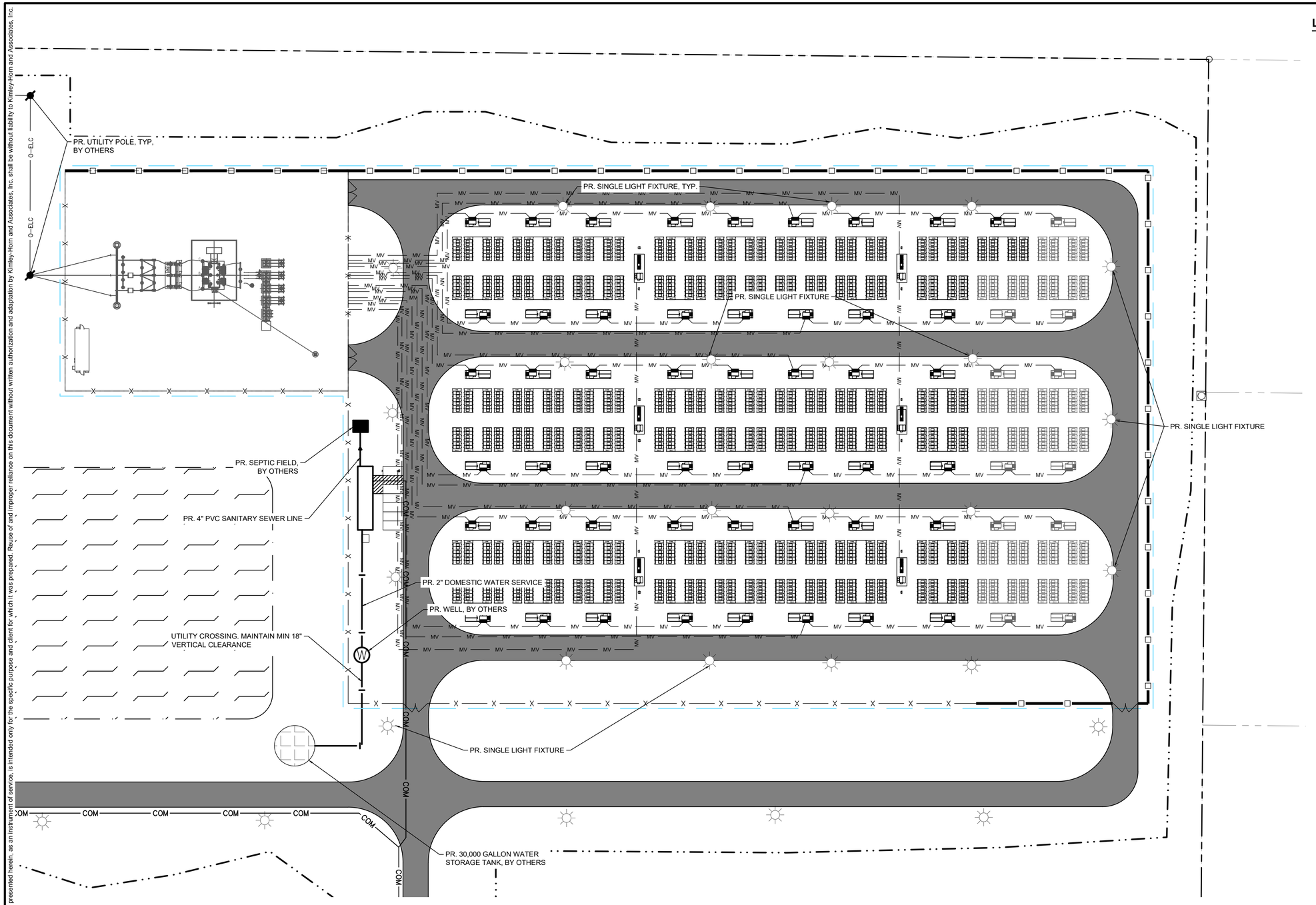
OVERALL UTILITY PLAN

SWAN BESS AND CYGNET BESS
PREPARED FOR
SWAN ENERGY STORAGE LLC AND CYGNET ENERGY STORGAGE LLC
COMSTOCK TOWNSHIP
MI

SHEET NUMBER
C600

MISS DIG 811



LEGEND

- WATERMAIN
- SANITARY SEWER
- TELEPHONE
- OVERHEAD ELECTRIC
- MEDIUM VOLTAGE CABLES
- LIGHT FIXTURE
- WELL, BY OTHERS
- SEPTIC TANK, BY OTHERS

NORTH

GRAPHIC SCALE IN FEET
0 25 50 100

MISS DIG 811

ISSUED FOR PERMIT - NOT FOR CONSTRUCTION

No.	REVISIONS	DATE	BY
1	ENTITLEMENT SET	06/09/2026	BPG

Kimley»Horn of Michigan, Inc.

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3000 TOWN CENTER, SUITE 2600
SOUTHFIELD, MI 48075
(312) 726 9445

CIP
Copenhagen Infrastructure Partners

STATE OF MICHIGAN
BRIAN GAMMON
ENGINEER
6201372404
PROFESSIONAL ENGINEER

Brian Gammon

KHA PROJECT	161262002
DATE	06/09/2026
SCALE	AS SHOWN
DESIGNED BY	JLL
DRAWN BY	CJC
CHECKED BY	BPG

UTILITY PLAN ENLARGEMENT

SWAN BESS AND CYGNET BESS
PREPARED FOR
SWAN ENERGY STORAGE LLC AND CYGNET ENERGY STORGAGE LLC
COMSTOCK TOWNSHIP
MI

SHEET NUMBER
C601

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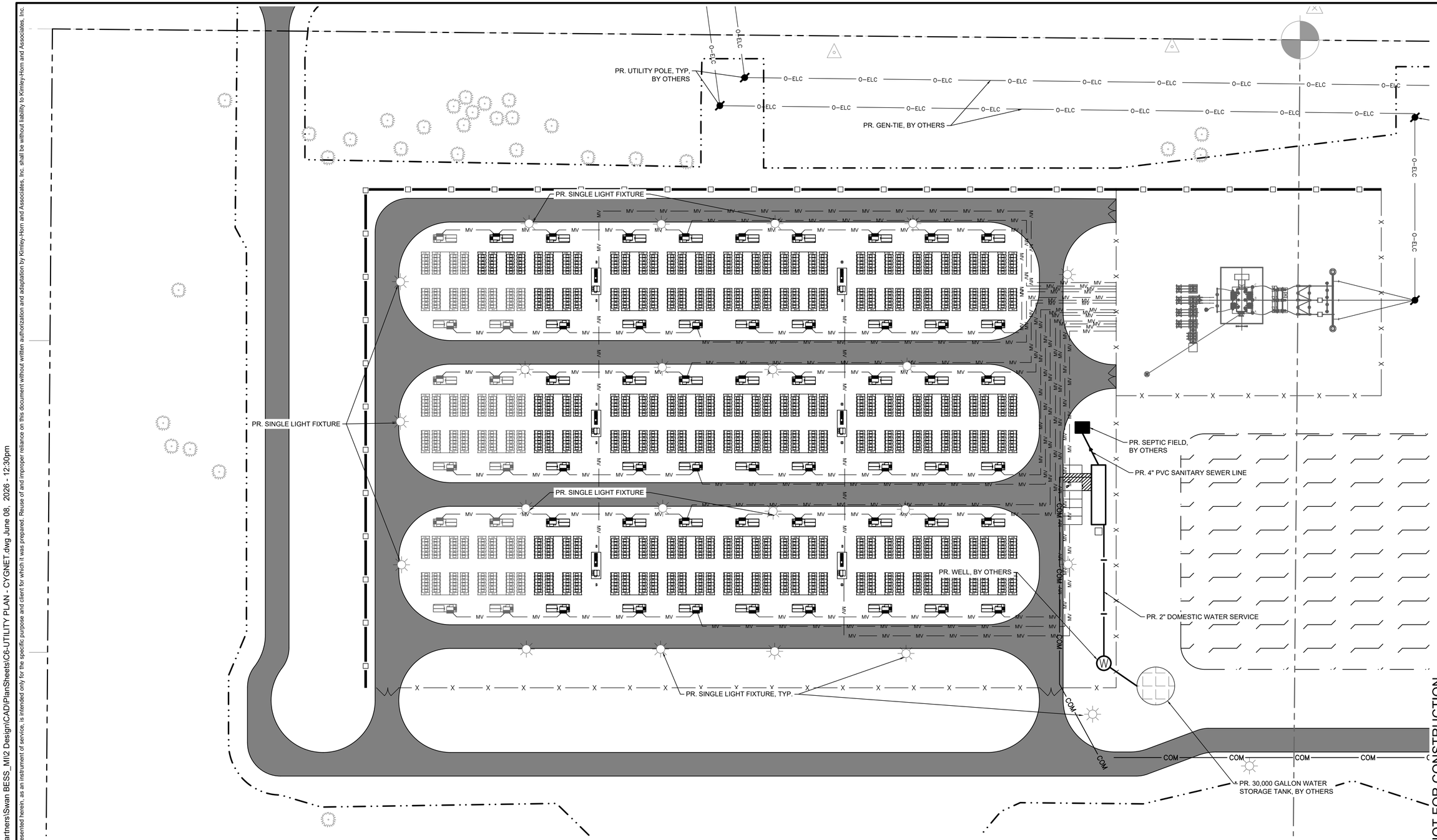
K:\TCW_LDEV\Copenhagen Infrastructure Partners\Swan BESS_MI\2 Design\CAD\PlanSheets\C6-UTILITY PLAN - SWAN.dwg June 08, 2026 - 12:30pm



LEGEND

- WATERMAIN
- SANITARY SEWER
- STORM SEWER
- COM — TELEPHONE
- O-ELC — OVERHEAD ELECTRIC
- MV — MEDIUM VOLTAGE CABLES
- LIGHT FIXTURE
- (W) — WELL, BY OTHERS
- ■ — SEPTIC TANK, BY OTHERS

NORTH

GRAPHIC SCALE IN FEET
0 25 50 100

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STATE OF MICHIGAN
BRIAN GAMMON
ENGINEER
6201312404
PROFESSIONAL ENGINEER

Brian Gammon

KHA PROJECT	161262002
DATE	06/08/2026
SCALE	AS SHOWN
DESIGNED BY	JLL
DRAWN BY	CJC
CHECKED BY	BPG

UTILITY PLAN ENLARGEMENT

SWAN BESS AND CYGNET BESS

PREPARED FOR
SWAN ENERGY STORAGE LLC AND
CYGNET ENERGY STORGAGE LLC
COMSTOCK
TOWNSHIP
MI

SHEET NUMBER
C602

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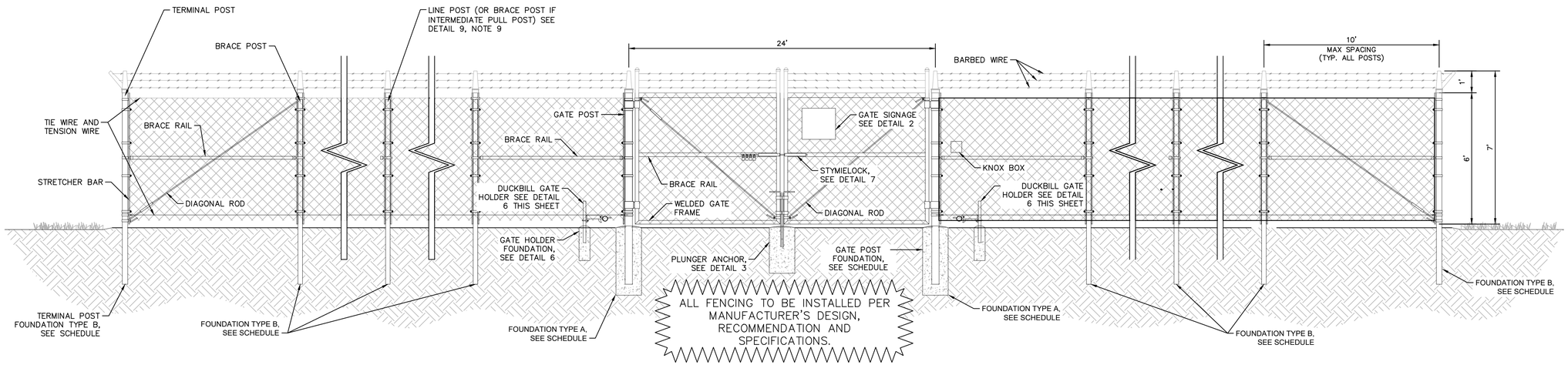
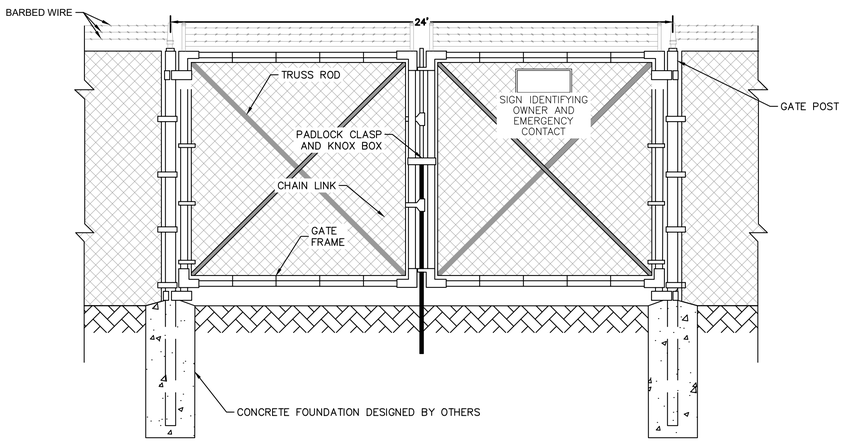


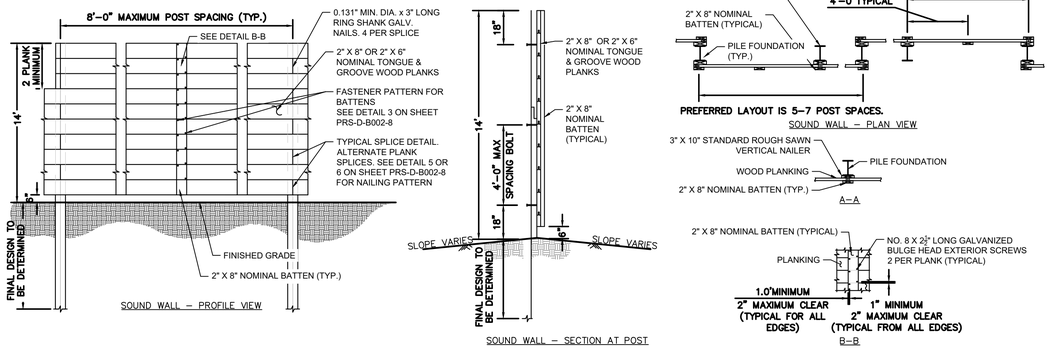
1 CHAIN LINK FENCE - BARBED WIRE DETAIL

NO SCALE



2 DOUBLE SWING GATE DETAIL WITH BARBED WIRE

NO SCALE



3 SOUND WALL - FOR REFERENCE ONLY

NO SCALE

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SOUTHFIELD, MI 48075
(312) 726 9445

CIP
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STATE OF MICHIGAN BRIAN GAMMON ENGINEER NO. 6201372903 LICENSED PROFESSIONAL ENGINEER

Brian Gammon

KHA PROJECT	161262002
DATE	06/08/2026
SCALE	AS SHOWN
DESIGNED BY	JLL
DRAWN BY	CJC
CHECKED BY	BPG

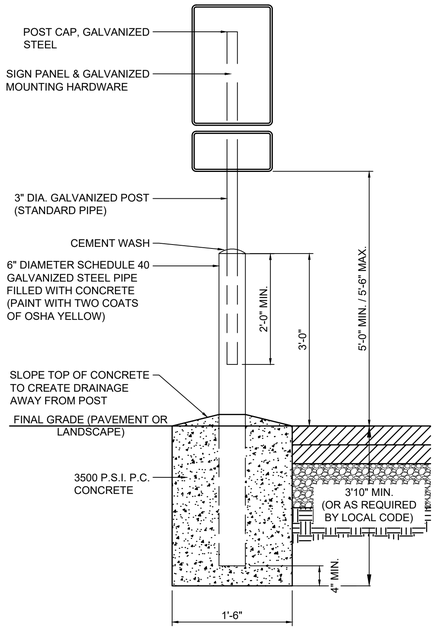
CIVIL DETAILS

ISSUED FOR PERMIT - NOT FOR CONSTRUCTION

SWAN BESS AND CYGNET BESS
PREPARED FOR
SWAN ENERGY STORAGE LLC AND CYGNET ENERGY STORGAGE LLC
COMSTOCK TOWNSHIP
MI

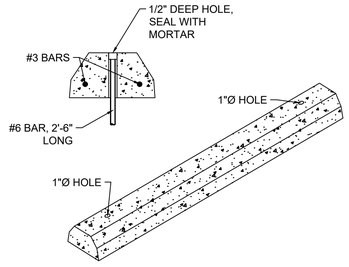
SHEET NUMBER
C700

MISS DIG 811



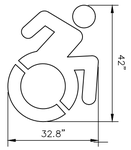
1 ACCESSIBLE PARKING SIGN IN BOLLARD

NO SCALE



2 PRECAST WHEEL STOP

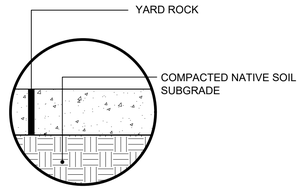
NO SCALE



3 ACCESSIBLE PARKING SYMBOL

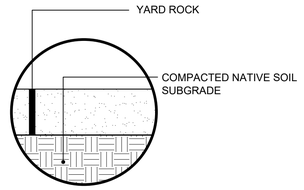
NO SCALE

PAVEMENT SECTIONS SHOWN ARE PROVIDED AS A REFERENCE ONLY. REFER TO GEOTECHNICAL REPORT FOR ALL PAVEMENT, SUBGRADE PREPARATION AND COMPACTION REQUIREMENTS.



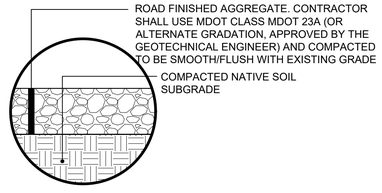
7 CONCRETE PAVEMENT

NO SCALE



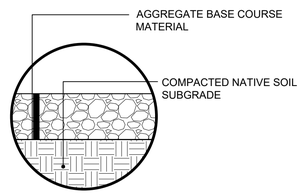
8 BESS YARD SECTION (REFER TO ELECTRICAL PLANS)

NO SCALE



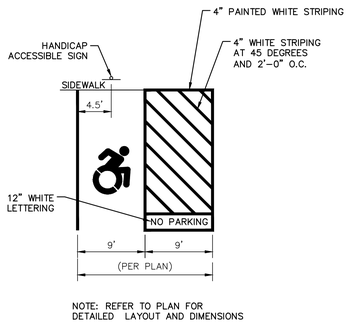
9 ACCESS ROAD PAVEMENT SECTION

SCALE: NTS



10 TEMPORARY LAYDOWN AREA SECTION

NO SCALE



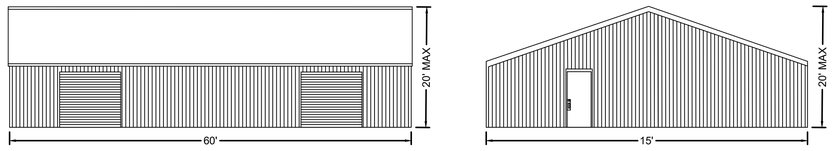
4 TYPICAL HANDICAP STRIPING

NO SCALE



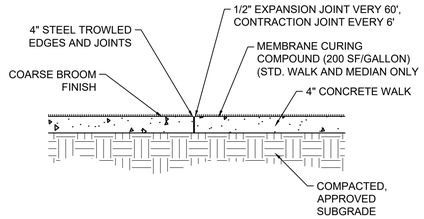
5 HP-3-1218 ADA PARKING SIGN

NO SCALE



6 OPERATIONS & MAINTENANCE BUILDING - FOR REFERENCE ONLY

NO SCALE



NOTES:

1. ALL EXCAVATION, COMPACTION AND BACKFILL INCIDENTAL TO UNIT PRICE BID FOR 4" SIDEWALK

11 CONCRETE SIDEWALK

NO SCALE

No.	REVISIONS	DATE	BY
1	ENTITLEMENT SET	06/08/2026	BPG

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(312) 726 9445

CIP
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STATE OF MICHIGAN BRIAN GAMMON ENGINEER NO. 6001312904 LICENSED PROFESSIONAL ENGINEER

Brian Gammon

KHA PROJECT	161262002
DATE	06/08/2026
SCALE	AS SHOWN
DESIGNED BY	JLL
DRAWN BY	EAS
CHECKED BY	BPG

ISSUED FOR PERMIT - NOT FOR CONSTRUCTION

CIVIL DETAILS

SWAN BESS AND CYGNET BESS
PREPARED FOR
SWAN ENERGY STORAGE LLC AND CYGNET ENERGY STORAGE LLC
COMSTOCK TOWNSHIP
MI

SHEET NUMBER
C701

MISS DIG 811

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14"

DANGER

HIGH VOLTAGE

UNAUTHORIZED PERSONNEL

KEEP OUT

10"

LOCATION(S): SIGN SHALL BE ATTACHED TO BESS SYSTEM FENCE LINE AT MINIMUM 100FT INTERVALS AND AT GATES
APPEARANCE: BLACK TEXT ON WHITE BACKGROUND WITH WHITE "DANGER" TEXT ON RED BACKGROUND

14"

DANGER

HIGH VOLTAGE FACILITIES

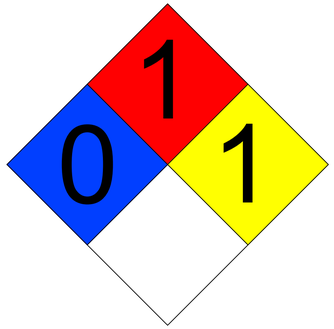
IN CASE OF EMERGENCY OR FOR INFORMATION REGARDING THIS GRID STORAGE SYSTEM

CONTACT <INSERT PROJECT OPERATOR> XXX-XXX-XXXX

10"

LOCATION(S): SIGN SHALL BE ATTACHED TO SUBSTATION POINT OF ENTRY

APPEARANCE: BLACK TEXT ON WHITE BACKGROUND WITH WHITE "DANGER" TEXT ON RED BACKGROUND



NFPA 704 LABEL

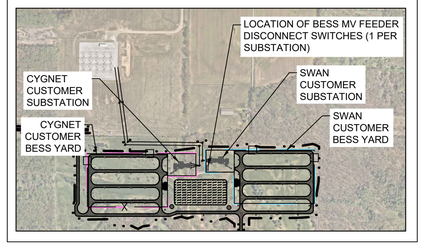
PLACE AT GATE TO BATTERY ENERGY STORAGE SYSTEM AREA

GENERAL NOTES:

1. PLACARDS AND LABELS SHALL BE APPLIED TO THE APPROPRIATE COMPONENTS IN ACCORDANCE WITH NEC.
2. COMPONENTS IN BATTERY CONTAINERS ARE SUPPLIED FROM THE MANUFACTURER WITH MARKINGS PRE-APPLIED TO MEET THE REQUIREMENTS OF NEC.
3. MARKING IDENTIFIED AS PLACARDS WILL BE ETCHED WITH WHITE GRAPHICS ONTO 1/16" PLASTIC PLACARDS WITH COLORS AS SHOWN. THE PLACARDS WILL BE ATTACHED MECHANICALLY OR WITH DOUBLE-SIDED ADHESIVE TO THE APPROPRIATE COMPONENT ENCLOSURES IN RELEVANT AND CONSPICUOUS LOCATIONS.
4. MARKS IDENTIFIED AS LABELS WILL BE ADHESIVE VINYL LABELS. THOSE SHOWN AS RED SHALL BE REFLECTIVE RED VINYL WITH WHITE LETTERING; THOSE SHOWN AS ORANGE SHALL HAVE AN ORANGE "WARNING" HEADER WITH WHITE BODY AND BLACK TEXT.
5. MARKINGS IDENTIFIED AS SIGNS SHALL BE METAL OR UV-RESISTANT PLASTIC SUITABLE FOR THE EXTERIOR ENVIRONMENT.

WARNING:

MULTIPLE POWER SOURCES CONNECTED TO THIS SERVICE WITH DISCONNECTS AS SHOWN:



LOCATION(S): IDENTIFICATION PLACARD SHALL BE LOCATED AT THE CUSTOMER BESS YARD

APPEARANCE: WHITE TEXT ON RED BACKGROUND

5"

WARNING

ARC FLASH AND SHOCK HAZARD
APPROPRIATE PPE REQUIRED.

FAILURE TO COMPLY
CAN RESULT IN DEATH OR INJURY.

3"

1/4"

LOCATION(S): SIGN SHALL BE PLACED ON DC AND AC ELECTRICAL EQUIPMENT, INCLUDING DISCONNECTS, INVERTERS, PANELBOARDS, METERS, ETC. UNLESS SUCH WORDS ALREADY EXIST.

APPEARANCE: BLACK TEXT ON WHITE BACKGROUND WITH BLACK "WARNING" TEXT ON ORANGE BACKGROUND

5"

WARNING

ELECTRIC SHOCK HAZARD.
DO NOT TOUCH TERMINALS.
TERMINALS ON BOTH THE LINE AND LOAD SIDES MAY BE ENERGIZED IN THE OPEN POSITION

3"

1/4"

LOCATION(S): SIGN SHALL BE PLACED ON DC AND AC ELECTRICAL EQUIPMENT UNLESS SUCH WORDS ALREADY EXIST. EQUIPMENT RADIALLY FED (IE. AUXILIARY AND CONTROL CIRCUITS) DO NOT REQUIRE THIS LABEL.
APPEARANCE: BLACK TEXT ON WHITE BACKGROUND WITH BLACK "WARNING" TEXT ON ORANGE BACKGROUND

AUXILIARY TRANSFORMER UNIT

AUXTX-10B-0X

WARNING:
ARC FLASH AND SHOCK HAZARD.
APPROPRIATE PPE REQUIRED.
FAILURE TO COMPLY CAN RESULT IN DEATH OR INJURY.

AUXILIARY TRANSFORMER UNIT

AUXTX-22C-0X

WARNING:
ARC FLASH AND SHOCK HAZARD.
APPROPRIATE PPE REQUIRED.
FAILURE TO COMPLY CAN RESULT IN DEATH OR INJURY.

LOCATION(S): PLACARD SHALL BE APPLIED TO EACH AUXILIARY TRANSFORMER
APPEARANCE: WHITE TEXT ON RED BACKGROUND

AUXSWB-10B-0X

OPERATING CURRENT: XXXX.XA
OPERATING VOLTAGE: 480V

AUXSWB-22C-0X

OPERATING CURRENT: XXXX.XA
OPERATING VOLTAGE: 480V

WHITE TEXT ON RED BACKGROUND. TEXT HEIGHT: 3/8" MIN.
PLACE ON AC COLLECTOR SWITCHBOARD

MEDIUM VOLTAGE SYSTEM

INV10XX-XX

AUTHORIZED PERSONNEL ONLY

WARNING! ELECTRICAL SHOCK HAZARD
DO NOT TOUCH TERMINALS
TERMINALS ON BOTH LINE & LOAD SIDES
MAY BE ENERGIZED IN OPEN POSITION

THIS UNIT IS FED BY MULTIPLE SOURCES:
THE UTILITY AND THE
BATTERY ENERGY STORAGE SYSTEM

MEDIUM VOLTAGE SYSTEM

INV11XX-XX

AUTHORIZED PERSONNEL ONLY

WARNING! ELECTRICAL SHOCK HAZARD
DO NOT TOUCH TERMINALS
TERMINALS ON BOTH LINE & LOAD SIDES
MAY BE ENERGIZED IN OPEN POSITION

THIS UNIT IS FED BY MULTIPLE SOURCES:
THE UTILITY AND THE
BATTERY ENERGY STORAGE SYSTEM

MEDIUM VOLTAGE SYSTEM

INV22XX-XX

AUTHORIZED PERSONNEL ONLY

WARNING! ELECTRICAL SHOCK HAZARD
DO NOT TOUCH TERMINALS
TERMINALS ON BOTH LINE & LOAD SIDES
MAY BE ENERGIZED IN OPEN POSITION

THIS UNIT IS FED BY MULTIPLE SOURCES:
THE UTILITY AND THE
BATTERY ENERGY STORAGE SYSTEM

LOCATION(S): IDENTIFICATION LABEL SHALL BE APPLIED TO DC CABINET OF POWER CONVERSION SYSTEM ENCLOSURE.
APPEARANCE: WHITE TEXT ON RED BACKGROUND

ENERGY STORAGE CABINET

CON10XX-XX-A-XX

AUTHORIZED PERSONNEL ONLY

WARNING! ELECTRICAL SHOCK HAZARD
DO NOT TOUCH TERMINALS
TERMINALS ON BOTH LINE & LOAD SIDES
MAY BE ENERGIZED IN OPEN POSITION

THIS UNIT IS FED FROM MEDIUM VOLTAGE TRANSFORMER

ENERGY STORAGE CABINET

CON11XX-XX-A-XX

AUTHORIZED PERSONNEL ONLY

WARNING! ELECTRICAL SHOCK HAZARD
DO NOT TOUCH TERMINALS
TERMINALS ON BOTH LINE & LOAD SIDES
MAY BE ENERGIZED IN OPEN POSITION

THIS UNIT IS FED FROM MEDIUM VOLTAGE TRANSFORMER

ENERGY STORAGE CABINET

CON22XX-XX-A-XX

AUTHORIZED PERSONNEL ONLY

WARNING! ELECTRICAL SHOCK HAZARD
DO NOT TOUCH TERMINALS
TERMINALS ON BOTH LINE & LOAD SIDES
MAY BE ENERGIZED IN OPEN POSITION

THIS UNIT IS FED FROM MEDIUM VOLTAGE TRANSFORMER

LOCATION(S): PLACARD SHALL BE APPLIED TO EACH BESS CONTAINER
APPEARANCE: WHITE TEXT ON RED BACKGROUND

MISS DIG 811

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SOUTHFIELD, MI 48075
(312) 726 9445

CIP
Copenhagen Infrastructure Partners

STATE OF MICHIGAN
BRIAN GAMMON
ENGINEER
NO. E0013129OA
LICENSED PROFESSIONAL ENGINEER

Brian Gammon

KHA PROJECT	161262002
DATE	06/08/2026
SCALE	AS SHOWN
DESIGNED BY	JLL
DRAWN BY	EAS
CHECKED BY	BPG

SIGNAGE DETAILS

SWAN BESS AND CYGNET BESS
PREPARED FOR
SWAN ENERGY STORAGE LLC AND CYGNET ENERGY STORGAGE LLC
COMSTOCK TOWNSHIP
MI

SHEET NUMBER
C800

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2' - 0"

1

NO TRESPASSING

Private property.
Unauthorized entry prohibited.
Violators will be prosecuted
under Michigan Compiled Laws
§750.552 (TRESPASS).

1' - 6"

2' - 0"

2

PELIGRO
PROHIBIDO EL PASO

Alto voltaje puede causar la muerte.
Prohibida la entrada no autorizada
- infractores seran procesados.

En caso de EMERGENCIA llamar
XXX-XXX-XXXX

1' - 6"

2' - 0"

3

WARNING

THESE FACILITIES
ARE MONITORED BY
VIDEO & ELECTRONIC
SECURITY EQUIPMENT

1' - 6"

2' - 0"

4

DANGER

High
Voltage.

KEEP OUT

1' - 6"

2' – 0"

5

DANGER

Lithium-ion
Batteries. Fire and
Explosion Risk.

Do NOT open doors without
ROCC authorization
XXX-XXX-XXXX

1' – 6"

2' - 0"

6

XXXX ENERGY STORAGE LLC

COMSTOCK
TOWNSHIP, MI 49041

1' - 6"

2' - 0"

7

NOTICE

IN CASE OF
EMERGENCY
CALL
XXX-XXX-XXXX

1' - 6"

2' - 0"

8

WARNING

ANYONE DAMAGING, VANDALIZING,
OR INTERFERING WITH THE
OPERATION OF THIS FACILITY IS IN
VIOLATION OF TITLE 18, UNITED
STATES CODE SECTION 1366 AND
PUNISHABLE BY 10 YEARS
IMPRISONMENT and $50,000 FINE.

1' - 6"

1 ' - 6"

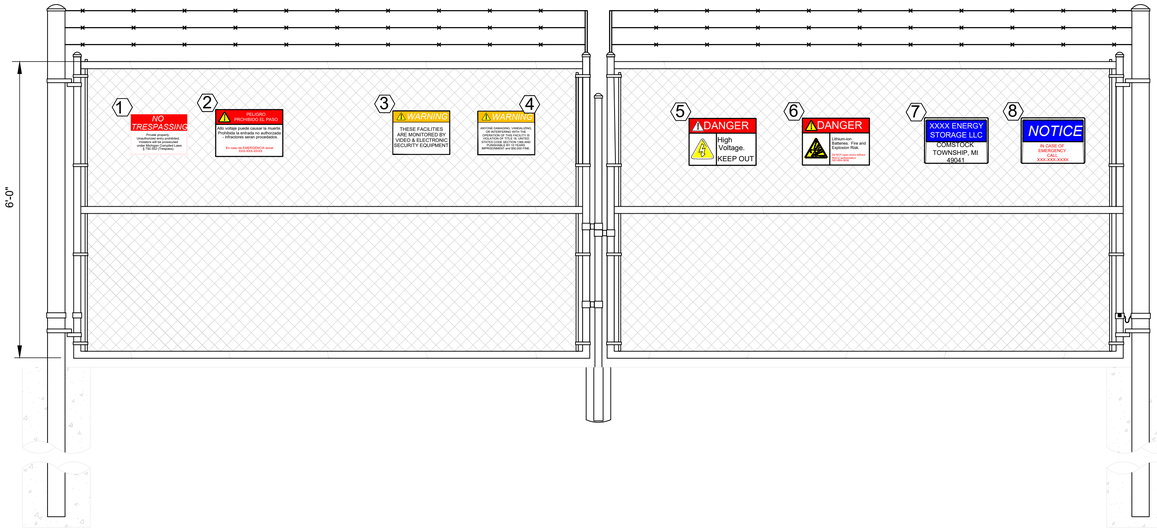
9

DANGER

Alarm indicates fire system is
Active. Lithium-ion Batteries.
Fire and Explosion Risk.

Do NOT open door without ROCC
authorization XXX-XXX-XXXX

1' - 0"

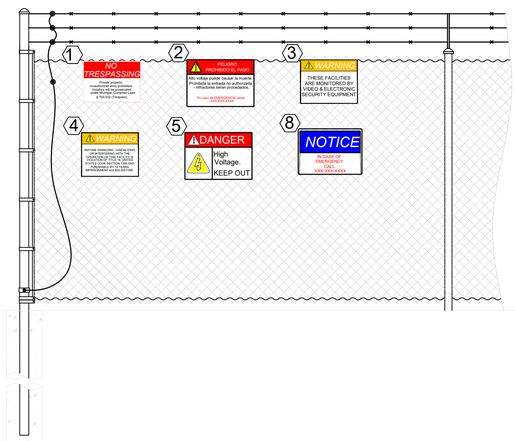


1 VEHICLE GATE FENCE

Scale: N.T.S.

NOTES:

1. THE SIGN DESIGNER OR INSTALLER SHALL ENSURE ALL SIGNS ARE OF DURABLE MATERIAL, FORMATTED CONSISTENTLY IN A HORIZONTAL ORIENTATION, 18"x24" FOR GATE/FENCE SIGNS AND 12"x18" FOR EQUIPMENT/CONTAINER SIGNS. SIGNS FOR ACCESS GATES/FENCE SHALL BE MOUNTED USING GALVANIZED OR STAINLESS STEEL HOG RINGS.
2. REQUIRED SIGNS SHALL BE MAINTAINED VISIBLE, WITHOUT OBSTRUCTIONS. IF SECURITY AND SAFETY SIGNS ARE DAMAGED, WEATHERED, OR MISSING THEY SHALL BE PROMPTLY REPLACED.
3. ARC FLASH STICKERS SHALL BE INSTALLED ON EACH ELECTRICAL EQUIPMENT DOOR OR COVER THAT MAY BE OPENED OR REMOVED FOR MAINTENANCE SERVICE. ALL DOORS ON SWITCHGEAR AND MOTOR CONTROL CENTERS SHALL BE LABELED, EVEN IF OPENING A DOOR DOES NOT EXPOSE UN INSULATED CONDUCTORS.
4. ARC FLASH STICKERS SHALL BE INSTALLED BASED ON ARC FLASH CALCULATIONS. PER SOPR/SMS 301.4., SOPR 272, AND SMS 270. STICKERS ON EQUIPMENT SHALL NOT BE REMOVED OR COVERED.



2 CORNER POST FENCE

Scale: N.T.S.

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Copenhagen Infrastructure Partners

STATE OF MICHIGAN
BRIAN DAMMON
ENGINEER
6201372404
PROFESSIONAL ENGINEER

Brian Jammon

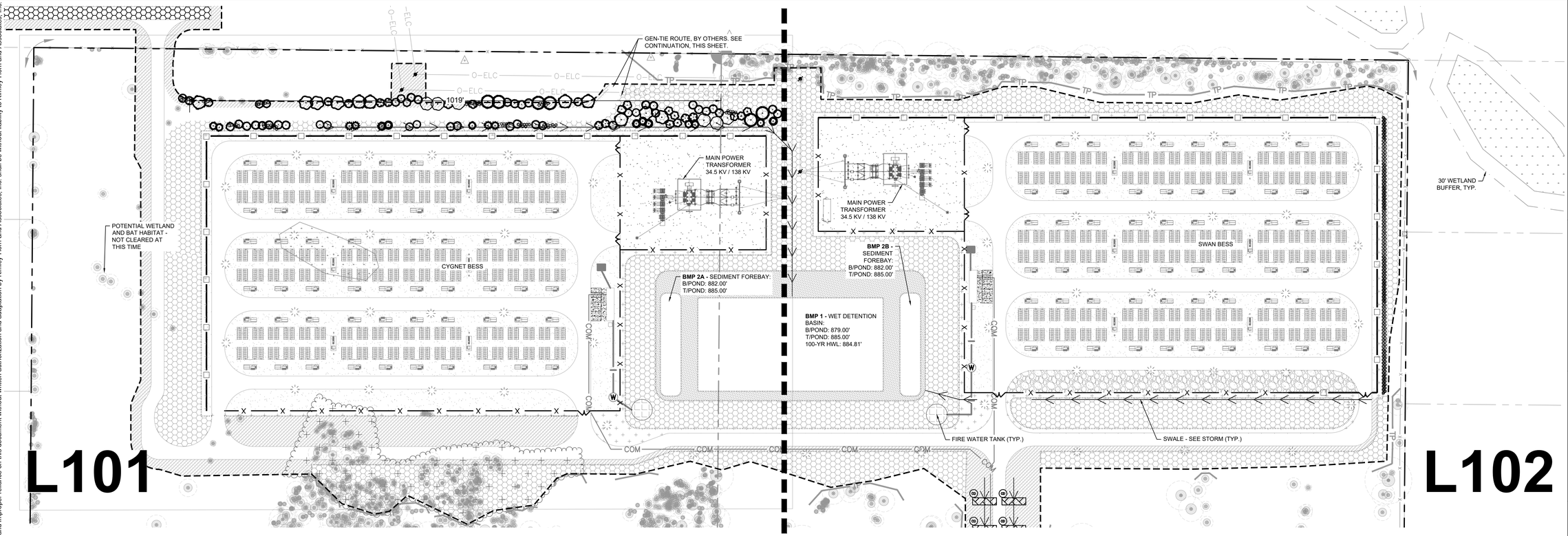
KHA PROJECT	161262002
DATE	06/08/2026
SCALE	AS SHOWN
DESIGNED BY	JLL
DRAWN BY	EAS
CHECKED BY	BPG

ISSUED FOR PERMIT - NOT FOR CONSTRUCTION

SIGNAGE PLAN

SWAN BESS AND CYGNET BESS
PREPARED FOR
SWAN ENERGY STORAGE LLC AND CYGNET ENERGY STORGAGE LLC
COMSTOCK TOWNSHIP
MI

SHEET NUMBER
C801



LANDSCAPE SUMMARY

NORTH GREENSPACE PLANTINGS FOR WEST PROPERTY:

REQUIRED GREENSPACE CANOPY TREES:	31 TREES = 1,019 L.F. / 100 L.F. * 3
PROVIDED GREENSPACE CANOPY TREES:	31 TREES = 23 PROPOSED + 8 EXISTING
REQUIRED GREENSPACE UNDERSTORY TREES:	62 TREES = 1,019 L.F. / 100 L.F. * 6
PROVIDED GREENSPACE UNDERSTORY TREES:	62 TREES
REQUIRED GREENSPACE CONIFEROUS TREES:	21 TREES = 1,019 L.F. / 100 L.F. * 2
PROVIDED GREENSPACE CONIFEROUS TREES:	21 TREES = 19 PROPOSED + 2 EXISTING
REQUIRED GREENSPACE SHRUBS:	92 SHRUBS = 1,019 L.F. / 100 L.F. * 9
PROVIDED GREENSPACE SHRUBS:	94 SHRUBS

NORTH GREENSPACE PLANTINGS FOR EAST PROPERTY:
- DENSE EXISTING VEGETATION, NO PROPOSED PLANTINGS.

EAST GREENSPACE PLANTINGS:
- A NATURAL COMPACT PLANTING AREA OF NARROW UPRIGHT EVERGREENS PLANTED AT 4.5' FEET ON CENTER PLANTED AT 45 DEGREE ALTERNATE SPACING. EVERGREEN SHRUB SCREENING PROPOSED DUE TO SITE CONSTRAINTS.
-

SOUTH GREENSPACE SCREENING:
- NO SCREENING PROVIDED DUE TO EXISTING TREES.

WEST GREENSPACE SCREENING:
- NO SCREENING PROVIDED DUE TO EXISTING TREES

LANDSCAPE LEGEND

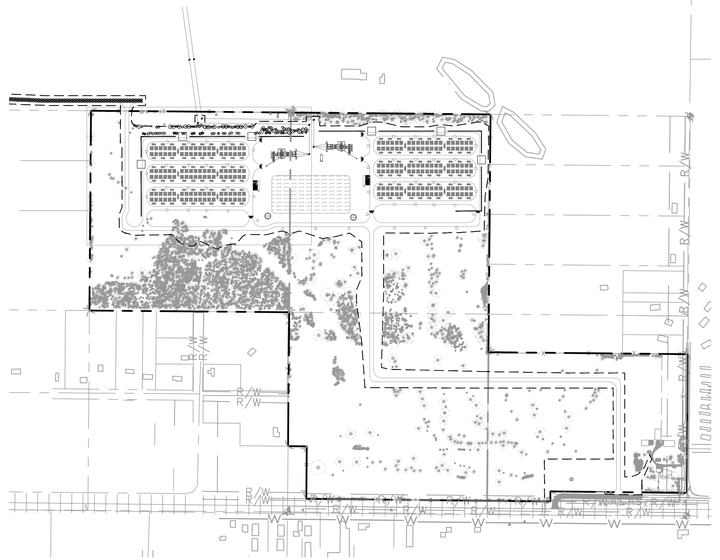
- APPROXIMATE LIMITS OF SEEDING, SEED ALL DISTURBED AREAS (TYP.)
- SEED / SOD EDGE (TYP.)
- MDOT CLASS A MIX (TYP.)
- BASIC SHORTGRASS PRAIRIE SEED MIX (TYP.)
- MESIC TALLGRASS PRAIRIE SEED MIX (TYP.)
- STORMWATER BASIN SEED MIX (TYP.)
- ROCK MULCH (TYP.)

SEEDING KEYNOTES

A	MDOT CLASS A MIX (TYP.)
SP	BASIC SHORTGRASS PRAIRIE SEED MIX (TYP.)
TP	MESIC TALLGRASS PRAIRIE SEED MIX (TYP.)
SB	STORMWATER BASIN SEED MIX (TYP.)

NORTH

GRAPHIC SCALE IN FEET
0 50 100 200



VICINITY MAP

NORTH

GRAPHIC SCALE IN FEET
0 250 500 1000

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KHA PROJECT 161262002
DATE 06/08/2026
SCALE AS SHOWN
DESIGNED BY CPK
DRAWN BY ATK
CHECKED BY CALW

GROUNDCOVER AND VEGETATION ESTABLISHMENT AND MANAGEMENT PLAN

SWAN BESS AND CYGNET BESS
PREPARED FOR
SWAN ENERGY STORAGE LLC AND CYGNET ENERGY STORGAGE LLC
COMSTOCK TOWNSHIP MI

SHEET NUMBER
L100

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MATCHLINE SEE L102

BMP 2B - SEDIMENT FOREBAY:
B/POND: 882.00'
T/POND: 885.00'

BMP 1 - WET DETENTION BASIN:
B/POND: 879.00'
T/POND: 885.00'
100-YR HWL: 884.81'

TREE TO REMAIN, PROTECT IN PLACE (TYP.)

SWALE - SEE STORM (TYP.)

FIRE WATER TANK (TYP.)

SEEDING KEYNOTES

A	MDOT CLASS A MIX (TYP.)
SP	BASIC SHORTGRASS PRAIRIE SEED MIX (TYP.)
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LANDSCAPE LEGEND

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- ROCK MULCH (TYP.)

NORTH

GRAPHIC SCALE IN FEET
0 25 50 100

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GROUNDCOVER AND VEGETATION ESTABLISHMENT ENLARGEMENT PLAN

SWAN BESS AND CYGNET BESS
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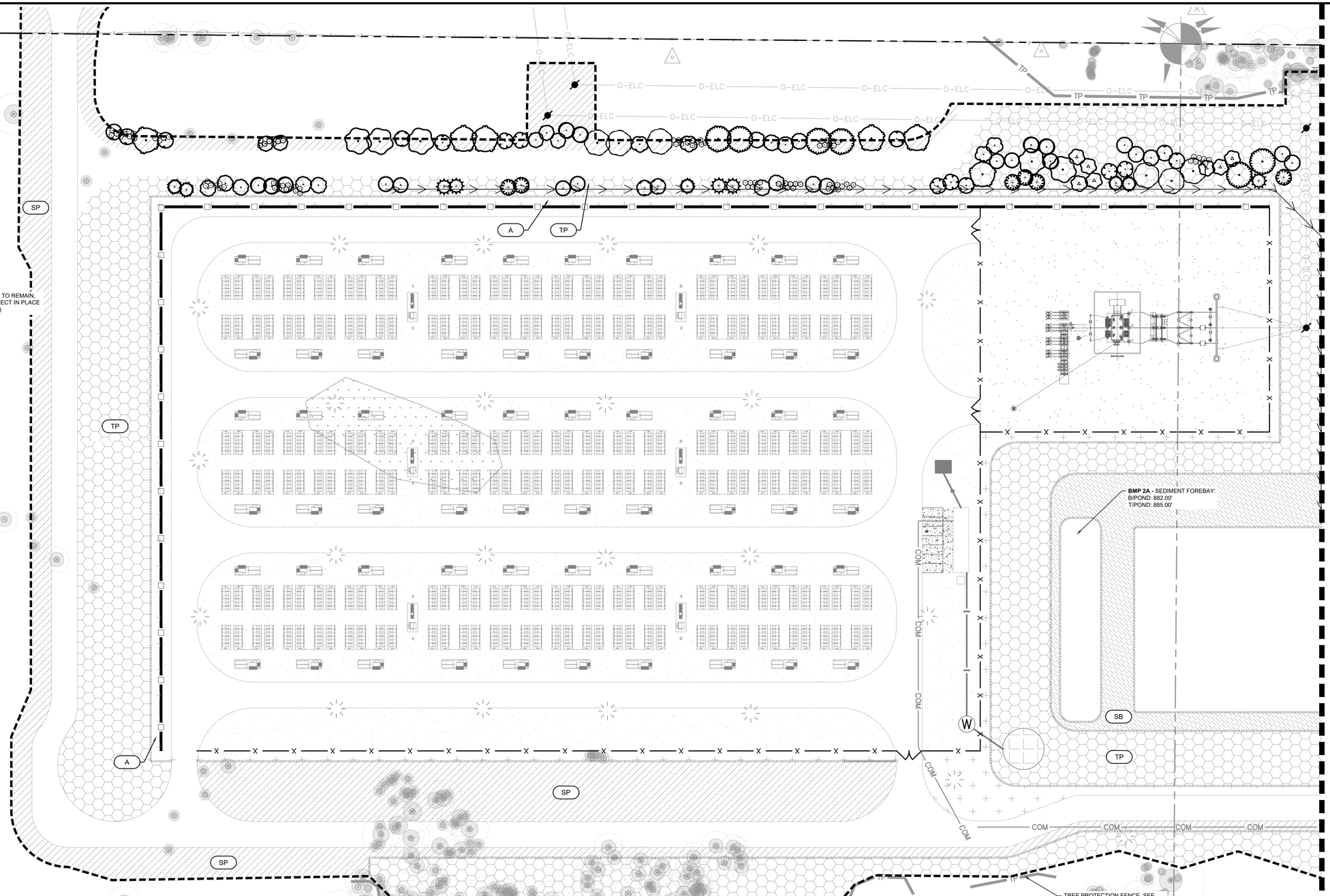

MATCHLINE SEE L101

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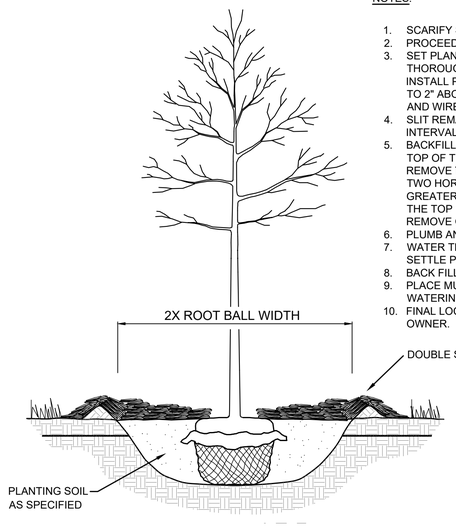
PLANT SCHEDULE

SYMBOL	CODE	QTY	COMMON NAME	BOTANICAL NAME	CAL	HT
CONIFEROUS TREE						
	ERC	5	EASTERN REDCEDAR	JUNIPERUS VIRGINIANA	B & B	5` HT.
	RDP	3	RED PINE	PINUS RESINOSA	B & B	5` HT.
	WHC	6	WHITE CEDAR	THUJA OCCIDENTALIS	B & B	5` HT.
	WHP	5	WHITE PINE	PINUS STROBUS	B & B	5` HT.
ORNAMENTAL TREE						
	ABS	4	AUTUMN BRILLIANCE APPLE SERVICEBERRY	AMELANCHIER X GRANDIFLORA 'AUTUMN BRILLIANCE'	B & B	1.5" CAL.
	AHB	8	AMERICAN HORNBEAM	CARPINUS CAROLINIANA	B & B	1.5" CAL.
	AMP	9	AMERICAN PLUM	PRUNUS AMERICANA	B & B	1.5" CAL.
	ERB	8	EASTERN REDBUD	CERCIS CANADENSIS	B & B	1.5" CAL.
	PPW	6	PAWPAW	ASIMINA TRILOBA	B & B	1.5" CAL.
	PRC	6	PRAIRIE ROSE CRABAPPLE	MALUS IOENSIS 'PRAIRIE ROSE'	B & B	1.5" CAL.
	PTB	9	PRAIRIE TORCH® BUCKEYE	AESCULUS X 'BERGESON'	B & B	1.5" CAL.
	RVB	7	RIVER BIRCH MULTI-TRUNK	BETULA NIGRA	B & B	6` HT.
	YWB	5	YELLOW BIRCH	BETULA ALLEGHANIENSIS	B & B	1.5" CAL.
OVERSTORY TREE						
	GMM	6	GREEN MOUNTAIN SUGAR MAPLE	ACER SACCHARUM `GREEN MOUNTAIN`	B & B	2" CAL.
	RDL	5	REDMOND AMERICAN LINDEN	TILIA AMERICANA `REDMOND`	B & B	2.5" CAL.
	RDO	6	RED OAK	QUERCUS RUBRA	B & B	2" CAL.
	SBH	6	SHAGBARK HICKORY	CARYA OVATA	B & B	2" CAL.

SYMBOL	CODE	QTY	COMMON NAME	BOTANICAL NAME	CONT	SPACING
DECIDUOUS SHRUBS						
	BTB	19	BUTTONBUSH	CEPHALANTHUS OCCIDENTALIS	BARE ROOT	5` O.C.
	GDW	20	GRAY DOGWOOD	CORNUS RACEMOSA	#5 CONT.	5` O.C.
	NBV	15	NANNYBERRY	VIBURNUM LENTAGO	BARE ROOT	5` O.C.
	ROD	24	RED-OSIER DOGWOOD	CORNUS SERICEA	#5 CONT.	5` O.C.
	SUM	16	SMOOTH SUMAC	RHUS GLABRA	BARE ROOT	5` O.C.
EVERGREEN SHRUBS						
	BFS	43	BOULEVARD FALSE-CYPRESS	CHAMAECYPARIS PISIFERA 'BOULEVARD'	#5 CONT.	4.5' O.C.
	RGA	54	RHEINGOLD ARBORVITAE	THUJA OCCIDENTALIS 'RHEINGOLD'	#5 CONT.	4.5' O.C.
	SPJ	42	SPARTAN JUNIPER	JUNIPERUS CHINENSIS 'SPARTAN'	#5 CONT.	4.5' O.C.
	TCA	28	TECHNY ARBORVITAE	THUJA OCCIDENTALIS 'TECHNY'	#5 CONT.	4.5' O.C.

NOTE:
QUANTITIES ON PLAN SUPERSEDE LIST QUANTITIES IN THE EVENT OF A DISCREPANCY.

ABBREVIATIONS:
B&B = BALLED AND BURLAPPED CAL. = CALIPER HT. = HEIGHT MIN. = MINIMUM
O.C. = ON CENTER SP. = SPECIES QTY. = QUANTITY



NOTES:

1. SCARIFY SIDES AND BOTTOM OF HOLE.
2. PROCEED WITH CORRECTIVE PRUNING.
3. SET PLANT ON UNDISTURBED NATIVE SOIL OR THOROUGHLY COMPACTED PLANTING SOIL. INSTALL PLANT SO THE ROOT FLARE IS AT OR UP TO 2" ABOVE THE FINISHED GRADE WITH BURLAP AND WIRE BASKET, (IF USED), INTACT.
4. SLIT REMAINING TREATED BURLAP AT 6" INTERVALS.
5. BACKFILL TO WITHIN APPROXIMATELY 12" OF THE TOP OF THE ROOTBALL, THEN WATER PLANT. REMOVE THE TOP 1/3 OF THE BASKET OR THE TOP TWO HORIZONTAL RINGS WHICHEVER IS GREATER. REMOVE ALL BURLAP AND NAILS FROM THE TOP 1/3 OF THE BALL. REMOVE ALL TWINE. REMOVE OR CORRECT STEM GIRDLING ROOTS.
6. PLUMB AND BACKFILL WITH PLANTING SOIL.
7. WATER THOROUGHLY WITHIN 2 HOURS TO SETTLE PLANTS AND FILL VOIDS.
8. BACK FILL VOIDS AND WATER SECOND TIME.
9. PLACE MULCH WITHIN 48 HOURS OF THE SECOND WATERING UNLESS SOIL MOISTURE IS EXCESSIVE.
10. FINAL LOCATION OF TREE TO BE APPROVED BY OWNER.

1 TREE PLANTING DETAIL

SCALE: N.T.S. L200

NOTES:

1. SCARIFY SIDES AND BOTTOM OF HOLE.
2. PROCEED WITH CORRECTIVE PRUNING OF TOP AND ROOT.
3. REMOVE CONTAINER AND SCORE OUTSIDE OF SOIL MASS TO REDIRECT AND PREVENT CIRCLING FIBROUS ROOTS. REMOVE OR CORRECT STEM GIRDLING ROOTS.
4. PLUMB AND BACKFILL WITH PLANTING SOIL.
5. WATER THOROUGHLY WITHIN 2 HOURS TO SETTLE PLANTS AND FILL VOIDS.
6. BACK FILL VOIDS AND WATER SECOND TIME.
7. PLACE MULCH WITHIN 48 HOURS OF THE SECOND WATERING UNLESS SOIL MOISTURE IS EXCESSIVE.
8. MIX IN 3-4" OF ORGANIC COMPOST.

2 SHRUB / PERENNIAL PLANTING DETAIL

SCALE: N.T.S. L200

LANDSCAPE NOTES

PLANTING

1. CONTACT COMMON GROUND ALLIANCE AT 811 OR CALL811.COM TO VERIFY LOCATIONS OF ALL UNDERGROUND UTILITIES PRIOR TO INSTALLATION OF ANY PLANTS OR LANDSCAPE MATERIAL.
2. ACTUAL LOCATION OF PLANT MATERIAL IS SUBJECT TO FIELD AND SITE CONDITIONS.
3. NO PLANTING WILL BE INSTALLED UNTIL ALL GRADING AND CONSTRUCTION HAS BEEN COMPLETED IN THE IMMEDIATE AREA.
4. ALL SUBSTITUTIONS MUST BE APPROVED BY THE LANDSCAPE ARCHITECT PRIOR TO SUBMISSION OF ANY BID AND/OR QUOTE BY THE LANDSCAPE CONTRACTOR.
5. PROVIDE TWO YEAR GUARANTEE OF ALL PLANT MATERIALS. THE GUARANTEE BEGINS ON THE DATE OF THE LANDSCAPE ARCHITECT'S OR OWNER'S WRITTEN ACCEPTANCE OF THE INITIAL PLANTING. REPLACEMENT PLANT MATERIAL SHALL HAVE A ONE YEAR GUARANTEE COMMENCING UPON PLANTING.
6. ALL PLANTS TO BE SPECIMEN GRADE, MICHIGAN-GROWN AND/OR HARDY. SPECIMEN GRADE SHALL ADHERE TO, BUT IS NOT LIMITED BY, THE FOLLOWING STANDARDS:
   ALL PLANTS SHALL BE FREE FROM DISEASE, PESTS, WOUNDS, SCARS, ETC.
   ALL PLANTS SHALL BE FREE FROM NOTICEABLE GAPS, HOLES, OR DEFORMITIES.
   ALL PLANTS SHALL BE FREE FROM BROKEN OR DEAD BRANCHES.
   ALL PLANTS SHALL HAVE HEAVY, HEALTHY BRANCHING AND LEAFING.
   CONIFEROUS TREES SHALL HAVE AN ESTABLISHED MAIN LEADER AND A HEIGHT TO WIDTH RATIO OF NO LESS THAN 5:3.
7. PLANTS TO MEET AMERICAN STANDARD FOR NURSERY STOCK (ANSI Z60.1-2014 OR MOST CURRENT VERSION) REQUIREMENTS FOR SIZE AND TYPE SPECIFIED.
8. PLANTS TO BE INSTALLED AS PER ANSI STANDARD PLANTING PRACTICES.
9. INSTALL PLANTS BY PLANT INSTALLATION PERIOD INFORMATION IN THE LATEST STANDARD PLANTING DETAILS FROM MDOT. PLANTINGS BEFORE OR AFTER THESE DATES ARE DONE AT RISK.
10. PLANTS SHALL BE IMMEDIATELY PLANTED UPON ARRIVAL AT SITE. PROPERLY HEEL-IN MATERIALS IF NECESSARY; TEMPORARY ONLY.
11. PRIOR TO PLANTING, FIELD VERIFY THAT THE ROOT COLLAR/ROOT FLARE IS LOCATED AT THE TOP OF THE BALLED & BURLAP TREE. IF THIS IS NOT THE CASE, SOIL SHALL BE REMOVED DOWN TO THE ROOT COLLAR/ROOT FLARE. WHEN THE BALLED & BURLAP TREE IS PLANTED, THE ROOT COLLAR/ROOT FLARE SHALL BE EVEN OR SLIGHTLY ABOVE FINISHED GRADE.
12. OPEN TOP OF BURLAP ON BB MATERIALS; REMOVE POT ON POTTED PLANTS; SPLIT AND BREAK APART PEAT POTS.
13. PRUNE PLANTS AS NECESSARY - PER STANDARD NURSERY PRACTICE AND TO CORRECT POOR BRANCHING OF EXISTING AND PROPOSED TREES.
14. WRAP ALL SMOOTH-BARKED TREES - FASTEN TOP AND BOTTOM. REMOVE BY APRIL 1ST.
15. STAKING OF TREES AS REQUIRED; REPOSITION, PLUMB AND STAKE IF NOT PLUMB AFTER ONE YEAR.

SOIL

16. TOPSOIL SHALL BE LOCAL FERTILE AGRICULTURAL SOIL FREE OF SUBSOILS, ROCKS LARGER THAN ONE INCH, CLAYS, PLANTS, WEEDS, ROOTS AND OTHER IMPURITIES. PH VALUE TO BE BETWEEN 5.4 AND 7.0. REMOVE DEBRIS AND WEEDS FROM SUBSOIL. MINIMUM 4" DEPTH TOPSOIL FOR ALL LAWN GRASS AREAS AND 12" DEPTH TOPSOIL FOR TREES, SHRUBS AND PERENNIALS. LIGHTLY COMPACT TOPSOIL AFTER PLACEMENT AND PROHIBIT CONSTRUCTION TRAFFIC FROM AREAS WITH TOPSOIL.
17. THE NEED FOR SOIL AMENDMENTS SHALL BE DETERMINED UPON SITE SOIL CONDITIONS PRIOR TO PLANTING. LANDSCAPE CONTRACTOR SHALL NOTIFY LANDSCAPE ARCHITECT FOR THE NEED OF ANY SOIL AMENDMENTS.

MULCH

18. MULCH TO BE AT ALL TREE, SHRUB, PERENNIAL, AND MAINTENANCE AREAS. TREE AND SHRUB PLANTING BEDS SHALL HAVE 4" DEPTH OF DOUBLE SHREDDED HARDWOOD MULCH. DOUBLE SHREDDED HARDWOOD MULCH TO BE USED AROUND ALL PLANTS WITHIN TURF AREAS. PERENNIAL AND ORNAMENTAL GRASS BEDS SHALL HAVE 2" DEPTH DOUBLE SHREDDED HARDWOOD MULCH. MULCH TO BE FREE OF DELETERIOUS MATERIAL AND NATURAL IN COLOR (DYE-FREE), OR APPROVED EQUAL. APPLY PRE-EMERGENT HERBICIDE PRIOR TO MULCH PLACEMENT PER MANUFACTURER RECOMMENDATIONS, USE PREEN OR PRE-APPROVED EQUAL. ROCK MULCH TO BE ON COMMERCIAL GRADE FILTER FABRIC, BY TYPAR, OR APPROVED EQUAL WITH NO EXPOSURE. MULCH AND FABRIC TO BE APPROVED BY OWNER PRIOR TO INSTALLATION. MULCH TO MATCH EXISTING CONDITIONS (WHERE APPLICABLE).

SEED/SOD

19. ALL DISTURBED AREAS TO BE SEEDED, UNLESS OTHERWISE NOTED. ALL TOPSOIL AREAS TO BE RAKED TO REMOVE DEBRIS AND ENSURE DRAINAGE. SLOPES OF 3:1 OR GREATER SHALL BE STAKED. SEED AS SPECIFIED, PER MDOT SPECIFICATIONS AND SUPPLIER/MANUFACTURER RECOMMENDATIONS. IF NOT INDICATED ON LANDSCAPE PLAN, SEE EROSION CONTROL PLAN.

ESTABLISHMENT

20. PROVIDE NECESSARY WATERING OF PLANT MATERIALS UNTIL THE PLANT IS FULLY ESTABLISHED OR IRRIGATION SYSTEM IS OPERATIONAL. OWNER WILL NOT PROVIDE WATER FOR CONTRACTOR.
21. REPAIR, REPLACE, OR PROVIDE SOD/SEED AS REQUIRED FOR ANY ROADWAY BOULEVARD AREAS ADJACENT TO THE SITE DISTURBED DURING CONSTRUCTION.

WARRANTY

22. REPAIR ALL DAMAGE TO PROPERTY FROM PLANTING OPERATIONS AT NO COST TO OWNER.
23. MAINTAIN TREES, SHRUBS, SEED AND OTHER PLANTS UNTIL PROJECT COMPLETION, BUT IN NO CASE, LESS THAN FOLLOWING PERIOD; 1 YEAR AFTER PROJECT COMPLETION. MAINTAIN TREES, SHRUBS, SEED AND OTHER PLANTS BY PRUNING, CULTIVATING, AND WEEDING AS REQUIRED FOR HEALTHY GROWTH. RESTORE PLANTING SAUCERS. TIGHTEN AND REPAIR STAKE AND GUY SUPPORTS AND RESET TREES AND SHRUBS TO PROPER GRADES OR VERTICAL POSITION AS REQUIRED. RESTORE OR REPLACE DAMAGED WRAPPINGS. SPRAY AS REQUIRED TO KEEP TREES AND SHRUBS FREE OF INSECTS AND DISEASE. REPLENISH MULCH TO THE REQUIRED DEPTH. MAINTAIN LAWNS FOR 60 DAYS AFTER INSTALLING SOD INCLUDING MOWING WHEN SOD RECITES 4" IN HEIGHT. WEED PLANTING BEDS AND MULCH SAUCERS AT MINIMUM ONCE A MONTH DURING THE GROWING SEASON. PROVIDE A MONTHLY REPORT TO THE OWNER ON WEEDING AND OTHER MAINTENANCE RESPONSIBILITIES.

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MDOT CLASS A SEED MIX

SEED	MINIMUM PURITY	MINIMUM GERMINATION	MIXTURE
CREEPING RED FESCUE	98.5%	85%	40%
KENTUCKY BLUE GRASS	98.5%	75%	30%
PERENNIAL RYEGRASS	99.5%	85%	30%

Native Connections
3815 N Westnedge Ave, Kalamazoo, MI 49004
(P) 269.459.6900
info@nativeconnections.net
www.nativeconnections.net

Basic Mesic Tallgrass Prairie Mix

This is the base version of our Mesic Tallgrass Prairie Mix. The lower diversity and seed density still provide more than adequate coverage to establish a simple tallgrass prairie in dry to mesic soils.

Total Seeding Rate: 31.28 lbs per acre
3.88 lbs grasses • 2.41 lbs forbs • 25 lbs nurse crop
39.42 native seeds per sq ft • up to 8 ft

Call, email or visit our website for pricing.

Grasses		PLS Oz/acre	Seeds/sq ft
Andropogon gerardii	Big Bluestem	10.00	2.30
Elymus canadensis	Canada Wild Rye	16.00	1.91
Panicum virgatum	Switchgrass	8.00	2.57
Schizachyrium scoparium	Little Bluestem	20.00	6.89
Sorghastrum nutans	Indian Grass	8.00	2.20
	Total Grasses	**62.00**	**15.87**

Forbs		PLS Oz/acre	Seeds/sq ft
Asclepias syriaca	Common Milkweed	2.00	0.18
Asclepias tuberosa	Butterfly Milkweed	2.00	0.20
Baptisia lactea (B. leucantha, B. alba)	White Wild Indigo	1.00	0.04
Chamaecrista fasciculata	Partridge Pea	8.00	0.50
Echinacea purpurea	Purple Coneflower	6.00	0.91
Heliopsis helianthoides	False sunflower	4.00	0.58
Liatris spicata	Marsh Blazingstar	1.50	0.38
Monarda fistulosa	Wild Bergamot	2.00	3.21
Penstemon digitalis	Foxglove Beardtongue	1.50	4.48
Ratibida pinnata	Yellow Coneflower	2.50	1.72
Rudbeckia hirta	Black-eyed Susan	4.00	8.45
Silphium integrifolium	Rosinweed	0.25	0.01
Solidago rigida	Stiff Goldenrod	1.00	0.94
Symphyotrichum novae-angliae	New England Aster	1.00	1.52
Zizia aurea	Golden Alexander	1.75	0.44
	Total Forbs	**38.50**	**23.56**

Temporary Grass Cover		Oz/acre	Seeds/sq ft
Lolium multiflorum	Annual Ryegrass	80.00	24.79
Avena sativa	Seed Oats	320.00	7.35
	Total Temp Grasses	**400.00**	**32.14**

Native Connections
3815 N Westnedge Ave, Kalamazoo, MI 49004
(P) 269.459.6900
info@nativeconnections.net
www.nativeconnections.net

Stormwater Mix

This mix is designed to withstand the low water quality and highly variable condtions associated with stormwater features. Most of the species are salt tolerant and most species will do well in mesic to wet hydrology with others filling in the wettest and driest ends of the spectrum. The high native seed count and heavy annual nurse crop in this mix ensure full and aggressive establishment.

Total Seeding Rate: 35.98 lbs per acre
3.13 lbs grasses • 2.85 lbs forbs • 30 lbs nurse crop
113.11 native seeds per sq ft

Call, email or visit our website for pricing.

Grasses, Sedges & Rushes		PLS Oz/acre	Seeds/sq ft
Andropogon gerardii	Big Bluestem	3.00	0.69
Carex vulpinoidea	Fox Sedge	2.00	4.59
Eleocharis palustris	Great Spike Rush	0.40	0.47
Elymus canadensis	Canada Wild Rye	12.00	1.430
Elymus virginicus	Virginia Wild Rye	12.00	1.16
Glyceria striata	Fowl Manna Grass	1.20	4.410
Juncus effusus	Soft Rush	0.40	9.18
Juncus tenuis	Path Rush	0.40	9.18
Panicum virgatum	Switchgrass	4.00	1.29
Schizachyrium scoparium	Little Bluestem	8.00	2.750
Scirpus cyperinus	Wool Grass	0.40	15.610
Scirpus validus (S. tabernaemontanii)	Soft-stem Bulrush	1.00	0.85
Sorghastrum nutans	Indian Grass	4.00	0.83
Spartina pectinata	Prairie Cordgrass	2.00	0.300
	Total Grasses	**50.80**	**52.74**

Forbs		PLS Oz/acre	Seeds/sq ft
Allium cernuum	Nodding Wild Onion	2.00	0.35
Asclepias incarnata	Swamp Milkweed	2.40	0.26
Asclepias tuberosa	Butterfly Milkweed	2.40	0.24
Bidens cernua	Nodding Bur Marigold	0.80	0.39
Doellingeria umbellata	Flat-topped Aster	0.40	0.62
Echinacea purpurea	Purple Coneflower	8.00	1.21
Eutrochium purpureum	Sweet Joe Pye Weed	1.20	1.16
Helenium autumnale	Sneezeweed	0.80	2.39
Heliopsis helianthoides	False sunflower	4.00	0.58
Lobelia siphilitica	Great Blue Lobelia	0.40	4.59
Mimulus ringens	Monkey Flower	0.40	21.12
Monarda fistulosa	Wild Bergamot	0.80	1.29
Penstemon digitalis	Foxglove Beardtongue	1.20	3.58
Physostegia virginiana	Obedient Plant	0.40	0.10
Polygonum pensylvanicum (Persicaria p.)	Pennsylvania Smartweed	4.00	1.19
Pycnanthemum virginianum	Mountain mint	0.40	2.02
Ratibida pinnata	Yellow Coneflower	1.60	1.10
Rudbeckia hirta	Black-eyed Susan	6.00	12.67
Senna hebecarpa	Wild Senna	4.00	0.13
Solidago riddellii	Riddell's Goldenrod	0.40	0.85
Symphyotrichum novae-angliae	New England Aster	0.40	0.61
Verbena hastata	Blue Vervain	1.60	3.42
Zizia aurea	Golden Alexander	2.00	0.51
	Total Forbs	**45.60**	**60.38**

Temporary Grass Cover		Oz/acre	Seeds/sq ft
Lolium multiflorum	Annual Ryegrass	112.00	34.71
Avena sativa	Seed Oats	368.00	8.45
	Total Temp Grasses	**480.00**	**43.16**

Native Connections
3815 N Westnedge Ave, Kalamazoo, MI 49004
(P) 269.459.6900
info@nativeconnections.net
www.nativeconnections.net

Basic Shortgrass Prairie Mix

This is the economy version of our Dry Shortgrass Prairie Mix. Though the diversity and seed density are greatly reduced, this is a great starter prairie where a low stature on dry soils is needed or desired.

Total Seeding Rate: 31.25 lbs per acre
4 lbs grasses • 2.25 lbs forbs • 25 lbs nurse crop
43 native seeds per sq ft

Call, email or visit our website for pricing.

Grasses		PLS Oz/acre	Seeds/sq ft
Bouteloua curtipendula	Side-oats Grama	22.00	3.03
Carex brevior	Plains Oval Sedge	1.00	0.67
Elymus canadensis	Canada Wild Rye	8.50	1.01
Koeleria cristata	June Grass	0.25	1.15
Schizachyrium scoparium	Little Bluestem	32.00	11.02
Sporobolus heterolepis	Prairie Dropseed	0.25	0.09
	Total Grasses	**64.00**	**16.97**

Forbs		PLS Oz/acre	Seeds/sq ft
Asclepias tuberosa	Butterfly Milkweed	0.50	0.05
Aster azureus (A. oolentangiensis)	Arrow-leaved Aster	0.50	0.92
Cassia fasciculata (Chamaecrista f.)	Partridge Pea	8.00	0.50
Coreopsis lanceolata	Lance-leaf Coreopsis	7.00	3.21
Dalea purpurea (Petalostemum p.)	Purple Prairie Clover	4.00	1.65
Echinacea purpurea	Purple Coneflower	7.00	1.06
Monarda fistulosa	Wild Bergamot	0.50	0.80
Penstemon digitalis	Foxglove Beardtongue	0.50	1.49
Potentilla arguta (Drymocallis a.)	Prairie Cinquefoil	0.50	2.64
Ratibida pinnata	Yellow Coneflower	0.70	0.48
Rudbeckia hirta	Black-eyed Susan	5.25	11.09
Solidago nemoralis	Old-field Goldenrod	0.25	1.72
Solidago rigida	Stiff Goldenrod	0.70	0.66
Verbena stricta	Hoary Vervain	0.60	0.39
	Total Forbs	**36.00**	**26.66**

Temporary Grass Cover		Oz/acre	Seeds/sq ft
Lolium multiflorum	Annual Ryegrass	80.00	24.79
Avena sativa	Seed Oats	320.00	7.35
	Total Temp Grasses	**400.00**	**32.14**

PERFORMANCE STANDARDS

SATISFACTORY GROUNDCOVER DEVELOPMENT ASSOCIATED WITH NATURALIZED VEGETATION SHOULD BE EVALUATED AT EACH MONITORING PERIOD AND BASED ON THE FOLLOWING CRITERIA.

UPON COMPLETION OF PROJECT CONSTRUCTION:

ALL DISTURBED AREAS OR AREAS IDENTIFIED AS BARE SOILS MEASURING ONE SQUARE METER WITH NO VEGETATION SHOULD RECEIVE EITHER TEMPORARY COVER CROP OR PERMANENT SEED APPLICATION. NO AREAS OF BARE SOILS SHOULD REMAIN AFTER SUBSTANTIAL COMPLETION OF THE PROJECT.

THREE MONTHS AFTER SEEDING:

WITHIN THREE MONTHS OF SEED APPLICATION, OR THREE MONTHS AFTER THE START OF THE GROWING SEASON FOLLOWING DORMANT SEEDING, APPROXIMATELY 60 PERCENT OF THE SEEDED AREA (EXCLUDING PAVING OR OTHER HARDSCAPE AREAS), AS MEASURED BY AERIAL COVER, SHOULD BE VEGETATED OR OTHERWISE STABILIZED AGAINST EROSION. TEMPORARY COVER CROP MAY BE INCLUDED IN STABILIZATION AND SEEDED AREA PERCENTAGE. SUPPLEMENTAL USE OF STRAW MULCH OR BLANKET SHOULD NOT BE INCLUDED IN THE SEEDED AREA PERCENTAGE, UNLESS NEW GROWTH GERMINATION IS IDENTIFIED WITHIN THE STRAW OR BLANKETED AREAS. ANY AREAS OF IDENTIFIED BARE SOILS MEASURING ONE SQUARE METER OR MORE WITH NO VEGETATION SHOULD BE RE-SEEDED.

AFTER THE FIRST YEAR:

BY THE END OF THE FIRST FULL GROWING SEASON, ALL SEEDED AREAS SHOULD HAVE 80 PERCENT MINIMUM VEGETATION (EXCLUDING PAVING OR OTHER HARDSCAPE AREAS), AS MEASURED BY AERIAL COVER. TEMPORARY COVER CROP MAY BE INCLUDED IN SEEDED AREA PERCENTAGES. ANY AREAS OF IDENTIFIED BARE SOILS MEASURING ONE SQUARE METER OR MORE WITH NO VEGETATION SHOULD BE RE-SEEDED.

AFTER THE SECOND YEAR:

BY THE END OF THE SECOND GROWING SEASON, ALL SEEDED AREAS SHOULD HAVE A MINIMUM OF 90 PERCENT VEGETATION GROUND COVER, OF WHICH 50 PERCENT SHOULD BE NATIVE AND NATURALIZED SPECIES IDENTIFIED IN FINAL SEED MIX (EXCLUDING PAVING OR OTHER HARDSCAPE AREAS). NATIVE AND NATURALIZED SPECIES PERCENTAGE SHOULD NOT INCLUDE TEMPORARY COVER CROP, EROSION CONTROL MEASURES, OR UNDESIRABLE AND INVASIVE PLANT SPECIES. ANY AREAS OF IDENTIFIED BARE SOILS MEASURING ONE SQUARE METER OR MORE WITH NO VEGETATION SHOULD BE RE-SEEDED.

AFTER THE THIRD YEAR, AND SUBSEQUENT YEARS:

BY THE END OF THE THIRD GROWING SEASON, ALL SEEDED AREAS SHOULD HAVE A MINIMUM OF 75 PERCENT GROUND COVER BY NATIVE AND NATURALIZED SPECIES IDENTIFIED IN FINAL SEED MIX (EXCLUDING PAVING OR OTHER HARDSCAPE AREAS). THIS SHOULD NOT INCLUDE TEMPORARY COVER CROP, EROSION CONTROL MEASURES, OR UNDESIRABLE AND INVASIVE PLANT SPECIES. NO AREAS IDENTIFIED AS BARE SOILS OF ONE SQUARE METER OR LARGER SHOULD BE PRESENT WITHIN SEEDED AREAS. ANY AREAS OF IDENTIFIED BARE SOILS MEASURING ONE SQUARE METER OR MORE WITH NO VEGETATION SHOULD BE RE-SEEDED.

IF PERFORMANCE STANDARDS ARE NOT MET AT EACH OBSERVATION PERIOD, THE LANDSCAPE CONTRACTOR SHOULD NOTIFY THE OWNER AND PROPOSE CORRECTIVE ACTION IN ORDER TO MEET THE PERFORMANCE STANDARD BY THE NEXT OBSERVATION PERIOD. CORRECTIVE ACTION MAY INCLUDE OVERSEEDING, ESPECIALLY AREAS IDENTIFIED WITH BARE SOILS, ADDITIONAL EROSION CONTROL MEASURES, OR HERBICIDE TREATMENTS.

GROUNDCOVER MAINTENANCE AND MONITORING

A THREE-YEAR STEWARDSHIP PROGRAM IS NECESSARY TO ENSURE PROPER ESTABLISHMENT AND HEALTH OF GROUND COVER, TO CONTROL INVASIVE SPECIES, AND TO PREVENT OVERGROWTH AND SHADING OF EQUIPMENT. AFTER THE THIRD GROWING SEASON, THE PROGRAM IS TO BE REDUCED TO A MINIMUM OF ONE VISIT PER YEAR, DEPENDENT UPON SITE CONDITIONS AND REQUIRED STRATEGIES TO MAINTAIN GOOD HEALTH OF THE SITE SUCH AS DETHATCHING, ADDITIONAL MOWING, OR HERBICIDE TREATMENTS. ALL ASSESSMENTS MADE DURING MONITORING VISITS SHOULD IDENTIFY ANY PRESENCE OF INVASIVE SPECIES AS DEFINED BY THE MINNESOTA BOARD OF WATER AND SOIL RESOURCES, INCLUDING ADDITIONAL SPECIES OF INVASIVE OR WEEDY VEGETATION AS DEFINED BY THE MINNESOTA DEPARTMENT OF NATURAL RESOURCES, UNIVERSITY OF MINNESOTA, AND THE U.S. DEPARTMENT OF AGRICULTURE. ASSESSMENTS SHOULD INCLUDE PLANNED ACTION TO MANAGE AND REMOVE IDENTIFIED WEEDY SPECIES.

FIRST YEAR:

THE EARLIEST POSSIBLE SEED APPLICATION MAY OCCUR IN THE SPRING OF THE FIRST YEAR. NO MAINTENANCE ACTIONS ARE REQUIRED TO BE PERFORMED DURING THE FIRST SEASON OF APPLICATION. IF SEED APPLICATION TAKES PLACE IN SUMMER OR FALL OF THE FIRST YEAR, MAINTENANCE AND MONITORING SHOULD START THE FOLLOWING SEASON.

SITE VISITS ARE RECOMMENDED TO BE PERFORMED ONE TO THREE TIMES THROUGHOUT THE SUMMER AND AN ADDITIONAL ONE TO THREE TIMES THROUGHOUT THE FALL, WITH MONITORING AND EVALUATION OF VEGETATION HEIGHT AND PRESENCE OF INVASIVE SPECIES OCCURRING AT EACH VISIT. IF WEEDY SPECIES ARE IDENTIFIED DURING AN OBSERVATION, MEASURES TO CONTROL INVASIVE WOODY AND HERBACEOUS FLORA THROUGH PHYSICAL REMOVAL OR SPOT HERBICIDE TREATMENTS ARE REQUIRED. MOWING SHOULD BE CONDUCTED DURING THE FIRST YEAR IN AREAS OF THE SITE IDENTIFIED TO HAVE VEGETATION OVER 18 INCHES IN HEIGHT. AREAS WITH GROUNDCOVER HEIGHT UNDER 18 INCHES MAY REMAIN UNTIL THE NEXT SCHEDULED MONITORING VISIT. NEWLY SEEDED AREAS SHOULD BE CUT BACK TO 9 INCHES IN HEIGHT, IF POSSIBLE, AS THE LOWER MOWING HEIGHT HELPS TO REDUCE OPPORTUNISTIC WEEDY SPECIES.

SECOND YEAR:

SITE VISITS ARE RECOMMENDED TO BE PERFORMED ONE TO THREE TIMES THROUGHOUT THE SPRING, SUMMER, AND FALL, WITH MONITORING AND EVALUATION OF VEGETATION HEIGHT AND PRESENCE OF INVASIVE SPECIES OCCURRING AT EACH VISIT. DURING THE FIRST VISIT OF THE YEAR, MOWING SHOULD OCCUR TO CUT BACK ANY VEGETATION TO A HEIGHT OF 9 INCHES AND REMOVE DEAD STALKS AND SEED HEADS FROM THE PREVIOUS GROWING SEASON. IF WEEDY SPECIES ARE IDENTIFIED DURING AN OBSERVATION, MEASURES TO CONTROL INVASIVE WOODY AND HERBACEOUS FLORA THROUGH PHYSICAL REMOVAL OR SPOT HERBICIDE TREATMENTS ARE REQUIRED.

MOWING SHOULD BE CONDUCTED AT EACH ADDITIONAL VISIT IN AREAS OF THE SITE IDENTIFIED TO HAVE VEGETATION OVER 24 INCHES IN HEIGHT. AREAS WITH GROUNDCOVER HEIGHT UNDER 24 INCHES MAY REMAIN UNTIL THE NEXT SCHEDULED MONITORING VISIT. VEGETATIVE AREAS SHOULD BE CUT BACK TO 12 INCHES IN HEIGHT.

THIRD YEAR:

SITE VISITS ARE RECOMMENDED TO BE PERFORMED ONE-TO-TWO TIMES DURING THE EARLY SPRING, SUMMER, AND FALL WITH MONITORING AND EVALUATION OF VEGETATION HEIGHT AND PRESENCE OF INVASIVE SPECIES OCCURRING AT EACH VISIT. DURING THE FIRST VISIT OF THE YEAR, MOWING SHOULD OCCUR TO CUT BACK ANY VEGETATION TO A HEIGHT BETWEEN 9 AND 12 INCHES TO REMOVE DEAD STALKS AND SEED HEADS FROM THE PREVIOUS GROWING SEASON. IF WEEDY SPECIES ARE IDENTIFIED DURING AN OBSERVATION, MEASURES TO CONTROL INVASIVE WOODY AND HERBACEOUS FLORA THROUGH PHYSICAL REMOVAL OR SPOT HERBICIDE TREATMENTS ARE REQUIRED.

MOWING SHOULD BE CONDUCTED IN AREAS OF THE SITE IDENTIFIED TO HAVE VEGETATION OVER 36 INCHES IN HEIGHT. AREAS WITH GROUNDCOVER HEIGHT UNDER 36 INCHES MAY REMAIN UNTIL THE NEXT SCHEDULED MONITORING VISIT. VEGETATIVE AREAS SHOULD BE CUT BACK TO 12 INCHES IN HEIGHT.

FOLLOWING THE THIRD YEAR:

SITE VISITS ARE RECOMMENDED TO BE PERFORMED AT LEAST ONCE A YEAR, DURING THE EARLY SPRING, WITH MONITORING AND EVALUATION OF VEGETATION HEIGHT AND PRESENCE OF INVASIVE SPECIES OCCURRING DURING THE VISIT. DURING THE SPRING, MOWING SHOULD OCCUR TO CUT BACK ANY VEGETATION TO A HEIGHT BETWEEN 9 AND 12 INCHES TO REMOVE DEAD STALKS AND SEED HEADS FROM THE PREVIOUS GROWING SEASON. IF WEEDY SPECIES ARE IDENTIFIED DURING AN OBSERVATION, MEASURES TO CONTROL INVASIVE WOODY AND HERBACEOUS FLORA THROUGH PHYSICAL REMOVAL OR SPOT HERBICIDE TREATMENTS ARE REQUIRED.

FOR THE REMAINDER OF THE YEAR, MOWING MAY ONLY BE NECESSARY IN AREAS THAT ARE IDENTIFIED TO HAVE INVASIVE OR WEEDY VEGETATION. VEGETATIVE AREAS SHOULD BE CUT BACK TO 12 INCHES IN HEIGHT.

No.	REVISIONS	DATE	BY
1	ENTITLEMENT SET	06/08/2026	BPG

Kimley»Horn of Michigan, Inc.
3000 TOWN CENTER, SUITE 2600
SOUTHFIELD, MI 48075
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Copenhagen Infrastructure Partners

KHA PROJECT	161262002
DATE	06/08/2026
SCALE	AS SHOWN
DESIGNED BY	CFK
DRAWN BY	ATK
CHECKED BY	CALW

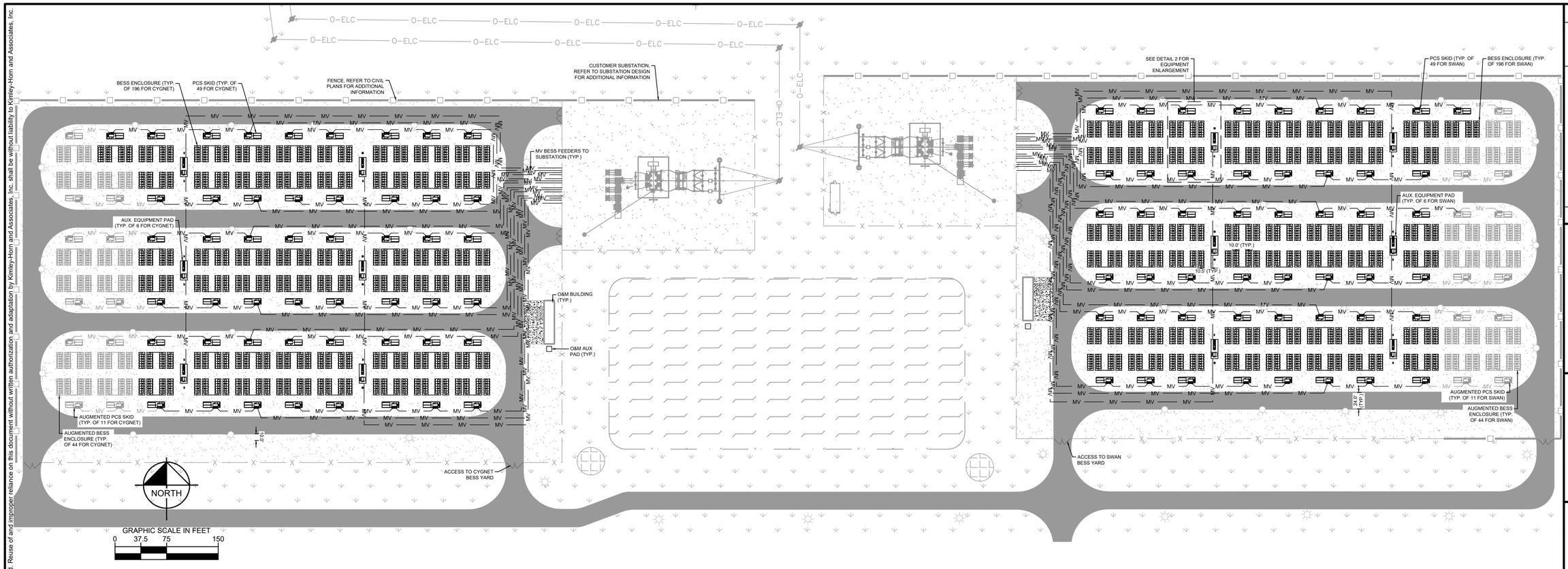
ISSUED FOR PERMIT - NOT FOR CONSTRUCTION

SWAN BESS AND CYGNET BESS
PREPARED FOR
SWAN ENERGY STORAGE LLC AND CYGNET ENERGY STORGAGE LLC
COMSTOCK TOWNSHIP MI

LANDSCAPE DETAILS

SHEET NUMBER
L201

MISS DIG 811



GENERAL NOTES:

1. CONTRACTOR TO VERIFY EXISTING SITE CONDITIONS AND EQUIPMENT LOCATIONS PRIOR TO STARTING ANY WORK.
2. CONDUIT ROUTING IS SHOWN DIAGRAMMATICALLY ON PLANS AND IS ONLY AN APPROXIMATION. THE EXACT ROUTING SHALL BE FIELD VERIFIED AND INSTALLED PER JURISDICTIONAL, MANUFACTURER, AND CLIENT REQUIREMENTS.
3. REFER TO CIVIL PLANS FOR ROAD AND OTHER CIVIL FEATURES.
4. GRAYED OUT EQUIPMENT IS TO BE INSTALLED AT A LATER DATE AS PART OF AUGMENTATION SCOPE.
5. CONTRACTOR TO ENSURE AUGMENTATION AREA IS FREE FROM CONDUITS.
6. CONTRACTOR TO PLACE CONDUITS STUB-OUTS WITH ENDCAPS FOR TIE-IN OF FUTURE AUGMENTATION EQUIPMENT.
7. TRENCH DRAWING IS DIAGRAMMATIC ONLY AND IS INTENDED TO SHOW TRENCH DEPTHS AND CONDUIT/CONDUCTOR SPACING RELATIVE TO THE SITE POWER DISTRIBUTION REQUIREMENTS. AMPACITY STUDY TO BE CONDUCTED DURING FUTURE REVISIONS TO DETERMINE CIRCUIT TRENCH SPACING.
8. TRENCHING AND CABLE INSTALLATION MUST BE COORDINATED TO AVOID ALL OBSTRUCTIONS. REFER TO CIVIL AND STRUCTURAL DRAWINGS FOR EQUIPMENT LOCATIONS, GRADING AND UNDERGROUND OBSTRUCTIONS.
9. INSTALL 6" WIDE RED DETECTABLE MARKER TAPE IN ALL TRENCHES.
10. WIDEN TRENCH AS NEEDED TO SUPPORT FEEDER QUANTITY.

LEGEND:

MV — MV FEEDER CABLES

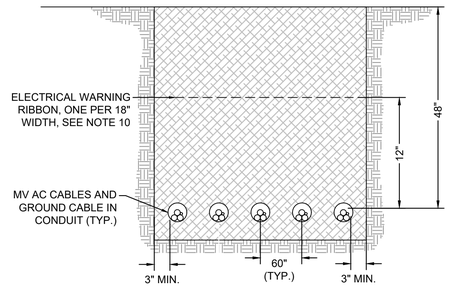
LIGHT FIXTURE

UNDISTURBED EARTH

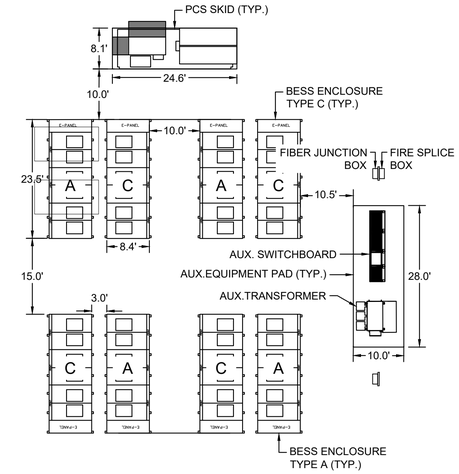
BACKFILL WITH CLEAN ENGINEERED MATERIAL, REFER TO GEOTECHNICAL SPECIFICATIONS FOR GRADATION AND COMPACTION REQUIREMENTS. REMOVE NATIVE MATERIAL IN ACCORDANCE WITH ENVIRONMENTAL REMEDIATION PLAN.

CYGNET BESS SYSTEM DESCRIPTION	
BESS OPERATING CAPACITY	200 MW / 800 MWh
INTERCONNECTION VOLTAGE	138 kV
SITE LAT/LONG	42.2936, -85.4782
POWER CONVERSION STATION INVERTER	
MAKE	EPC POWER
MODEL	M SYSTEM +M10
QUANTITY	(49) 5.3 MVA PCS (11) 5.3 MVA AUGMENTED PCS) (CURTAILED TO MEET 200MW AT POI)
ENERGY STORAGE SYSTEM	
MAKE	LG
MODEL	JF2 DC LINK
CONFIGURATION TO GRID	AC COUPLED
DURATION (@ MAX)	4 HOURS
CONTAINER CAPACITY (@ MAX)	1,278 kW / 5112 kWh
CONTAINER QUANTITY	98 TYPE A (22 AUGMENTED) 98 TYPE C (22 AUGMENTED)
AUXILIARY EQUIPMENT	
AUX SWITCHBOARD MODEL	TBD
AUX SWITCHBOARD QUANTITY	6
AUX TRANSFORMER MODEL	TBD
AUX TRANSFORMER QUANTITY	6
BATTERY MANAGEMENT SYSTEM	
MAKE	LG
MODEL	STANDARD
AUGMENTATION SCHEDULE	
YEAR 5	102.2 MWh
YEAR 11	122.7 MWh

SWAN BESS SYSTEM DESCRIPTION	
BESS OPERATING CAPACITY	200 MW / 800 MWh
INTERCONNECTION VOLTAGE	138 kV
SITE LAT/LONG	42.2936, -85.4782
POWER CONVERSION STATION INVERTER	
MAKE	EPC POWER
MODEL	M SYSTEM +M10
QUANTITY	(49) 5.3 MVA PCS (11) 5.3 MVA AUGMENTED PCS) (CURTAILED TO MEET 200MW AT POI)
ENERGY STORAGE SYSTEM	
MAKE	LG
MODEL	JF2 DC LINK
CONFIGURATION TO GRID	AC COUPLED
DURATION (@ MAX)	4 HOURS
CONTAINER CAPACITY (@ MAX)	1,278 kW / 5112 kWh
CONTAINER QUANTITY	98 TYPE A (22 AUGMENTED) 98 TYPE C (22 AUGMENTED)
AUXILIARY EQUIPMENT	
AUX SWITCHBOARD MODEL	TBD
AUX SWITCHBOARD QUANTITY	6
AUX TRANSFORMER MODEL	TBD
AUX TRANSFORMER QUANTITY	6
BATTERY MANAGEMENT SYSTEM	
MAKE	LG
MODEL	STANDARD
AUGMENTATION SCHEDULE	
YEAR 5	102.2 MWh
YEAR 11	122.7 MWh



1 / E100 TYPICAL MV AC FEEDER TRENCH
NTS



2 / E100 EQUIPMENT ENLARGEMENT
1" = 15'

ISSUED FOR PERMIT - NOT FOR CONSTRUCTION

REVISIONS	XX/XX/XX	XXX
1		

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SOUTHFIELD, MI 48075
(312) 726 9445

CIP
Copenhagen Infrastructure Partners

KHA PROJECT 161262002
DATE 03/27/2026
SCALE AS SHOWN
DESIGNED BY NJA
DRAWN BY TOZ
CHECKED BY JMM

SITE PLAN

SWAN BESS AND CYGNET BESS
PREPARED FOR
SWAN ENERGY STORAGE LLC AND CYGNET ENERGY STORGAGE LLC
COMSTOCK TOWNSHIP
MI

SHEET NUMBER
E100

MISS DIG 811

K:\TCW_LDE\Copenhagen Infrastructure Partners\Swan BESS_MI2 Design\CAD\PlanSheets\E-100 - SITE PLAN.dwg June 08, 2026 - 12:40pm
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\\TCWfiler01\Projects01\MW_TCW\Data\TCW_LDEV\Copenhagen Infrastructure Partners\Swan BESS_MI\2 Design\CAD\PlanSheets\PP100-PHOTOMETRICS PLAN.dwg June 08, 2026 - 12:49pm

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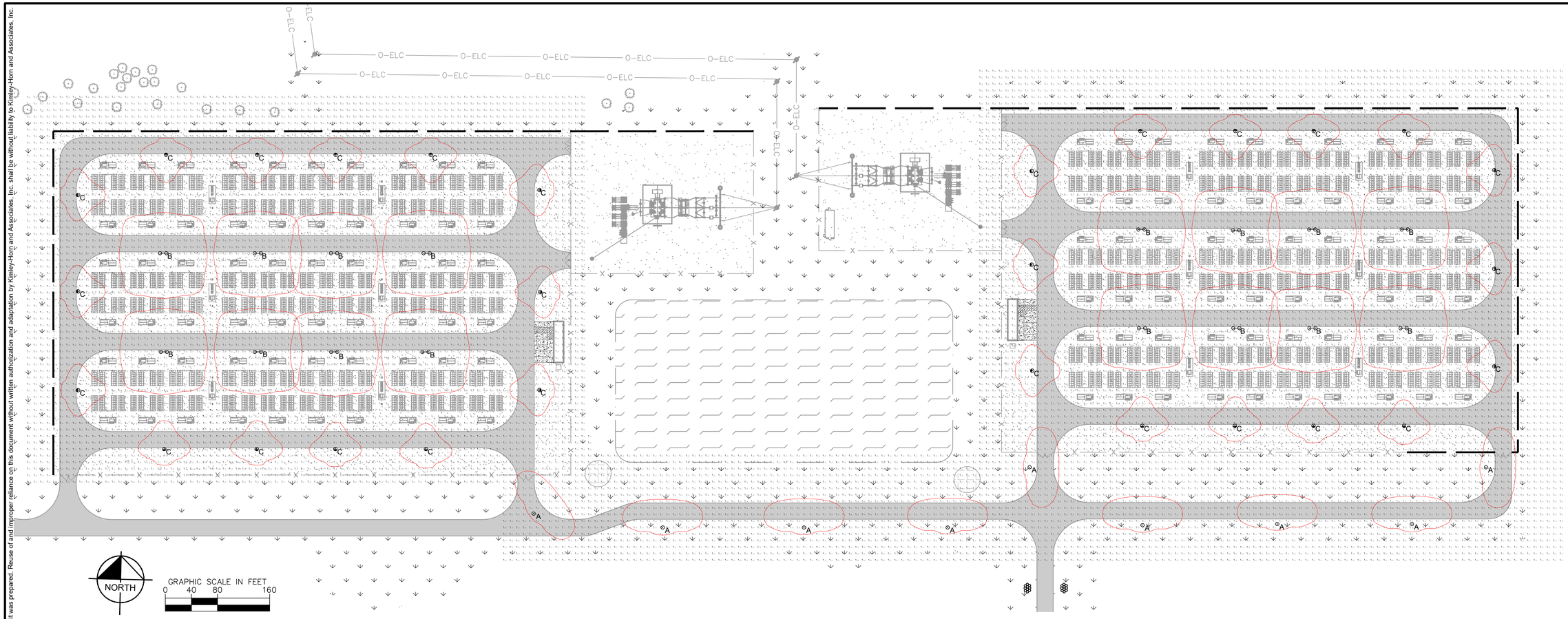
O-ELC
O-ELC
O-ELC

EXHIBIT 4

PROJECT NARRATIVE

FOR

SWAN BESS & CYGNET BESS

SPECIAL USE PERMIT APPLICATION & SITE PLAN REVIEW – BATTERY ENERGY STORAGE SYSTEM

KALAMAZOO COUNTY, MICHIGAN

JUNE 2026 | VERSION 1

Prepared By:

Kimley»Horn of Michigan, Inc.

CIP Copenhagen Infrastructure Partners

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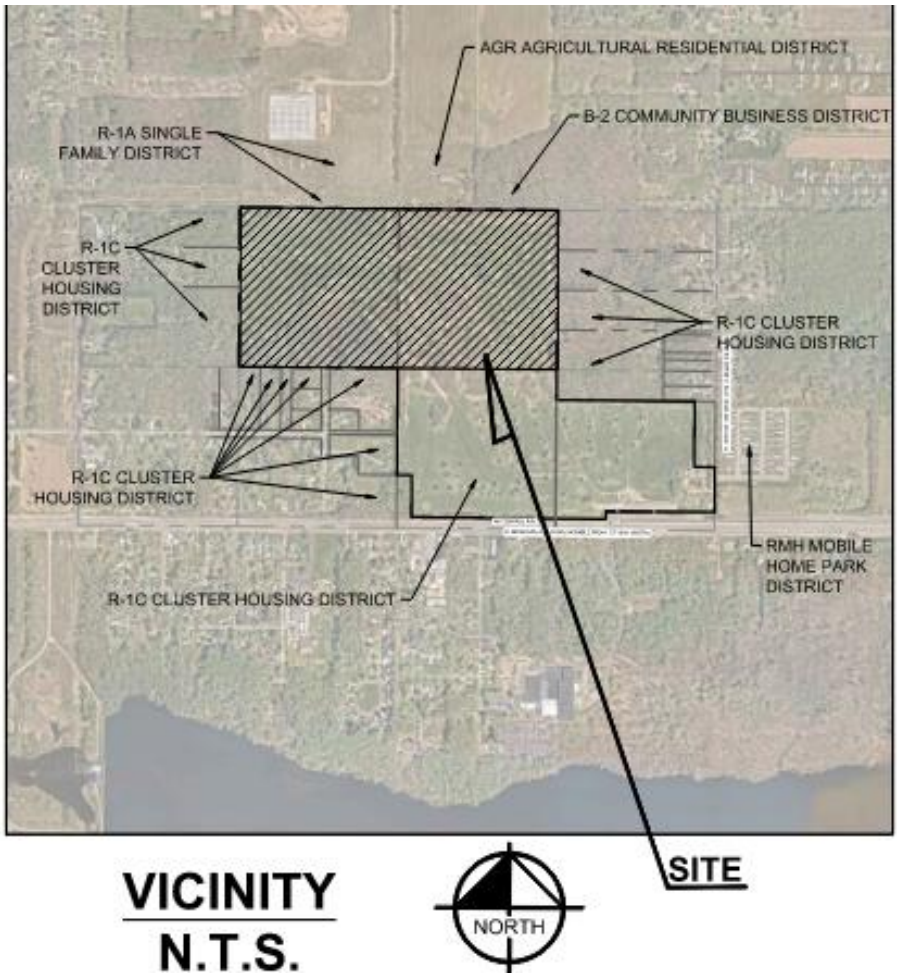
1.0 PROJECT LOCATION

1.1 GENERAL LOCATION

Swan Energy Storage LLC (CIP) and Cygnet Energy Storage LLC (CIP) is proposing the Swan Battery Energy Storage System (BESS) & Cygnet Battery Energy Storage System (BESS) on a 144.28 acre portion of Parcel Nos. 07-16-455-051 and 07-16-330-011 in Comstock Township, Kalamazoo County, MI generally North of IL-96, South of E Main Street, and west of N 30th Street in Kalamazoo County, Michigan. The project area is within the northeast ¼ of the southwest ¼ of section 16, township 2 south, range 10 west. To the North of the project area are areas zoned AGR Agricultural Residential District, to the East there are areas zoned as R-1C Cluster Housing District, and to the West is R-1C Cluster Housing District.



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The applicant for the Swan BESS and Cygnet BESS projects is requesting Site Plan and Special Use Permit Approval to construct, operate, and eventually decommission the Swan BESS and Cygnet BESS facilities and related infrastructure within the existing R-1C Cluster Housing, and Battery Energy Storage System Large Off-Site Overlay zoning district. The combined facilities will provide up to 400 megawatts (MW) /1600 megawatt-hours (MWh) of energy storage capacity.

2.0 PURPOSE OF REQUEST

2.1 ZONING ANALYSIS

Comstock Township adopted an ordinance, effective December 15, 2025, which amended the Zoning Ordinance to include definitions and provisions for regulating battery energy storage systems (BESS). BESS Ordinance No.564 distinguishes between on-site and off-site battery energy storage systems. Swan BESS and Cygnet BESS are considered Large Off-Site BESS since they have a nameplate capacity of 50 MW or more and an energy discharge of 200 MWh or more. Swan BESS and Cygnet BESS are designed to meet or exceed all requirements of the Zoning Ordinance, while mitigating any potential impacts on non-participating properties.

3.0 DESCRIPTION OF PROPOSAL

3.1 OVERVIEW

The proposed project will consist of the following development activities:

- Site preparation, including removal of existing crops/vegetation and grading (as necessary). Special care will be provided to protect existing trees and wetlands.
- Installation of two (2) - 200 MW/800 MWh BESS consisting of lithium-ion batteries, storage containers, transformers, substations and electrical cabling and associated equipment.
- A 6-foot chain link with 1-foot of barbed wire fence along the north and south side of the BESS facilities and north side of the project substations, a 14-foot noise wall along the east, north, and west side of the BESS facilities, and locked access gates with Knox box for emergency access.
- Construction of a 138 kV generator intertie electrical transmission line or “gen-tie”, including transmission poles and associated electricity transmission facilities, connecting from the project site to the existing substation to the west.
- Construction of temporary and permanent on-site access roads for construction and maintenance activities.
- Construction of one (1) permanent stormwater management facility and site utilities.
- Construction of other necessary infrastructure, including two (2) permanent operation and maintenance (O&M) buildings.

3.2 PROPOSED USE

The proposed use of the property is Battery Energy Storage System (BESS) facilities with supporting infrastructure designed to enhance grid stability, optimize energy utilization, and facilitate renewable energy integration. The BESS will provide essential services such as frequency regulation, voltage support, and additional capacity during peak demand periods, ensuring compliance with regulatory standards. By storing energy during off-peak hours and discharging during peak demand, the system will improve generation

efficiency, reduce costs, and manage local peak loads, which will help defer expensive transmission and distribution upgrades.

Additionally, the facility will mitigate renewable energy intermittency, enable time-shifting of energy supply to better align with demand, and support power restoration following outages, thereby strengthening grid resilience. The BESS will also supply backup power to critical infrastructure during emergencies, enhancing energy security. This investment represents a strategic step toward modernizing the grid, supporting renewable energy adoption, and improving overall efficiency and reliability—contributing to a more sustainable and resilient energy future. Together, the Swan and Cygnet systems will be charged from the electrical grid and will have a storage capacity of up to 400 MW/1600 MWh.

The proposed BESS is sited on a former golf course and undeveloped land that minimizes new disturbance and supports efficient interconnection. The BESS is sited on the closest undeveloped land to the existing electrical infrastructure, as other sites were not suitable to accommodate the technical, spatial, environmental, or access needs for the BESS facility. Given those complexities, the chosen parcel represents the most practical, lowest-impact siting option.

3.3 HOURS OF OPERATION

The BESS system will be in operation 24/7 once connected to the grid, however instances of charging and discharge will vary depending on the local power supply and demand. The Project will be unmanned, except for intermittent maintenance.

3.4 PROJECT COMPONENTS

Below is a description of the individual project components.

3.4.1 PROJECT SUBSTATION AND GEN-TIE

The project will consist of two on-site (Customer) substations. These substations will interconnect each of the proposed Battery Energy Storage System (BESS) yards via multiple medium voltage underground feeders. Each customer substation yard will house a Generator Step Up (GSU) transformer that will step up the voltage from the BESS yard, up to the interconnection voltage of 138 kV. Each proposed substation yard will include an electrical control house; an operational building used to control/monitor the substation. It houses ancillary equipment for systems necessary for the overall function of a substation. Such systems include control relays, server racks, telecommunications and technical security, fire alarm and protection, etc. It will occupy approximately 588 square feet within the customer substation yard.

A generator intertie will be interconnected at 138 kV from each customer substation to the point of interconnection at the existing utility substation 0.1 miles to the north. The exact gen-tie route to be determined by others as the project progresses. As shown on the Site Plan, the proposed substations will be enclosed by a 6-foot chain link fence with 1-foot of barbed wire and a 14-foot sound wall, located within the designated building envelope.

3.4.2 ENERGY STORAGE SYSTEMS

The projects will feature two stand-alone lithium-ion BESS facilities with a combined capacity of up to 400 MW and 4-hour duration (1600 MWh). The system will be housed in enclosures containing racks with

battery modules and string inverters. An Emergency Management System (EMS) will monitor performance and condition while providing operational control. The facility will be overseen by an unmanned control center operating 24/7.

Safety and security measures will include an electronic security system, smoke detectors, and alarm system. Additional fire safety protocols are detailed in Section 3.7.2.

Battery systems operate silently, with noise limited to HVAC units required for temperature regulation.

Energy stored in the BESS will be connected to the electrical grid. The system will utilize integral inverters with bidirectional capability which enable charging and discharging from/to the grid and provide essential grid support. The BESS Specifications can be found in **Exhibit M**.

3.4.3 TRANSFORMERS

The projects will utilize stand-alone medium voltage transformers. The GSU transformer will be maintained within the customer substation. Refer to the Civil Package accompanied by this application for further explanation of the location of the MV transformers and BESS containers.

3.4.4 PERMANENT BUILDINGS AND STRUCTURES

Ancillary facilities such as the O&M buildings, exterior lighting, telecommunications, and meteorological data collection system may also be installed.

To comply with NFPA 855 standards, battery storage containers will be set back a minimum of 100 ft from the property line.

Two O&M buildings may be required for the project. The proposed O&M buildings will be located near the substation to the associated BESS yards. It is currently estimated 5 parking spaces will be required given the current building size of 900 square feet, which is compliant with Comstock Township Zoning Ordinance, Section 5.1C(1), which states that the total combined floor space of the accessory building(s) shall not exceed the limited of 5,000 square feet for a 10 acre or more lot. Facility performance will be monitored including amount of energy transferred, equipment failure, and weather. The facility will have controlled access with gated entrance equipped with a Knox Box.

3.5 PERIMETER FENCING AND GATES

Perimeter fencing will include a 6-foot chain link fence with 1-foot of barbed wire along the north, east, west, and south side of the BESS facilities and north, east, south, and west side of the client substation, A 14-foot noise wall on the east, north, and west side of the BESS facilities, and locked access gates with Knox Box for emergency access to the BESS facilities. The substation perimeter fence is proposed as a chain link fence in the height of 6 feet on the south, east, and west side, and a sound wall with a height of 14 feet is proposed on the north side. Per Section 5.9A of the Charter Township Zoning Ordinance. The Planning Commission may approve a height of up to six (6) feet if the Planning Commission determines that a higher fence is necessary for the safety and security of the site based on the use of the site and per Section 5.9A(5) of the Charter Township Zoning Ordinance. Access Gates with Knox Box will be located at key access points for the construction, operations, and maintenance phases. The proposed substation and BESS yard will be largely screened by existing and proposed vegetation between the public right-of-way and project site. Proposed locations of all fencing, walls, and gates are illustrated on the Site Plan Package of this application in **Exhibit A**. The Noise Analysis can be found in **Exhibit J**.

3.5.1 SITE SECURITY AND OUTDOOR LIGHTING

Security cameras will be installed on the control enclosures and O&M buildings. Cameras will be mounted on poles at an appropriate height and will face inward to monitor on-site activity. Lighting poles will also be placed within the project site. All outdoor lighting shall be in accordance with Section 5.10D of the Comstock Township Zoning Ordinance and all county standards, regulations, and requirements. Project design will include lighting at the front gate, O&M building, BESS yard, and Substation. Additional lighting specific to the project area may be either motion activated or light sensitive to come on in the evenings and shut off in the morning automatically. Exterior lighting will be shielded downward to prevent any spillover into adjacent properties. All project specific lighting will be included in the Site Plan package in this application. The Photometric Plan can be found in **Exhibit H**.

3.6 CONSTRUCTION

Construction of the energy storage system will include site preparation as well as the installation of the battery storage structures, safety systems, inverters, substation, and interconnection.

3.6.1 SIGNAGE

During all phases of this project, signage for safety, information on system type, special hazards, fire suppression system, 24-hour emergency contact information, visible warning sign concerning voltage placed at the base of all pad mounted transformers and substations, and identification will be posted around the perimeter of the project site. No large billboards or other forms of advertising signage are proposed. All signage will conform to Comstock Township Zoning Ordinance signage requirements for this zone, described in Chapter 16 of the Comstock Township Zoning Ordinance.

The Project will comply with NFPA 855 “Standard for the Installation of Stationary Energy Storage Systems” or any applicable successor standard adopted by the Michigan Public Service Commission.

3.6.2 DRAINAGE

A permanent stormwater basin will be designed and constructed to support site drainage. On-site drainage areas have been delineated, and forebays and an infiltration basin are proposed to provide the required storage, rate control, and water quality volumes to accommodate the runoff volume from the specified storm events. A specific drainage plan for the project intending to meet the requirements of Comstock Township and Kalamazoo County Drain Commission can be found in the Site Plan Package attached to this application in **Exhibit A**.

3.7 CONSTRUCTION SCHEDULE AND WORKFORCE

Construction is anticipated to begin early 2027 and could last up to 18 months. Construction is anticipated to be undertaken in phases that may overlap, including an initial site preparation phase, a phase during which the energy storage system will be installed, and a phase during which the power conversion station and substation will be installed. Following the installation, testing and commissioning will take place. Most of the labor force is expected to come from the surrounding communities within the Kalamazoo Metropolitan Area. There will be an estimated workforce of up to 50-100 full-time employees during construction.

Construction equipment will be primarily operated between 7:00 AM and 7:00 PM, Monday through Friday. Depending on schedule demand, working hours in the early morning, evening, nights, and weekends may occur during certain construction phases. However, this is not an expected aspect of project construction.

All construction work, including any weekend work, will comply with the policies and requirements established by Comstock Township Zoning Ordinance.

3.7.1 PERSONNEL TRAINING

The applicant will coordinate with the local fire department to provide a collaborative approach to Emergency Responses. The project applicant will also implement the following measures during project construction and operation:

- All applicable Comstock Township and Kalamazoo County standards and requirements will be followed to ensure accessibility and ground clearance of emergency vehicles (e.g., fire engines).
- Smoking will be prohibited at the project site.
- Work crews will be required to park vehicles away from flammable vegetation such as dry grass and brush. At the end of each workday, heavy equipment will be required to be parked over gravel, mineral soil, asphalt, or concrete where available to reduce the risk of fire.
- All heavy equipment will be required to include mechanisms for fire suppression, including spark arresters or turbocharging (which eliminates sparks in exhaust) and fire extinguishers.

3.8 OPERATION AND MAINTENANCE

Upon commissioning, the project will enter the operation phase with energy storage and dispatching power during both daylight and non-daylight hours as required by grid operators year-round.

Operational activities at the project site will include:

- Vegetation, weed, and pest management.
- Security.
- Responding to automated electronic alerts based on monitored data for a safe operating system.
- Occasional equipment repair and replacement.
- Communicating with transmission system operators and other entities involved in facility operations.

Project site maintenance and equipment repairs will be generally conducted during daytime hours. Maintenance typically will include inspection of the substation and battery energy storage system components. O&M at the substation and MV transformers in the BESS yard will include visual inspections of the oil/water separators systems. As part of the ongoing O&M, the energy storage system will be inspected regularly. A more detailed maintenance schedule will be developed based on selected battery manufacturer requirements.

Regular preventative maintenance will include checking security of DC and AC connections: replacement of fans, filters, and pumps as required or recommended, and validating measurements of key electrical and environmental sensors. The project will maintain up to 6 parking spaces to accommodate both O&M staff as well as first responders throughout the project lifespan.

3.8.1 O&M WORKFACE

The project will employ staff members for ongoing facility maintenance and repairs. A record of inspections will be kept on-site. The operational labor force is expected to be from the greater Kalamazoo Metropolitan Area.

3.8.2 FIRE PREVENTION AND SAFETY PROGRAM

Swan BESS and Cygnet BESS recognizes that fire safety, as well as the safety of our first responders and Comstock's citizens, are central to the Township's review and approval of the projects. During the O&M phase of the project, the Fire Prevention, Suppression, and Safety Program, including all training and practices, will be consistent with those described above under construction activities. Fire safety requirements and development standards for the project will comply with all applicable codes and regulations, including NFPA855. The Emergency Response Guide will be included as **Exhibit E**.

BESS systems are designed with external (site alarm panel, and emergency stop system) as well as internal (interior sensors for heat, smoke, and gas and audible and visual alarms) safety systems. Internal systems are designed to work within battery enclosures to prevent or detect the formation of a fire. The climate control system (HVAC and chillers) would keep the batteries running at optimal and safe temperatures to maximize performance and longevity. Should the cooling units fail, the batteries and their control systems have redundant mechanisms to shut the batteries down. External systems alert and assist first responders. The BESS would be designed to meet all applicable fire safety codes. Once operational, the BESS facility will be monitored remotely 24/7, as well as experience routine facility checks by full-time personnel. The Emergency Response Guide will be included as **Exhibit E**.

3.9 DECOMSSIONING AND SITE RECLAMATION

3.9.1 DECOMMISSIONING OF FACILITIES

The project is anticipated to have an operating life of up to 20 years. Upon site decommissioning, all above grade buildings, structures, and concrete foundations will be removed from the site. After this period, the project will be either repowered or decommissioned. Project decommissioning will involve the removal of above-grade facilities, buried electrical conduit, and all concrete foundations. Equipment will be repurposed off-site, recycled, or disposed of in a landfill as appropriate.

When the energy storage system will be decommissioned, most battery components will be recycled. Lithium-ion (li-ion) phosphate batteries and their constituent parts will likely be recycled, or be disposed of appropriately.

Decommissioning is expected to occur in 3 phases:

- Phase 1 will involve shutting down the systems and removing hazardous materials and wiring;
- Phase 2 will include removing the battery storage containers, inverters, and substations; and
- Phase 3 will include removing site fencing, driveways, and the final soils reclamation process.

Decommissioning will involve the use of heavy equipment similar to that used for construction. Appropriate hazardous materials control and erosion control measures will be used throughout the decommissioning process. It is anticipated that such controls will be substantially similar to those implemented during construction, although the intensity of activities will be lower.

3.9.2 SITE RECLAMATION

All roads, driveways, and other areas compacted during original construction or by equipment used for decommissioning will be tilled in a manner adequate to restore the sub-grade material to the proper density and depth consistent with adjacent properties. Low areas will be filled with clean, compatible sub-grade material. After proper sub-grade depth is established, locally sourced topsoil will be placed to a depth and

density consistent with adjacent properties. Locally sourced compost will be applied to the topsoil, and revegetation with native seeds or plantings will be accomplished. More detail on decommissioning will be provided with the Final Site Plan Approval Package. The Decommissioning Plan can be found in **Exhibit K**.

4.0 RELATIONSHIP TO SURROUNDING PROPERTIES

4.1 SURROUNDING PARCELS

The projects parcels are located adjacent to parcels zoned R-1C Cluster Housing District, AGR Agricultural Residential District, and B-2 Community Business District. The project sites are located within parcels zoned for R-1C Cluster Housing District and Battery Energy Storage System Large Off-Site Overlay District, maintaining a compatible use for an energy storage facility based on Article 4 Section 4.61 C(2). The proposed projects are located approximately 0.9 miles west from Comstock Fire Department Station 9-3.

Surrounding parcels maintain vacant, residential, agricultural, and industrial uses. Land use directly to the north is zoned AGR Agricultural Residential District, to the East there are areas zoned as R-1C Cluster Housing District, and to the West is R-1C Cluster Housing District.

Residential uses are located approximately 0.1 miles east and south of the project area. The residential area to the south is separated from the projects area by E Michigan Ave and to the east by N 30th St. This road system, as well as the designated project setbacks, and fencing, will act as a barrier between residential communities located in proximity to the project area.

4.2 BENEFITS TO THE COMMUNITY AND SURROUNDING AREA

4.2.1 ECONOMIC BENNEFITS

The BESS Project will also promote the general welfare of Comstock Township by enhancing grid resiliency and increasing local tax revenues. Per section 4.61(C)(21) of the BESS Ordinance, The BESS Projects will enter into a Community Host Agreement with the Township amounting to $825/MW of the nameplate capacity for 20 years, which will provide additional resources to be used as determined by the Township for police, fire, public safety, and other infrastructure. Comstock Township requires up to 66% of payment upfront, but not to exceed $2 million dollars.

4.2.2 ENVIRONMENTAL BENNEFITS

This Project consists of two (2) - 200 MW battery energy storage systems, which will increase energy availability for the growing population of Kalamazoo County. Energy stored may include renewable sources such as solar or wind accessed through the utility grid. As energy demand grows, the function of a BESS is to enhance grid resilience and stabilize, reducing the need for new energy system development in the future. This can lead to a reduction in Kalamazoo County's overall energy emissions. Environmental benefits include reduced greenhouse gas emissions and improving overall system efficiency. The BESS project will be implemented with a focus on optimal sizing, siting, and adherence to all regulatory and permitting requirements, with detailed impact assessments to ensure minimal environmental disruption and community benefits. The project team has conducted due diligence on environmental and natural resources including wetlands & sensitive water features, protected species, and cultural resources, and no significant impacts are expected by the project's development.

The Applicant affirms that the proposed BESS systems will not commence commercial operation until it is in full compliance with all applicable state and federal environmental laws, including but not limited to the Natural Resources and Environmental Protection Act, 1993 PA 451 (MCL 324.101 to 324.90106).

A review of the Custom Soil Resource Report for Kalamazoo County, Michigan prepared by the USDA Natural Resources Conservation Service indicates that soils within the area of interest are dominated by loamy and sandy loam soils formed on outwash plains, ice-margin complexes, and till plains. The most prevalent soil map units include Kalamazoo loam, Oshtemo sandy loam, and Spinks loamy sand, which are generally well drained to moderately well drained and commonly classified as prime farmland or farmland of local importance. These soils typically exhibit moderate available water capacity and variable slopes ranging from nearly level to steep. The Custom Soil Resource Report for Kalamazoo County can be found in **Exhibit N**.

The BESS Project the system is not expected to have an impact on television signals, microwave signals, agricultural global position systems, military defense radar, radio reception, or weather and doppler radio.

4.2.3 Community Benefits

The Applicant will preserve and designate approximately 105.06 acres of the Property as open space for future recreational land use, see **Exhibit Q**. The Applicant recognizes the Township's interest in the meaningful and durable community benefit that this lands provides. The Applicant further remains committed to working with the Township in good faith to identify the most appropriate recreational use, access rights, and implementation structure for this space. The Applicant proposes that the specific details such as type, scope, design, ownership structure, construction timeline, and other implementation details for the recreational use be set through a separate joint development agreement or similar mutually acceptable mechanism after the Project advances through the planning and zoning approval process.

5.0 PROJECT ACCESSIBILITY AND CIRCULATION

5.1 SITE ACCESSIBILITY AND CIRCULATION

Access to the site will be provided from the south via one entrance from a private drive off Riverview Drive. A secondary access road from the northwest off N 28th St is proposed for emergency access only. All internal roads are proposed to be compacted gravel. Once operational, on-site vehicle circulation will consist of O&M vehicles. The site access roads are designed to allow for the circulation of a fire truck design vehicle. The Truck Circulation Plan can be found in **Exhibit I**.

6.0 DEVELOPMENT SCHEDULE

6.1 PROJECT SCHEDULE

Below is an indicative schedule for development:

• Q2 2026—Attain Site Plan approvals. All required planning and zoning approvals, which may include Preliminary Site Plan Approval, Special Use Permit, Kalamazoo County Stormwater Approval, and Final Site Plan Approval.

• Q4 2026—Attain Building Permits, Kalamazoo County Soil Erosion and Sedimentation Control (SESC) Permit, and EGLE Notice of Coverage NOC, which may include building, earthwork, grading & drainage, tree clearing, erosion control, etc.

• Q1 2027—Construction starts (earliest anticipated)

• Q2 2028—Construction complete. Operations begin, (earliest anticipated)

• 2028 to 2048—O&M Phase (up to 20 years).

7.0 COMMUNITY FACILITIES AND SERVICES

7.1 PROJECT PROXIMITY TO LOCAL FACILITIES

The proposed projects are located approximately 0.9 miles west from Comstock Fire Department Station 9-3.

8.0 PUBLIC UTILITES

Water and wastewater will be provided via on-site well and septic systems. See the table in Section 8.1 for additional information on utility providers for the project.

8.1 Utility Providers

Utility	**Provider and Contact Information**
Water and Wastewater	The Comstock Township Water & Wastewater Department – (269) 381-2360
Police	Kalamazoo County Sheriff's Office – (269) 383-8821
Fire Protection	Comstock Township Department of Fire and Rescue – (269) 345-9244
Electric Service	Consumers Energy Company – (517) 788-0550
Telephone Service	TBD
Waste & Recycle	Republic Services – (888) 249-5112

EXHIBIT A: CIVIL PLANS

SITE DEVELOPMENT PLANS
FOR
SWAN BESS AND CYGNET BESS

65 N 30TH ST.,
COMSTOCK TOWNSHIP, KALAMAZOO COUNTY, MI

PROJECT TEAM:

CIVIL ENGINEER
KIMLEY-HORN OF MICHIGAN, INC.
3000 TOWN CTR, STE. 2600
SOUTHFIELD, MI 48075
ENGINEER OF RECORD: BRIAN GAMMON, P.E.
TELEPHONE: (612) 503-8532

LANDSCAPE ARCHITECT
KIMLEY-HORN OF MICHIGAN, INC.
3000 TOWN CTR, STE. 2600
SOUTHFIELD, MI 48075
CONTACT: RYAN HYLLESTED
TELEPHONE: (612) 568-0698

ELECTRICAL ENGINEER
KIMLEY-HORN OF MICHIGAN, INC.
3000 TOWN CTR, STE. 2600
SOUTHFIELD, MI 48075
CONTACT: NICHOLAS ALFONSO, P.E.
TELEPHONE: (914) 368-9203

OWNER / DEVELOPER
SWAN ENERGY STORAGE LLC AND
CYGNET ENERGY STORGAGE LLC
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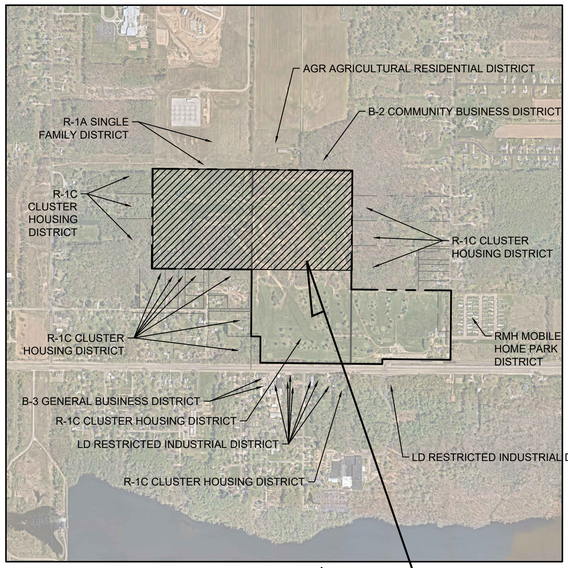
CHICAGO, IL 60606
CONTACT: SIMONE MARLETTI
TELEPHONE: (917) 451-0718

SURVEYOR
ROWE PROFESSIONAL SERVICES COMPANY
507 36TH ST SE
GRAND RAPIDS, MI 49548
CONTACT: ROBERT CHURCH, P.S
TELEPHONE: (616) 272-7125



VICINITY
N.T.S.

NORTH

PROJECT INFORMATION

ZONING:	R-1C CLUSTER HOUSING DISTRICT, BATTERY ENERGY STORAGE SYSTEM LARGE OFF-SITE OVERLAY DISTRICT
PROPOSED USE:	BATTERY ENERGY STORAGE SYSTEM
FLOODPLAIN:	ZONE X
PROPERTY LINE SETBACK:	50'
RIGHT-OF-WAY SETBACK:	100'
SENSITIVE LAND USE SETBACK:	2000'
NFPA 855 REMOTE LOCATION BATTERY SETBACK:	100'
OCCUPIED BUILIDNG SETBACK:	300'
PARCEL AREA:	144.28 AC
BESS DEVELOPMENT AREA:	39.22 AC
PARCEL NUMBER:	07-16-455-051 AND 07-166-330-011

PROJECT DESCRIPTION

THE PROJECT CONSISTS OF THE INSTALLATION OF TWO 200 MW / 8000 MWH BATTERY ENERGY STORAGE SYSTEMS.
PROJECT AREA (EXCLUDING ALL EXISTING AND PROPOSED PUBLIC RIGHTS-OF-WAY): 48.91 AC

LEGAL DESCRIPTION

LAND IN THE TOWNSHIP OF COMSTOCK, KALAMAZOO COUNTY, MI, DESCRIBED AS FOLLOWS: PARCEL 1: THE NORTHEAST QUARTER OF THE SOUTHWEST QUARTER OF SECTION 16, TOWN 2 SOUTH, RANGE 10 WEST. PARCEL 2A: THE WEST HALF OF THE SOUTHEAST QUARTER OF SECTION 16, TOWN 2 SOUTH, RANGE 10 WEST, EXCEPT BEGINNING AT THE INTERSECTION OF THE NORTH AND SOUTH QUARTER LINE OF SAID SECTION WITH THE NORTH LINE OF THE RIGHT OF WAY OF THE MICHIGAN CENTRAL RAILROAD AND RUNNING THENCE NORTH 0 DEGREES 8 MINUTES WEST ALONG SAID QUARTER LINE 347 FEET, THENCE SOUTH 89 DEGREES 58 MINUTES EAST PARALLEL TO THE NORTH LINE OF SAID RIGHT OF WAY 123.47 FEET; THENCE SOUTH 0 DEGREES 8 MINUTES EAST PARALLEL TO SAID QUARTER LINE 347 FEET TO THE NORTH LINE OF SAID RAILROAD RIGHT OF WAY; THENCE NORTH 89 DEGREES 58 MINUTES WEST ALONG THE NORTH LINE OF SAID RIGHT OF WAY 123.47 FEET TO THE PLACE OF BEGINNING; ALSO EXCEPT THE RIGHT OF WAY OF THE MICHIGAN CENTRAL RAILROAD AS LOCATED OVER AND ACROSS THE FIRST ABOVE DESCRIBED PARCEL OF LAND. PARCEL 2B: PART OF THE EAST 1/2 OF THE SOUTHEAST 1/4 OF SECTION 16 OF TOWN 2 SOUTH, RANGE 10 WEST, DESCRIBED AS COMMENCING AT THE INTERSECTION OF THE EAST LINE OF SAID SECTION 16 WITH THE NORTH LINE OF THE RIGHT OF WAY OF THE MICHIGAN CENTRAL RAILROAD; THENCE NORTH ON THE EAST SECTION LINE 980 FEET; THENCE WEST PARALLEL WITH THE NORTH LINE OF SAID RIGHT OF WAY OF THE MICHIGAN CENTRAL RAILROAD TO THE NORTH AND SOUTH 1/8 LINE OF SAID SOUTHEAST 1/4 OF SECTION 16, THENCE SOUTH THEREON 980 FEET TO THE NORTH LINE OF SAID MICHIGAN CENTRAL RAILROAD RIGHT OF WAY; THENCE EAST THEREON TO THE PLACE OF BEGINNING, EXCEPT THE SOUTH 66 FEET OF THE EAST 900 FEET THEREOF.

NOTES:

1. CONTRACTOR SHALL CONFIRM THAT THE EXISTING CONDITIONS FOR THE SITE MATCH WHAT IS SHOWN ON THE DRAWINGS INCLUDED PRIOR TO CONSTRUCTION.
2. IF REPRODUCED, THE SCALES SHOWN ON THESE PLANS ARE BASED ON A 22" x 34" SHEET.
3. ALL NECESSARY INSPECTIONS AND/OR CERTIFICATIONS REQUIRED BY CODES AND/OR UTILITY SERVICES COMPANIES SHALL BE PERFORMED PRIOR TO ANNOUNCED BUILDING POSSESSION AND THE FINAL CONNECTION OF SERVICES.
4. ALL GENERAL CONTRACTOR WORK TO BE COMPLETED (EARTHWORK, FINAL UTILITIES, AND FINAL GRADING) BY THE MILESTONE DATE IN PROJECT DOCUMENTS.

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TP204	TREE PRESERVATION ENLARGEMENT
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ISSUED FOR PERMIT - NOT FOR CONSTRUCTION

No.	REVISIONS	DATE	BY
1	ENTITLEMENT SET	06/08/2026	BPG

Kimley»Horn of Michigan, Inc.
3000 TOWN CENTER, SUITE 2600
SOUTHFIELD, MI 48075
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CIP Copenhagen Infrastructure Partners

STATE OF MICHIGAN BRIAN GAMMON ENGINEER NO. 6201012904 PROFESSIONAL ENGINEER

Brian Gammon

KHA PROJECT	161282002
DATE	06/08/2026
SCALE	AS SHOWN
DESIGNED BY	JLL
DRAWN BY	CJC
CHECKED BY	BPG

COVER SHEET

SWAN BESS AND CYGNET BESS MI
PREPARED FOR
SWAN ENERGY STORAGE LLC AND CYGNET ENERGY STORGAGE LLC
COMSTOCK TOWNSHIP

SHEET NUMBER
C000

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K:\TCW_LDEV\Copenhagen Infrastructure Partners\Swan BESS_MI\2 Design\CAD\PlanSheets\C1-GENERAL NOTES.dwg June 08, 2026 - 12:26pm
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GENERAL CONSTRUCTION NOTES

1. THE CONTRACTOR AND SUBCONTRACTORS SHALL OBTAIN A COPY OF THE LATEST EDITION OF THE STANDARD SPECIFICATIONS OF THE LOCAL JURISDICTION AND STATE DEPARTMENT OF TRANSPORTATION AND BECOME FAMILIAR WITH THE CONTENTS PRIOR TO COMMENCING WORK. UNLESS OTHERWISE NOTED, ALL WORK SHALL CONFORM AS APPLICABLE TO THESE STANDARDS AND SPECIFICATIONS.
3. PERFORM ALL WORK IN COMPLIANCE WITH APPLICABLE TOWNSHIP REGULATIONS, STATE CODES, AND O.S.H.A. STANDARDS. THE CONTRACTOR IS RESPONSIBLE FOR FURNISHING THE NECESSARY MATERIALS & LABOR TO CONSTRUCT THE FACILITY AS SHOWN AND DESCRIBED IN THE CONSTRUCTION DOCUMENTS, AND IN ACCORDANCE WITH THE SPECIFICATIONS AND REQUIREMENTS OF THE APPROPRIATE APPROVING AUTHORITIES.
4. CONTRACTOR SHALL CLEAR AND GRUB ALL AREAS UNLESS OTHERWISE INDICATED, REMOVING TREES, STUMPS, ROOTS, MUCK, EXISTING PAVEMENT AND ALL OTHER DELETERIOUS MATERIAL.
5. THE EXISTING SUBSURFACE UTILITY INFORMATION IN THIS PLAN IS QUALITY LEVEL "D" UNLESS OTHERWISE NOTED. THIS QUALITY LEVEL WAS DETERMINED ACCORDING TO THE GUIDELINES OF CI/ACSE 38/02, ENTITLED STANDARD GUIDELINES FOR THE COLLECTION AND DEPICTION OF SUBSURFACE QUALITY DATA BY THE FHA. EXISTING UTILITIES SHOWN ARE LOCATED ACCORDING TO THE INFORMATION AVAILABLE TO THE ENGINEER AT THE TIME OF THE TOPOGRAPHIC SURVEY AND HAVE NOT BEEN INDEPENDENTLY VERIFIED BY THE OWNER OR THE ENGINEER. GUARANTEE IS NOT MADE THAT ALL EXISTING UNDERGROUND UTILITIES ARE SHOWN OR THAT THE LOCATION OF THOSE SHOWN ARE ENTIRELY ACCURATE. FINDING THE ACTUAL LOCATION OF ANY EXISTING UTILITIES IS THE CONTRACTOR'S RESPONSIBILITY AND SHALL BE DONE BEFORE COMMENCING ANY WORK IN THE VICINITY. FURTHERMORE, THE CONTRACTOR SHALL BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES DUE TO THE CONTRACTOR'S FAILURE TO EXACTLY LOCATE AND PRESERVE ANY AND ALL UNDERGROUND UTILITIES. THE OWNER OR ENGINEER WILL ASSUME NO LIABILITY FOR ANY DAMAGES SUSTAINED OR COST INCURRED BECAUSE OF THE OPERATIONS IN THE VICINITY OF EXISTING UTILITIES OR STRUCTURES, NOR FOR TEMPORARY BRACING AND SHORING OF SAME. IF IT IS NECESSARY TO SHORE, BRACE, SWING OR RELOCATE A UTILITY, THE UTILITY COMPANY OR DEPARTMENT AFFECTED SHALL BE CONTACTED AND THEIR PERMISSION OBTAINED REGARDING THE METHOD TO USE FOR SUCH WORK.
6. IT IS THE CONTRACTOR'S RESPONSIBILITY TO CONTACT THE VARIOUS UTILITY COMPANIES WHICH MAY HAVE BURIED OR AERIAL UTILITIES WITHIN OR NEAR THE CONSTRUCTION AREA BEFORE COMMENCING WORK. THE CONTRACTOR SHALL PROVIDE 48 HOURS MINIMUM NOTICE TO ALL UTILITY COMPANIES PRIOR TO BEGINNING CONSTRUCTION.
7. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL REQUIRED CONSTRUCTION PERMITS AND BONDS IF REQUIRED PRIOR TO CONSTRUCTION.
8. THE CONTRACTOR SHALL HAVE AVAILABLE AT THE JOB SITE AT ALL TIMES ONE COPY OF THE CONSTRUCTION DOCUMENTS INCLUDING PLANS, SPECIFICATIONS, GEOTECHNICAL REPORT AND SPECIAL CONDITIONS AND COPIES OF ANY REQUIRED CONSTRUCTION PERMITS.
9. ANY DISCREPANCIES ON THE DRAWINGS SHALL BE IMMEDIATELY BROUGHT TO THE ATTENTION OF THE OWNER AND ENGINEER BEFORE COMMENCING WORK. NO FIELD CHANGES OR DEVIATIONS FROM DESIGN ARE TO BE MADE WITHOUT PRIOR APPROVAL OF THE OWNER AND NOTIFICATION TO THE ENGINEER.
10. ALL COPIES OF COMPACTION, CONCRETE AND OTHER REQUIRED TEST RESULTS ARE TO BE SENT TO THE OWNER DIRECTLY FROM THE TESTING AGENCY.
11. THE CONTRACTOR SHALL BE RESPONSIBLE FOR DOCUMENTING AND MAINTAINING AS-BUILT INFORMATION WHICH SHALL BE RECORDED AS CONSTRUCTION PROGRESSES OR AT THE COMPLETION OF APPROPRIATE CONSTRUCTION INTERVALS AND SHALL BE RESPONSIBLE FOR PROVIDING AS-BUILT DRAWINGS TO THE OWNER FOR THE PURPOSE OF CERTIFICATION TO JURISDICTIONAL AGENCIES AS REQUIRED. ALL AS-BUILT DATA SHALL BE COLLECTED BY A STATE PROFESSIONAL LAND SURVEYOR WHOSE SERVICES ARE ENGAGED BY THE CONTRACTOR.
12. ANY WELLS DISCOVERED ON SITE THAT WILL HAVE NO USE MUST BE PLUGGED BY A LICENSED WELL DRILLING CONTRACTOR IN A MANNER APPROVED BY ALL JURISDICTIONAL AGENCIES. CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ANY WELL ABANDONMENT PERMITS REQUIRED.
13. ANY WELL DISCOVERED DURING EARTH MOVING OR EXCAVATION SHALL BE REPORTED TO THE APPROPRIATE JURISDICTIONAL AGENCIES WITHIN 24 HOURS AFTER DISCOVERY IS MADE.
14. THE CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING THAT THE PROPOSED IMPROVEMENTS SHOWN ON THE PLANS DO NOT CONFLICT WITH ANY KNOWN EXISTING OR OTHER PROPOSED IMPROVEMENTS. IF ANY CONFLICTS ARE DISCOVERED, THE CONTRACTOR SHALL NOTIFY THE OWNER PRIOR TO INSTALLATION OF ANY PORTION OF THE SITE WORK THAT WOULD BE AFFECTED. FAILURE TO NOTIFY OWNER OF AN IDENTIFIABLE CONFLICT PRIOR TO PROCEEDING WITH INSTALLATION RELIEVES OWNER OF ANY OBLIGATION TO PAY FOR A RELATED CHANGE ORDER.
15. SHOULD CONTRACTOR ENCOUNTER ANY DEBRIS LADEN SOIL, STRUCTURES NOT IDENTIFIED IN THE DOCUMENTS, OR OTHER SOURCE OF POTENTIAL CONTAMINATION, THEY SHALL IMMEDIATELY CONTACT THE ENGINEER AND OWNER.
16. CONTRACTOR SHALL NOTIFY OWNER AND/OR ENGINEER 48 HOURS IN ADVANCE OF THE FOLLOWING ACTIVITIES: PRE-CONSTRUCTION MEETING, SUBGRADE PREPARATION, BASE INSTALLATION, ASPHALT INSTALLATION, UNDERGROUND PIPING AND UTILITIES INSTALLATION, INSTALLATION OF STRUCTURES, CHECK VALVES, HYDRANTS, METERS, ETC., SIDEWALK INSTALLATION, CONNECTIONS TO WATER AND SEWER MAINS, TESTS OF UTILITIES.

THIRD PARTY SUPPLEMENTAL INFORMATION

KIMLEY-HORN ASSUMES NO LIABILITY FOR ANY ERRORS, INACCURACIES, OR OMISSIONS CONTAINED WITHIN SUPPLEMENTAL INFORMATION PROVIDED BY THIRD PARTY CONSULTANTS.

1. **BOUNDARY & TOPOGRAPHIC SURVEY**
   PERFORMED BY: ROWE PROFESSIONAL SERVICES COMPANY
   ADDRESS: 507 36TH ST SE, GRAND RAPIDS, MI 49548
   PHONE: (616) 272-7125
   DATED: 05/22/2026
2. **CONSTRUCTION TESTING**
   TEST REPORTS REQUIRED FOR CLOSE OUT INCLUDE, BUT ARE NOT LIMITED TO:
   - DENSITY TEST REPORTS
   - BACTERIOLOGICAL TESTS OF WATER SYSTEM
   - PRESSURE TEST OF WATER/SEWER
   - LEAK TESTS ON SEWER SYSTEM AND GREASE TRAPS
   - ANY OTHER TESTING REQUIRED BY THE AGENCY/MUNICIPALITY

EROSION CONTROL NOTES

1. THE STORM WATER POLLUTION PREVENTION PLAN ("SWPPP") IS COMPRISED OF THE EROSION CONTROL PLAN, THE STANDARD DETAILS, THE PLAN NARRATIVE, ATTACHMENTS INCLUDED IN THE SPECIFICATIONS OF THE SWPPP, PLUS THE PERMIT AND ALL SUBSEQUENT REPORTS AND RELATED DOCUMENTS.
2. ALL CONTRACTORS AND SUBCONTRACTORS INVOLVED WITH STORM WATER POLLUTION PREVENTION SHALL OBTAIN A COPY OF THE STORM WATER POLLUTION PREVENTION PLAN AND THE STATE NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM GENERAL PERMIT (NPDES PERMIT) AND BECOME FAMILIAR WITH THEIR CONTENTS.
3. BEST MANAGEMENT PRACTICES (BMP'S) AND CONTROLS SHALL CONFORM TO FEDERAL, STATE, OR LOCAL REQUIREMENTS OR MANUAL OF PRACTICE, AS APPLICABLE. THE CONTRACTOR SHALL IMPLEMENT ADDITIONAL CONTROLS AS DIRECTED BY THE PERMITTING AGENCY OR OWNER.
4. THE CONTRACTOR IS SOLELY RESPONSIBLE FOR COMPLYING WITH THE REQUIREMENTS OF THE AUTHORITIES HAVING JURISDICTION, AND SHALL MAINTAIN COMPLIANCE WITH APPLICABLE LAWS AND REGULATIONS FOR THE DURATION OF CONSTRUCTION.
5. THE CONTRACTOR SHALL FIELD ADJUST AND/OR PROVIDE ADDITIONAL EROSION CONTROL BMP'S AS NEEDED TO PREVENT EROSION AND OFF-SITE SEDIMENT DISCHARGE FROM THE CONSTRUCTION SITE. LOG AND RECORD ANY ADJUSTMENTS AND DEVIATIONS FROM THE APPROVED EROSION CONTROL PLANS WITHIN THE SWPPP DOCUMENTS STORED IN THE JOB SITE TRAILER.
6. BMPS SHOWN ON THE EROSION AND SEDIMENT CONTROL PLAN, AND IN THE STORM WATER POLLUTION PREVENTION PLAN, SHALL BE MAINTAINED IN FULLY FUNCTIONAL CONDITION AS REQUIRED BY ALL JURISDICTIONS UNTIL NO LONGER REQUIRED FOR A COMPLETED PHASE OF WORK OR FINAL STABILIZATION OF THE SITE. ALL EROSION AND SEDIMENTATION CONTROL MEASURES SHALL BE CHECKED BY A CERTIFIED PERSON AT LEAST ONCE EVERY 7 CALENDAR DAYS AND WITHIN 24 HOURS OF THE END OF A 0.5-INCH OR GREATER RAINFALL EVENT.
7. EROSION & SEDIMENT CONTROL BMPS SHALL BE MAINTAINED IN ACCORDANCE WITH THE FOLLOWING:
   7.1. INLET PROTECTION DEVICES AND BARRIERS SHALL BE REPAIRED OR REPLACED IF THEY SHOW SIGNS OF UNDERMINING OR DETERIORATION.
   7.2. ALL SEEDED AREAS SHALL BE CHECKED REGULARLY TO VERIFY THAT A HEALTHY STAND OF VEGETATION IS MAINTAINED. SEEDED AREAS SHOULD BE FERTILIZED, WATERED AND RE-SEEDED AS NEEDED. REFER TO THE LANDSCAPE PLAN AND PROJECT SPECIFICATIONS.
   7.3. SILT FENCES SHALL BE REPAIRED TO THEIR ORIGINAL CONDITIONS IF DAMAGED. SEDIMENT SHALL BE REMOVED FROM THE SILT FENCES WHEN IT REACHES ONE-THIRD THE HEIGHT OF THE SILT FENCE.
   7.4. THE ROCK CONSTRUCTION ENTRANCE(S) SHALL BE MAINTAINED IN A CONDITION WHICH WILL PREVENT TRACKING OR FLOW OF MUD ONTO PUBLIC RIGHTS-OF-WAY. THIS MAY REQUIRE PERIODIC ADDITIONS OF ROCK TOP DRESSING AS CONDITIONS DEMAND.
   7.5. THE TEMPORARY PARKING AND STORAGE AREA SHALL BE KEPT IN GOOD CONDITION (SUITABLE FOR PARKING AND STORAGE). THIS MAY REQUIRE PERIODIC ADDITIONS OF TOP DRESSING IF THE TEMPORARY PARKING CONDITIONS DEMAND.
   7.6. PERFORM ALL MAINTENANCE OPERATIONS IN A TIMELY MANNER BUT IN NO CASE LATER THAN 2 CALENDAR DAYS FOLLOWING THE INSPECTION.

PAVING AND STRIPING NOTES

1. ALL PAVING, CONSTRUCTION, MATERIALS, AND WORKMANSHIP WITHIN JURISDICTION'S RIGHT-OF-WAY SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF THE LOCAL TOWNSHIP OR COUNTY SPECIFICATIONS AND STANDARDS, OR THE STATE DOT SPECIFICATIONS AND STANDARDS IF NOT COVERED BY LOCAL TOWNSHIP OR COUNTY REGULATIONS.
2. ALL SIGNS, PAVEMENT MARKINGS, AND OTHER TRAFFIC CONTROL DEVICES SHALL CONFORM TO MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (M.U.T.C.D) AND TOWNSHIP STANDARDS.
3. CONTRACTOR SHALL FURNISH ALL PAVEMENT MARKINGS FOR FIRE LANES, ROADWAY LANES, PARKING STALLS, ACCESSIBLE PARKING SYMBOLS, ACCESS AISLES, STOP BARS AND SIGNS, AND MISCELLANEOUS STRIPING WITHIN THE PARKING LOT AS SHOWN ON THE PLANS.
4. ALL EXPANSION JOINTS SHALL EXTEND THROUGH THE CURB.
5. THE MINIMUM LENGTH OF OFFSET JOINTS AT RADIUS POINTS SHALL BE 2 FEET.
6. ALL JOINTS, INCLUDING EXPANSION JOINTS WITH REMOVABLE TACK STRIPS, SHALL BE SEALED WITH JOINT SEALANT.
7. THE MATERIALS AND PROPERTIES OF ALL CONCRETE SHALL MEET THE APPLICABLE REQUIREMENTS IN THE A.C.I. (AMERICAN CONCRETE INSTITUTE) MANUAL OF CONCRETE PRACTICE.
8. CONTRACTOR SHALL APPLY A SECOND COATING OVER ALL PAVEMENT MARKINGS PRIOR TO ACCEPTANCE BY OWNER FOLLOWED BY A COAT OF GLASS BEADS AS APPLICABLE PER THE PROJECT DOCUMENTS.
9. ANY EXISTING PAVEMENT, CURBS AND/OR SIDEWALKS DAMAGED OR REMOVED WILL BE REPAIRED BY THE CONTRACTOR AT HIS EXPENSE TO THE SATISFACTION OF THE ENGINEER AND OWNER.
10. BEFORE PLACING PAVEMENT, CONTRACTOR SHALL VERIFY SUITABLE ACCESSIBLE ROUTES (PER A.D.A). GRADING FOR ALL SIDEWALKS AND ACCESSIBLE ROUTES INCLUDING CROSSING DRIVEWAYS SHALL CONFORM TO CURRENT ADA STATE/NATIONAL STANDARDS. IN NO CASE SHALL ACCESSIBLE RAMP SLOPES EXCEED 1 VERTICAL TO 12 HORIZONTAL. IN NO CASE SHALL SIDEWALK CROSS SLOPES EXCEED 2%. IN NO CASE SHALL LONGITUDINAL SIDEWALK SLOPES EXCEED 5%. IN NO CASE SHALL ACCESSIBLE PARKING STALLS OR AISLES EXCEED 2% (1.5% TARGET) IN ALL DIRECTIONS. SIDEWALK ACCESS TO EXTERNAL BUILDING DOORS AND GATES SHALL BE ADA COMPLIANT. CONTRACTOR SHALL NOTIFY ENGINEER IMMEDIATELY IF ADA CRITERIA CANNOT BE MET IN ANY LOCATION PRIOR TO PAVING. NO CONTRACTOR CHANGE ORDERS WILL BE ACCEPTED FOR A.D.A COMPLIANCE ISSUES.
11. MAXIMUM JOINT SPACING IS TWICE THE DEPTH OF THE CONCRETE PAVEMENT IN FEET.

GRADING AND DRAINAGE NOTES

1. GENERAL CONTRACTOR AND ALL SUBCONTRACTORS SHALL VERIFY THE SUITABILITY OF ALL EXISTING AND PROPOSED SITE CONDITIONS INCLUDING GRADES AND DIMENSIONS BEFORE START OF CONSTRUCTION. THE ENGINEER SHALL BE NOTIFIED IMMEDIATELY OF ANY DISCREPANCIES.
2. THE CONTRACTOR SHALL GRADE THE SITE TO THE ELEVATIONS INDICATED AND SHALL ADJUST BMP'S AS NECESSARY AND REGRADE WASHOUTS WHERE THEY OCCUR AFTER EVERY RAINFALL UNTIL A GRASS STAND IS WELL ESTABLISHED OR ADEQUATE STABILIZATION OCCURS.
3. CONTRACTOR SHALL ENSURE THERE IS POSITIVE DRAINAGE FROM THE PROPOSED BUILDINGS SO THAT SURFACE RUNOFF WILL DRAIN BY GRAVITY TO NEW OR EXISTING DRAINAGE OUTLETS. CONTRACTOR SHALL ENSURE NO PONDING OCCURS IN PAVED AREAS AND SHALL NOTIFY ENGINEER IF ANY GRADING DISCREPANCIES ARE FOUND IN THE EXISTING AND PROPOSED GRADES PRIOR TO PLACEMENT OF PAVEMENT OR UTILITIES.
4. CONTRACTOR SHALL PROTECT ALL MANHOLE COVERS, VALVE COVERS, VAULT LIDS, FIRE HYDRANTS, POWER POLES, GUY WIRES, AND TELEPHONE BOXES THAT ARE TO REMAIN IN PLACE AND UNDISTURBED DURING CONSTRUCTION. EXISTING CASTINGS AND STRUCTURES TO REMAIN SHALL BE ADJUSTED TO MATCH THE PROPOSED FINISHED GRADES.
5. BACKFILL FOR UTILITY LINES SHALL BE PLACED PER DETAILS, STANDARDS, AND SPECIFICATIONS SO THAT THE UTILITY WILL BE STABLE. WHERE UTILITY LINES CROSS THE PARKING LOT, THE TOP 6 INCHES SHALL BE COMPACTED SIMILARLY TO THE REMAINDER OF THE LOT. UTILITY DITCHES SHALL BE VISUALLY INSPECTED DURING THE EXCAVATION PROCESS TO ENSURE THAT UNDESIRABLE FILL IS NOT USED.
6. CONTRACTOR IS RESPONSIBLE FOR THE REMOVAL AND REPLACEMENT OF 4" OF TOPSOIL AT COMPLETION OF WORK. ALL UNPAVED AREAS IN EXISTING RIGHTS-OF-WAY DISTURBED BY CONSTRUCTION SHALL BE REGRADED AND SODDED.
7. AFTER PLACEMENT OF SUBGRADE AND PRIOR TO PLACEMENT OF PAVEMENT, CONTRACTOR SHALL TEST AND OBSERVE PAVEMENT AREAS FOR EVIDENCE OF PONDING. ALL AREAS SHALL ADEQUATELY DRAIN TOWARDS THE INTENDED STRUCTURE TO CONVEY STORM RUNOFF. CONTRACTOR SHALL IMMEDIATELY NOTIFY OWNER AND ENGINEER IF ANY DISCREPANCIES ARE DISCOVERED.
8. WHERE EXISTING PAVEMENT IS INDICATED TO BE REMOVED AND REPLACED, THE CONTRACTOR SHALL SAW CUT FULL DEPTH FOR A SMOOTH AND STRAIGHT JOINT AND REPLACE THE PAVEMENT WITH THE SAME TYPE AND DEPTH OF MATERIAL AS EXISTING OR AS INDICATED.
9. THE CONTRACTOR SHALL INSTALL PROTECTION OVER ALL DRAINAGE STRUCTURES FOR THE DURATION OF CONSTRUCTION AND UNTIL ACCEPTANCE OF THE PROJECT BY THE OWNER. ALL DRAINAGE STRUCTURES SHALL BE CLEANED OF DEBRIS AS REQUIRED DURING AND AT THE END OF CONSTRUCTION TO PROVIDE POSITIVE DRAINAGE FLOWS.
10. IF DEWATERING IS REQUIRED, THE CONTRACTOR SHALL OBTAIN ANY APPLICABLE REQUIRED PERMITS. THE CONTRACTOR IS TO COORDINATE WITH THE OWNER AND THE DESIGN ENGINEER PRIOR TO ANY EXCAVATION.
11. FIELD DENSITY TESTS SHALL BE TAKEN AT INTERVALS IN ACCORDANCE WITH THE LOCAL JURISDICTIONAL AGENCY OR TO STATE DOT STANDARDS. IN THE EVENT THAT THE CONTRACT DOCUMENTS AND THE JURISDICTIONAL AGENCY REQUIREMENTS ARE NOT IN AGREEMENT, THE MOST STRINGENT SHALL GOVERN.
12. ALL SLOPES AND AREAS DISTURBED BY CONSTRUCTION SHALL BE GRADED AS PER PLANS. THE AREAS SHALL THEN BE SODDED OR SEEDED AS SPECIFIED IN THE PLANS, FERTILIZED, MULCHED, WATERED AND MAINTAINED UNTIL GROWTH IS ESTABLISHED TO MINIMUM COVERAGE OF 70% IN ALL AREAS. ANY AREAS DISTURBED FOR ANY REASON PRIOR TO FINAL ACCEPTANCE OF THE JOB SHALL BE CORRECTED BY THE CONTRACTOR AT NO ADDITIONAL COST TO THE OWNER. ALL EARTHEN AREAS WILL BE SODDED OR SEEDED AND MULCHED AS SHOWN ON THE LANDSCAPING PLAN.
13. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE CONTROL OF DUST AND DIRT RISING AND SCATTERING IN THE AIR DURING CONSTRUCTION AND SHALL PROVIDE WATER SPRINKLING OR OTHER SUITABLE METHODS OF CONTROL. THE CONTRACTOR SHALL COMPLY WITH ALL GOVERNING REGULATIONS PERTAINING TO ENVIRONMENTAL PROTECTION.
14. SOD, WHERE CALLED FOR, MUST BE INSTALLED AND MAINTAINED ON EXPOSED SLOPES WITHIN 48 HOURS OF COMPLETING FINAL GRADING, AND AT ANY OTHER TIME AS NECESSARY, TO PREVENT EROSION, SEDIMENTATION OR TURBID DISCHARGES.
15. THE CONTRACTOR SHALL ENSURE THAT LANDSCAPE ISLAND PLANTING AREAS AND OTHER PLANTING AREAS ARE NOT COMPACTED AND DO NOT CONTAIN ROAD BASE MATERIALS. THE CONTRACTOR SHALL ALSO EXCAVATE AND REMOVE ALL UNDESIRABLE MATERIAL FROM ALL AREAS ON THE SITE TO BE PLANTED AND PROPERLY DISPOSED OF IN A LEGAL MANNER.
16. THE CONTRACTOR SHALL INSTALL ALL UNDERGROUND STORM WATER PIPING PER MANUFACTURER'S RECOMMENDATIONS AND STATE DOT SPECIFICATIONS.
17. PAVEMENTS SHALL BE INSTALLED IN ACCORDANCE WITH THE RECOMMENDATION OF THE SITE SPECIFIC GEOTECHNICAL EVALUATION REPORT AND TOWNSHIP & STATE DOT SPECIFICATIONS.
18. SPOT ELEVATIONS REPRESENT THE FINISHED SURFACE GRADE OR FLOWLINE OF CURB UNLESS OTHERWISE NOTED.
19. LIMITS OF CONSTRUCTION ARE TO THE PROPERTY LINE UNLESS OTHERWISE SPECIFIED ON THE PLAN.
20. IMMEDIATELY REPORT TO THE OWNER ANY DISCREPANCIES FOUND BETWEEN ACTUAL FIELD CONDITIONS AND CONSTRUCTION DOCUMENTS.
21. THE CONTRACTOR IS RESPONSIBLE FOR LOCATING AND PROTECTING EXISTING UTILITIES, AND SHALL REPAIR ALL DAMAGE TO EXISTING UTILITIES THAT OCCUR DURING CONSTRUCTION WITHOUT COMPENSATION.
22. BLEND NEW EARTHWORK SMOOTHLY TO TRANSITION BACK TO EXISTING GRADE.
23. ALL PROPOSED GRADES ONSITE SHALL BE 3:1 OR FLATTER UNLESS OTHERWISE INDICATED ON THE PLANS. ANY SLOPES STEEPER THAN 4:1 REQUIRE EROSION AND SEDIMENT CONTROL BLANKET.
24. ADHERE TO ALL TERMS AND CONDITIONS AS NECESSARY IN THE GENERAL N.P.D.E.S. PERMIT AND STORMWATER POLLUTION PREVENTION PLAN (SWPPP) FOR STORMWATER DISCHARGE ASSOCIATED WITH CONSTRUCTION ACTIVITIES.
25. ADJUST AND/OR CUT EXISTING PAVEMENT AS NECESSARY TO ASSURE A SMOOTH FIT AND CONTINUOUS GRADE.

WATER STORM SEWER & SANITARY SEWER NOTES

1. THE CONTRACTOR SHALL CONSTRUCT GRAVITY SEWER LATERALS, MANHOLES, GRAVITY SEWER LINES, AND DOMESTIC WATER AND FIRE PROTECTION SYSTEM AS SHOWN ON THESE PLANS. THE CONTRACTOR SHALL FURNISH ALL NECESSARY MATERIALS, EQUIPMENT, MACHINERY, TOOLS, MEANS OF TRANSPORTATION AND LABOR NECESSARY TO COMPLETE THE WORK IN FULL AND COMPLETE ACCORDANCE WITH THE SHOWN, DESCRIBED AND REASONABLY INTENDED REQUIREMENTS OF THE CONTRACT DOCUMENTS AND JURISDICTIONAL AGENCY REQUIREMENTS. IN THE EVENT THAT THE CONTRACT DOCUMENTS AND THE JURISDICTIONAL AGENCY REQUIREMENTS ARE NOT IN AGREEMENT, THE MOST STRINGENT SHALL GOVERN.
2. ALL EXISTING UNDERGROUND UTILITY LOCATIONS SHOWN ARE APPROXIMATE. THE CONTRACTOR SHALL COMPLY WITH ALL REQUIREMENTS FOR UTILITY LOCATION AND COORDINATION IN ACCORDANCE WITH THE NOTES CONTAINED IN THE GENERAL CONSTRUCTION SECTION OF THIS SHEET.
3. THE CONTRACTOR SHALL RESTORE ALL DISTURBED VEGETATION IN KIND, UNLESS SHOWN OTHERWISE.
4. DEFLECTION OF PIPE JOINTS AND CURVATURE OF PIPE SHALL NOT EXCEED THE MANUFACTURER'S SPECIFICATIONS. SECURELY CLOSE ALL OPEN ENDS OF PIPE AND FITTINGS WITH A WATERTIGHT PLUG WHEN WORK IS NOT IN PROGRESS. THE INTERIOR OF ALL PIPES SHALL BE CLEAN AND JOINT SURFACES WIPED CLEAN AND DRY AFTER THE PIPE HAS BEEN LOWERED INTO THE TRENCH. VALVES SHALL BE PLUMB AND LOCATED ACCORDING TO THE PLANS.
5. ALL PIPE AND FITTINGS SHALL BE CAREFULLY STORED FOLLOWING MANUFACTURER'S RECOMMENDATIONS. CARE SHALL BE TAKEN TO AVOID DAMAGE TO THE COATING OR LINING IN ANY D.I. PIPE FITTINGS. ANY PIPE OR FITTING WHICH IS DAMAGED OR WHICH HAS FLAWS OR IMPERFECTIONS WHICH, IN THE OPINION OF THE ENGINEER OR OWNER, RENDERS IT UNFIT FOR USE, SHALL NOT BE USED. ANY PIPE NOT SATISFACTORY FOR USE SHALL BE CLEARLY MARKED AND IMMEDIATELY REMOVED FROM THE JOB SITE, AND SHALL BE REPLACED AT THE CONTRACTOR'S EXPENSE.
6. WATER FOR FIRE FIGHTING SHALL BE MADE AVAILABLE FOR USE BY THE CONTRACTOR PRIOR TO COMBUSTIBLES BEING BROUGHT ON SITE.
7. ALL UTILITY AND STORM DRAIN TRENCHES LOCATED UNDER AREAS TO RECEIVE PAVING SHALL BE COMPLETELY BACK FILLED IN ACCORDANCE WITH THE GOVERNING JURISDICTIONAL AGENCY'S SPECIFICATIONS. IN THE EVENT THAT THE CONTRACT DOCUMENTS AND THE JURISDICTIONAL AGENCY REQUIREMENTS ARE NOT IN AGREEMENT, THE MOST STRINGENT SHALL GOVERN.
8. UNDERGROUND UTILITY LINES SHALL BE SURVEYED BY A STATE LICENSED PROFESSIONAL LAND SURVEYOR PRIOR TO BACK FILLING.
9. CONTRACTOR SHALL PERFORM, AT THEIR OWN EXPENSE, ANY AND ALL TESTS REQUIRED BY THE SPECIFICATIONS AND/OR ANY AGENCY HAVING JURISDICTION. THESE TESTS MAY INCLUDE, BUT MAY NOT BE LIMITED TO, INFILTRATION AND EXFILTRATION, TELEVISION INSPECTION AND A MANDREL TEST ON GRAVITY SEWER. A COPY OF THE TEST RESULTS SHALL BE PROVIDED TO THE UTILITY PROVIDER, OWNER AND JURISDICTIONAL AGENCY AS REQUIRED.
10. BETWEEN WATER AND SEWER MANHOLES AND PIPES, CONTRACTOR SHALL PROVIDE FOR A MINIMUM HORIZONTAL CLEARANCE OF 10-FEET AND A MINIMUM VERTICAL SEPARATION OF 18-INCHES.
11. IF ANY EXISTING STRUCTURES TO REMAIN ARE DAMAGED DURING CONSTRUCTION IT SHALL BE THE CONTRACTORS RESPONSIBILITY TO REPAIR AND/OR REPLACE THE EXISTING STRUCTURE AS NECESSARY TO RETURN IT TO EXISTING CONDITIONS OR BETTER.
12. ALL STORM PIPE ENTERING STRUCTURES SHALL BE GASKETED AND/OR GROUTED TO ASSURE CONNECTION AT STRUCTURE IS WATERTIGHT UNLESS OTHERWISE STATED BY TOWNSHIP AND STATE DESIGN STANDARDS AND SPECIFICATIONS.
13. UNLESS OTHERWISE STATED IN TOWNSHIP AND STATE DESIGN STANDARDS AND SPECIFICATIONS, ALL STORM SEWER MANHOLES IN PAVED AREAS SHALL BE FLUSH WITH PAVEMENT, AND SHALL HAVE TRAFFIC BEARING RING & COVERS. MANHOLES IN UNPAVED AREAS SHALL BE 6" ABOVE FINISH GRADE. LIDS SHALL BE LABELED "STORM SEWER". EXISTING CASTINGS AND STRUCTURES WITHIN PROJECT LIMITS SHALL BE ADJUSTED TO MEET THESE CONDITIONS AND THE PROPOSED FINISHED GRADE.
14. TOPOGRAPHIC INFORMATION IS TAKEN FROM A TOPOGRAPHIC SURVEY BY LAND SURVEYORS. IF THE CONTRACTOR DOES NOT ACCEPT EXISTING TOPOGRAPHY AS SHOWN ON THE PLANS, WITHOUT EXCEPTION, THEN THE CONTRACTOR SHALL SUPPLY, AT THEIR EXPENSE, A TOPOGRAPHIC SURVEY BY A REGISTERED LAND SURVEYOR TO THE OWNER FOR REVIEW.
15. CONSTRUCTION SHALL COMPLY WITH ALL APPLICABLE GOVERNING CODES AND BE CONSTRUCTED TO SAME.
16. ALL STORM STRUCTURES SHALL HAVE A SMOOTH UNIFORM POURED MORTAR FROM INVERT IN TO INVERT OUT.
17. ROOF DRAINS SHALL BE CONNECTED TO STORM SEWER BY PREFABRICATED WYES OR AT STORM STRUCTURES. ROOF DRAINS AND TRUCK WELL DRAIN SHALL RUN AT A MINIMUM 2.0% SLOPE, UNLESS NOTED OTHERWISE, AND TIE IN AT THE CENTERLINE OF THE STORM MAIN.
18. PROVIDE INSULATION OF UNDERGROUND ROOF DRAINS AND SANITARY SEWER SERVICES IF ADEQUATE FROST DEPTH CANNOT BE PROVIDED.
19. THE CONTRACTOR SHALL PROTECT EXISTING UNDERGROUND UTILITIES AND APPURTENANCES THAT ARE TO REMAIN FROM DAMAGE DURING CONSTRUCTION OPERATIONS.
20. THE LOCATION OF EXISTING UTILITIES, STORM DRAINAGE STRUCTURES AND OTHER ABOVE AND BELOW-GRADE IMPROVEMENTS ARE APPROXIMATE AS SHOWN. IT IS THE CONTRACTOR'S RESPONSIBILITY TO DETERMINE THE EXACT LOCATION, SIZE AND INVERT ELEVATIONS OF EACH PRIOR TO THE START OF CONSTRUCTION.
21. A MINIMUM SEPARATION OF 5-FEET IS REQUIRED BETWEEN UNDERGROUND UTILITIES AND TREES UNLESS A ROOT BARRIER IS UTILIZED.
22. GAS, PHONE AND ELECTRIC SERVICES SHOWN FOR INFORMATIONAL PURPOSES ONLY. DRY UTILITY COMPANIES MAY ALTER THE DESIGN LAYOUT DURING THEIR REVIEW. CONTRACTOR TO COORDINATE FINAL DESIGN AND INSTALLATION WITH UTILITY COMPANIES.
23. COORDINATE UTILITY INSTALLATION WITH IRRIGATION DESIGN AND INSTALLATION.
24. ALL DIMENSIONS ARE TO FLOW LINE OF CURB UNLESS OTHERWISE NOTED. PERIMETER WALL DIMENSIONS ARE TO INSIDE WALL FACE. REFERENCE ARCHITECTURAL PLANS FOR EXACT WALL WIDTH AND SPECIFICATIONS.
25. REFERENCE ARCHITECTURAL PLANS (BY OTHERS) FOR EXACT BUILDING DIMENSIONS, MATERIALS SPECIFICATIONS.
26. REFERENCE M.E.P. PLANS (BY OTHERS) FOR MECHANICAL EQUIPMENT DIMENSIONS AND SPECIFICATIONS.
27. CONTRACTOR SHALL REFERENCE STRUCTURAL PLANS (BY OTHERS) FOR FOOTING AND FOUNDATION PAD PREPARATION SPECIFICATIONS.
28. CONTRACTOR SHALL REFERENCE M.E.P PLANS (BY OTHERS) FOR ROUTING OF PROPOSED ELECTRICAL & COMMUNICATIONS SERVICES AND SITE LIGHTING LAYOUT.

MISS DIG 811

ISSUED FOR PERMIT - NOT FOR CONSTRUCTION

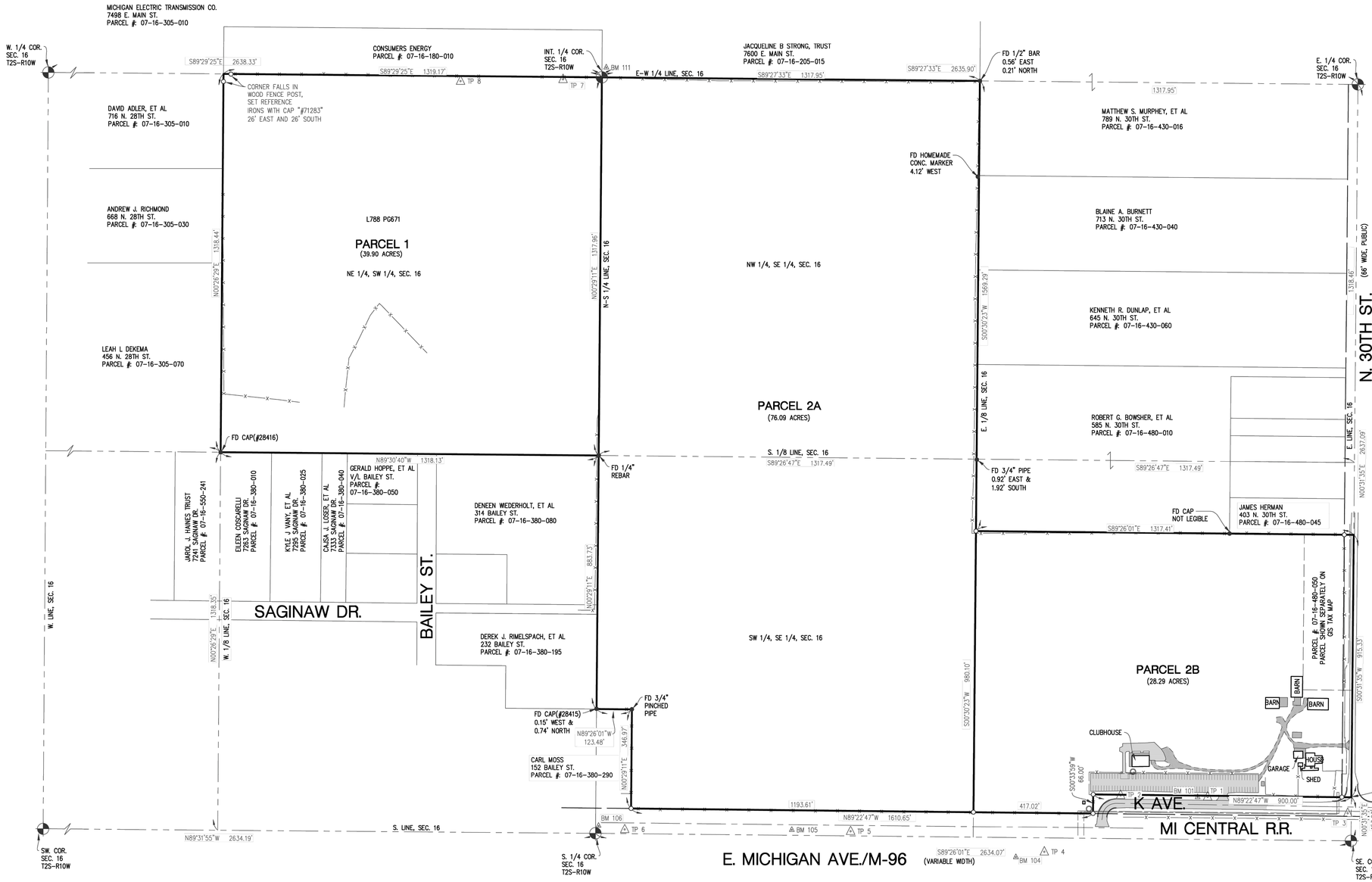
No.	REVISIONS	DATE	BY
1	ENTITLEMENT SET	06/02/2026	BPG

Kimley»Horn of Michigan, Inc.
© 2026 KIMLEY-HORN OF MICHIGAN
3000 TOWN CENTER, SUITE 2600
SOUTHFIELD, MI 48075
(312) 726 9445

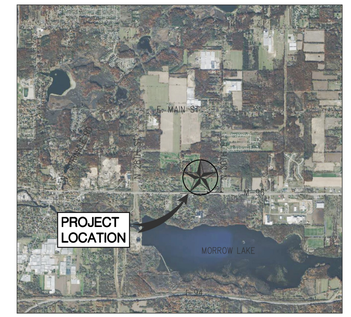
CIP Copenhagen Infrastructure Partners

STATE OF MICHIGAN — BRIAN GAMMON — ENGINEER — 6201372401 — PROFESSIONAL ENGINEER
Brian Gammon

KHA PROJECT	161282002
DATE	06/08/2026
SCALE	AS SHOWN
D



LOCATION MAP: N.T.S.





LEGEND

- TRAVERSE POINT
- BENCHMARK
- SET IRON
- FOUND IRON
- SECTION & 1/4 CORNER
- WATER WELL
- ONE POST TRAFFIC SIGN
- GUY WIRE
- UTILITY POLE
- ROUND CATCHBASIN
- CENTERLINE OF ROAD
- FENCE
- BUILDING
- SECTION LINE
- PROPERTY LINE (APPROX)
- U.G. GAS LINE
- EDGE OF CONCRETE
- EDGE OF ASPHALT
- EDGE OF GRAVEL

CERTIFICATION:

TO:
KIMLEY HORN OF MICHIGAN, INC
CI IV MASTER DEVCO, LLC
FIRST AMERICAN TITLE INSURANCE COMPANY

THIS IS TO CERTIFY THAT THIS MAP OR PLAT AND THE SURVEY ON WHICH IT IS BASED WERE MADE IN ACCORDANCE WITH THE 2021 MINIMUM STANDARD DETAIL REQUIREMENTS FOR ALTA/NSPS LAND TITLE SURVEYS, JOINTLY ESTABLISHED AND ADOPTED BY ALTA AND NSPS, AND INCLUDES ITEMS 1, 3, 4, 5, 8, 9, 11, 13 AND 16 OF TABLE A THEREOF. THE FIELDWORK WAS COMPLETED ON FEBRUARY 24, 2026.

DATE OF PLAT OR MAP [2026-03-06] [ROBERT A. CHURCH & 4001071293]

PRELIMINARY: MAY 22, 2026

PLAN DATE: 3/6/26
PROJECT MGR: RAC
REVIEWER: RAC
SCALE: 1" = 200'

ROWE PROFESSIONAL SERVICES COMPANY
507 36th Street SE
Grand Rapids, MI 49548
O: (616) 272-7125
www.rowepsc.com

ALTA/NSPS LAND TITLE SURVEY PREPARED FOR
CI IV MASTER DEVCO, LLC.
SWAN BESS PROJECT
PART OF SECTION 16, T2S, R10W
COMSTOCK TOWNSHIP, KALAMAZOO COUNTY, MICHIGAN

REV:
V100
SHT# 1 OF 2
JOB No: 2600026

PLOTTED: 5/22/2026 10:17 AM R:\Projects\2600026\Survey\SV-2600026-ALTA.dwg

LEGAL DESCRIPTION PER FIRST AMERICAN TITLE INSURANCE COMPANY COMMITMENT NO. NCS-FA500MI27-NRG, DATED DECEMBER 02, 2025 AT 8:00AM

RECORD LEGAL DESCRIPTION:

LAND IN THE TOWNSHIP OF COMSTOCK, KALAMAZOO COUNTY, MI, DESCRIBED AS FOLLOWS:

PARCEL 1:

THE NORTHEAST QUARTER OF THE SOUTHWEST QUARTER OF SECTION 16, TOWN 2 SOUTH, RANGE 10 WEST.

PARCEL 2A:

THE WEST HALF OF THE SOUTHEAST QUARTER OF SECTION 16, TOWN 2 SOUTH, RANGE 10 WEST, EXCEPT BEGINNING AT THE INTERSECTION OF THE NORTH AND SOUTH QUARTER LINE OF SAID SECTION WITH THE NORTH LINE OF THE RIGHT OF WAY OF THE MICHIGAN CENTRAL RAILROAD AND RUNNING THENCE NORTH 0 DEGREES 8 MINUTES WEST ALONG SAID QUARTER LINE 347 FEET, THENCE SOUTH 89 DEGREES 58 MINUTES EAST PARALLEL TO THE NORTH LINE OF SAID RIGHT OF WAY 123.47 FEET; THENCE SOUTH 0 DEGREES 8 MINUTES EAST PARALLEL TO SAID QUARTER LINE 347 FEET TO THE NORTH LINE OF SAID RAILROAD RIGHT OF WAY; THENCE NORTH 89 DEGREES 58 MINUTES WEST ALONG THE NORTH LINE OF SAID RIGHT OF WAY 123.47 FEET TO THE PLACE OF BEGINNING; ALSO EXCEPT THE RIGHT OF WAY OF THE MICHIGAN CENTRAL RAILROAD AS LOCATED OVER AND ACROSS THE FIRST ABOVE DESCRIBED PARCEL OF LAND.

PARCEL 2B:

PART OF THE EAST 1/2 OF THE SOUTHEAST 1/4 OF SECTION 16 OF TOWN 2 SOUTH, RANGE 10 WEST, DESCRIBED AS COMMENCING AT THE INTERSECTION OF THE EAST LINE OF SAID SECTION 16 WITH THE NORTH LINE OF THE RIGHT OF WAY OF THE MICHIGAN CENTRAL RAILROAD; THENCE NORTH ON THE EAST SECTION LINE 980 FEET; THENCE WEST PARALLEL WITH THE NORTH LINE OF SAID RIGHT OF WAY OF THE MICHIGAN CENTRAL RAILROAD TO THE NORTH AND SOUTH 1/8 LINE OF SAID SOUTHEAST 1/4 OF SECTION 16, THENCE SOUTH THEREON 980 FEET TO THE NORTH LINE OF SAID MICHIGAN CENTRAL RAILROAD RIGHT OF WAY; THENCE EAST THEREON TO THE PLACE OF BEGINNING, EXCEPT THE SOUTH 66 FEET OF THE EAST 900 FEET THEREOF.

UTILITY INFORMATION:

PER MISS DIG TICKET NUMBER: 202600900273-000, SUBMITTED ON 2/9/2026

MISS DIG TICKET RESPONDERS (AS OF 3/6/2026):

ATT	MAP PROVIDED-SITE CLEAR
CONSUMERS ENERGY ELECTRIC	MAP PROVIDED-SITE CLEAR
CONSUMERS ENERGY GAS	MAPS PROVIDED-APPROXIMATE LOCATIONS SHOWN HEREON
KALAMAZOO CITY WATER	MAP PROVIDED-SITE CLEAR, MAIN IN M-96 RIGHT OF WAY
LEVEL 3(LUMEN) FIBER OPTICS	MAP PROVIDED-SITE CLEAR, LINES IN M-96 RIGHT OF WAY

MISS DIG TICKET NON-RESPONDERS (AS OF 3/6/2026):
COMSTOCK CHARTER TWP SANITARY SEWER
CHARTER CABLE TV
U.S. SIGNAL CORPS FIBER OPTICS

THERE MAY BE ABOVE GROUND AND BELOW GROUND UTILITIES THAT WERE NOT GRAPHICALLY SHOWN ON THE DRAWING DUE TO MISS DIG TICKET MEMBERS NOT RESPONDING TO THE ABOVE MENTIONED TICKET.

TRAVERSE POINTS:

TP #1
SET 1/2" X 18" REROD WITH ROWE TRAV CAP 30'± WEST OF CENTERLINE OF DRIVE TO GOLF COURSE 18'± NORTH OF CENTERLINE K AVE
NORTHING = 289448.390
EASTING = 12823526.635

TP #2
SET 1/2" X 18" REROD WITH ROWE TRAV CAP 25'± NORTH OF CENTERLINE K AVE 20'± EAST OF POWER POLE
NORTHING = 289453.838
EASTING = 12823223.140

TP #3
SET 1/2" X 18" REROD WITH ROWE TRAV CAP 20'± NORTH OF CENTERLINE K AVE 10'± WEST OF K AVE AND 30TH ST SIGN
NORTHING = 289391.579
EASTING = 12824015.001

TP #4
SET 1/2" X 18" REROD WITH ROWE TRAV CAP 40'± SOUTH OF M-96 CENTERLINE 100'± WEST OF CENTERLINE 30TH AVE
NORTHING = 289257.421
EASTING = 12822957.361

TP #5
SET 1/2" X 18" REROD WITH ROWE TRAV CAP 18'± NORTH OF M-96 CENTERLINE 110'± EAST OF LANDALE ST TO SOUTH
NORTHING = 289328.435
EASTING = 12822281.747

TP #6
SET 1/2" X 18" REROD WITH ROWE TRAV CAP 20'± NORTH OF M-96 CENTERLINE 75'± WEST OF CENTERLINE ELLIOT ST CENTERLINE
NORTHING = 289334.845
EASTING = 12821494.400

TP #7
SET 1/2" X 18" REROD WITH ROWE TRAV CAP 7'± SOUTH OF EAST-WEST FENCE 40'± WEST OF NORTH-SOUTH TREE LINE
NORTHING = 291949.894
EASTING = 12821279.511

TP #8
SET 1/2" X 18" REROD WITH ROWE TRAV CAP 15'± SOUTH OF EAST-WEST FENCE 15'± S15W OF 4X4 POST
NORTHING = 291943.852
EASTING = 12823491.749

ALL COORDINATE VALUES ARE GRID.

SCHEDULE B, PART II, EXCEPTIONS, PER FIRST AMERICAN TITLE INSURANCE COMPANY COMMITMENT NO. NCS-FA500MI27-NRG, DATED DECEMBER 02, 2025 AT 8:00AM

1. ANY DEFECT, LIEN, ENCUMBRANCE, ADVERSE CLAIM, OR OTHER MATTER THAT APPEARS FOR THE FIRST TIME IN THE PUBLIC RECORDS OR IS CREATED, ATTACHES, OR IS DISCLOSED BETWEEN THE COMMITMENT DATE AND THE DATE ON WHICH ALL OF THE SCHEDULE B, PART I—REQUIREMENTS ARE MET.
   LEGAL IN NATURE, NOT A MATTER OF SURVEYING
2. ANY FACTS, RIGHTS, INTERESTS OR CLAIMS THAT ARE NOT SHOWN BY THE PUBLIC RECORDS BUT THAT COULD BE ASCERTAINED BY AN INSPECTION OF THE LAND OR BY MAKING INQUIRY OF PERSONS IN POSSESSION OF THE LAND.
   LEGAL IN NATURE, NOT A MATTER OF SURVEYING
3. EASEMENTS, LIENS OR ENCUMBRANCES, OR CLAIMS THEREOF, NOT SHOWN BY THE PUBLIC RECORDS.
   LEGAL IN NATURE, NOT A MATTER OF SURVEYING
4. ANY ENCROACHMENT, ENCUMBRANCE, VIOLATION, VARIATION, OR ADVERSE CIRCUMSTANCE AFFECTING THE TITLE INCLUDING DISCREPANCIES, CONFLICTS IN BOUNDARY LINES, SHORTAGE IN AREA, OR ANY OTHER FACTS THAT WOULD BE DISCLOSED BY AN ACCURATE AND COMPLETE LAND SURVEY OF THE LAND, AND THAT ARE NOT SHOWN IN THE PUBLIC RECORDS.
   NONE OBSERVED DURING FIELD SURVEY OR DISCOVERED AS A RESULT OF FURTHER RESEARCH
5. TAXES AND ASSESSMENTS NOT DUE AND PAYABLE AT COMMITMENT DATE.
   LEGAL IN NATURE, NOT A MATTER OF SURVEYING
6. ANY LIEN OR RIGHT TO A LIEN, IMPOSED BY LAW, AS A RESULT OF SERVICES, LABOR, AND/OR MATERIALS USED, OR TO BE USED, FOR IMPROVEMENT TO THE LAND.
   LEGAL IN NATURE, NOT A MATTER OF SURVEYING
7. WATER RIGHTS, CLAIMS OR TITLE TO WATER, WHETHER OR NOT SHOWN BY THE PUBLIC RECORDS.
   LEGAL IN NATURE, NOT A MATTER OF SURVEYING
8. ANY CLAIM TO (A) OWNERSHIP OF OR RIGHTS TO MINERALS AND SIMILAR SUBSTANCES, INCLUDING BUT NOT LIMITED TO ORES, METALS, COAL, LIGNITE, OIL, GAS, URANIUM, CLAY, ROCK, SAND, AND GRAVEL LOCATED IN, ON, OR UNDER THE LAND OR PRODUCED FROM THE LAND, WHETHER SUCH OWNERSHIP OR RIGHTS ARISE BY LEASE, GRANT, EXCEPTION, CONVEYANCE, RESERVATION, OR OTHERWISE; AND (B) ANY RIGHTS, PRIVILEGES, IMMUNITIES, RIGHTS OF WAY, AND EASEMENTS ASSOCIATED THEREWITH OR APPURTENANT THERETO, WHETHER OR NOT THE INTERESTS OR RIGHTS EXCEPTED IN (A) OR (B) APPEAR IN THE PUBLIC RECORDS OR ARE SHOWN IN SCHEDULE B.
   LEGAL IN NATURE, NO SUCH CLAIMS OR INTERESTS DISCOVERED AS A RESULT OF THIS SURVEY
9. ALL TAX MAP NUMBERS REFERRED TO IN THE TITLE REPORT AND FINAL POLICY ARE FOR INFORMATIONAL PURPOSES ONLY AND FIRST AMERICAN TITLE INSURANCE COMPANY DOES NOT INSURE, NOR LIMIT THE EXCEPTIONS, TO THE TAX MAP NUMBERS INDICATED.
   ADJOINING PARCEL LINES AND OWNER INFORMATION SHOWN PER AVAILABLE GIS/TAX MAP AND ARE APPROXIMATE
10. COVENANTS, CONDITIONS, TERMS AND/OR RESTRICTIONS CONTAINED IN A WARRANTY DEED RECORDED MARCH 29, 1962 IN/AS LIBER 788, PAGE 671, OF KALAMAZOO COUNTY RECORDS.
    DEED INCLUDES PARCEL 1, DEEDED RESTRICTIONS DO NOT APPLY TO THE SUBJECT PARCEL
11. EASEMENT DEED BY COURT ORDER IN SETTLEMENT OF LANDOWNER ACTION BY AND BETWEEN DAVID K DART AND DEBRA L DART AND SPRINT COMMUNICATIONS COMPANY L.P., QWEST COMMUNICATIONS COMPANY, LLC, LEVEL 3 COMMUNICATIONS, LLC, AND WILTEL COMMUNICATIONS, LLC CREATED BY INSTRUMENT RECORDED SEPTEMBER 17, 2013 IN/AS INSTRUMENT NO. 2013-038710, OF KALAMAZOO COUNTY RECORDS. (AFFECTS PARCEL 2A AND 2B)
    EASEMENT NOT PLOTTABLE DUE TO LACK OF INFORMATION REGARDING UNDERGROUND CABLES
12. INTEREST OF OTHERS IN OIL, GAS AND MINERAL RIGHTS, IF ANY, WHETHER OR NOT RECORDED IN THE PUBLIC RECORDS.
    LEGAL IN NATURE, NOT A MATTER OF SURVEYING
13. INTEREST, IF ANY, OF THE UNITED STATES, STATE OF MICHIGAN, OR ANY POLITICAL SUBDIVISION THEREOF, IN THE OIL, GAS AND MINERALS IN AND UNDER AND THAT MAY BE PRODUCED FROM THE LAND.
    LEGAL IN NATURE, NOT A MATTER OF SURVEYING
14. RIGHTS OF TENANTS UNDER UNRECORDED LEASES.
    LEGAL IN NATURE, NOT A MATTER OF SURVEYING
15. TO THE EXTENT A TRACT IS BOUNDED BY A PUBLIC ROAD, RIGHTS OF OTHERS IN AND TO ANY PORTION OF THE PROPERTY THAT LIES WITHIN SAID ROAD.
    RIGHTS OF WAY SHOWN HEREON

SURVEYOR'S NOTES:

1. VERTICAL DATUM IS NAVD88.
2. HORIZONTAL DATUM IS MICHIGAN STATE PLANE COORDINATE SYSTEM, SOUTH ZONE NAD83 (2011).
3. GRID DISTANCE / 0.999932637 = GROUND DISTANCE.
4. BEARINGS ARE BASED UPON MICHIGAN STATE PLANE COORDINATE SYSTEM, SOUTH ZONE NAD83 (2011).
5. THE SUBJECT PROPERTY IS THE SAME AS THE PROPERTY DESCRIBED IN SCHEDULE A OF THE PROVIDED TITLE COMMITMENT.
6. THE LEGAL DESCRIPTION PROVIDED IN SCHEDULE C OF THE PROVIDED TITLE COMMITMENT CONTAINS PROPERTY MEASUREMENTS AS RECORDED.
8. ALL PROPERTY BOUNDARY MEASUREMENTS SHOWN HEREON ARE MEASURED, DISTANCES AND AREAS HAVE BEEN CONVERTED TO GROUND DISTANCES (REFER TO NOTE 3).
9. ALL SECTION CORNERS SHOWN HEREON WERE FOUND IN GOOD CONDITION
10. ALL TITLE DOCUMENTS ARE SHOWN AND/OR NOTED HEREON, INCLUDING THOSE FOR OFFSITE FEATURES/EASEMENTS, IF PROVIDED TO ROWE.
11. RAILROAD RIGHT OF WAY SHOWN BASED ON BEST FIT CENTERLINE OF FIELD OBSERVATIONS, AND QUIT CLAIM DEED AS RECORDED IN LIBER M, PAGE 16, KALAMAZOO COUNTY RECORDS

ALTA STANDARDS - TABLE A NOTES:

1. MONUMENTS PLACED (OR A REFERENCE MONUMENT OR WITNESS TO THE CORNER) AT ALL MAJOR CORNERS OF THE BOUNDARY OF THE SURVEYED PROPERTY, UNLESS ALREADY MARKED OR REFERENCED BY EXISTING MONUMENTS OR WITNESSES IN CLOSE PROXIMITY TO THE CORNER.
   ALL CORNERS HAVE BEEN SET
3. FLOOD ZONE CLASSIFICATION (WITH PROPER ANNOTATION BASED ON FEDERAL FLOOD INSURANCE RATE MAPS OR THE STATE OR LOCAL EQUIVALENT) DEPICTED BY SCALED MAP LOCATION AND GRAPHIC PLOTTING ONLY.
   THE SUBJECT PARCEL(S) IS FULLY WITHIN FLOOD ZONE X (AREA OF MINIMAL FLOOD HAZARD) PER FEMA FIRM MAP 26077C0215E EFFECTIVE 7/31/2024
4. GROSS LAND AREA (AND OTHER AREAS IF SPECIFIED BY THE CLIENT).
   PARCEL 1 = 39.90 ACRES
   PARCEL 2A = 76.09 ACRES
   PARCEL 2B = 28.29 ACRES
   TOTAL = 144.28 ACRES
5. VERTICAL RELIEF WITH THE SOURCE OF INFORMATION (E.G., GROUND SURVEY, AERIAL MAP), CONTOUR INTERVAL, DATUM, WITH ORIGINATING BENCHMARK, WHEN APPROPRIATE.
   VERTICAL RELIEF DETERMINED BY AERIAL LiDAR AND GROUND SURVEY
8. SUBSTANTIAL FEATURES OBSERVED IN THE PROCESS OF CONDUCTING THE FIELDWORK (IN ADDITION TO THE IMPROVEMENTS AND FEATURES REQUIRED PURSUANT TO SECTION 5 ABOVE) (E.G., PARKING LOTS, BILLBOARDS, SIGNS, SWIMMING POOLS, LANDSCAPED AREAS, SUBSTANTIAL AREAS OF REFUSE).
   ALL IMPROVEMENTS OBSERVED DURING SURVEY ARE SHOWN HEREON.
9. NUMBER AND TYPE (E.G., DISABLED, MOTORCYCLE, REGULAR, AND OTHER MARKED SPECIALIZED TYPES) OF CLEARLY IDENTIFIABLE PARKING SPACES ON SURFACE PARKING AREAS, LOTS, AND IN PARKING STRUCTURES. STRIPING OF CLEARLY IDENTIFIABLE PARKING SPACES ON SURFACE PARKING AREAS AND LOTS.
   115 TOTAL PARKING SPACES (112 STANDARD, 3 HANDICAPPED)
11. EVIDENCE OF UNDERGROUND UTILITIES EXISTING ON OR SERVING THE SURVEYED PROPERTY (IN ADDITION TO THE OBSERVED EVIDENCE OF UTILITIES REQUIRED PURSUANT TO SECTION 5.E.IV.) AS DETERMINED BY:
    a. PLANS AND/OR REPORTS PROVIDED BY CLIENT (WITH REFERENCE AS TO THE SOURCES OF INFORMATION)
    PLANS AND INFORMATION RECEIVED VIA MISS DIG DESIGN TICKET NO. 202602090027 3-000 SHOWN AND NOTED HEREON AS APPLICABLE
    b. MARKINGS COORDINATED BY THE SURVEYOR PURSUANT TO A PRIVATE UTILITY LOCATE REQUEST.
    VISIBLE UTILITIES SHOWN HEREON, MICHIGAN MISS DIG DOES NOT MARK UTILITIES FOR SURVEYING OR ENGINEERING PURPOSES

NOTE TO THE CLIENT, INSURER, AND LENDER – WITH REGARD TO TABLE A, ITEM 11, INFORMATION FROM THE SOURCES CHECKED ABOVE WILL BE COMBINED WITH OBSERVED EVIDENCE OF UTILITIES PURSUANT TO SECTION 5.E.IV. TO DEVELOP A VIEW OF THE UNDERGROUND UTILITIES. HOWEVER, LACKING EXCAVATION, THE EXACT LOCATION OF UNDERGROUND FEATURES CANNOT BE ACCURATELY, COMPLETELY, AND RELIABLY DEPICTED. IN ADDITION, IN SOME JURISDICTIONS, 811 OR OTHER SIMILAR UTILITY LOCATE REQUESTS FROM SURVEYORS MAY BE IGNORED OR RESULT IN AN INCOMPLETE RESPONSE, IN WHICH CASE THE SURVEYOR SHALL NOTE ON THE PLAT OR MAP HOW THIS AFFECTED THE SURVEYOR'S ASSESSMENT OF THE LOCATION OF THE UTILITIES. WHERE ADDITIONAL OR MORE DETAILED INFORMATION IS REQUIRED, THE CLIENT IS ADVISED THAT EXCAVATION MAY BE NECESSARY.

13. NAMES OF ADJOINING OWNERS ACCORDING TO CURRENT TAX RECORDS. IF MORE THAN ONE OWNER, IDENTIFY THE FIRST OWNER'S NAME LISTED IN THE TAX RECORDS FOLLOWED BY "ET AL."
    ADJOINER NAME AND PARCEL NUMBER SHOWN HEREON
16. EVIDENCE OF RECENT EARTH MOVING WORK, BUILDING CONSTRUCTION, OR BUILDING ADDITIONS OBSERVED IN THE PROCESS OF CONDUCTING THE FIELDWORK.
    NO RECENT ACTIVITY OBSERVED DURING FIELD SURVEY

BENCHMARKS:

BM #101
SET SPIKE IN NORTH SIDE OF POWER POLE 100'± WEST OF CENTERLINE DRIVE TO GOLF COURSE
NORTHING = 289447
EASTING = 12823491
ELEVATION = 805.68

BM #104
SET SPIKE IN NORTH SIDE OF POWER POLE 150'± WEST OF CENTERLINE K AVE AT RR CROSSING
NORTHING = 289238
EASTING = 12822857
ELEVATION = 802.64

BM #105
SET SPIKE IN SOUTH SIDE OF GUY POLE 15'± WEST OF CENTERLINE LANDALE ST
NORTHING = 289333
EASTING = 12822076
ELEVATION = 798.95

BM #106
CHISELED SQUARE IN SOUTHEAST CORNER OF HEADWALL 115'± WEST OF CENTERLINE ELLIOT ST 25'± NORTH OF CENTERLINE M-96
NORTHING = 289348
EASTING = 12821403
ELEVATION = 797.35

BM #111
CHISELED 'X' IN WEST SIDE OF CONCRETE BASE OF METAL POLE #8611
NORTHING = 291991
EASTING = 12821430
ELEVATION = 901.83

ALL COORDINATE VALUES ARE GRID

PRELIMINARY: MAY 22, 2026

PLAN DATE: 3/6/2026
PROJECT MGR: RAC
REVIEWER: RAC
SCALE: N/A

ROWE PROFESSIONAL SERVICES COMPANY
507 36th Street SE
Grand Rapids, MI 49548
O: (616) 272-7125
www.rowepsc.com

ALTA/NSPS LAND TITLE SURVEY PREPARED FOR
CI IV MASTER DEVCO, LLC.
SWAN BESS PROJECT
PART OF SECTION 16, T2S, R10W
COMSTOCK TOWNSHIP, KALAMAZOO COUNTY, MICHIGAN

REV:

SHT# V101
JOB No: 2600026

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PLOTTED: 5/22/2026 10:17 AM

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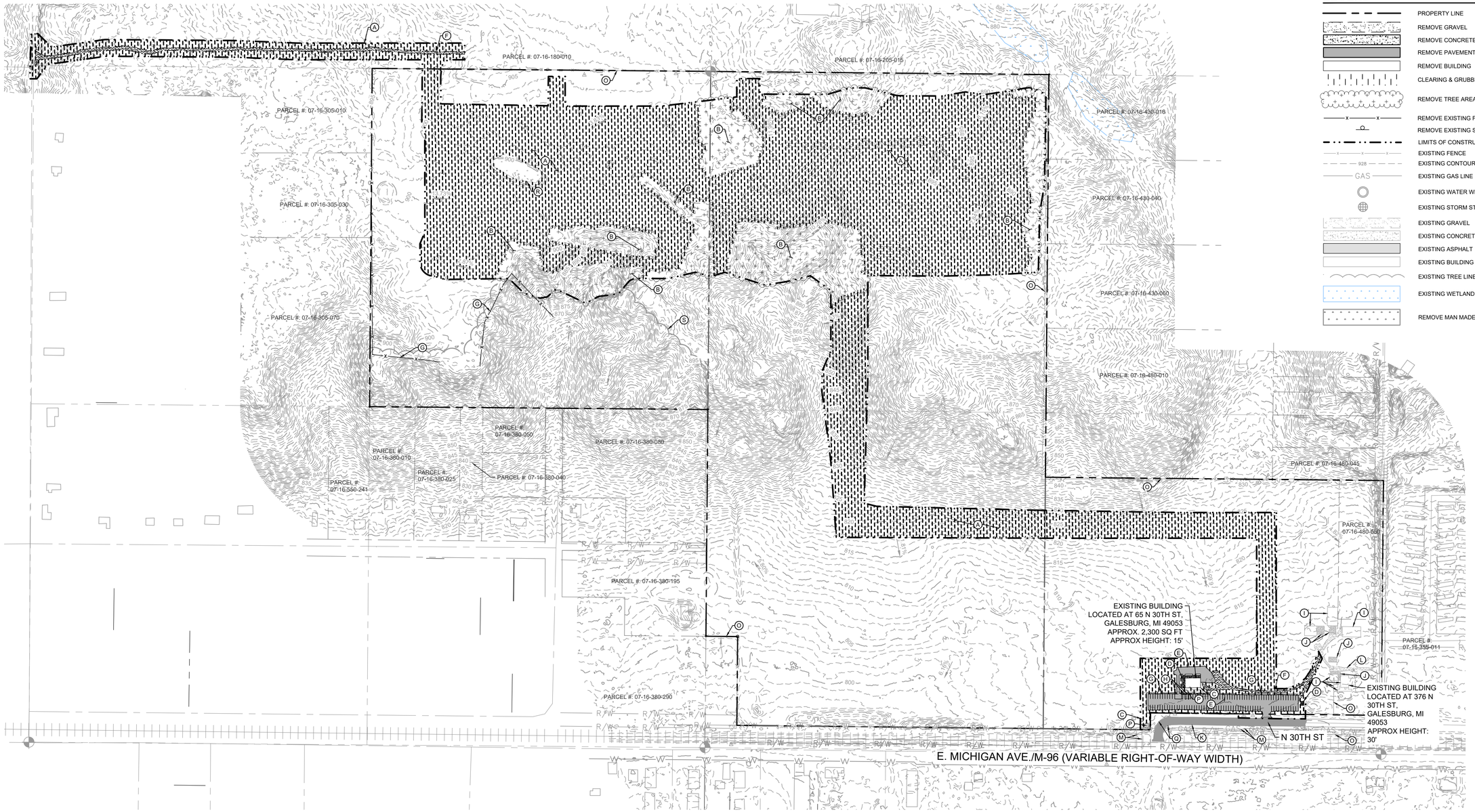

LEGEND

- PROPERTY LINE
- REMOVE GRAVEL
- REMOVE CONCRETE SURFACE
- REMOVE PAVEMENT
- REMOVE BUILDING
- CLEARING & GRUBBING
- REMOVE TREE AREA
- REMOVE EXISTING FENCE
- REMOVE EXISTING SIGN
- LIMITS OF CONSTRUCTION
- EXISTING FENCE
- EXISTING CONTOUR
- EXISTING GAS LINE
- EXISTING WATER WELL
- EXISTING STORM STRUCTURE
- EXISTING GRAVEL
- EXISTING CONCRETE
- EXISTING ASPHALT
- EXISTING BUILDING
- EXISTING TREE LINE
- EXISTING WETLAND
- REMOVE MAN MADE POND

DEMOLITION PLAN NOTES

1. THE CONTRACTOR IS RESPONSIBLE FOR THE DEMOLITION, REMOVAL, AND DISPOSAL (IN A LOCATION APPROVED BY ALL GOVERNING AUTHORITIES) OF ALL STRUCTURES, PADS, WALLS, FLUMES, FOUNDATIONS, PARKING, DRIVES, DRAINAGE STRUCTURES, UTILITIES, ETC. SUCH THAT THE IMPROVEMENTS ON THE PLANS CAN BE CONSTRUCTED. FACILITIES TO BE REMOVED SHALL BE UNDERCUT TO SUITABLE MATERIAL AND BROUGHT TO GRADE WITH SUITABLE COMPACTED FILL MATERIAL PER THE PROJECT DOCUMENTS.
2. THE CONTRACTOR IS RESPONSIBLE FOR REMOVING ALL DEBRIS FROM THE SITE AND DISPOSING OF THE DEBRIS IN A LAWFUL MANNER AND IN ACCORDANCE WITH LOCAL AND STATE REGULATIONS. THE CONTRACTOR SHALL OBTAIN ANY REQUIRED PERMITS FOR DEMOLITION AND DISPOSAL FROM THE APPROPRIATE LOCAL AND STATE AGENCIES. CONTRACTOR SHALL PROVIDE COPIES OF THE PERMIT AND RECEIPTS OF DISPOSAL OF MATERIALS TO THE OWNER AND OWNERS REPRESENTATIVE, INCLUDING THE TYPE OF DEBRIS AND LOCATION WHERE IT WAS DISPOSED.
3. THE CONTRACTOR SHALL MAINTAIN UTILITY SERVICES TO ADJACENT PROPERTIES AT ALL TIMES. UTILITY SERVICES SHALL NOT BE INTERRUPTED WITHOUT APPROVAL FROM THE CONSTRUCTION MANAGER AND COORDINATION WITH THE ADJACENT PROPERTIES AND/OR THE TOWNSHIP.
4. THE CONTRACTOR SHALL COORDINATE WITH RESPECTIVE UTILITY COMPANIES PRIOR TO THE REMOVAL AND/OR RELOCATION OF UTILITIES. THE CONTRACTOR SHALL COORDINATE WITH THE UTILITY COMPANY CONCERNING PORTIONS OF WORK WHICH MAY BE PERFORMED BY THE UTILITY COMPANY'S FORCES AND ANY FEES WHICH ARE TO BE PAID TO THE UTILITY COMPANY FOR THEIR SERVICES. THE CONTRACTOR IS RESPONSIBLE FOR PAYING ALL FEES AND CHARGES.
5. THE LOCATIONS OF EXISTING UTILITIES SHOWN ON THE PLAN HAVE BEEN DETERMINED FROM THE BEST INFORMATION AVAILABLE AND ARE GIVEN FOR THE CONVENIENCE OF THE CONTRACTOR. THE ENGINEER ASSUMES NO RESPONSIBILITY FOR THEIR ACCURACY. PRIOR TO THE START OF ANY DEMOLITION ACTIVITY, THE CONTRACTOR SHALL NOTIFY THE AFFECTED UTILITY COMPANIES TO PROVIDE LOCATIONS OF EXISTING UTILITIES WITHIN PROPOSED WORK AREA.
6. EXISTING SEWERS, PIPING AND UTILITIES SHOWN ARE BASED ON AVAILABLE RECORD PLAN DATA AND/OR FIELD UTILITY MARKINGS AND ARE NOT TO BE INTERPRETED AS THE EXACT LOCATION. ADDITIONAL UNMARKED OBSTACLES MAY EXIST ON THE SITE. VERIFY EXISTING CONDITIONS AND PROCEED WITH CAUTION AROUND ANY ANTICIPATED UNDERGROUND FEATURES. GIVE NOTICE TO AFFECTED UTILITY COMPANIES REGARDING REMOVAL OF SERVICE LINES AND CAP ANY ABANDONED LINES BEFORE PRECEDING WITH THE PROPOSED WORK.
7. ELECTRICAL, TELEPHONE, CABLE, WATER, FIBER OPTIC, AND/OR GAS LINES NEEDING TO BE REMOVED OR RELOCATED SHALL BE COORDINATED WITH THE AFFECTED UTILITY COMPANY. ADEQUATE TIME SHALL BE PROVIDED FOR RELOCATION AND CLOSE COORDINATION WITH THE UTILITY COMPANY IS NECESSARY TO PROVIDE A SMOOTH TRANSITION IN UTILITY SERVICE. CONTRACTOR SHALL PAY CLOSE ATTENTION TO EXISTING UTILITIES WITHIN ANY ROAD RIGHT-OF-WAY DURING CONSTRUCTION.
8. CONTRACTOR MUST PROTECT THE PUBLIC AT ALL TIMES WITH FENCING, BARRICADES, ENCLOSURES, ETC. (AND OTHER APPROPRIATE BEST MANAGEMENT PRACTICES) AS APPROVED BY THE CONSTRUCTION MANAGER. MAINTENANCE OF TRAFFIC CONTROL SHALL BE COORDINATED IN ACCORDANCE WITH COMSTOCK TOWNSHIP, KALAMAZOO COUNTY, AND MICHIGAN DOT AS NECESSARY.
9. CONTRACTOR SHALL MAINTAIN ACCESS TO ADJACENT PROPERTIES DURING CONSTRUCTION, AND SHALL NOTIFY ADJACENT PROPERTY OWNERS IF ACCESS WILL BE INTERRUPTED OR ALTERED AT ANY TIME DURING CONSTRUCTION.
10. PRIOR TO THE START OF DEMOLITION, INSTALL EROSION CONTROL BMP'S IN ACCORDANCE WITH THE EROSION & SEDIMENT CONTROL PLANS / SWPPP.
11. CONTRACTOR MAY LIMIT SAW-CUT AND PAVEMENT REMOVAL TO ONLY THOSE AREAS WHERE IT IS REQUIRED AS SHOWN ON THESE CONSTRUCTION PLANS BUT IF ANY DAMAGE IS INCURRED ON ANY OF THE SURROUNDING PAVEMENT OR CURB, THE CONTRACTOR SHALL BE RESPONSIBLE FOR ITS REMOVAL AND REPAIR.
12. THE CONTRACTOR SHALL COORDINATE WATER MAIN WORK WITH THE TOWNSHIP WATER AND FIRE DEPARTMENTS TO ENSURE ADEQUATE FIRE PROTECTION IS CONSTANTLY AVAILABLE TO THE SITE AND SURROUNDING PROPERTIES THROUGH ALL PHASES OF CONSTRUCTION. CONTRACTOR WILL BE RESPONSIBLE FOR ARRANGING/PROVIDING ANY REQUIRED WATER MAIN SHUT OFFS WITH COMSTOCK TOWNSHIP. ANY COSTS ASSOCIATED WITH WATER MAIN SHUT OFFS WILL BE THE RESPONSIBILITY OF THE CONTRACTOR AND NO EXTRA COMPENSATION WILL BE PROVIDED.
13. IN THE EVENT A WELL IS FOUND, THE CONTRACTOR SHALL CONTACT THE ENGINEER AND OWNER IMMEDIATELY. ALL WELLS SHALL BE SEALED BY A LICENSED WELL CONTRACTOR IN ACCORDANCE WITH STATE REQUIREMENTS.
14. IN THE EVENT THAT UNKNOWN CONTAINERS OR TANKS ARE ENCOUNTERED, THE CONTRACTOR SHALL CONTACT THE OWNER AND/OR OWNERS REPRESENTATIVE IMMEDIATELY. ALL CONTAINERS SHALL BE DISPOSED OF AT A PERMITTED LANDFILL PER THE PROJECT DOCUMENTS.
15. CONTRACTOR SHALL NOTIFY THE ENGINEER IF ANY EXISTING DRAINTILE IS ENCOUNTERED ON SITE; ACTIVE DRAINTILE SHALL NOT BE REMOVED WITHOUT APPROVAL FROM THE ENGINEER.
16. IF CONTAMINATED MATERIAL IS ENCOUNTERED ON THE PROJECT SITE, THE CONTRACTOR SHALL STOP WORK AND NOTIFY THE OWNER AND ENGINEER IMMEDIATELY.
17. REFER TO TREE INVENTORY AND TREE PRESERVATION PLANS FOR DETAIL ON TREE REMOVALS.

KEYNOTE LEGEND

- (A) CLEARING AND GRUBBING
- (B) REMOVE EXISTING TREES
- (C) REMOVE EXISTING BUILDING
- (D) REMOVE EXISTING CONCRETE
- (E) REMOVE EXISTING ASPHALT
- (F) REMOVE EXISTING GRAVEL
- (G) REMOVE EXISTING FENCE
- (H) REMOVE EXISTING SIGN
- (I) PROTECT EXISTING BUILDING
- (J) PROTECT EXISTING CONCRETE
- (K) PROTECT EXISTING ASPHALT
- (L) PROTECT EXISTING GRAVEL
- (M) PROTECT EXISTING GAS LINE
- (N) PROTECT EXISTING STORM STRUCTURE
- (O) PROTECT EXISTING FENCE
- (P) PROTECT EXISTING WATER WELL
- (Q) PROTECT EXISTING CURB AND GUTTER
- (R) REMOVE EXISTING MAN MADE POND
- (S) PROTECT EXISTING TREE LINE

NORTH

GRAPHIC SCALE IN FEET
0 100 200 400

MISS DIG 811

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1	ENTITLEMENT SET	06/08/2026	BPG

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3000 TOWN CENTER, SUITE 2600
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(312) 726 9445

CIP
Copenhagen Infrastructure Partners

STATE OF MICHIGAN
BRIAN GAMMON
ENGINEER
NO.
6201312424
PROFESSIONAL ENGINEER

Brian Gammon

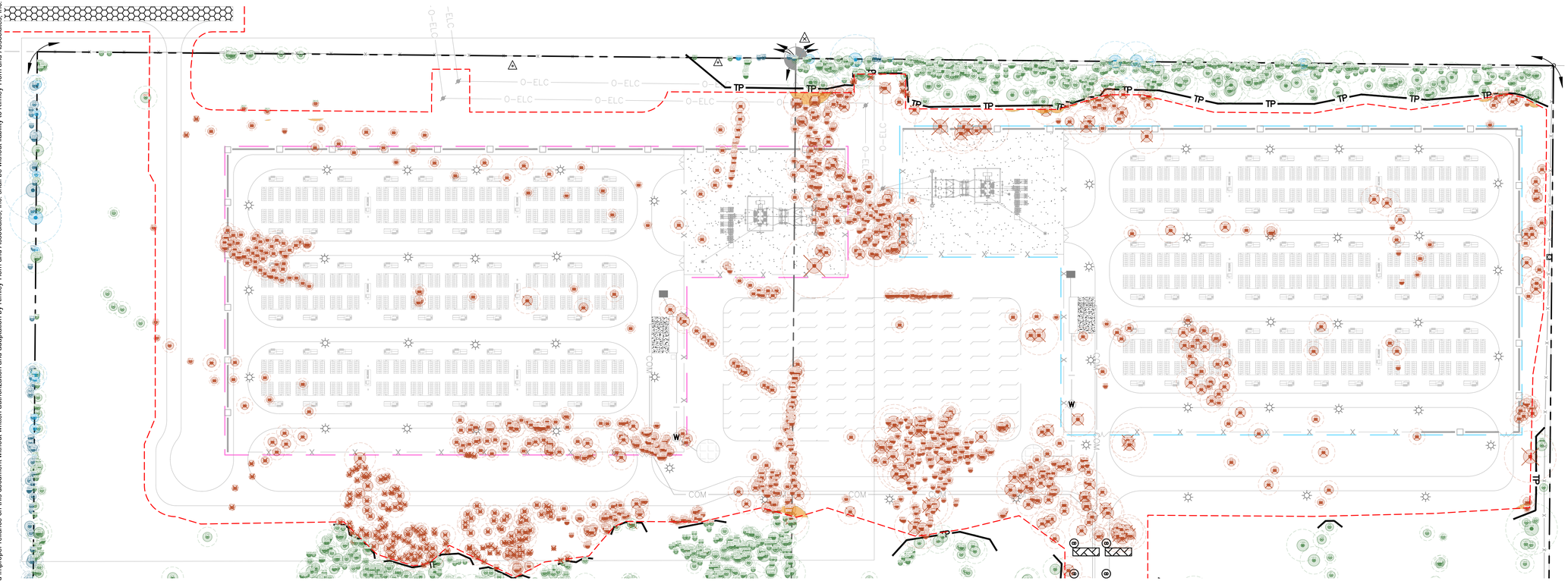
KHA PROJECT	161262002
DATE	06/08/2026
SCALE	AS SHOWN
DESIGNED BY	JLL
DRAWN BY	CJC
CHECKED BY	BPG

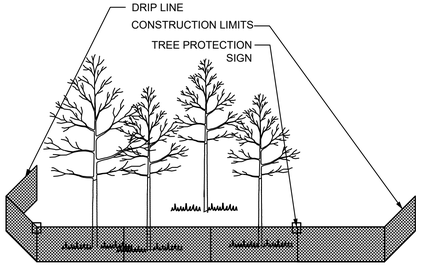
ISSUED FOR PERMIT - NOT FOR CONSTRUCTION

EXISTING CONDITIONS AND SITE DEMOLITION PLAN

SWAN BESS AND CYGNET BESS
PREPARED FOR
SWAN ENERGY STORAGE LLC AND CYGNET ENERGY STORGAGE LLC
COMSTOCK TOWNSHIP
MI

SHEET NUMBER
C200





FURNISH AND INSTALL TEMPORARY FENCE AT THE TREE'S DRIPLINE
OR CONSTRUCTION LIMITS AS SPECIFIED, PRIOR TO ANY CONSTRUCTION.
WHEN POSSIBLE PLACE FENCE 25 FEET BEYOND THE DRIP LINE.
PLACE PROTECTION SIGNS ALONG FENCE AT 20' INTERVALS.

1 TEMPORARY TREE PROTECTION FENCE PLACEMENT
SCALE: N.T.S. TP201

TREE PROTECTION NOTES

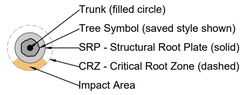
1. PRUNING WILL BE DONE BY PROFESSIONALS DURING APPROPRIATE PRUNING SEASON.
2. NO STORAGE OF MATERIALS, OPERATION OF MACHINERY, OR DEVELOPMENT OF ANY SORT WILL OCCUR WITHIN THE FENCE-LINE WITHOUT APPROVAL IN WRITING FROM THE TOWNSHIP.
3. SITE GRADING TO BE DONE ONLY AFTER PROTECTIVE MEASURES HAVE BEEN TAKEN, TOWNSHIP HAS APPROVED FENCING LOCATIONS, AND ALL CONTRACTORS HAVE BEEN BREIFED ON TREE PRESERVATION TECHNIQUES.
4. EXISTING TREES TO REMAIN OR REMOVED TO BE CLEARLY IDENTIFIED, WITHIN DISTURBANCE LIMITS AND 10' OUTSIDE OF THE DISTURBANCE LIMITS.
5. TREE PRESERVATION TO BE APPROVED BY OWNER AND PER LOCAL GOVERNMENTAL AUTHORITY.

TREE MITIGATION DATA

TOTAL TREES ONSITE:	7,047 TREES
TOTAL TREES REMOVED:	1,521 TREES
TOTAL TREES SAVED:	5,526 TREES

LEGEND

- PROPERTY LINE
- LIMITS OF CONSTRUCTION
- TREE PROTECTION FENCE

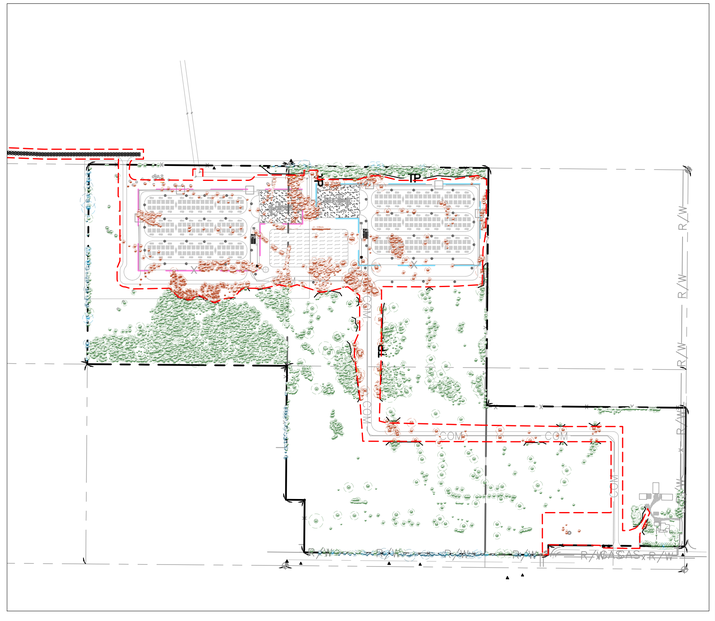


TREE TYPES:

- **SITE SAVED**
- **BOUNDARY SAVED**
- **CO-OWNED SAVED**
- **REMOVED** (Uses Removal X Symbol color)

KEYNOTE LEGEND

- (A) EXISTING TREE TO BE SAVED (TYP.)
- (B) EXISTING TREE TO BE REMOVED (TYP.)
- (C) LIMITS OF CONSTRUCTION (TYP.)
- (D) TREE PROTECTION FENCE (SEE DETAIL) (TYP.)



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(312) 726 9445

CIP Copenhagen Infrastructure Partners

STATE OF MICHIGAN BRIAN GAMMON ENGINEER NO. 6201312464 PROFESSIONAL ENGINEER

Brian Gammon

KHA PROJECT	161282002
DATE	06/08/2026
SCALE	########
DESIGNED BY	JLL
DRAWN BY	EAS
CHECKED BY	BPG

OVERALL TREE PRESERVATION PLAN

SWAN BESS AND CYGNET BESS
PREPARED FOR
SWAN ENERGY STORAGE LLC AND CYGNET ENERGY STORGAGE LLC
COMSTOCK TOWNSHIP
MI

SHEET NUMBER
TP201

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LEGEND

- PROPERTY LINE
- LIMITS OF CONSTRUCTION
- TREE PROTECTION FENCE
- Trunk (filled circle)
- Tree Symbol (saved style shown)
- SRP - Structural Root Plate (solid)
- CRZ - Critical Root Zone (dashed)
- Impact Area

TREE TYPES:

- SITE SAVED
- BOUNDARY SAVED
- CO-OWNED SAVED
- REMOVED (Uses Removal X Symbol color)

KEYNOTE LEGEND

- A EXISTING TREE TO BE SAVED (TYP.)
- B EXISTING TREE TO BE REMOVED (TYP.)
- C LIMITS OF CONSTRUCTION (TYP.)
- D TREE PROTECTION FENCE (SEE DETAIL) (TYP.)

NORTH

GRAPHIC SCALE IN FEET
0 25 50 100

MISS DIG 811

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SHEET NUMBER
TP202

SWAN BESS AND CYGNET BESS

PREPARED FOR
SWAN ENERGY STORAGE LLC AND
CYGNET ENERGY STORGAGE LLC
COMSTOCK
TOWNSHIP MI

TREE PRESERVATION ENLARGEMENT

KHA PROJECT	161262002
DATE	06/08/2026
SCALE	AS SHOWN
DESIGNED BY	CFK
DRAWN BY	CFK
CHECKED BY	BPG

Brian Gannon

CIP
Copenhagen Infrastructure Partners

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(312) 726 9445

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S89°29'25"E 1319.17'

N00°26'29"E 1318.44'

N00°29'11"E 1317.96'

LEGEND

- PROPERTY LINE
- LIMITS OF CONSTRUCTION
- TREE PROTECTION FENCE

Trunk (filled circle)
Tree Symbol (saved style shown)
SRP - Structural Root Plate (solid)
CRZ - Critical Root Zone (dashed)
Impact Area

TREE TYPES:

- **SITE SAVED**
- **BOUNDARY SAVED**
- **CO-OWNED SAVED**
- **REMOVED** (Uses Removal X Symbol color)

KEYNOTE LEGEND

- (A) EXISTING TREE TO BE SAVED (TYP.)
- (B) EXISTING TREE TO BE REMOVED (TYP.)
- (C) LIMITS OF CONSTRUCTION (TYP.)
- (D) TREE PROTECTION FENCE (SEE DETAIL) (TYP.)

GRAPHIC SCALE IN FEET
0 25 50 100

NORTH

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STATE OF MICHIGAN
BRIAN GAMMON
ENGINEER
NO.
6201312404
PROFESSIONAL ENGINEER

Brian Gammon

KHA PROJECT	161262002
DATE	06/08/2026
SCALE	AS SHOWN
DESIGNED BY	CFK
DRAWN BY	CFK
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TREE PRESERVATION ENLARGEMENT

SWAN BESS AND CYGNET BESS
PREPARED FOR
SWAN ENERGY STORAGE LLC AND CYGNET ENERGY STORGAGE LLC
COMSTOCK TOWNSHIP
MI

SHEET NUMBER
TP203

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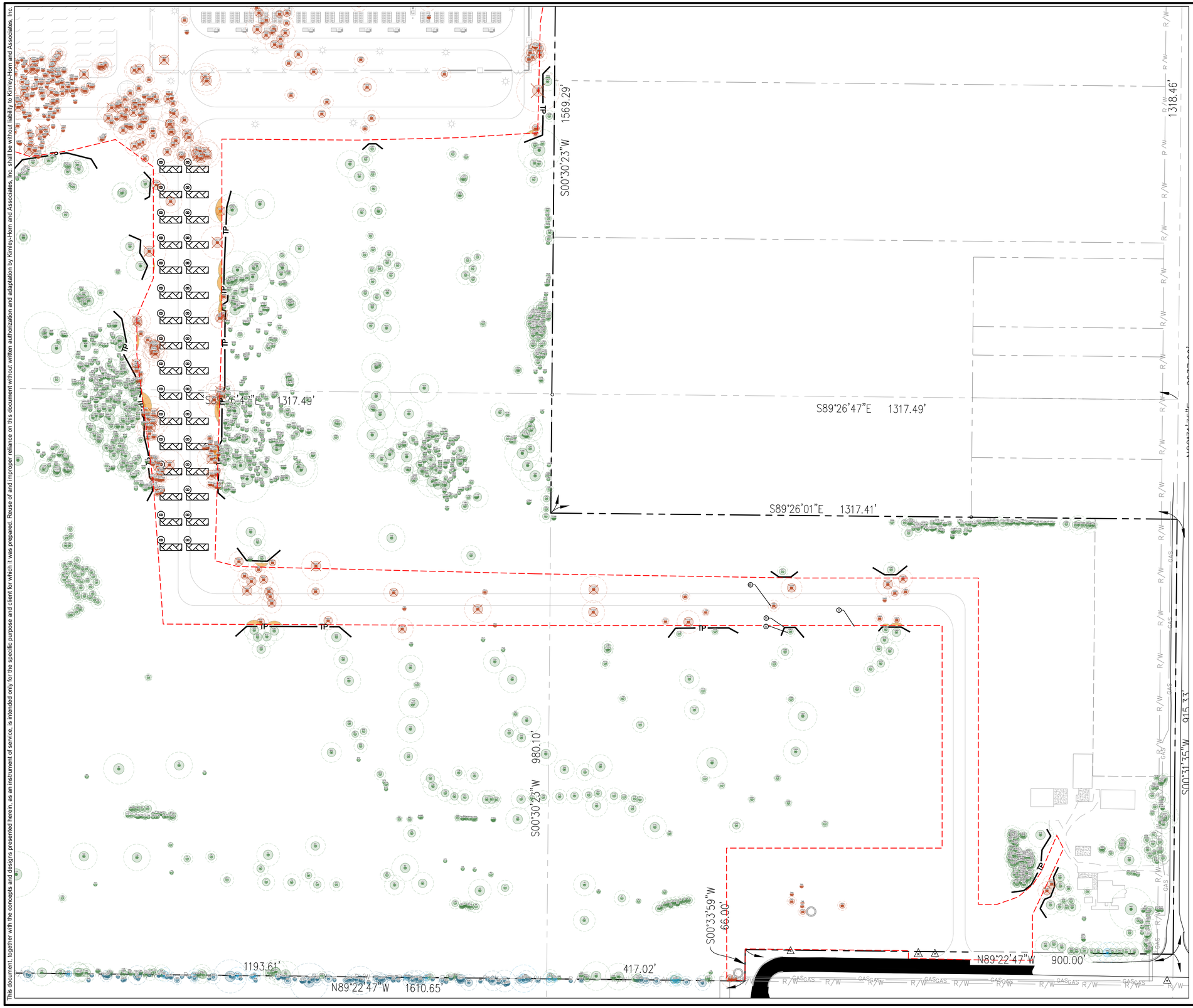

LEGEND

- PROPERTY LINE
- LIMITS OF CONSTRUCTION
- TREE PROTECTION FENCE

Trunk (filled circle)
Tree Symbol (saved style shown)
SRP - Structural Root Plate (solid)
CRZ - Critical Root Zone (dashed)
Impact Area

TREE TYPES:

- **SITE SAVED**
- **BOUNDARY SAVED**
- **CO-OWNED SAVED**
- **REMOVED** (Uses Removal X Symbol color)

KEYNOTE LEGEND

- (A) EXISTING TREE TO BE SAVED (TYP.)
- (B) EXISTING TREE TO BE REMOVED (TYP.)
- (C) LIMITS OF CONSTRUCTION (TYP.)
- (D) TREE PROTECTION FENCE (SEE DETAIL) (TYP.)

GRAPHIC SCALE IN FEET
0 25 50 100

NORTH

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STATE OF MICHIGAN
BRIAN GAMMON
ENGINEER
6201012404
PROFESSIONAL ENGINEER

Brian Gammon

KHA PROJECT 161282002
DATE 06/08/2026
SCALE AS SHOWN
DESIGNED BY CFK
DRAWN BY CFK
CHECKED BY BPG

TREE PRESERVATION ENLARGEMENT

SWAN BESS AND CYGNET BESS
PREPARED FOR
SWAN ENERGY STORAGE LLC AND CYGNET ENERGY STORGAGE LLC
COMSTOCK TOWNSHIP MI

SHEET NUMBER
TP204

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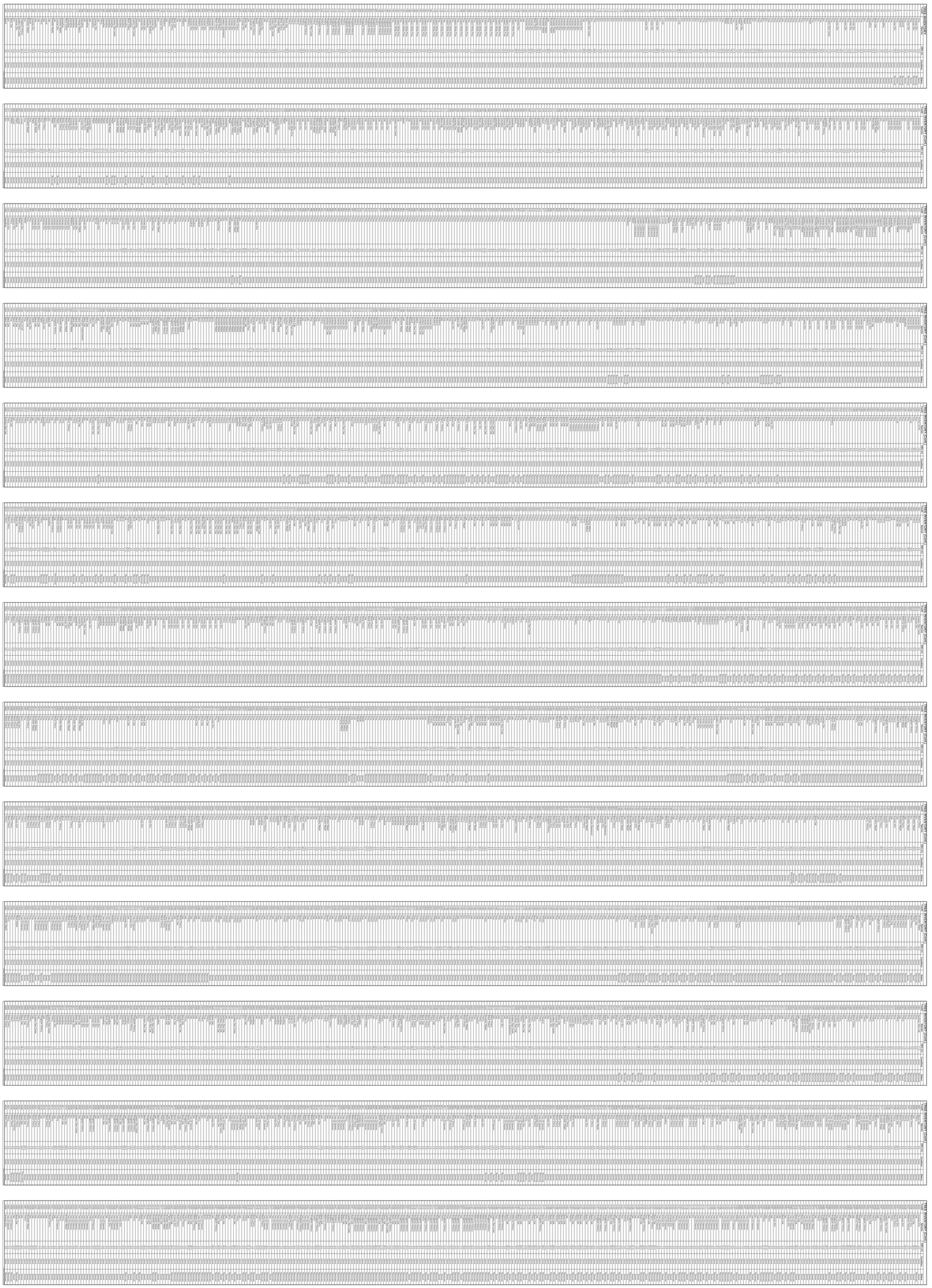

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SHEET NUMBER
TP205

SWAN BESS AND CYGNET BESS

PREPARED FOR
SWAN ENERGY STORAGE LLC AND
CYGNET ENERGY STORGAGE LLC
COMSTOCK
TOWNSHIP MI

TREE INVENTORY

KHA PROJECT	161262002
DATE	06/08/2026
SCALE	########
DESIGNED BY	JLL
DRAWN BY	EAS
CHECKED BY	BPG

Brian Gannon

CIP
Copenhagen Infrastructure Partners

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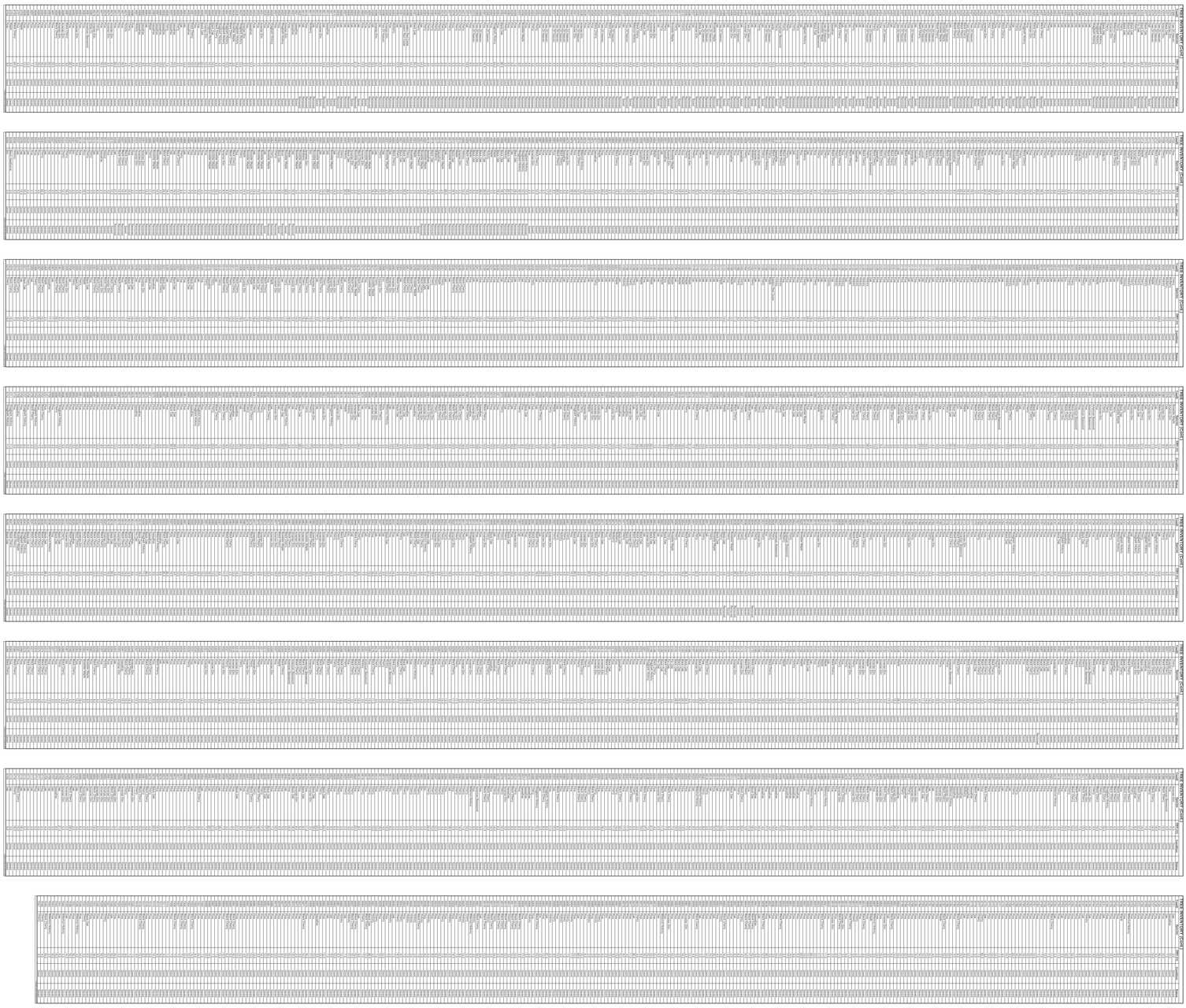

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SHEET NUMBER
TP206

SWAN BESS AND CYGNET BESS

PREPARED FOR
SWAN ENERGY STORAGE LLC AND
CYGNET ENERGY STORGAGE LLC
COMSTOCK
TOWNSHIP MI

TREE INVENTORY

KHA PROJECT	161262002
DATE	06/08/2026
SCALE	########
DESIGNED BY	JLL
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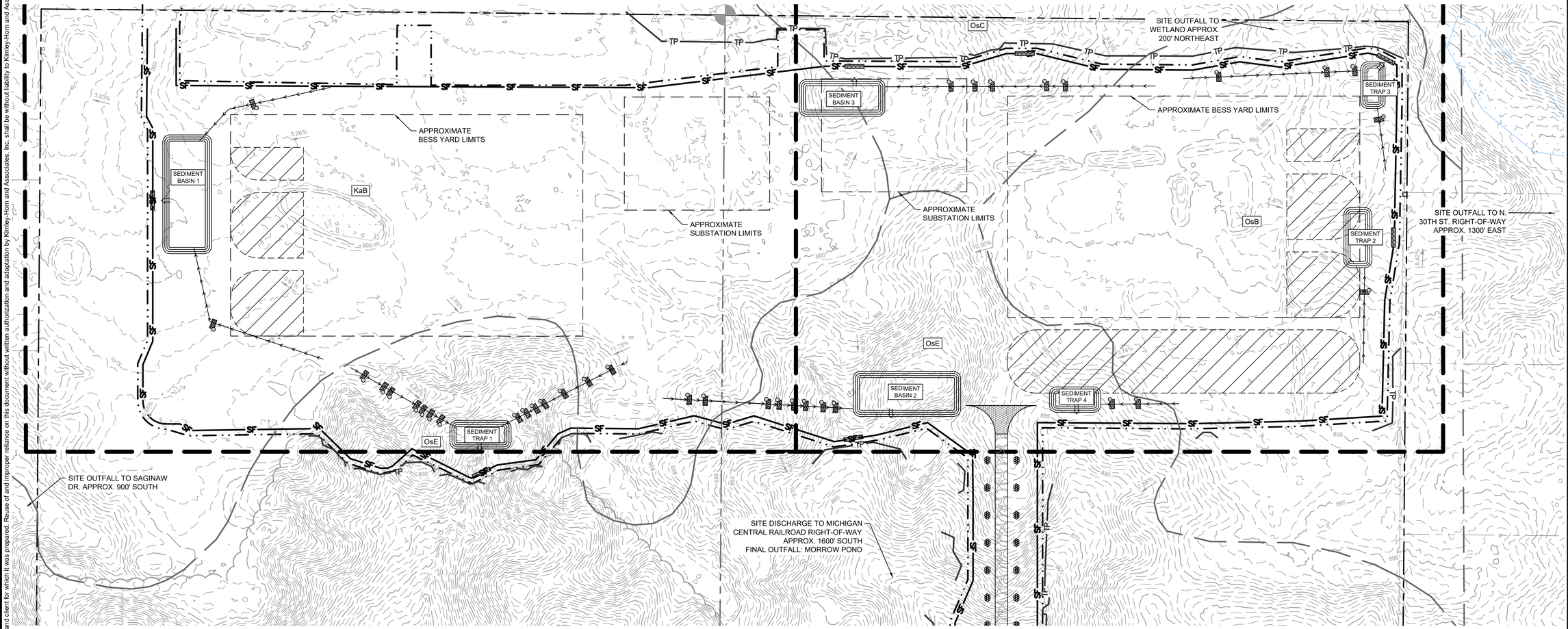

EROSION CONTROL PLAN NOTES

1. THE STORM WATER POLLUTION PREVENTION PLAN ("SWPPP") IS COMPRISED OF THE EROSION CONTROL PLAN, THE STANDARD DETAILS, THE PLAN NARRATIVE, ATTACHMENTS INCLUDED IN THE SPECIFICATIONS OF THE SWPPP, PLUS THE PERMIT AND ALL SUBSEQUENT REPORTS AND RELATED DOCUMENTS.
2. ALL CONTRACTORS AND SUBCONTRACTORS INVOLVED WITH LAND DISTURBING ACTIVITIES SHALL OBTAIN A COPY OF THE SWPPP AND NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) GENERAL PERMIT, AND BECOME FAMILIAR WITH THEIR CONTENTS.
3. BEST MANAGEMENT PRACTICES (BMP'S) AND CONTROLS SHALL CONFORM TO FEDERAL, STATE AND LOCAL REQUIREMENTS, AS APPLICABLE. THE CONTRACTOR SHALL IMPLEMENT ADDITIONAL CONTROLS AS DIRECTED BY THE PERMITTING AGENCY, ENGINEER OR OWNER.
4. SITE ENTRY AND EXIT LOCATIONS SHALL BE MAINTAINED IN A CONDITION THAT WILL PREVENT THE TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC ROADWAYS. SEDIMENT SPILLED, DROPPED, WASHED, OR TRACKED ONTO A PUBLIC ROADWAY FROM THE CONSTRUCTION SITE MUST BE REMOVED AS SOON AS PRACTICABLE. WHEN WASHING IS REQUIRED TO REMOVE SEDIMENT PRIOR TO ENTRANCE ONTO A PUBLIC ROADWAY, IT SHALL BE DONE IN AN AREA STABILIZED WITH CRUSHED STONE WHICH DRAINS INTO AN APPROVED SEDIMENT BASIN. ANY FINES IMPOSED FOR DISCHARGING SEDIMENT ONTO A PUBLIC RIGHT OF WAY SHALL BE PAID BY THE CONTRACTOR.
5. TEMPORARY SEEDING OR OTHER APPROVED METHODS OF STABILIZATION SHALL BE INITIATED WITHIN 7 DAYS OF THE LAST DISTURBANCE ON ANY AREA OF THE SITE.
6. THE CONTRACTOR SHALL MINIMIZE LAND DISTURBANCE AND CLEARING TO THE MAXIMUM EXTENT PRACTICAL OR AS REQUIRED BY THE GENERAL PERMIT.
7. CONTRACTOR SHALL DENOTE ON THE PLAN THE TEMPORARY PARKING AND STORAGE AREA WHICH SHALL ALSO BE USED AS THE EQUIPMENT MAINTENANCE AND CLEANING AREA, EMPLOYEE PARKING AREA, AND AREA FOR LOCATING PORTABLE FACILITIES, OFFICE TRAILERS, AND TOILET FACILITIES.
8. ALL WASH WATER FROM THE CONSTRUCTION SITE (CONCRETE TRUCKS, VEHICLE CLEANING, EQUIPMENT CLEANING, ETC.) SHALL BE DETAINED AND PROPERLY TREATED BEFORE DISPOSAL.
9. SUFFICIENT OIL AND GREASE ABSORBING MATERIALS AND FLOTATION BOOMS SHALL BE MAINTAINED ON SITE OR READILY AVAILABLE TO CONTAIN AND CLEAN-UP FUEL OR CHEMICAL SPILLS AND LEAKS.
10. THE CONTRACTOR SHALL BE RESPONSIBLE FOR DUST CONTROL ON SITE. THE USE OF MOTOR OILS AND OTHER PETROLEUM BASED OR TOXIC LIQUIDS FOR DUST SUPPRESSION OPERATIONS IS PROHIBITED.
11. RUBBISH, TRASH, GARBAGE, LITTER, OR OTHER SUCH MATERIALS SHALL BE DEPOSITED INTO SEALED CONTAINERS. MATERIALS SHALL BE PREVENTED FROM LEAVING THE PREMISES THROUGH THE ACTION OF WIND OR STORM WATER DISCHARGE INTO DRAINAGE DITCHES OR WATERS OF THE STATE.
12. STAGING AREAS, STOCKPILES, SPOILS, ETC. SHALL BE LOCATED OUTSIDE OF DRAINAGE WAYS SUCH THAT STORM WATER RUNOFF WILL NOT BE ADVERSELY AFFECTED. PROVIDE STABILIZATION MEASURES SUCH AS PERIMETER EROSION CONTROL BMP'S, SEEDING, OR OTHER COVERING AS NECESSARY TO PREVENT EROSION.
13. CONTRACTOR SHALL BE RESPONSIBLE FOR RE-ESTABLISHING ANY EROSION CONTROL BMP DISTURBED DURING CONSTRUCTION OPERATIONS. NOTIFY THE OWNER'S REPRESENTATIVE OF ANY DEFICIENCIES IN THE ESTABLISHED EROSION CONTROL MEASURES THAT MAY LEAD TO UNAUTHORIZED DISCHARGE OF STORM WATER POLLUTANTS. UNAUTHORIZED POLLUTANTS INCLUDE (BUT ARE NOT LIMITED TO) EXCESS CONCRETE DUMPING, CONCRETE RESIDUE, PAINTS, SOLVENTS, GREASES, FUELS, LUBRICANT OILS, PESTICIDES, AND SOLID WASTE MATERIALS.
14. EROSION CONTROL BMP'S SHOWN ON THESE PLANS SHALL BE INSTALLED PRIOR TO THE START OF LAND-DISTURBING ACTIVITIES ON THE PROJECT, AND INITIATED AS SOON AS PRACTICABLE.
15. THE CONTRACTOR IS SOLELY RESPONSIBLE FOR COMPLYING WITH THE REQUIREMENTS OF THE AUTHORITIES HAVING JURISDICTION, AND SHALL MAINTAIN COMPLIANCE WITH APPLICABLE LAWS AND REGULATIONS FOR THE DURATION OF CONSTRUCTION.
16. THE CONTRACTOR SHALL FIELD ADJUST AND/OR PROVIDE ADDITIONAL EROSION CONTROL BMP'S AS NEEDED TO PREVENT EROSION AND OFF-SITE SEDIMENT DISCHARGE FROM THE CONSTRUCTION SITE. LOG AND RECORD ANY ADJUSTMENTS AND DEVIATIONS FROM THE APPROVED EROSION CONTROL PLANS WITHIN THE SWPPP DOCUMENTS STORED IN THE JOB SITE TRAILER.

SWPPP UPDATES & AMENDMENTS

THE CONTRACTOR MUST UPDATE THE SWPPP BY NOTING ON THE SITE MAPS IN THE JOB SITE BINDER TO REFLECT THE PROGRESS OF CONSTRUCTION ACTIVITIES AND GENERAL CHANGES TO THE PROJECT SITE FOR THE DURATION OF LAND DISTURBING ACTIVITIES. AT A MINIMUM, UPDATES SHALL BE MADE DAILY TO TRACK CONSTRUCTION PROGRESS DESCRIBED IN THE SEQUENCE OF CONSTRUCTION. THE CONTRACTOR IS RESPONSIBLE FOR NOTING THE LOCATION OF THE JOB SITE TRAILER, TEMPORARY PARKING & LAYDOWN AREAS, PORTA-POTTY, WHEEL WASH, CONCRETE WASHOUT, FUEL & MATERIAL STORAGE, SOLID WASTE CONTAINERS, AND OTHER CONSTRUCTION RELATED FACILITIES THAT MAY IMPACT STORMWATER RUNOFF.

PHASE 1 SEQUENCE OF CONSTRUCTION

1. INSTALL PERIMETER EROSION CONTROL (I.E. SILT FENCE) AND INLET PROTECTION AT EXISTING STORMWATER INLETS.
2. CONSTRUCT STABILIZED CONSTRUCTION ENTRANCE AND CONCRETE WASHOUT
3. PREPARE TEMPORARY PARKING AND STORAGE AREA.
4. CONSTRUCT AND STABILIZE DIVERSIONS AND TEMPORARY SEDIMENT BASINS.
5. CLEAR AND GRUB THE SITE.
6. BEGIN MASS SITE GRADING AND ROUGH GRADE SITE SUFFICIENTLY TO ESTABLISH PROPOSED DRAINAGE PATTERNS.
7. START CONSTRUCTION OF THE BUILDING PAD AND STRUCTURES.
8. TEMPORARILY SEED, THROUGHOUT CONSTRUCTION, DISTURBED AREAS THAT WILL BE INACTIVE FOR 14 DAYS OR MORE OR AS REQUIRED BY THE NPDES AND/OR TOWNSHIP GRADING PERMIT(S).

NOTE: THE SEQUENCE OF CONSTRUCTION IS INTENDED TO CONVEY THE GENERAL CONCEPTS OF THE EROSION CONTROL DESIGN AND SHOULD NOT BE RELIED UPON FOR CONSTRUCTION PURPOSES. THE CONTRACTOR IS SOLELY RESPONSIBLE FOR DETAILED PHASING AND CONSTRUCTION SEQUENCING NECESSARY TO CONSTRUCT THE PROPOSED IMPROVEMENTS. THE CONTRACTOR SHALL NOTIFY THE ENGINEER IN WRITING IMMEDIATELY, PRIOR TO AND/OR DURING CONSTRUCTION IF ANY ADDITIONAL INFORMATION ON THE CONSTRUCTION SEQUENCE IS NECESSARY.

LEGEND

MDTMB SESC KEYING SYSTEM NO.

	ROCK CONSTRUCTION ENTRANCE	S53
SF	SILT FENCE	S51
	LIMITS OF DISTURBANCE	
TP	TREE PROTECTION FENCE	
	SILT FENCE ROCK OUTLET	
	DIVERSION DITCH	ES37
	LAYDOWN YARD	
	ROCK CHECK DAM	ES31
	INLET PROTECTION	S58
	TEMPORARY ACCESS ROAD	

SOILS LEGEND	
KALAMAZOO LOAM, 2 TO 6 PERCENT SLOPES	KaB
OSHTEMO SANDY LOAM, 0 TO 6 PERCENT SLOPS	OsB
OSHTEMO SANDY LOAM, 6 TO 12 PERCENT SLOPS	OsC
OSHTEMO SANDY LOAM, 18 TO 35 PERCENT SLOPS	OsE

PHASE I BMP QUANTITIES

SILT FENCE	± 11,213 LF
SILT FENCE ROCK OUTLET	7 EA
ROCK CONSTRUCTION ENTRANCE	1 EA
DIVERSION DITCH	± 3,226 LF
ROCK CHECK DAM	46 EA
TREE PROTECTION FENCE	± 5,640 LF
INLET PROTECTION	2 EA

SEDIMENT BASIN/TRAP SIZING TABLE

	DRAINAGE AREA (AC)	TOTAL REQUIRED VOLUME (CF)	MIN. DEPTH (FT)	MIN. BOTTOM LENGTH (FT)	MIN. BOTTOM WIDTH (FT)
BASIN 1	11.58	± 41,688	3.00	205	70
BASIN 2	9.45	± 34,030	3.00	183	63
BASIN 3	5.34	± 19,224	3.00	140	47
TRAP 1	4.78	± 8,604	3.00	94	31
TRAP 2	4.52	± 8,136	3.00	92	30
TRAP 3	2.51	± 4,518	3.00	66	23
TRAP 4	2.93	± 5,274	3.00	75	25

NORTH

GRAPHIC SCALE IN FEET
0 50 100 200

MISS DIG 811

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1	ENTITLEMENT SET	06/09/2026	BPG

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Brian Gammon

KHA PROJECT	161262002
DATE	06/08/2026
SCALE	AS SHOWN
DESIGNED BY	JLL
DRAWN BY	EAS
CHECKED BY	BPG

OVERALL SOIL EROSION AND SEDIMENT CONTROL PLAN - PHASE 1

SWAN BESS AND CYGNET BESS

PREPARED FOR
SWAN ENERGY STORAGE LLC AND CYGNET ENERGY STORGAGE LLC
COMSTOCK TOWNSHIP
MI

SHEET NUMBER
C300

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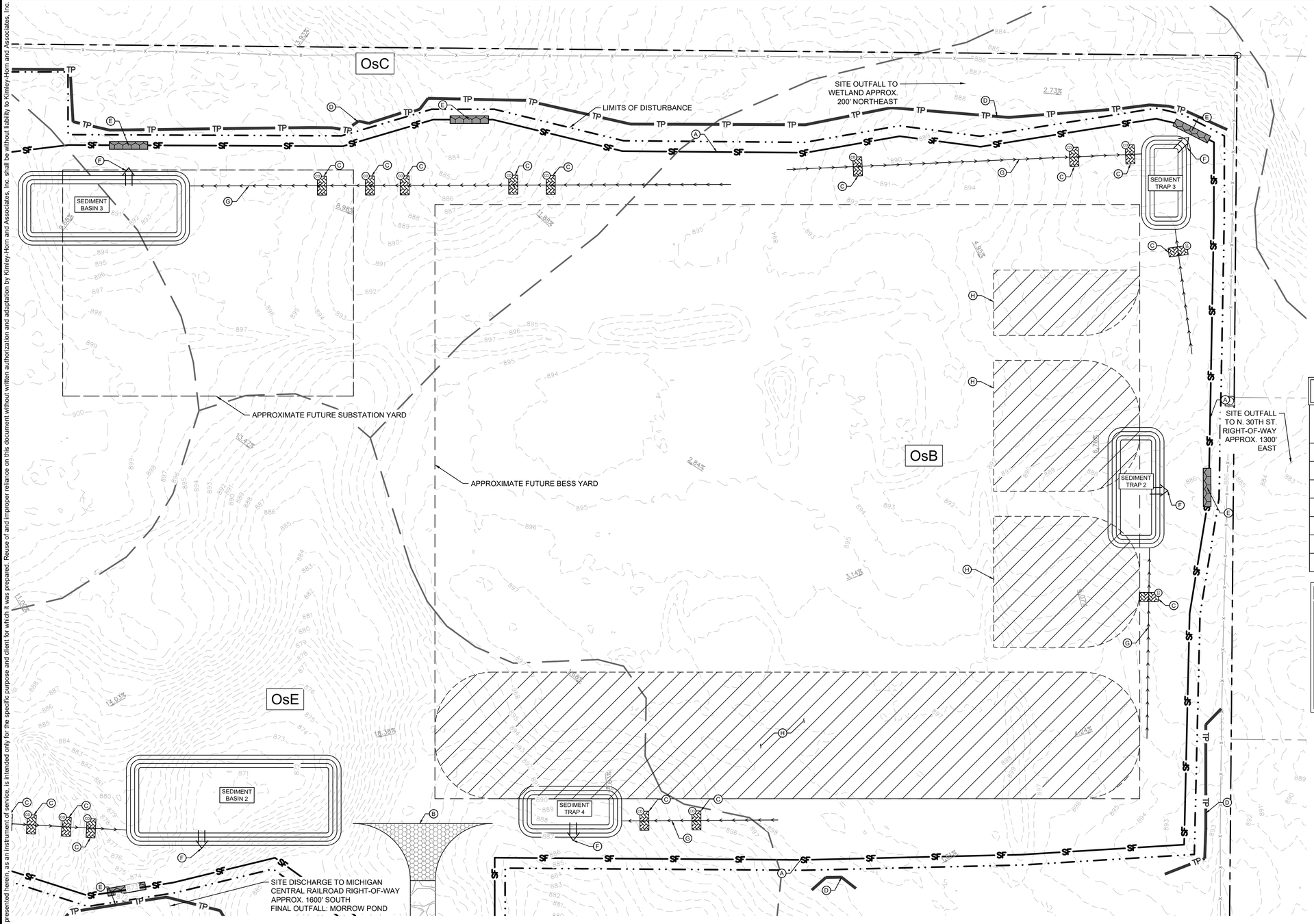

LEGEND

MDTMB SESC KEYING SYSTEM NO.

ROCK CONSTRUCTION ENTRANCE	S53
SILT FENCE	S51
LIMITS OF DISTURBANCE	
TREE PROTECTION FENCE	
SILT FENCE ROCK OUTLET	
DIVERSION DITCH	ES37
LAYDOWN YARD	
ROCK CHECK DAM	ES31
INLET PROTECTION	S58
TEMPORARY ACCESS ROAD	

KEYNOTE LEGEND

A	SILT FENCE
B	ROCK CONSTRUCTION ENTRANCE
C	ROCK CHECK DAM
D	TREE PROTECTION FENCE
E	SILT FENCE ROCK OUTLET
F	TEMPORARY SEDIMENT BASIN/TRAP OUTFALL
G	DIVERSION DITCH
H	LAYDOWN YARD
I	INLET PROTECTION

SEDIMENT BASIN/TRAP SIZING TABLE

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SOILS LEGEND	
KALAMAZOO LOAM, 2 TO 6 PERCENT SLOPES	KaB
OSHTEMO SANDY LOAM, 0 TO 6 PERCENT SLOPS	OsB
OSHTEMO SANDY LOAM, 6 TO 12 PERCENT SLOPS	OsC
OSHTEMO SANDY LOAM, 18 TO 35 PERCENT SLOPS	OsE

NORTH

GRAPHIC SCALE IN FEET
0 25 50 100

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CIP Copenhagen Infrastructure Partners

STATE OF MICHIGAN BRIAN GAMMON ENGINEER NO. E201312904 LICENSED PROFESSIONAL ENGINEER

Brian Gammon

KHA PROJECT 161262002
DATE 06/08/2026
SCALE AS SHOWN
DESIGNED BY JLL
DRAWN BY EAS
CHECKED BY BPG

SOIL EROSION AND SEDIMENT CONTROL PLAN - PHASE 1 ENLARGEMENT

SWAN BESS AND CYGNET BESS
PREPARED FOR
SWAN ENERGY STORAGE LLC AND CYGNET ENERGY STORGAGE LLC
COMSTOCK TOWNSHIP MI

SHEET NUMBER
C301

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LIMITS OF DISTURBANCE

SEDIMENT BASIN 1

KaB

EXISTING MAN MADE POND

APPROXIMATE FUTURE SUBSTATION YARD

APPROXIMATE FUTURE BESS YARD

SITE OUTFALL TO SAGINAW DR. APPROX. 1100' SOUTH

OsE

SEDIMENT TRAP 1

SITE DISCHARGE TO MICHIGAN CENTRAL RAILROAD RIGHT-OF-WAY APPROX. 2200' SOUTH FINAL OUTFALL: MORROW POND

LEGEND

MDTMB SESC KEYING SYSTEM NO.

	ROCK ENTRANCE	S53
SF	SILT FENCE	S51
	LIMITS OF DISTURBANCE	
TP	TREE PROTECTION FENCE	
	SILT FENCE ROCK OUTLET	
	DIVERSION DITCH	ES37
	LAYDOWN YARD	
	ROCK CHECK DAM	ES31
	INLET PROTECTION	S58
	TEMPORARY ACCESS ROAD	

KEYNOTE LEGEND

A	SILT FENCE
B	ROCK CONSTRUCTION ENTRANCE
C	ROCK CHECK DAM
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E	SILT FENCE ROCK OUTLET
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SEDIMENT BASIN/TRAP SIZING TABLE

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NORTH

GRAPHIC SCALE IN FEET
0 25 50 100

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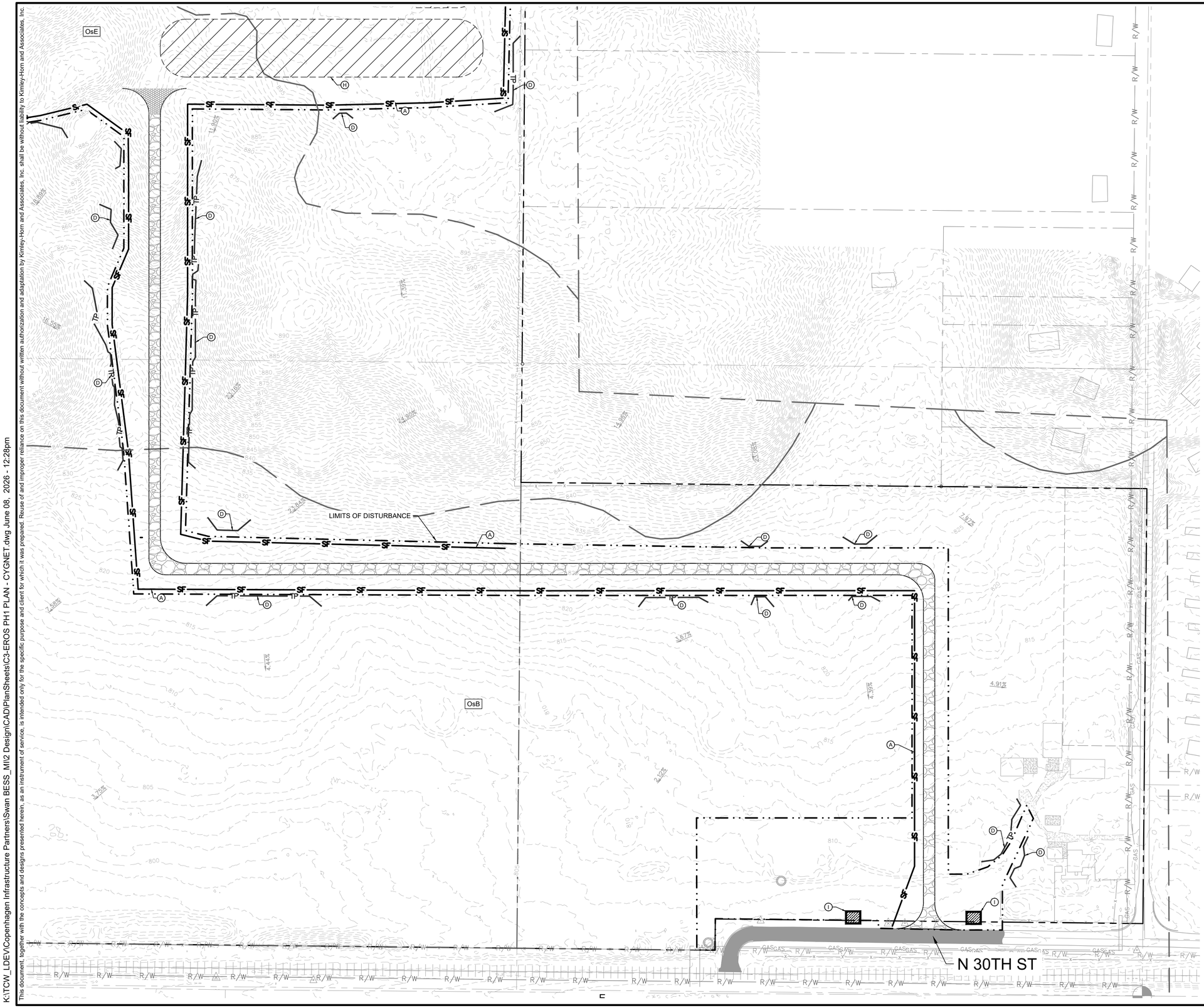
Brian Gammon

KHA PROJECT 161282002
DATE 06/08/2026
SCALE AS SHOWN
DESIGNED BY JLL
DRAWN BY EAS
CHECKED BY BPG

SOIL EROSION AND SEDIMENT CONTROL PLAN - PHASE 1 ENLARGEMENT

SWAN BESS AND CYGNET BESS
PREPARED FOR
SWAN ENERGY STORAGE LLC AND CYGNET ENERGY STORGAGE LLC
COMSTOCK TOWNSHIP
MI

SHEET NUMBER
C302



LEGEND

MDTMB SESC KEYING SYSTEM NO.

	ROCK ENTRANCE	S53
SF	SILT FENCE	S51
	LIMITS OF DISTURBANCE	
TP	TREE PROTECTION FENCE	
	SILT FENCE ROCK OUTLET	
	DIVERSION DITCH	ES37
	LAYDOWN YARD	
	ROCK CHECK DAM	ES31
	INLET PROTECTION	S58
	TEMPORARY ACCESS ROAD	

KEYNOTE LEGEND

A	SILT FENCE
B	ROCK CONSTRUCTION ENTRANCE
C	ROCK CHECK DAM
D	TREE PROTECTION FENCE
E	SILT FENCE ROCK OUTLET
F	TEMPORARY SEDIMENT BASIN/TRAP OUTFALL
G	DIVERSION DITCH
H	LAYDOWN YARD
I	INLET PROTECTION

SEDIMENT BASIN/TRAP SIZING TABLE

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OSHTEMO SANDY LOAM, 18 TO 35 PERCENT SLOPS	OsE

NORTH

GRAPHIC SCALE IN FEET
0 50 100 200

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KHA PROJECT 161262002
DATE 06/09/2026
SCALE AS SHOWN
DESIGNED BY JLL
DRAWN BY EAS
CHECKED BY BPG

SOIL EROSION AND SEDIMENT CONTROL PLAN - PHASE 1 ENLARGEMENT

SWAN BESS AND CYGNET BESS
PREPARED FOR
SWAN ENERGY STORAGE LLC AND CYGNET ENERGY STORGAGE LLC
COMSTOCK TOWNSHIP
MI

SHEET NUMBER
C303

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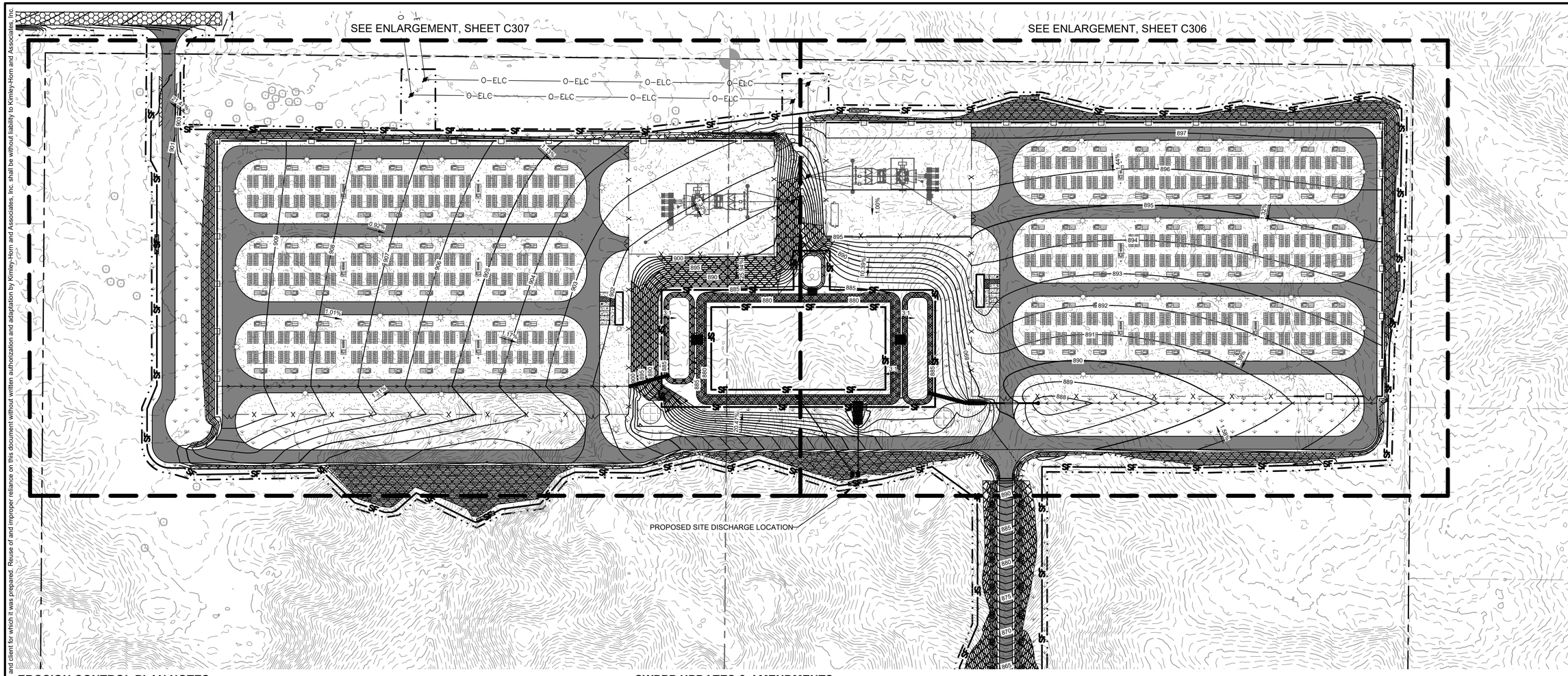
SEE ENLARGEMENT, SHEET C307
SEE ENLARGEMENT, SHEET C306
O-ELC
PROPOSED SITE DISCHARGE LOCATION
SF
0.92%
1.01%
1.57%
1.44%
1.33%
1.00%
1.08%
1.68%
1.89%
1.98%
2.00%
2.00%
2.00

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LEGEND

		MDTMB SESC KEYING SYSTEM NO.
	ROCK ENTRANCE	S53
	EROSION CONTROL BLANKET	E9
	INLET PROTECTION	S58
SF	SILT FENCE	S51
	LIMITS OF DISTURBANCE	
	SILT FENCE ROCK OUTLET	
	ROCK CHECK DAM	ES31
	SWALE	ES37
	RIPRAP	E12
	BIOROLL	

KEYNOTE LEGEND

A	SILT FENCE
B	INLET PROTECTION
C	ROCK CONSTRUCTION ENTRANCE
D	SILT FENCE ROCK OUTLET
E	EROSION CONTROL BLANKET
F	RIPRAP
G	SWALE
H	BIOROLL
I	ROCK CHECK DAM

NORTH

GRAPHIC SCALE IN FEET
0 25 50 100

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KHA PROJECT 161282002
DATE 06/08/2026
SCALE AS SHOWN
DESIGNED BY JLL
DRAWN BY EAS
CHECKED BY BPG

SOIL EROSION AND SEDIMENT CONTROL PLAN - PHASE 2 ENLARGEMENT

SWAN BESS AND CYGNET BESS
PREPARED FOR
SWAN ENERGY STORAGE LLC AND CYGNET ENERGY STORGAGE LLC
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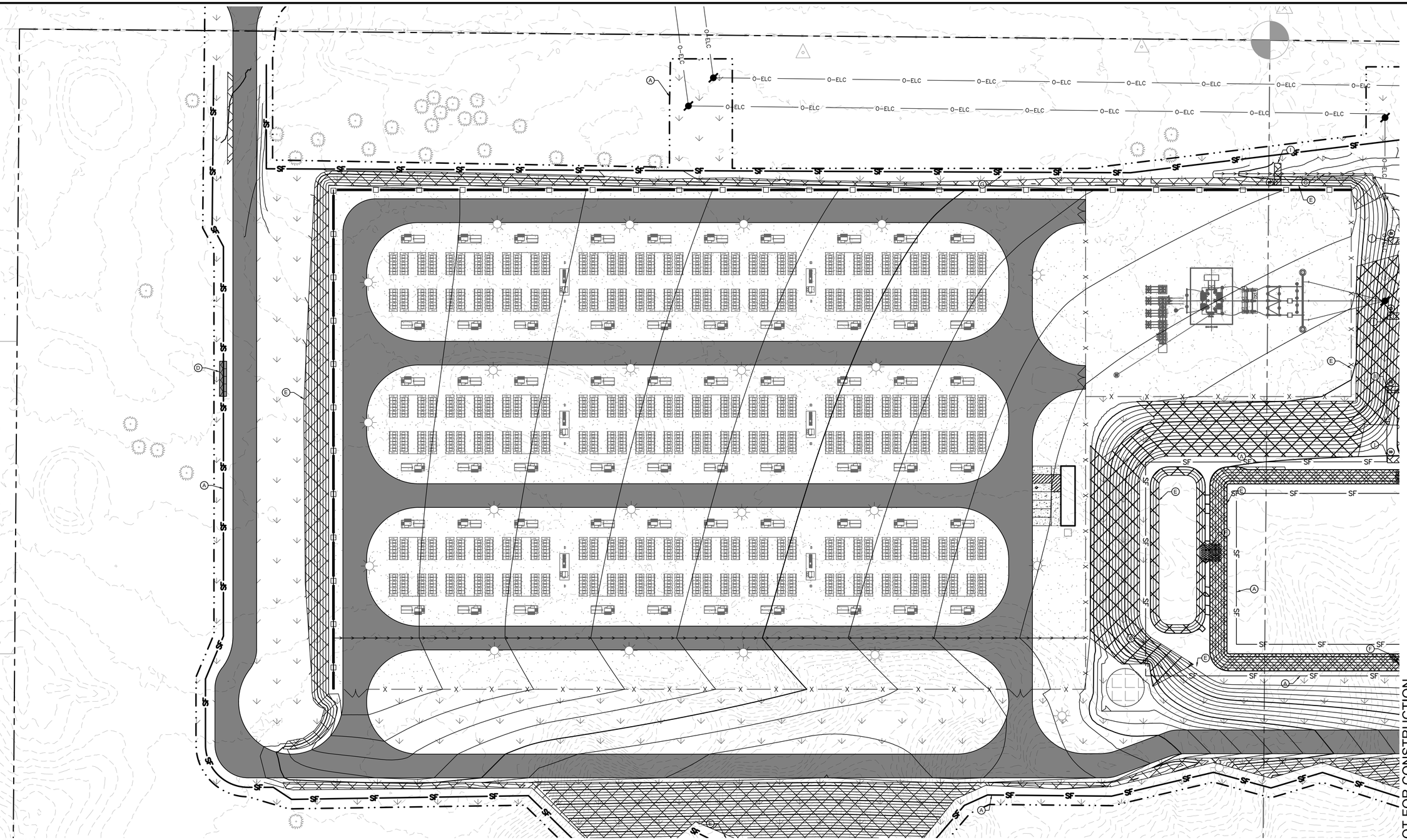
SHEET NUMBER
C306



LEGEND

MDTMB SESC KEYING SYSTEM NO.

	ROCK ENTRANCE	S53
	EROSION CONTROL BLANKET	E9
	INLET PROTECTION	S58
SF	SILT FENCE	S51
	LIMITS OF DISTURBANCE	
	SILT FENCE ROCK OUTLET	
	ROCK CHECK DAM	ES31
	SWALE	ES37
	RIPRAP	E12
	BIOROLL	

KEYNOTE LEGEND

(A)	SILT FENCE
(B)	INLET PROTECTION
(C)	ROCK CONSTRUCTION ENTRANCE
(D)	SILT FENCE ROCK OUTLET
(E)	EROSION CONTROL BLANKET
(F)	RIPRAP
(G)	SWALE
(H)	BIOROLL

NORTH

GRAPHIC SCALE IN FEET
0 25 50 100

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Brian Gammon

KHA PROJECT	161262002
DATE	06/08/2026
SCALE	AS SHOWN
DESIGNED BY	JLL
DRAWN BY	EAS
CHECKED BY	BPG

SOIL EROSION AND SEDIMENT CONTROL PLAN - PHASE 2 ENLARGEMENT

SWAN BESS AND CYGNET BESS
PREPARED FOR
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COMSTOCK TOWNSHIP
MI

SHEET NUMBER
C307

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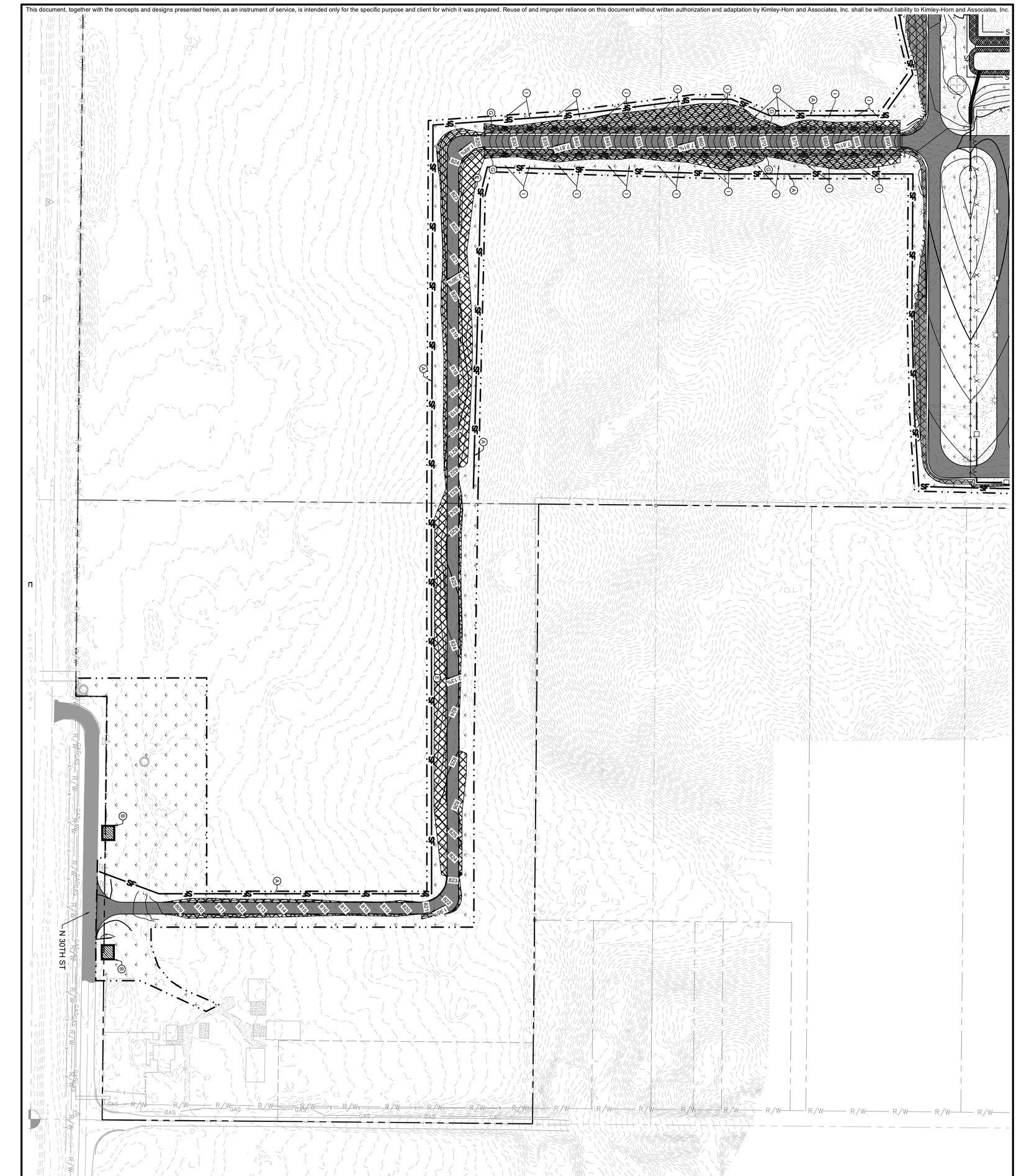

LEGEND

ROCK ENTRANCE	E12
EROSION CONTROL BLANKET	ES37
INLET PROTECTION	ES31
SILT FENCE	SS8
LIMITS OF DISTURBANCE	SS1
SILT FENCE ROCK OUTLET	E9
ROCK CHECK DAM	SS3
SWALE	
RIPRAP	
BIOROLL	

MDTMB SESC KEYING SYSTEM NO.

KEYNOTE LEGEND

A	SILT FENCE
B	INLET PROTECTION
C	ROCK CONSTRUCTION ENTRANCE
D	SILT FENCE ROCK OUTLET
E	EROSION CONTROL BLANKET
F	RIPRAP
G	SWALE
H	BIOROLL
I	ROCK CHECK DAM

GRAPHIC SCALE IN FEET 0 50 100 200

NORTH

MISS DIG 811

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SHEET NUMBER C308

SWAN BESS AND CYGNET BESS

PREPARED FOR
SWAN ENERGY STORAGE LLC AND CYGNET ENERGY STORGAGE LLC
COMSTOCK TOWNSHIP MI

SOIL EROSION AND SEDIMENT CONTROL PLAN - PHASE 2 ENLARGEMENT

KHA PROJECT	161262002
DATE	06/08/2026
SCALE	AS SHOWN
DESIGNED BY	JLL
DRAWN BY	EAS
CHECKED BY	BPG

Brian Gannon

Copenhagen Infrastructure Partners

Kimley»Horn of Michigan, Inc.

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3000 TOWN CENTER, SUITE 2600
SOUTHFIELD, MI 48075
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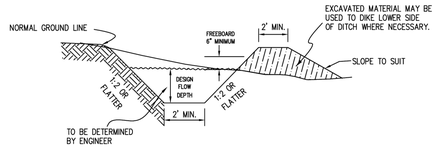
No.	REVISIONS	DATE	BY
1	ENTITLEMENT SET	06/08/2026	BPG

281

ES37

DIVERSION DITCH



CUT SECTION FOR DITCHES

NOTES:
- ALL STRUCTURAL BEST MANAGEMENT PRACTICES TO BE DESIGNED BY A REGISTERED ENGINEER OR LANDSCAPE ARCHITECT.
- ALL DIVERSIONS SHOULD BE FLAT BOTTOM. AVOID "V" PROFILES.
- MAY USE VEGETATED CHANNELS (SEE E11).

STANDARD SYMBOL

STATE OF MICHIGAN
DEPARTMENT OF TECHNOLOGY, MANAGEMENT AND BUDGET
STATE FACILITIES ADMINISTRATION

ES37

DIVERSION DITCH SPECIFICATIONS

When
- Temporarily diverts runoff around disturbed construction areas, highly erodible soils and other sensitive areas such as steep slopes.

Why
- To reduce erosion and sedimentation and route surface flows away from vulnerable areas, to divert flows to proposed sediment basins, and to prevent slope failures.

Where
- Where diversion of upslope runoff is necessary to prevent damage to unstabilized or disturbed construction areas and other vulnerable areas such as steep slopes.

How
1. Review site plan to determine areas subject to erosive surface runoff, construction areas needing protection from runoff, or collection and conveyance areas requiring runoff be directed into sediment basins or traps.
2. Locate diversion ditches prior to excavation of area to be protected and with consideration of pre-construction drainage patterns and capacities.
3. Temporary diversion ditches should be sized to carry at least a 10-year 24 hour storm event, unless local ordinances require greater capacity.
4. Permanent diversion ditches should be sized by a professional engineer.
5. Ditches should be located above, not on, a cut or fill slope and should run essentially perpendicular to the direction of runoff.
6. Ditch should have a minimum 2' wide bottom, a minimum 18" depth, with side slopes 1:2 or flatter.
7. Ditch grade minimum is usually 1%, maximum grade is dependent upon ditch armoring, capacity and diversion outlet (generally not greater than 10%).
8. Ditches may be vegetated or stabilized with rock riprap or matting.

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ES37

DIVERSION DITCH SPECIFICATIONS

How (cont.)
9. Care should be taken to prevent placement of material from ditch excavation into waterbodies, wetlands, or other sensitive areas.
10. Excavated material sidecast along diversion ditch should be compacted and stabilized.
11. Seed and mulch ditches with less than 5% grade; riprap and sod ditches with greater than 5% grade.

Maintenance
- Diversion should be inspected after every rainfall.
- Sediment should be removed from the diversion ditch and repairs made as necessary.
- Mow to remove excess growth of woody vegetation (design consideration).
- Except for maintenance, keep vehicles out of the ditch.

Limitations
- Diversion ditches should not adversely impact upstream or downstream properties.
- Use may be limited by quantity of diverted runoff.
- Seeding ditches will delay use until cover established.

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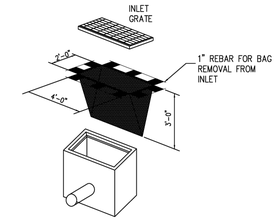
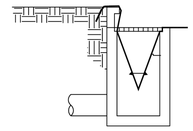
S58

INLET PROTECTION – FABRIC DROP

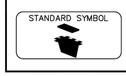


ISOMETRIC VIEW



INSTALLATION DETAIL

STANDARD SYMBOL



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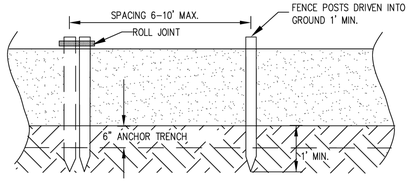
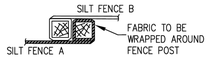
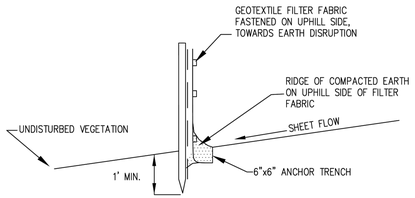
S51

SILT FENCE

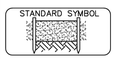




ROLL JOINTS



STANDARD SYMBOL



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S51

SILT FENCE SPECIFICATIONS

When
- A temporary measure for preventing sediment movement.

Why
- Used to prevent sediment suspended in runoff from leaving an earth change area.

Where
- Use adjacent to critical areas, wetlands, base of slopes, and watercourses.

How
1. Install parallel to a contour.
2. The silt fence should be made of woven geotextile fabric.
3. Silt fence should accomodate no more than 1/2 to 1 acre of drainage per 100' of fence.
4. Dig a 6" trench along the area where the fence is to be installed.
5. Place 6" of the silt fence bottom flap into the trench.
6. Backfill the trench with soil and compact the soil on both sides. Create a small ridge on the up-slope side of the fence.
7. Install wooden stakes 6 – 10' apart and drive into the ground a minimum of 12".
8. Staple the geotextile fabric to the wooden stakes.
9. Join sections of silt fence by wrapping ends together (See drawing).

Maintenance
- Inspect frequently and immediately after each storm event. Check several times during prolonged storm events. If necessary, repair immediately.
- If the sediment has reached 1/3 the height of the fence, the soil should be removed and disposed of in a stable upland site.
- The fence should be re-installed if water is seeping underneath it or if the fence has become ineffective.
- Silt fence should be removed once vegetation is established and up-slope area has stabilized.

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S51

SILT FENCE SPECIFICATIONS

Limitations
- Silt fence may cause temporary ponding and could fail if too much water flows through the area.
- Do not use in areas with concentrated flows.
- Chance of failure increases if fence is installed incorrectly or if sediment accumulation is not removed.

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S58

INLET PROTECTION – FABRIC DROP SPECIFICATIONS

When
- When sediment laden stormwater requires treatment before entering a stormwater drainage system.

Why
- To prevent sediment from entering stormwater systems.

Where
- Use in or at stormwater inlets, especially at construction sites or in streets.

How
1. A filter fabric bag is hung inside the inlet, beneath the grate.
2. Replace grate, which will hold bag in place.
3. Anchor filter bag with 1" rebar for removal from inlet.
4. Flaps of bag that extend beyond the bag can be buried in soil in earth areas.

Maintenance
- Drop inlet filters should be inspected routinely and after each major rain event.
- Damaged filter bags should be replaced.
- Clean and/or replace filter bag when 1/2 full.
- Replace clogged fabric immediately.
- If needed, initiate repairs immediately upon inspection.
- Remove entire protective mechanism when upgradient areas are stabilized and streets have been swept.

Limitations
- Can only accommodate small flow quantities.
- Requires frequent maintenance.
- Ponding may occur around storm drains if filter is clogged.

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KHA PROJECT 161262002
DATE 06/08/2026
SCALE AS SHOWN
DESIGNED BY JLL
DRAWN BY EAS
CHECKED BY BPG

SOIL EROSION AND SEDIMENT CONTROL DETAILS

SWAN BESS AND CYGNET BESS
PREPARED FOR
SWAN ENERGY STORAGE LLC AND CYGNET ENERGY STORGAGE LLC
COMSTOCK TOWNSHIP
MI

SHEET NUMBER
C310

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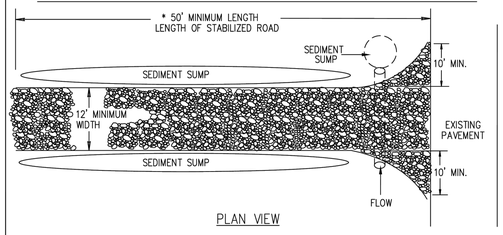
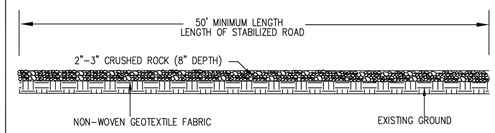
S53

STABILIZED CONSTRUCTION ACCESS



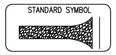
PLAN VIEW



PROFILE

NOTES:
1. Establish stabilized construction entrance prior to the initiation of site construction activities.
2. Care should be taken to prevent material movement into adjacent wetlands/waterbodies.
3. Care should be taken to maintain existing roadside drainage via culvert installation, with sediment sump placed downflow of culvert.

STANDARD SYMBOL



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S53

STABILIZED CONSTRUCTION ACCESS SPECIFICATIONS

When
- Construction traffic is expected to leave a construction site.
- Stabilization of interior construction roads is desired.

Why
- To minimize tracking of sediment onto public roadways and to minimize disturbance of vegetation.

Where
- Stabilized construction entrances shall be located at every point where construction traffic enters or leaves a construction site. Vehicles leaving the site must be routed over the rock ingress/egress corridor.

How
1. Stabilized construction access road should be established at the onset of the construction activities and maintained in place for the duration of the construction project.
2. Installation of this practice should be the responsibility of the site clearing or excavating contractor.
3. Access location should be cleared of woody vegetation.
4. Non-woven geotextile fabric shall be placed over the existing ground prior to placing stone.
5. Access size should be a minimum of 50'. (30' for single residence lot).
6. Access width should be 12' minimum, flared at the existing road to provide a turning radius.
7. Crushed aggregate (2" to 3"), or reclaimed or recycled concrete equivalent, shall be placed at least 8" deep over the length and width of the ingress/egress corridor.

Maintenance
- Periodic inspection and needed maintainence shall be provided after each rain event.
- Stabilized entrances shall be repaired and rock added as necessary.

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S53

STABILIZED CONSTRUCTION ACCESS SPECIFICATIONS

Maintenance (cont.)
- Sediment deposited on public rights-of-way shall be removed immediately and returned to the construction site.
- If soils are such that washing of tires is required, it shall be done in a wash rack area, stabilized with stone, immediately prior to the construction access stabilized corridor.
- At the project completion, rock access road should be removed and disposed of unless utilized as subgrade for final road.

Limitations
- Effectiveness limited, sediment may be tracked onto roads requiring additional action.

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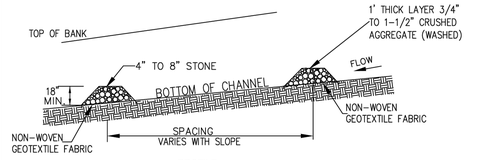
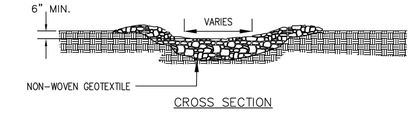
ES31

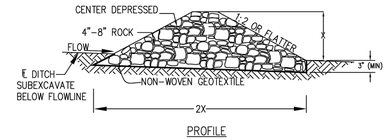
CHECK DAM



PROFILE



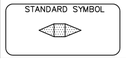
CROSS SECTION



PROFILE

NOTE: BASE WIDTH SHOULD BE AT LEAST 2X THE HEIGHT

STANDARD SYMBOL



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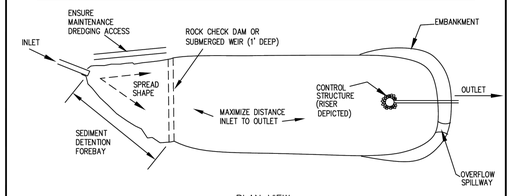
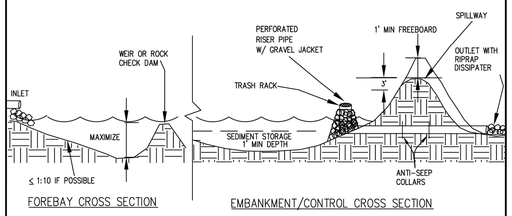
S55

SEDIMENT BASIN



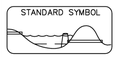
PLAN VIEW



FOREBAY CROSS SECTION

EMBANKMENT/CONTROL CROSS SECTION

STANDARD SYMBOL



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S55

SEDIMENT BASIN SPECIFICATIONS

When
- When site runoff is sediment-laden and/or runoff release rate is required.

Why
- To detain runoff sufficiently to allow excessive sediment to settle out before stormwater leaves construction site.

Where
- At the outlet of any disturbed area or at the ultimate site outlet.
- Should be used in association with dikes, temporary channels, and pipes to divert stormwater from the disturbed areas into the basin.
- May be combined with permanent detention basin.

How
1. Basin to be designed by engineer to ensure adequate storage volume from the contributing drainage area.
2. Basins should be constructed before clearing and grading work begins.
3. Basins should be located at the stormwater outlet for the site and multiple basins may be located throughout the site.
4. Basin location should ensure suitable access for maintenance and cleanout.
5. Do not locate in a stream.
6. All basin sites should be located where embankment failure will not result in loss of life or property damage.
7. The basin volume should be designed to handle the volume of stormwater expected from the disturbed acreage for a minimum 10-year storm event.
8. The basin volume consists of two zones
   - A sediment storage zone to a 1' minimum depth.
   - A settling zone at least 2 feet deep.

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SEDIMENT BASIN SPECIFICATIONS

How (cont.)
9. Design should contain sufficient capacity to detain runoff for 24-48 hours, maximizing sediment settlement potential.
10. Length to width ratio should be greater than 4:1 to allow for sufficient settlement time.
11. Utilize a well anchored riser pipe with anti-seep collars as the principal outlet, along with an emergency overflow spillway for major events.

Maintenance
- Inspect weekly and after each major storm event.
- Check the depth of sediment deposit to insure capacity of basin storage is adequate for stormwater and sediment deposition.
- Remove sediment when the forebay or basin design depth is 50% full of sediment.

Limitations
- Liability concerns based on failure of the basin and flooding of adjacent properties.
- May become an attractive nuisance to children and waterfowl.
- Typically, permanent basins are used for drainage of 5 acres or more.
- Effective in removing sediment down to the medium silt size fraction, however, not effective with fine silt and clay without extending detention time.

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ES31

CHECK DAM SPECIFICATIONS

When
- To reduce surface flow velocities.

Why
- To minimize erosion in flow corridors.

Where
- Within constructed flow corridors to reduce velocity until permanent stabilization is achieved.
- Within existing flow corridors to address or prevent velocity-caused erosion.

How
1. The check dam shall be constructed of rock only.
2. The rock shall be placed on non-woven geotextile fabric.
3. Remove woody vegetation prior to placing non-woven geotextile fabric.
4. Non-woven geotextile fabric shall be inset a minimum of 3" below adjacent grades.
5. The check dam shall be constructed of 4"-8" stone. The stone shall be placed to completely cover the width of the flow corridor and shall be keyed into adjacent banks.
6. The middle of the check dam shall be lower than the outer edges, such that no flow goes around the structure.
7. The up-stream side of the check dam can be lined with smaller crushed aggregate to improve efficiency.
8. Slopes of check dam should be 1:2 or flatter.

Maintenance
- Check dams should be inspected after each runoff event.
- Clogged stone should be periodically cleaned.
- Needed repairs should be initiated immediately after inspection.
- Accumulated upflow sediment should be periodically removed.
- If check dam is intended as temporary structure, remove after stablization is achieved.

Limitations
- Use only in small open channels which drain 10 acres or less.
- Not to be used in live streams.

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No.	REVISIONS	DATE	BY
1	ENTITLEMENT SET	06/09/2026	BPG

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KHA PROJECT 161262002
DATE 06/08/2026
SCALE AS SHOWN
DESIGNED BY JLL
DRAWN BY EAS
CHECKED BY BPG

SOIL EROSION AND SEDIMENT CONTROL DETAILS

SWAN BESS AND CYGNET BESS
PREPARED FOR
SWAN ENERGY STORAGE LLC AND CYGNET ENERGY STORGAGE LLC
COMSTOCK TOWNSHIP
MI

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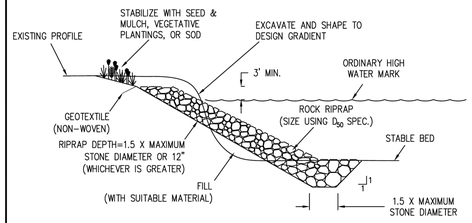
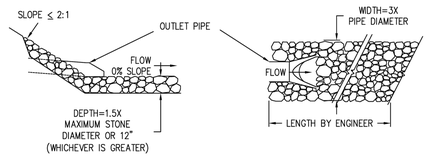
E12 RIPRAP

STREAM BANK APPLICATION



OUTLET POINT APPLICATION



STANDARD SYMBOL

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STATE FACILITIES ADMINISTRATION

E12 RIPRAP SPECIFICATIONS

When
- When concentrated water flows have the potential to create scour, down-cutting, or lateral cutting.

Why
- To prevent loss of land or damage to utilities or structures. In aquatic applications, riprap is used to control channel meander and maintain capacity, protect against wave attack, and reduce sediment load.

Where
- In natural or constructed channels with areas susceptible to erosion from the action of water, ice, or debris, or to damage by livestock or vehicular traffic.
- In shoreline areas where the erosion problem may be solved through simple structural measures.
- On slopes with profiles measuring 1:1.5 or less.

How
1. Review subject site to identify areas subject to concentrated flows or wave/current attack.
2. The appropriateness and extent of riprap placement is site specific and should be determined in the field.
3. The area under review for riprap placement must be shaped and contoured appropriately by grading prior to material placement.
4. Non-woven geotextile fabric should be installed prior to riprap placement, with upper end and toe end of fabric buried or anchored to prevent movement.
5. Riprap placement should be started at a stabilized location and ended at a stabilized or contoured point.
6. Material selected for riprap should be hard, angular, and resistant to weathering. Appropriate material size depends on expected water energy and intended function of the material.

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E12 RIPRAP SPECIFICATIONS

How (cont.)
7. Riprap mixture should be an even mixture of stone sizes based on the average, or D_{50}. This means 50% of the stone, by size, will be larger than the diameter specified, and 50% will be smaller than the size specified. The diameter of the largest stone should not be more than 1.5 times the D_{50} stone size.
8. See table on the following page for typical riprap stone sizes.
9. Rock shall be placed so that larger rocks are uniformly distributed and in contact with one another. Smaller rocks should fill the voids.
10. When in contact with moving water, riprap will tie into a stable bank at the downstream end and will be keyed into the bank at the upstream end. Riprap should extend 3 ft. above the ordinary high water mark or to the top of the bank on short slopes. Extend riprap a minimum 10 ft. beyond active erosion area.

Maintenance
- All installations should be inspected immediately after the first rainfall to confirm the stability of the placed material. Follow-up inspections should occur regularly and provisions made for prompt repair if needed.

Limitations
- Area is cleared prior to the addition of riprap, therefore no areas are preserved with native vegetation.

SIZE OF TYPICAL RIPRAP STONES

Weight (lbs.)	Average Spherical Diameter (in.) D_{50}	Typical Rectangular Shape Length (in.)	Width/Height (in.)
50	10	18	6
100	13	21	7
150	14	24	8
300	18	30	10
500	22	36	12
1000	27	45	15
1500	31	52	17
2000	34	57	19
4000	43	72	24
6000	49	83	28
8000	54	90	30

Source: Adapted from USDA NRCS

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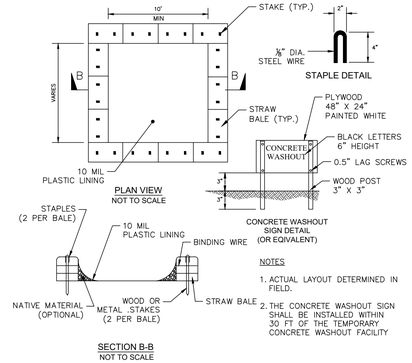
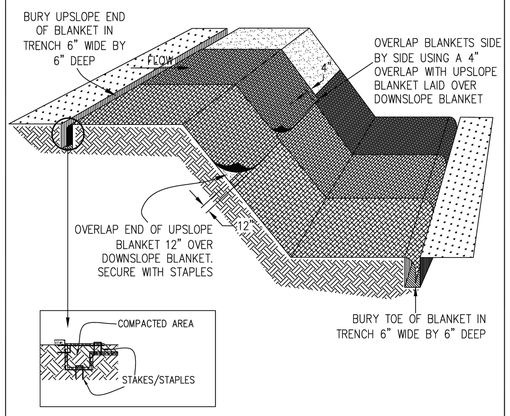


1 CONCRETE WASHOUT DETAIL

NO SCALE

E9 MULCH BLANKETS



NOTES:
1. PLACE MULCH BLANKET PARALLEL TO FLOW AND ANCHOR SECURELY.
2. WHEN BLANKETS ARE USED IN FLOWING DITCH, BLANKETS SHOULD NOT OVERLAP IN DITCH CENTER PARALLEL TO FLOW.
3. STAPLES INSTALLED/SECURED ACCORDING TO MANUFACTURER'S SPECIFICATIONS.
4. WHERE POSSIBLE, CONSTRUCT WITH BIODEGRADABLE MATERIAL.

STANDARD SYMBOL



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E9 MULCH BLANKETS SPECIFICATIONS

When
- When seeded areas are subject to erosive surface flows, severe wind, or to protect non-vegetated slopes or areas during the winter.

Why
- Protects seeded areas and slopes against erosion from rain or wind. Holds soil moisture to allow for seed germination and reduces wind dessication of germinated seeds.

Where
- Use on exposed slopes, newly seeded areas, new ditch bottoms, and other areas subject to erosion.

How
1. Prepare subgrade to proper grade and compaction requirements.
2. Remove ruts, roots, soil clods, or other debris from surface subject to mulch blanket installation.
3. Spread or drill seed.
4. Consult with erosion control material supplier to select mulch blanket based on slope gradient, expected surface run-off, and protection term necessary (long or short term).
5. Position selected mulch blanket as close as possible to intended use location.
6. Install blanket at top of slope, first anchoring toe in trench 6" wide X 6" deep, progressing down-slope or down-gradient with approximately 12" of blanket extended beyond the up-slope portion of the trench.
7. Anchor the blanket with staples/stakes placed approximately 12" apart in the bottom of the trench. Backfill and compact the trench after securing.
8. Apply seed to compacted soil and fold the 12" portion of the blanket over compacted area and secure with a row of staples/stakes placed 12" apart across the width of the blanket.
9. Unroll the blankets down or horizontally across the slope.

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E9 MULCH BLANKETS SPECIFICATIONS

How (cont.)
10. Overlap blanket edges by a minimum of 4" and blanket ends by a minimum of 12". Overlaps should be in the direction of expected flow with the up-slope blanket placed over the down-slope blanket edge.
11. Secure down-slope end of blanket with staples/stakes and trench in.

Maintenance
- Check after a rain event to ensure the blanket is still in place.
- Keep eroded soil, vehicular and pedestrian traffic, and concentrated runoff away from the blanketed area.

Limitations
- Mulch blankets and anchors may inhibit mowing.

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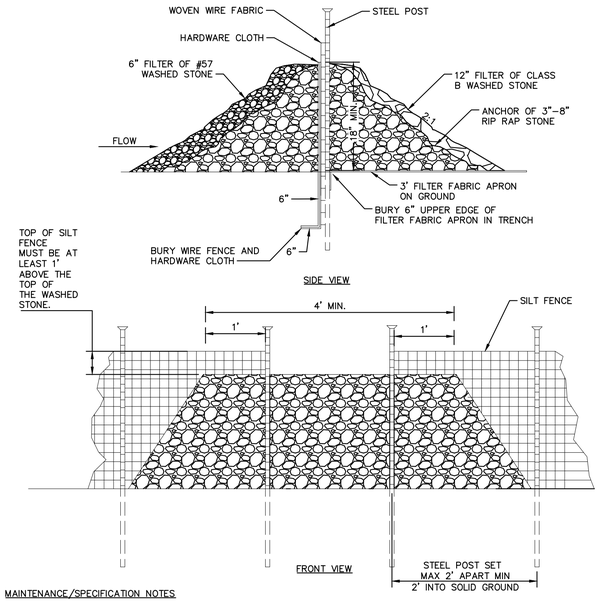

MAINTENANCE/SPECIFICATION NOTES

1. REMOVE SEDIMENT WHEN HALF OF STONE OUTLET IS COVERED.
2. REPLACE STONE AS NEEDED TO ENSURE DEWATERING.
3. SILT FENCE OUTLETS SHOULD NOT BE LOCATED WHERE THE OUTFLOW WILL ERODE THE SOIL BELOW.

2 SILT FENCE ROCK OUTLET DETAIL

NO SCALE

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BRIAN GAMMON
ENGINEER
NO. 6201312904
PROFESSIONAL ENGINEER

Brian Gammon

KHA PROJECT 161262002
DATE 06/08/2026
SCALE AS SHOWN
DESIGNED BY JLL
DRAWN BY EAS
CHECKED BY BPG

SOIL EROSION AND SEDIMENT CONTROL DETAILS

SWAN BESS AND CYGNET BESS
PREPARED FOR
SWAN ENERGY STORAGE LLC AND CYGNET ENERGY STORGAGE LLC
COMSTOCK TOWNSHIP
MI

SHEET NUMBER
C312

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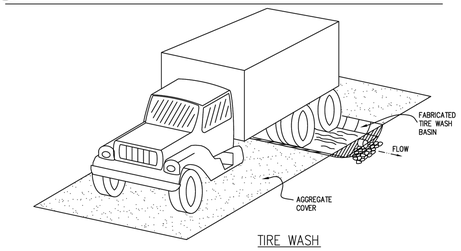
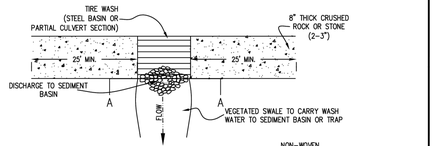
S54

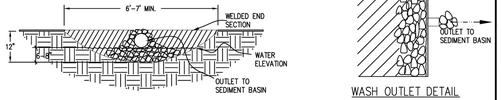
TIRE WASH



TIRE WASH



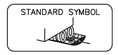
PLAN VIEW



CROSS SECTION A-A

WASH OUTLET DETAIL

STANDARD SYMBOL



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S54

TIRE WASH SPECIFICATIONS

When
- Whenever traffic will be entering or leaving a construction site with soil capable of clinging onto construction vehicles; resulting in tracking of mud onto paved roads.

Why
- Reduces excessive sediment tracking of soil onto paved roads.

Where
- As an addition to aggregate construction entrances.

How
1. Construct tire wash on level ground at minimum length of 6'-7', a minimum of 10' wide to match width of aggregate road.
2. Construct 25' minimum approaches to tire wash with minimum 8" thickness of 2-3" stone.
3. Construct tire wash of partial culvert section or fabricated metal. Weld metal plates to culvert ends to contain water.
4. Provide outlet on one end of tire wash to allow excess water to drain. Outlet invert should be located 6-8" above bottom of tire wash.
5. Within tire wash structure, protect outlet pipe with non-woven geotextile fabric and 2-3" stone to prevent sediment discharge.
6. Protect swale with 2-3" stone on non-woven geotextile fabric.
7. Fill tire wash basin with water daily or when water depth is reduced to 1/2 the distance between basin bottom and outlet point.
8. Wash rack discharges should be directed into a sediment basin through a vegetated channel.
9. Remove sediment accumulation daily.

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S54

TIRE WASH SPECIFICATIONS

Maintenance
- Sediment accumulation in wash shall be removed regularly and placed into proper disposal location.
- Maintain to specified dimensions by adding approach rock when necessary each day.
- Monitor water levels throughout working hours.
- Discharge swale should be inspected regularly to ensure tire wash discharge path is maintained to receiving sediment basin.
- Damage to tire wash shall be repaired prior to additional use of rack.

Limitations
- Requires daily maintenance.
- May not clean tire tread completely.

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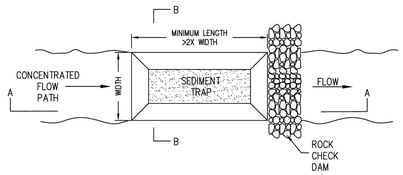
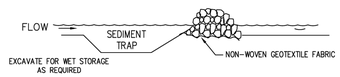
S56

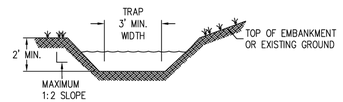
SEDIMENT TRAP



PLAN VIEW

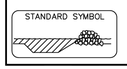


CROSS SECTION AA



CROSS SECTION BB

STANDARD SYMBOL



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S56

SEDIMENT TRAP SPECIFICATIONS

When
- When runoff from construction sites contains suspended sediment.

Why
- Should be used as a temporary measure.
- To collect and store sediment from sites cleared and/or graded during construction.

Where
- In small drainage areas with less than 5 acres of contributing drainage.
- Along the construction site perimeter where runoff is discharged offsite.
- Above check dams and/or upslope of drain inlet protection measures.

How
1. Prior to construction initiation, identify stormwater drainage routes likely to carry construction site runoff.
2. Build sediment traps in site runoff corridors before clearing, grubbing, and grading begin.
3. Install traps in natural depressions or in small drainageways to minimize vegetation removal.
4. A sediment trap is intended as a temporary measure.
5. In-stream applications should be designed by a professional engineer, with consideration for the type of soil, size of drainage area, and desired sediment removal efficiency.
6. Locate where the trap can be easily cleared of sediment.
7. Collection channels should enter the trap from the upslope side.
8. The sediment trap should have a minimum length to width ratio of 2:1.
9. The outlet of the trap must be stabilized with rock, vegetation, or another suitable material.

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S56

SEDIMENT TRAP SPECIFICATIONS

Maintenance
- Sediment shall be removed and trap restored to its original dimensions when the sediment has accumulated to 1/2 the design depth of the trap. Removed sediment shall be deposited in an upland area in such a manner that it will not erode.
- The structure shall be inspected after each rain event and repairs made as needed.
- The sediment trap shall be removed and the area stabilized when the contributory drainage area has been properly stabilized. The swale sediment trap will be properly backfilled and the swale or ditch reconstructed.

Limitations
- Only use for drainage areas up to 5 acres.
- Removes coarse sediment only (medium silt size or larger) unless trap area is sized similar to a sediment basin with extended residence time.

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KHA PROJECT 161262002
DATE 06/08/2026
SCALE AS SHOWN
DESIGNED BY JLL
DRAWN BY EAS
CHECKED BY BPG

SOIL EROSION AND SEDIMENT CONTROL DETAILS

SWAN BESS AND CYGNET BESS
PREPARED FOR
SWAN ENERGY STORAGE LLC AND CYGNET ENERGY STORGAGE LLC
COMSTOCK TOWNSHIP
MI

SHEET NUMBER
C313

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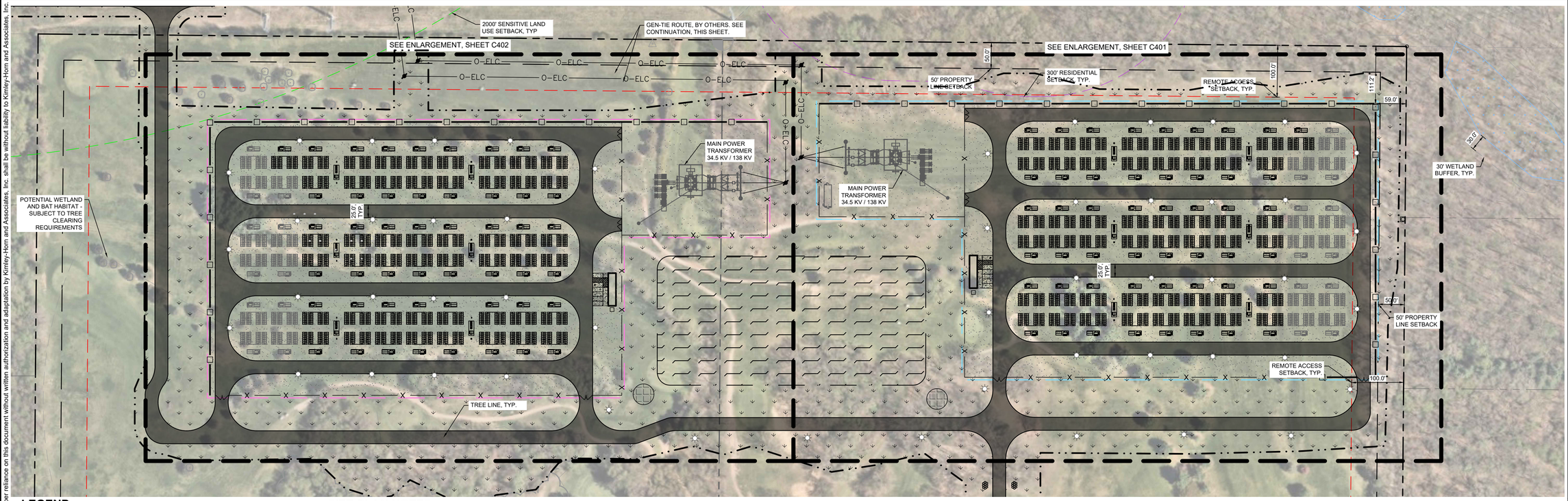


LEGEND

- PROPERTY BOUNDARY
- INTERNAL PARCEL PROPERTY LINE
- ADJACENT PARCEL PROPERTY LINE
- PROPERTY SETBACK LINE
- NFPA 855 REMOTE LOCATION SETBACK LINE
- SENSITIVE LAND USE SETBACK LINE
- OCCUPIED BUILDING SETBACK
- RIGHT-OF-WAY SETBACK
- EX. JURISDICTIONAL WETLAND (PER USSH)
- EX. MAN MADE POND (PER USSH)
- WETLAND SETBACK
- POTENTIAL WETLAND AND BAT HABITAT - SUBJECT TO TREE CLEARING REQUIREMENTS
- TREE LINE BOUNDARY
- PROPOSED SITE FENCE
- PROPOSED NOISE WALL
- PROPOSED GATE
- BATTERY ENCLOSURE
- BATTERY ENCLOSURE (AUGMENTED)
- PROPOSED ACCESS ROAD - COMPACTED AGGREGATE
- PROPOSED IMPROVED ACCESS ROAD
- PROPOSED LANDSCAPING, SEE LANDSCAPING PLANS
- BESS YARD ROCK, SIZE AND DEPTH TBD
- SUBSTATION YARD ROCK, SIZE AND DEPTH TBD
- CONCRETE PAVEMENT
- PROPOSED STORM WATER POND
- SWAN BESS LIMITS
- CYGNET BESS LIMITS
- FIRE WATER TANK
- LIGHT FIXTURE
- EXISTING TREE

SITE PLAN NOTES

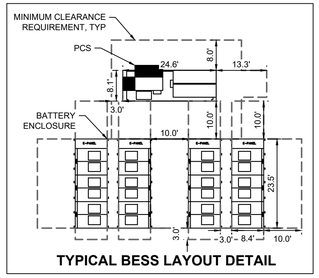
1. REFER TO THE ARCHITECTURAL PLANS FOR EXACT LOCATIONS AND DIMENSIONS OF STOOPS, TRUCK DOCKS, TRASH ENCLOSURES & PRECISE BUILDING DIMENSIONS. REFER TO THE SITE ELECTRICAL PLAN FOR LOCATIONS OF PROPOSED LIGHT POLES, CONDUITS, AND ELECTRICAL EQUIPMENT.
2. REFER TO CERTIFIED SITE SURVEY OR PLAT FOR EXACT LOCATION OF EXISTING EASEMENTS, PROPERTY BOUNDARY DIMENSIONS, AND ADJACENT RIGHT-OF-WAY & PARCEL INFORMATION.
3. DIMENSIONS AND RADII ARE DRAWN TO THE FACE OF CURB, UNLESS OTHERWISE NOTED. DIMENSIONS ARE ROUNDED TO THE NEAREST TENTH FOOT, AND AREAS ARE ROUNDED TO THE NEAREST SQUARE FOOT.
4. UNLESS OTHERWISE NOTED, THE CONTRACTOR SHALL BE RESPONSIBLE FOR RELOCATING EXISTING SITE IMPROVEMENTS THAT CONFLICT WITH THE PROPOSED WORK, INCLUDING BUT NOT LIMITED TO TRAFFIC SIGNS, LIGHT POLES, ABOVEGROUND UTILITIES, ETC. PERFORM WORK IN ACCORDANCE WITH GOVERNING AUTHORITIES REQUIREMENTS AND PROJECT SITE WORK SPECIFICATIONS. COST SHALL BE INCLUDED IN BASE BID.
5. TYPICAL PARKING STALL DIMENSIONS SHALL BE 9.0-FEET IN WIDTH AND 20-FEET IN LENGTH UNLESS OTHERWISE INDICATED.
6. MONUMENT SIGN(S) ARE DETAILED ON THE ARCHITECTURAL PLANS AND ARE SHOWN FOR GRAPHICAL & INFORMATIONAL PURPOSES ONLY. CONTRACTOR TO VERIFY SIGN DIMENSIONS, LOCATION AND REQUIRED PERMITS WITH THE OWNER.
7. TYPICAL BESS EQUIPMENT HEIGHTS SHALL BE 9.5-FEET FOR BATTERIES AND 9.0-FEET FOR PCS UNITS.

PROPERTY SUMMARY	
TOTAL PROPERTY AREA	+/- 144.28 AC
CONSTRUCTION DISTURBED AREA	+/- 53.79 AC
BESS DEVELOPMENT AREA	+/- 39.22 AC
OPEN SPACE	+/- 105.06 AC
SITE DATA	
EXISTING ZONING	R-1C
PROPOSED ZONING	R-1C (WITHIN BATTERY ENERGY SOTRAGE SYSTEM LARGE OFF-SITE OVERLAY DISTRICT)
PROPOSED LAND USE	INDUSTRIAL/UTILITY
TOWNSHIP OF COMSTOCK SETBACKS	PROPERTY LINE = 50'
	RIGHT-OF-WAY = 100'
	SENSITIVE LAND USE = 2000'
	OCCUPIED BUILDINGS = 300'
NFPA 855 SETBACK	REMOTE LOCATION = 100'
PARKING STALLS REQUIRED/PROVIDED	6/10*
ADA PARKING STALLS REQUIRED/PROVIDED	1/1

*THERE IS NO PARKING REQUIREMENT ASSOCIATED WITH THE COMSTOCK TOWNSHIP ORDINANCE FOR BATTERY ENERGY STORAGE SYSTEMS FOR O&M BUILDINGS. PARKING STALL REQUIREMENT WAS DERIVED FROM INSTITUTE OF TRANSPORTATION ENGINEERS' RATES OF 2.5 TO 3 PARKING SPACES PER 1,000 SQFT FOR "SMALL UTILITY BUILDINGS". THE PROPOSED O&M BUILDING HAS AN AREA OF 945 SQFT, THE EXPECTED PARKING DEMAND IS APPROXIMATELY 3 VEHICLES.

SWAN BESS SUMMARY		
POWER [MW]		200 MW
ENERGY [MWh]		800 MWh
TOTAL NO. OF BATTERY ENCLOSURES (BOL)		196
NO. OF SKID (PSC + MVTR) (BOL)		49
NO. OF SKIDS (PCS + MVTR)		11
NO. OF BATTERY ENCLOSURE		44
1ST AUGMENTATION	YEAR	5
	NO. OF SKID	5
	NO. OF BATTERY ENCLOSURE	20
2ND AUGMENTATION	YEAR	11
	NO. OF SKID	6
	NO. OF BATTERY ENCLOSURE	24
CUMULATIVE NO. OF BATTERY ENCLOSURE (EOL)		240
CUMULATIVE NO. OF SKID (PCS + MVTR) (EOL)		60

CYGNET BESS SUMMARY		
POWER [MW]		200 MW
ENERGY [MWh]		800 MWh
TOTAL NO. OF BATTERY ENCLOSURES (BOL)		196
NO. OF SKID (PSC + MVTR) (BOL)		49
NO. OF SKIDS (PCS + MVTR)		11
NO. OF BATTERY ENCLOSURE		44
1ST AUGMENTATION	YEAR	5
	NO. OF SKID	5
	NO. OF BATTERY ENCLOSURE	20
2ND AUGMENTATION	YEAR	11
	NO. OF SKID	6
	NO. OF BATTERY ENCLOSURE	24
CUMULATIVE NO. OF BATTERY ENCLOSURE (EOL)		240
CUMULATIVE NO. OF SKID (PCS + MVTR) (EOL)		60



TYPICAL BESS LAYOUT DETAIL

NORTH

GRAPHIC SCALE IN FEET
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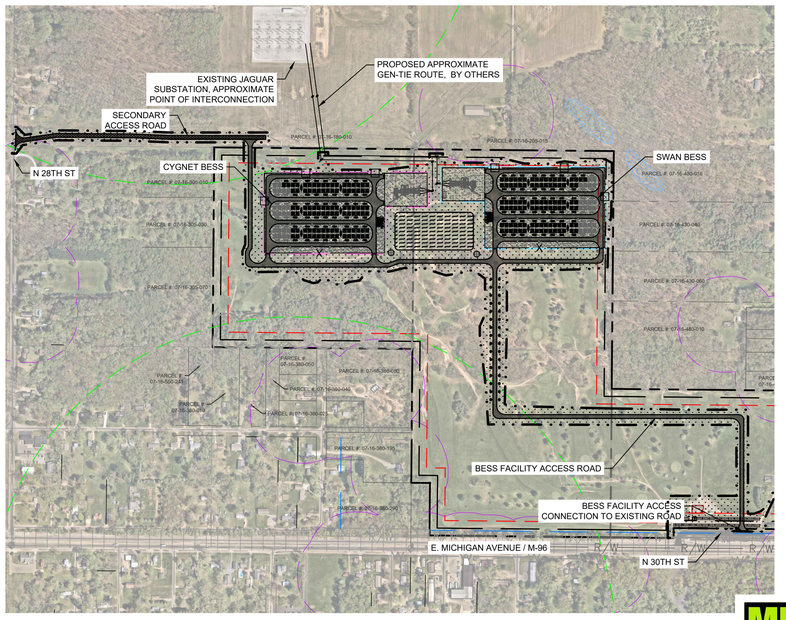

APPROXIMATE GEN-TIE ROUTE, BY OTHERS
APPROXIMATE BESS FACILITY ACCESS ROAD

NORTH

GRAPHIC SCALE IN FEET
0 250 500 1000

MISS DIG 811

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Brian Gammon

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DATE	06/08/2026
SCALE	AS SHOWN
DESIGNED BY	JLL
DRAWN BY	CJC
CHECKED BY	BPG

OVERALL SITE PLAN AND AUGMENTATION PLAN

SWAN BESS AND CYGNET BESS

PREPARED FOR
SWAN ENERGY STORAGE LLC AND CYGNET ENERGY STORGAGE LLC
COMSTOCK TOWNSHIP
MI

SHEET NUMBER
C400

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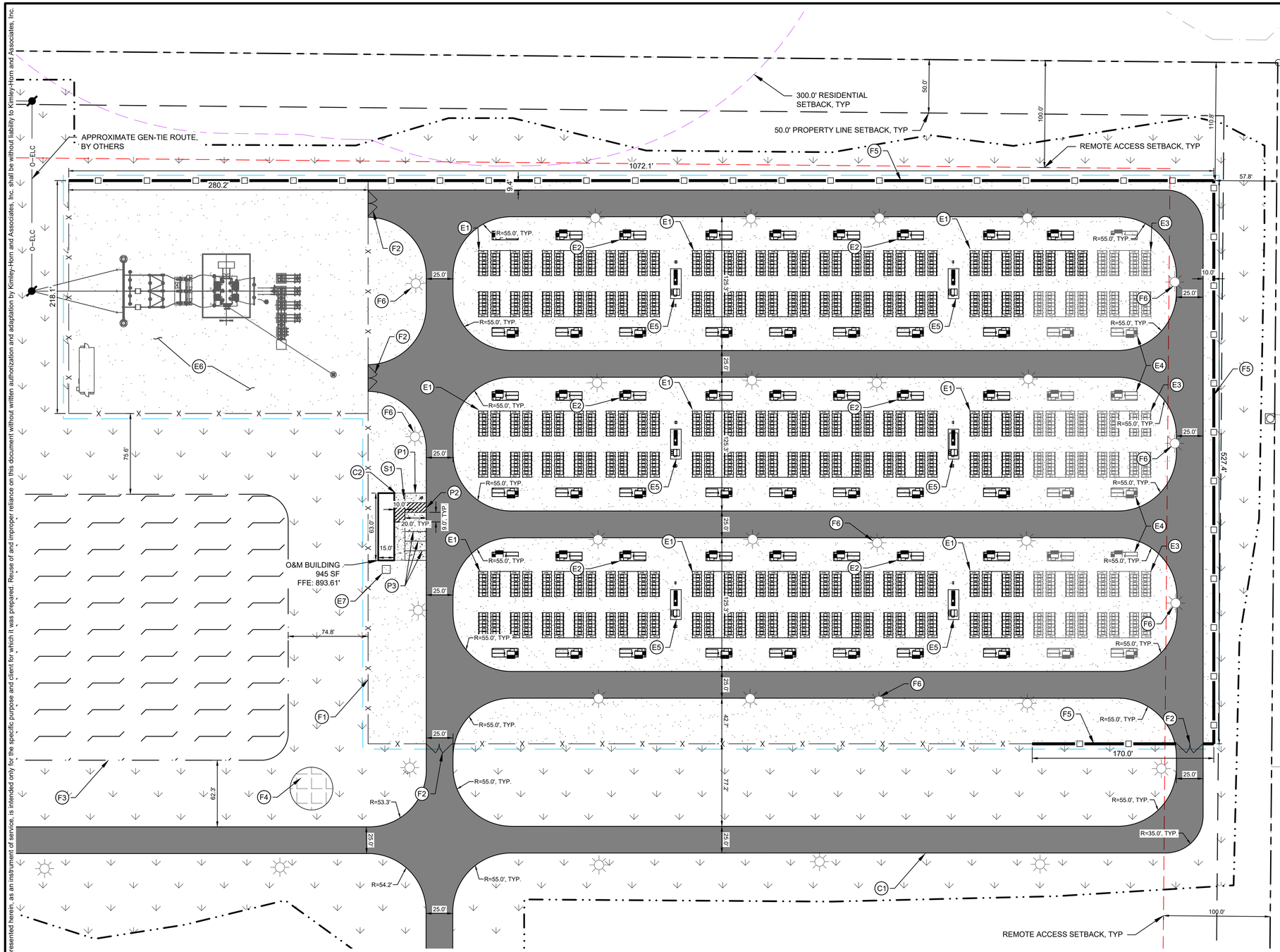

LEGEND

- PROPERTY BOUNDARY
- INTERNAL PARCEL PROPERTY LINE
- ADJACENT PARCEL PROPERTY LINE
- PROPERTY SETBACK LINE
- NFPA 855 REMOTE LOCATION SETBACK LINE
- SENSITIVE LAND USE SETBACK LINE
- OCCUPIED BUILDING SETBACK
- RIGHT-OF-WAY SETBACK
- EX. JURISDICTIONAL WETLAND (PER USSH)
- EX. MAN MADE POND (PER USSH)
- WETLAND SETBACK
- POTENTIAL WETLAND AND BAT HABITAT - SUBJECT TO TREE CLEARING REQUIREMENTS
- TREE LINE BOUNDARY
- PROPOSED SITE FENCE
- PROPOSED NOISE WALL
- PROPOSED GATE
- BATTERY ENCLOSURE
- BATTERY ENCLOSURE (AUGMENTED)
- PROPOSED ACCESS ROAD - COMPACTED AGGREGATE
- PROPOSED IMPROVED ACCESS ROAD
- PROPOSED LANDSCAPING, SEE LANDSCAPING PLANS
- BESS YARD ROCK, SIZE AND DEPTH TBD
- SUBSTATION YARD ROCK, SIZE AND DEPTH TBD
- CONCRETE PAVEMENT
- PROPOSED STORM WATER POND
- SWAN BESS LIMITS
- CYGNET BESS LIMITS
- FIRE WATER TANK
- LIGHT FIXTURE
- EXISTING TREE

KEYNOTE LEGEND

EQUIPMENT

- (E1) BATTERY ENCLOSURE
- (E2) PCS
- (E3) FUTURE AUGMENTATION BATTERY ENCLOSURE
- (E4) FUTURE AUGMENTATION PCS
- (E5) AUXILIARY PAD
- (E6) SUBSTATION ENCLOSURE, BY OTHERS
- (E7) O&M BUILDING AUX PAD, BY OTHERS

CURB, SIDEWALK & PAVEMENT

- (C1) ACCESS ROAD - SEE DETAIL 9, SHEET C701
- (C2) CONCRETE PAVEMENT - SEE DETAIL 7, SHEET C701

SITE FIXTURES

- (F1) 6' CHAIN-LINK FENCE WITH 1' BARBED WIRE - SEE DETAIL 1, SHEET C700
- (F2) CHAIN-LINK FENCE SWING GATE - SEE DETAIL 2, SHEET C700
- (F3) STORMWATER MANAGEMENT AREA
- (F4) 30,000 GALLON WATER TANK, BY OTHERS
- (F5) 14' NOISE WALL - SEE DETAIL 3, SHEET C700
- (F6) LIGHT FIXTURE

PAVEMENT MARKINGS

- (P1) ACCESSIBLE PARKING SYMBOL & LOADING AREA - SEE DETAIL 4, SHEET C701
- (P2) STRIPED WHITE CROSS-HATCH AREA 4" SOLID LINES @ 45° 2' O.C.
- (P3) 4" WIDE WHITE PAINTED SOLID PARKING LOT LINE

SIGNAGE

- (S1) ADA PARKING SIGN IN BOLLARD - SEE DETAIL 1, SHEET C701

NORTH

GRAPHIC SCALE IN FEET
0 25 50 100

MISS DIG 811

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1	ENTITLEMENT SET	06/08/2026	BPG

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Copenhagen Infrastructure Partners

STATE OF MICHIGAN
BRIAN GAMMON
ENGINEER
6201312404
PROFESSIONAL ENGINEER
Brian Gammon

KHA PROJECT	161262002
DATE	06/08/2026
SCALE	AS SHOWN
DESIGNED BY	JLL
DRAWN BY	CJC
CHECKED BY	BPG

SITE PLAN ENLARGEMENT

SWAN BESS AND CYGNET BESS
PREPARED FOR
SWAN ENERGY STORAGE LLC AND CYGNET ENERGY STORGAGE LLC
COMSTOCK TOWNSHIP
MI

SHEET NUMBER
C401

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50.0' PROPERTY LINE SETBACK, TYP

2000.0' SENSITIVE LAND USE SETBACK, TYP

REMOTE ACCESS SETBACK, TYP

APPROXIMATE GEN-TIE ROUTE, BY OTHERS

POTENTIAL WETLAND AND BAT HABITAT - SUBJECT TO TREE CLEARING REQUIREMENTS

TREE LINE, TYP

O&M BUILDING
945 SF
FFE: 901.91'

332.5'
166.8'
526.9'
1073.7'
280.2'
218.1'
68.3'
63.0'
68.4'
41.6'
125.3'
25.0'
10.0'
20.0', TYP.
15.0'
9.0', TYP.
R=55.0', TYP.
R=35.0'
R=35.0', TYP.
R=55.0'

LEGEND

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- (E4) FUTURE AUGMENTATION PCS
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CURB, SIDEWALK & PAVEMENT
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SITE FIXTURES
- (F3) 6' CHAIN-LINK FENCE WITH 1' BARBED WIRE - SEE DETAIL 1, SHEET C700
- (F4) CHAIN-LINK FENCE SWING GATE - SEE DETAIL 2, SHEET C700
- (F5) STORMWATER MANAGEMENT AREA
- (F6) 30,000 GALLON WATER TANK, BY OTHERS
- (F7) 14' NOISE WALL - SEE DETAIL 3, SHEET C700
- (F8) LIGHT FIXTURE

PAVEMENT MARKINGS
- (P1) ACCESSIBLE PARKING SYMBOL & LOADING AREA - SEE DETAIL 4, SHEET C701
- (P2) STRIPED WHITE CROSS-HATCH AREA 4" SOLID LINES @ 45° 2' O.C.
- (P3) 4" WIDE WHITE PAINTED SOLID PARKING LOT LINE

SIGNAGE
- (S1) ADA PARKING SIGN IN BOLLARD - SEE DETAIL 1 SHEET C701

GRAPHIC SCALE IN FEET
0 25 50 100

NORTH

MISS DIG 811

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STATE OF MICHIGAN
BRIAN GAMMON
ENGINEER
6201312044
PROFESSIONAL ENGINEER

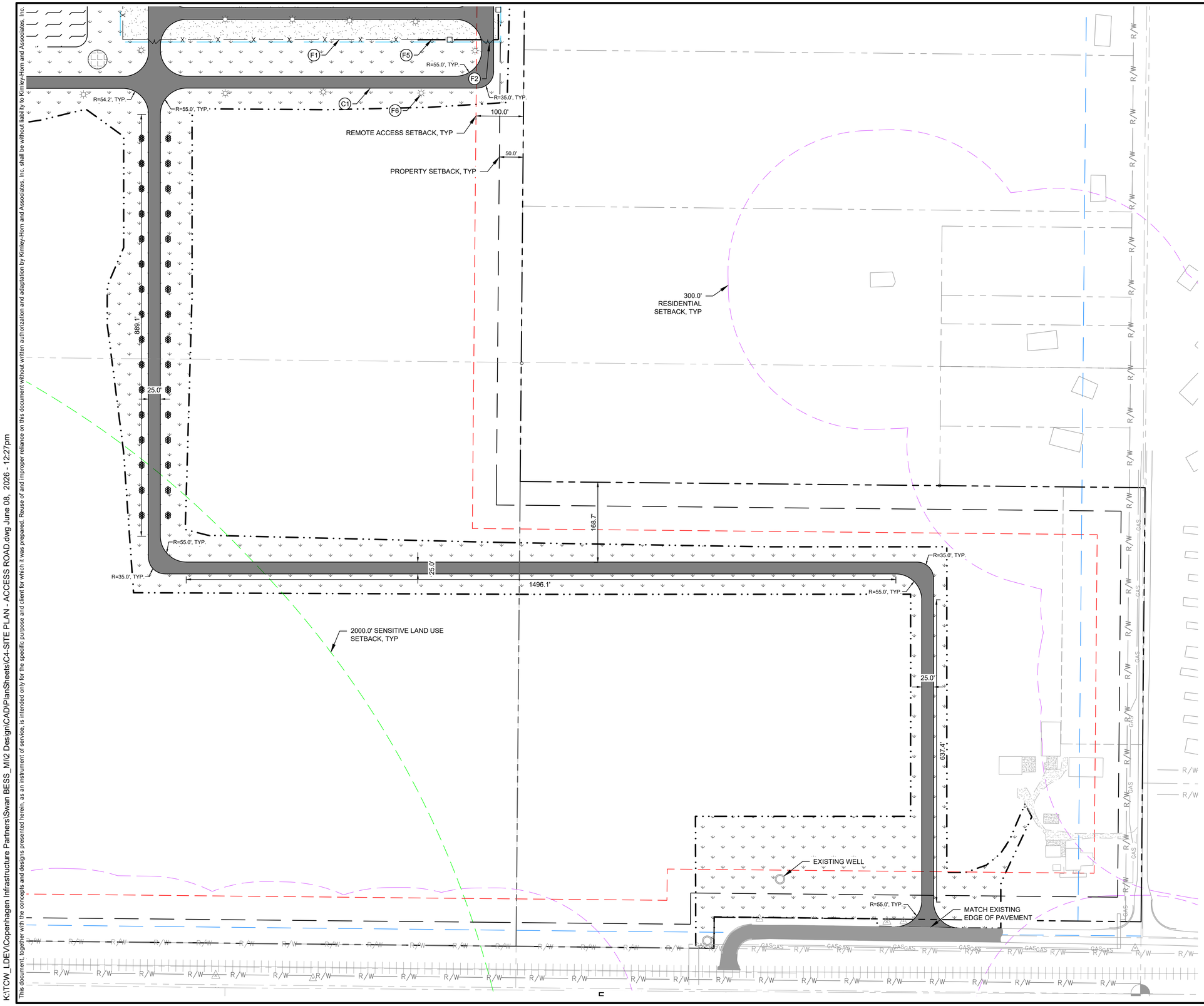
Brian Gammon

KHA PROJECT	161262002
DATE	06/08/2026
SCALE	AS SHOWN
DESIGNED BY	JLL
DRAWN BY	CJC
CHECKED BY	BPG

SITE PLAN ENLARGEMENT

SWAN BESS AND CYGNET BESS
PREPARED FOR
SWAN ENERGY STORAGE LLC AND CYGNET ENERGY STORGAGE LLC
COMSTOCK TOWNSHIP
MI

SHEET NUMBER
C402



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NORTH

GRAPHIC SCALE IN FEET
0 50 100 200

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STATE OF MICHIGAN
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ENGINEER
NO. 6201312474
PROFESSIONAL ENGINEER

Brian Gammon

KHA PROJECT	161282002
DATE	06/08/2026
SCALE	AS SHOWN
DESIGNED BY	JLL
DRAWN BY	EAS
CHECKED BY	BPG

SITE PLAN ENLARGEMENT

SWAN BESS AND CYGNET BESS
PREPARED FOR
SWAN ENERGY STORAGE LLC AND CYGNET ENERGY STORGAGE LLC
COMSTOCK TOWNSHIP
MI

SHEET NUMBER
C403

MISS DIG 811

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O-ELC

SWAN CONSTRUCTION DESIGN VEHICLE

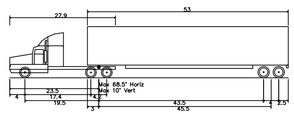
CYGNET CONSTRUCTION DESIGN VEHICLE

R/W

PROPOSED CONNECTION TO N 30TH ST.

E MICHIGAN AVE/M-99 (VARIABLE RIGHT-OF-WAY)

CONSTRUCTION DESIGN VEHICLE



WB-67 – Interstate Semi-Trailer

Overall Length	73.501ft
Overall Width	8.500ft
Overall Body Height	13.500ft
Min Body Ground Clearance	1.334ft
Max Track Width	8.500ft
Lock-to-lock time	6.00s
Max Steering Angle (Virtual)	28.40°

THE VEHICLE MANEUVERING IDENTIFIED ON THIS PLAN WAS PREPARED USING VEHICLE TRACKING SOFTWARE AND DOES NOT NECESSARILY REPRESENT ACTUAL CONDITIONS NOR DOES IT ACCOUNT FOR EXTERNAL FACTORS. THIS ANALYSIS SHOULD NOT BE USED AS THE SOLE BASIS FOR THE CLIENT'S DECISION MAKING

NORTH

GRAPHIC SCALE IN FEET
0 75 150 300

MISS DIG 811

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STATE OF MICHIGAN
BRIAN GAMMON
ENGINEER
NO. 6201312904
PROFESSIONAL ENGINEER

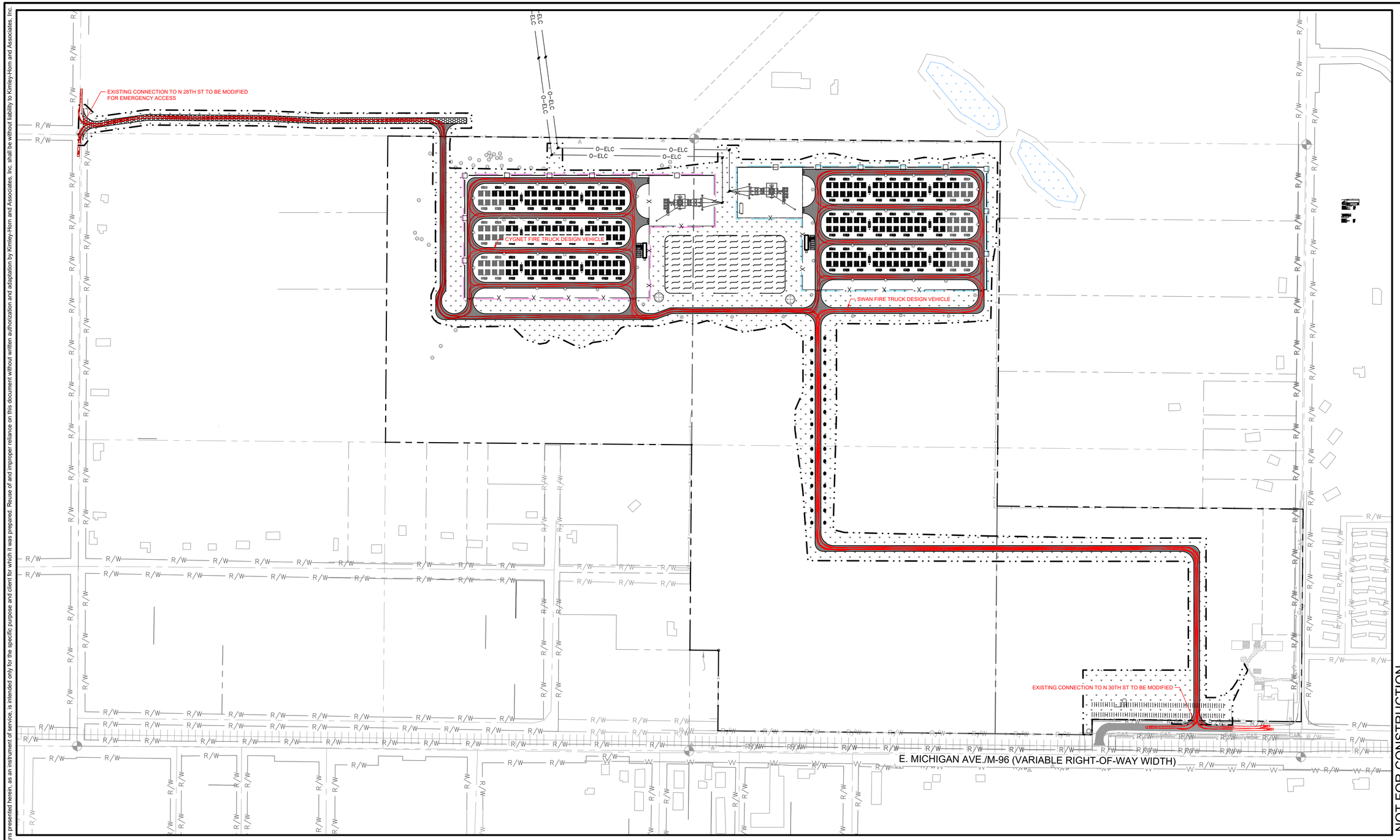
Brian Gammon

KHA PROJECT	161262002
DATE	06/08/2026
SCALE	AS SHOWN
DESIGNED BY	JLL
DRAWN BY	EAS
CHECKED BY	BPG

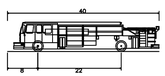
CONSTRUCTION VEHICLE CIRCULATION PLAN

SWAN BESS AND CYGNET BESS
PREPARED FOR
SWAN ENERGY STORAGE LLC AND CYGNET ENERGY STORGAGE LLC
COMSTOCK TOWNSHIP
MI

SHEET NUMBER
C410



FIRE TRUCK DESIGN VEHICLE



Pumper Fire Truck	
Overall Length	40.000ft
Overall Width	8.167ft
Overall Body Height	7.745ft
Min Body Ground Clearance	0.656ft
Track Width	8.167ft
Lock-to-lock time	5.00s
Max Wheel Angle	45.00°

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NORTH

GRAPHIC SCALE IN FEET
0 100 200 400

MISS DIG 811

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SOUTHFIELD, MI 48075
(312) 726 9445

CIP Copenhagen Infrastructure Partners

STATE OF MICHIGAN BRIAN GAMMON ENGINEER NO. 6201312904 LICENSED PROFESSIONAL ENGINEER

Brian Gammon

KHA PROJECT 161262002
DATE 06/08/2026
SCALE AS SHOWN
DESIGNED BY JLL
DRAWN BY EAS
CHECKED BY BPG

EMERGENCY VEHICLE CIRCULATION PLAN

SWAN BESS AND CYGNET BESS
PREPARED FOR
SWAN ENERGY STORAGE LLC AND CYGNET ENERGY STORGAGE LLC
COMSTOCK TOWNSHIP MI

SHEET NUMBER
C411

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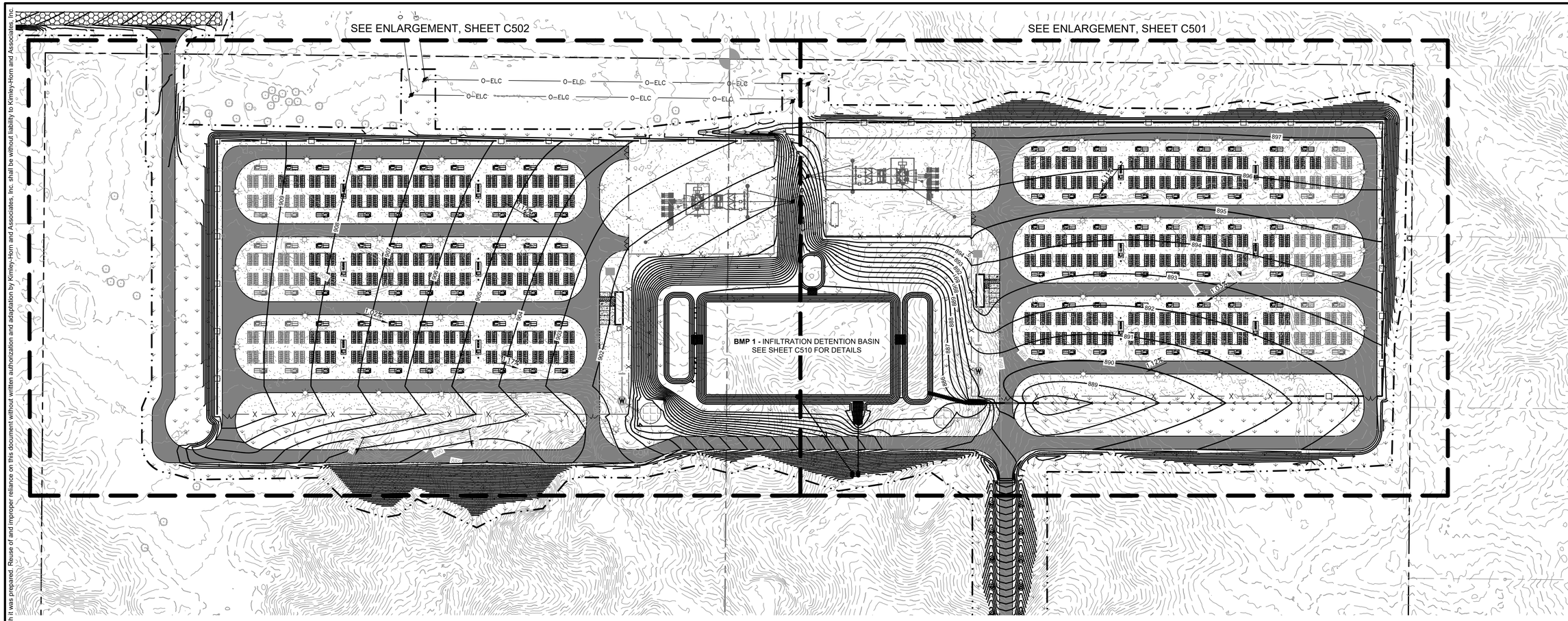

GRADING PLAN NOTES

1. PERFORM GRADING WORK IN ACCORDANCE WITH APPLICABLE TOWNSHIP SPECIFICATIONS AND BUILDING PERMIT REQUIREMENTS.
2. CONTACT STATE 811 CALL-BEFORE-YOU-DIG LOCATING SERVICE AT LEAST TWO WORKING DAYS PRIOR TO EXCAVATION FOR UNDERGROUND UTILITY LOCATIONS.
3. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL HORIZONTAL AND VERTICAL CONTROL.
4. FIELD VERIFY THE LOCATIONS AND ELEVATIONS OF EXISTING UTILITIES AND TOPOGRAPHIC FEATURES PRIOR TO THE START OF LAND DISTURBING ACTIVITIES. NOTIFY THE PROJECT ENGINEER OF ANY DISCREPANCIES OR VARIATIONS IMPACTING THE PROPOSED DESIGN OF THE PROJECT.
5. IN PAVED AREAS, ROUGH GRADE TO SUBGRADE ELEVATION AND LEAVE THE SITE READY FOR SUB-BASE.
6. SUBGRADE EXCAVATION SHALL BE BACKFILLED IMMEDIATELY AFTER EXCAVATION TO HELP OFFSET ANY STABILITY PROBLEMS DUE TO WATER SEEPAGE OR STEEP SLOPES. WHEN PLACING NEW SURFACE MATERIAL ADJACENT TO EXISTING PAVEMENT, THE EXCAVATION SHALL BE BACKFILLED PROMPTLY TO AVOID UNDERMINING OF EXISTING PAVEMENT.
7. ELEVATIONS SHOWN REPRESENT FINISHED SURFACE GRADES. SPOT ELEVATIONS ALONG CURB & GUTTER REPRESENT THE FLOW LINE UNLESS OTHERWISE NOTED
8. EXCESS MATERIAL, BITUMINOUS SURFACING, CONCRETE ITEMS, ABANDONED UTILITY ITEMS, AND OTHER UNSTABLE MATERIALS SHALL BECOME THE PROPERTY OF THE CONTRACTOR AND SHALL BE DISPOSED OF OFF THE CONSTRUCTION SITE.
9. CONTRACTOR IS RESPONSIBLE FOR CONSTRUCTION OF PAVEMENTS AND CURB AND GUTTER WITH SMOOTH UNIFORM SLOPES THAT PROVIDE POSITIVE DRAINAGE TO COLLECTION POINTS. MAINTAIN A MINIMUM SLOPE OF 1.25% IN ASPHALT PAVEMENT AREAS AND A MINIMUM SLOPE OF 0.50% IN CONCRETE PAVEMENT AREAS.
10. MAINTAIN A MINIMUM SLOPE OF 0.50% ALONG CURB & GUTTER. REVIEW PAVEMENT GRADIENT AND CONSTRUCT "INFALL" CURB WHERE PAVEMENT DRAINS TOWARD THE GUTTER, AND "OUTFALL" CURB WHERE PAVEMENT DRAINS AWAY FROM THE GUTTER.
11. INSTALL A MINIMUM OF 4-INCHES OF AGGREGATE BASE MATERIAL UNDER PROPOSED CONCRETE CURB & GUTTER, SIDEWALKS, AND TRAILS UNLESS OTHERWISE DETAILED.
12. GRADING FOR SIDEWALKS AND ACCESSIBLE ROUTES, INCLUDING CROSSING DRIVEWAYS, SHALL CONFORM TO CURRENT STATE & NATIONAL ADA STANDARDS:

    ACCESSIBLE RAMP SLOPES SHALL NOT EXCEED 8.3% (1:12).
    SIDEWALK CROSS-SLOPES SHALL NOT EXCEED 2.0%.
    LONGITUDINAL SIDEWALK SLOPES SHALL NOT EXCEED 5.0%.
    ACCESSIBLE PARKING STALLS AND ACCESS AISLES SHALL NOT EXCEED 2.0% IN ANY DIRECTION. A MAXIMUM SLOPE OF 1.50% IS PREFERRED.

    SIDEWALK ACCESS TO EXTERNAL BUILDING DOORS AND GATES SHALL BE ADA COMPLIANT. NOTIFY ENGINEER IMMEDIATELY IF ADA CRITERIA CANNOT BE MET IN ANY LOCATION PRIOR TO PAVEMENT INSTALLATION. CHANGE ORDERS WILL NOT BE ACCEPTED FOR ADA COMPLIANCE ISSUES.
13. UPON COMPLETION OF LAND DISTURBING ACTIVITIES, RESTORE ADJACENT OFFSITE AREAS DISTURBED BY CONSTRUCTION TO MATCH OR EXCEED THE ORIGINAL CONDITION. LANDSCAPE AREAS SHALL BE RE-VEGETATED WITH A MINIMUM OF 4-INCHES OF TOPSOIL.
14. EXCAVATE DRAINAGE TRENCHES TO FOLLOW PROPOSED STORM SEWER ALIGNMENTS. REFER TO THE UTILITY PLANS FOR LAYOUT AND ELEVATIONS FOR PROPOSED SANITARY SEWER, WATER MAIN, AND OTHER BUILDING UTILITY SERVICE CONNECTIONS.

STORM SEWER NOTES

1. INSTALL STORM SEWER IN ACCORDANCE WITH APPLICABLE TOWNSHIP OR STATE SPECIFICATIONS, STATE PLUMBING CODE, AND BUILDING PERMIT REQUIREMENTS.
2. CONTACT STATE 811 CALL-BEFORE-YOU-DIG LOCATING SERVICE AT LEAST TWO WORKING DAYS PRIOR TO EXCAVATION FOR UNDERGROUND UTILITY LOCATIONS.
3. STORM SEWER PIPE SHALL BE AS FOLLOWS:
    RCP: ASTM C-76
    HDPE: ASTM F-714, F-894
    PVC: ASTM D-2729
    PVC SCH40: ASTM D-1785, D-2665, F-794
   DRAIN TILE SHALL BE AS FOLLOWS:
    PE: ASTM F-6667
    PVC: ASTM D-2729
   FITTINGS SHALL BE AS FOLLOWS:
    RCP: ASTM C-76, JOINTS PER ASTM C-361, C-990, AND C-443
    HDPE: ASTM D-3212
    PVC: ASTM D-2729, JOINTS PER ASTM D-3212
    PVC SCH40: ASTM D-2665, F-794, F-1866
4. CONTRACTOR IS RESPONSIBLE FOR ALL HORIZONTAL AND VERTICAL CONTROL.
5. FIELD VERIFY THE LOCATIONS AND ELEVATIONS OF EXISTING UTILITIES AND TOPOGRAPHIC FEATURES PRIOR TO THE START OF LAND DISTURBING ACTIVITIES. NOTIFY THE PROJECT ENGINEER OF ANY DISCREPANCIES OR VARIATIONS IMPACTING THE PROPOSED DESIGN OF THE PROJECT.
6. EXCAVATE DRAINAGE TRENCHES TO FOLLOW PROPOSED STORM SEWER ALIGNMENTS. REFER TO THE UTILITY PLANS FOR LAYOUT AND ELEVATIONS FOR PROPOSED SANITARY SEWER, WATER MAIN, AND OTHER BUILDING UTILITY SERVICE CONNECTIONS. REFER TO THE GRADING PLAN FOR DETAILED SURFACE ELEVATIONS.
7. EXCESS MATERIAL, BITUMINOUS SURFACING, CONCRETE ITEMS, ABANDONED UTILITY ITEMS, AND OTHER UNSTABLE MATERIALS SHALL BECOME THE PROPERTY OF THE CONTRACTOR AND SHALL BE DISPOSED OF OFF THE CONSTRUCTION SITE.
8. COORDINATE WITH THE PLUMBING PLANS FOR THE LOCATION, SIZE AND ELEVATION OF THE PROPOSED UNDERGROUND ROOF DRAIN CONNECTIONS.
9. WHERE STORM SEWER ROOF DRAINS HAVE LESS THAN 4-FEET OF COVER IN PAVED AREAS OR 3-FEET OF COVER IN LANDSCAPE AREAS, PROVIDE 3-INCH THICK INSULATION A MINIMUM OF 5-FEET IN WIDTH, CENTERED ON THE PIPE.
10. ALL STORM SEWER PIPE JOINTS SHALL BE WATER-TIGHT CONNECTIONS.
11. ALL STORM SEWER PIPE CONNECTIONS TO MANHOLES SHALL BE GASKETED AND WATER TIGHT. BOOTED COUPLERS AT THE STRUCTURE OR A WATER STOP WITH NON-SHRINK GROUT MAY BE USED IN ACCORDANCE WITH LOCAL CODES.
12. CONTRACTOR SHALL AIR TEST ALL STORM SEWER PIPE IN ACCORDANCE WITH LOCAL CODE REQUIREMENTS.

INFILTRATION BMP NOTES

1. TO THE EXTENT PRACTICABLE, LIMIT USE OF HEAVY CONSTRUCTION EQUIPMENT WITHIN THE BOUNDARIES OF THE PROPOSED INFILTRATION BMP. UTILIZE AN EXCAVATOR WITH A TOOTHED BUCKET TO AVOID COMPACTING OR SMEARING OF SOILS.
2. AFTER INITIAL EXCAVATION AND ROUGH GRADING, PROVIDE A MINIMUM OF TWO (2) DOUBLE RING INFILTROMETER TESTS WITHIN THE INFILTRATION AREA AT THE ELEVATION OF THE BASIN BOTTOM. PROVIDE THE RESULTS TO THE ENGINEER OF RECORD FOR REVIEW AND APPROVAL PRIOR TO COMPLETING INSTALLATION OF THE BASIN OR UNDERGROUND SYSTEM.
3. IF CLAY SOILS ARE ENCOUNTERED, OVER-EXCAVATE AS NECESSARY TO REACH NATIVE SANDY/SILTY SOIL. BACKFILL THE ADDITIONAL EXCAVATION WITH SUITABLE ENGINEERED FILL MATERIAL.
4. IF NATIVE SUBGRADE SOILS AT THE BOTTOM OF THE PROPOSED INFILTRATION AREA ARE DETERMINED TO NOT BE CONDUCIVE TO THE DESIGN INFILTRATION REQUIREMENTS, REMOVE AND REPLACE THE POORLY INFILTRATION SOILS TO A DEPTH WHERE THE EXISTING NATIVE SUBGRADE SOILS MEET OR EXCEED THE DESIGN INFILTRATION REQUIREMENTS AS REVIEWED BY THE ENGINEER.
5. FINAL EXCAVATION OF THE INFILTRATION AREA AND INSTALLATION OF ANY ENGINEERED SOIL MUST OCCUR IN DRY CONDITIONS TO PREVENT SMEARING AND COMPACTION.
6. REMOVE ANY EXCESS SOILS THAT ENTER THE INFILTRATION BASIN PRIOR TO FINAL STABILIZATION.
7. UPON COMPLETION OF THE INFILTRATION/FILTRATION SYSTEM INSTALLATION AND FINAL STABILIZATION OF THE TRIBUTARY AREA, PROVIDE DOCUMENTATION THAT THE BMP DRAINS DOWN WITHIN 48 HOURS.

LEGEND

- PROPERTY LINE
- 928 — EXISTING CONTOUR
- 925 — PROPOSED CONTOUR
- PROPOSED SWALE
- PROPOSED STORM MANHOLE (SOLID CASTING)
- PROPOSED STORM MANHOLE (ROUND INLET CASTING)
- PROPOSED FLARED END SECTION
- PROPOSED RIPRAP
- PROPOSED STORM SEWER
- 100.00 — PROPOSED SPOT ELEVATION
- FL: 0.0 — PROPOSED FLOW LINE ELEVATION
- 0.0% — PROPOSED DRAINAGE DIRECTION

NORTH
GRAPHIC SCALE IN FEET
0 50 100 200

MISS DIG 811

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CIP
Copenhagen Infrastructure Partners

STATE OF MICHIGAN
BRIAN GAMMON
ENGINEER
NO. 6201312464
PROFESSIONAL ENGINEER

Brian Gammon

KHA PROJECT 161262002
DATE 06/08/2026
SCALE AS SHOWN
DESIGNED BY JLL
DRAWN BY CJC
CHECKED BY BPG

OVERALL GRADING AND DRAINAGE PLAN

SWAN BESS AND CYGNET BESS
PREPARED FOR
SWAN ENERGY STORAGE LLC AND CYGNET ENERGY STORGAGE LLC
COMSTOCK TOWNSHIP
MI

SHEET NUMBER
C500

K:\TCW_LDEV\Copenhagen Infrastructure Partners\Swan BESS_MI\2 Design\CAD\PlanSheets\C5-GRADING PLAN - SWAN.dwg June 08, 2026 - 12:30pm

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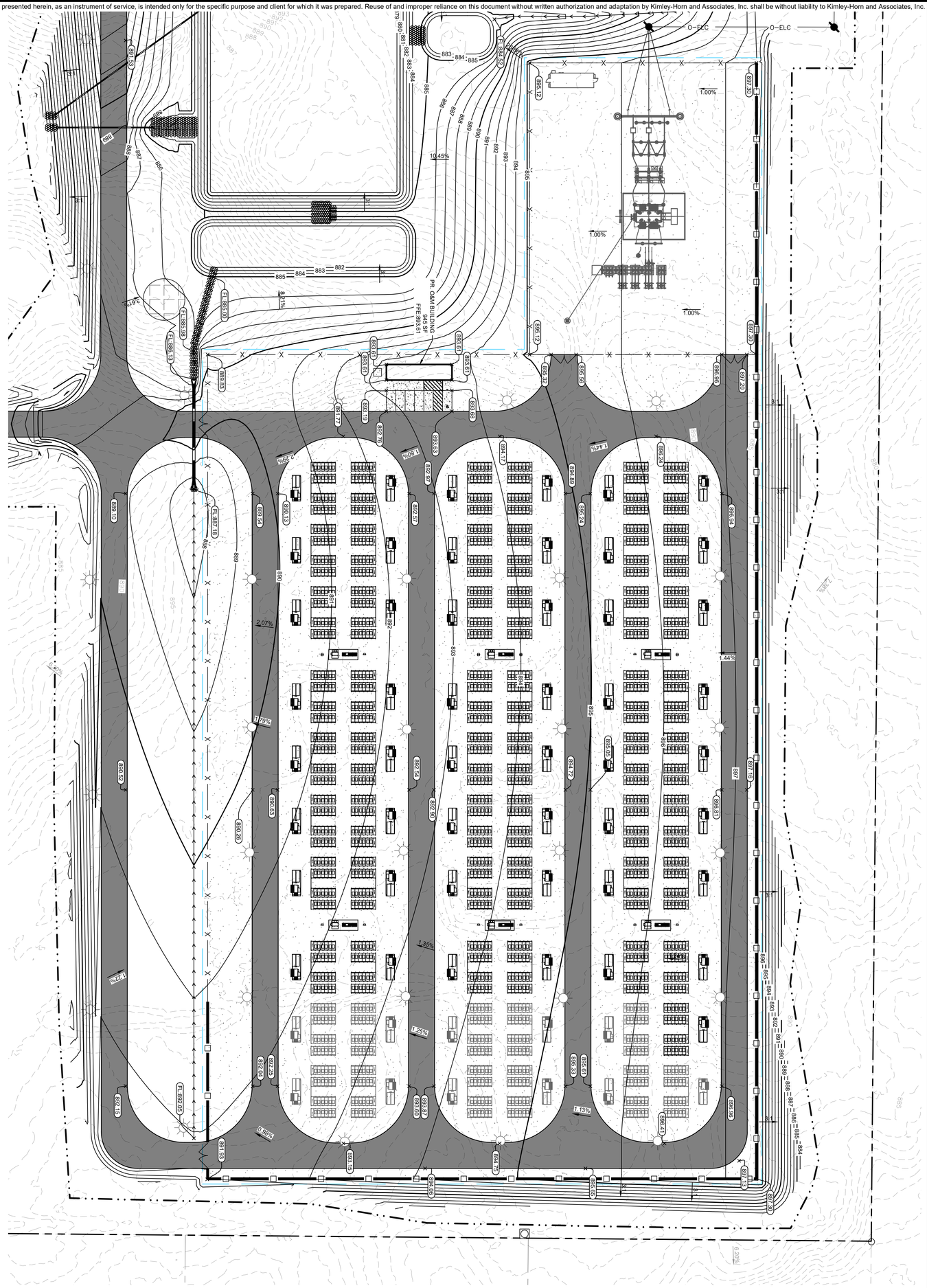

LEGEND

- PROPERTY LINE
- EXISTING CONTOUR
- PROPOSED CONTOUR
- PROPOSED SWALE
- PROPOSED STORM MANHOLE (SOLID CASTING)
- PROPOSED STORM MANHOLE (ROUND INLET CASTING)
- PROPOSED FLARED END SECTION
- PROPOSED RIPRAP
- PROPOSED STORM SEWER
- PROPOSED SPOT ELEVATION
- PROPOSED FLOW LINE ELEVATION
- PROPOSED DRAINAGE DIRECTION
- PROPOSED ROCK CHECK DAM

NORTH

GRAPHIC SCALE IN FEET
0 25 50 100

MISS DIG 811

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SHEET NUMBER
C501

SWAN BESS AND CYGNET BESS

PREPARED FOR
SWAN ENERGY STORAGE LLC AND
CYGNET ENERGY STORGAGE LLC
COMSTOCK
TOWNSHIP MI

GRADING PLAN ENLARGEMENT

KHA PROJECT	161262002
DATE	06/08/2026
SCALE	AS SHOWN
DESIGNED BY	JLL
DRAWN BY	CJC
CHECKED BY	BPG

Brian Gannon

CIP
Copenhagen Infrastructure Partners

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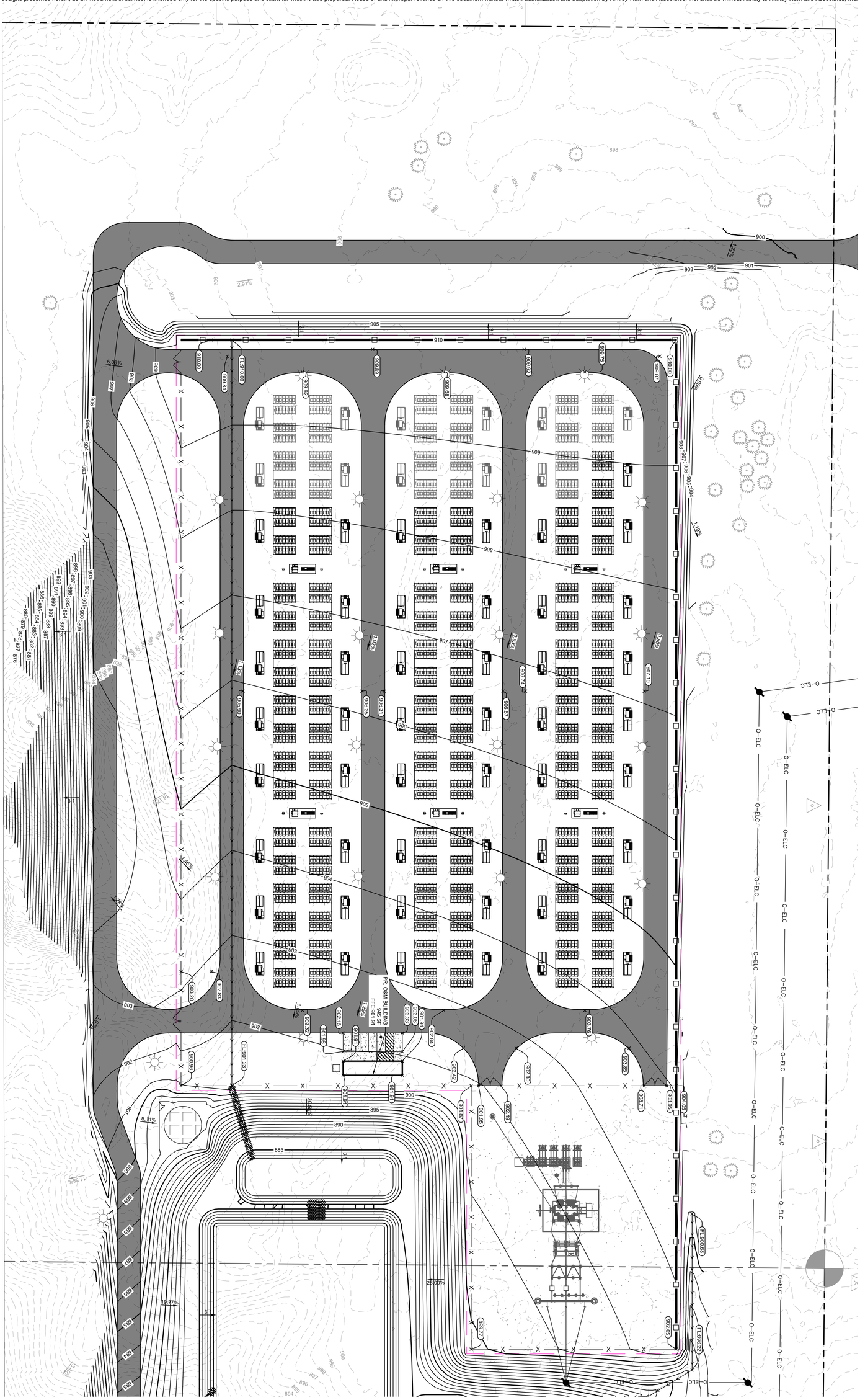
LEGEND

- PROPERTY LINE
- EXISTING CONTOUR
- PROPOSED CONTOUR
- PROPOSED SWALE
- PROPOSED STORM MANHOLE (SOLID CASTING)
- PROPOSED STORM MANHOLE (ROUND INLET CASTING)
- PROPOSED FLARED END SECTION
- PROPOSED RIPRAP
- PROPOSED STORM SEWER
- PROPOSED SPOT ELEVATION
- PROPOSED FLOW LINE ELEVATION
- PROPOSED DRAINAGE DIRECTION
- PROPOSED ROCK CHECK DAM



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SHEET NUMBER C502	SWAN BESS AND CYGNET BESS PREPARED FOR SWAN ENERGY STORAGE LLC AND CYGNET ENERGY STORGAGE LLC COMSTOCK TOWNSHIP MI	GRADING PLAN ENLARGEMENT	KHA PROJECT 161262002 DATE 06/08/2026 SCALE AS SHOWN DESIGNED BY JLL DRAWN BY CJC CHECKED BY BPG	Brian Gannon STATE OF MICHIGAN BRIAN GANNON NO. 4801270-04 LICENSED PROFESSIONAL ENGINEER	CIP Copenhagen Infrastructure Partners	Kimley»Horn of Michigan, Inc. © 2026 KIMLEY-HORN OF MICHIGAN 3000 TOWN CENTER, SUITE 2600 SOUTHFIELD, MI 48075 (312) 726 9445

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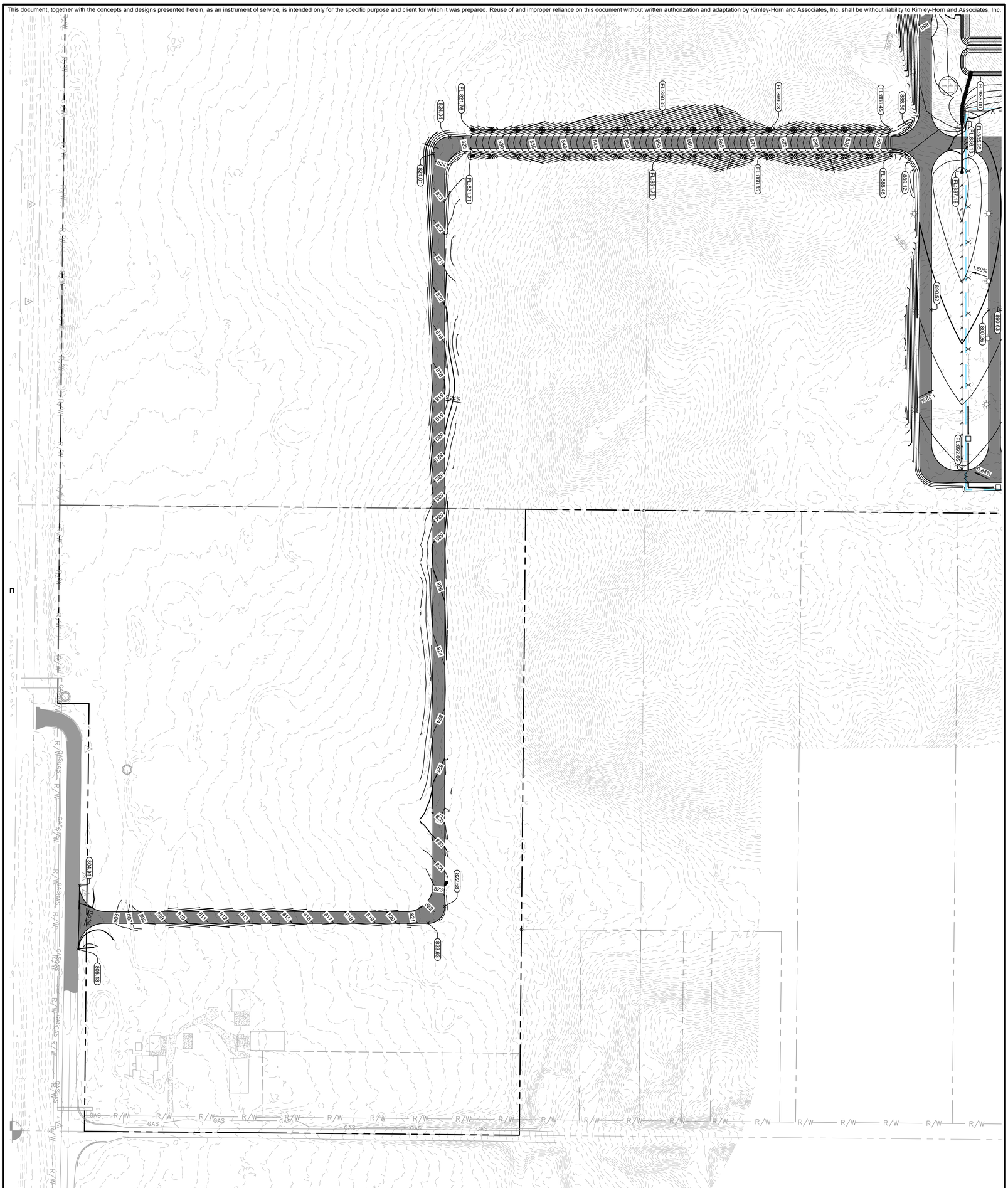
EL 865.00
EL 865.93
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EL 868.45
EL 869.12
EL 867.73
EL 867.77
EL 867.78
EL 864.94
EL 862.01
EL 862.85
EL 862.63
EL 865.13
EL 864.91
EL 892.05
1.89%
1.34%
R=42.00'
R=30.00'
R=30.00'
R=30

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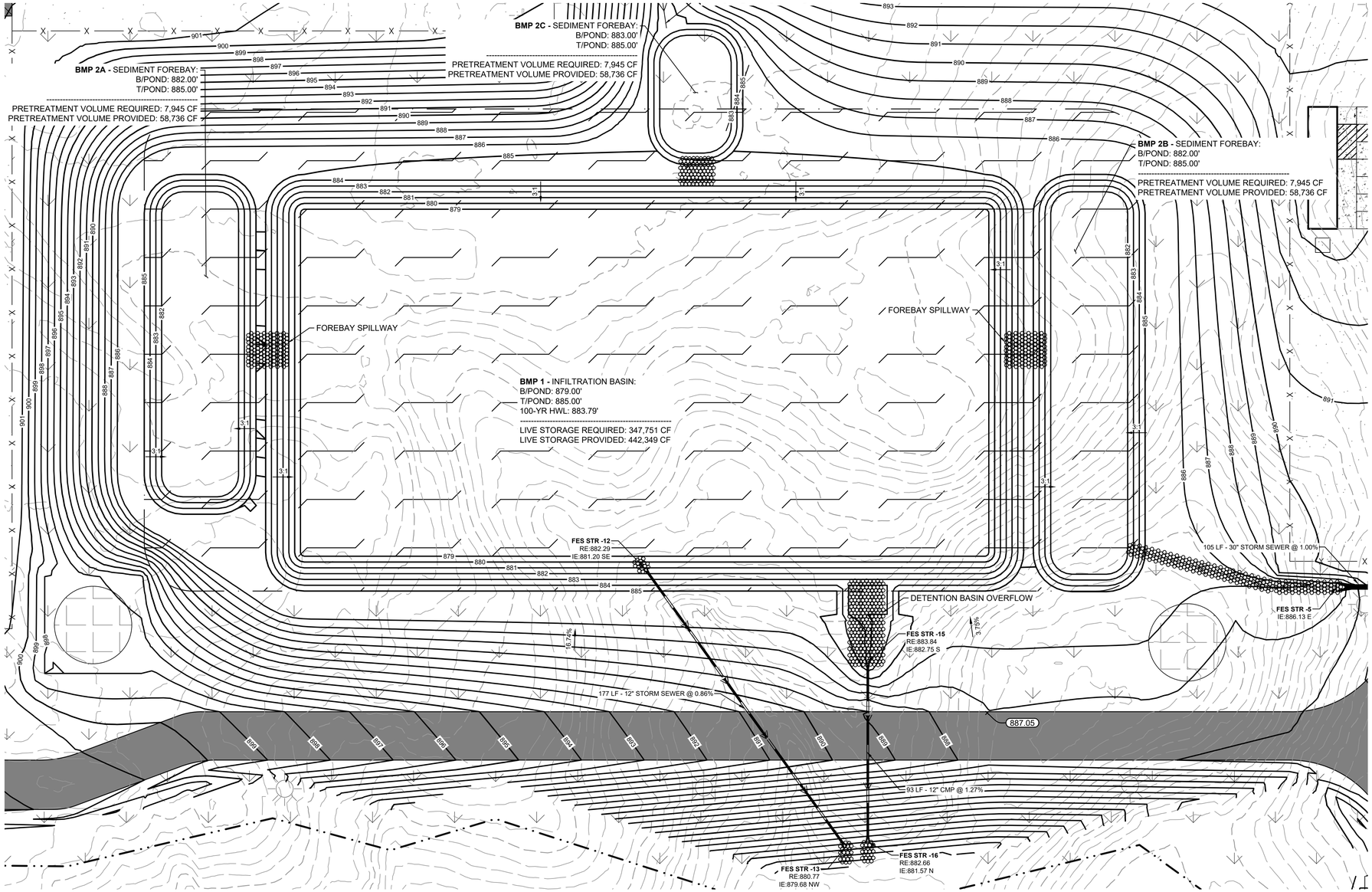
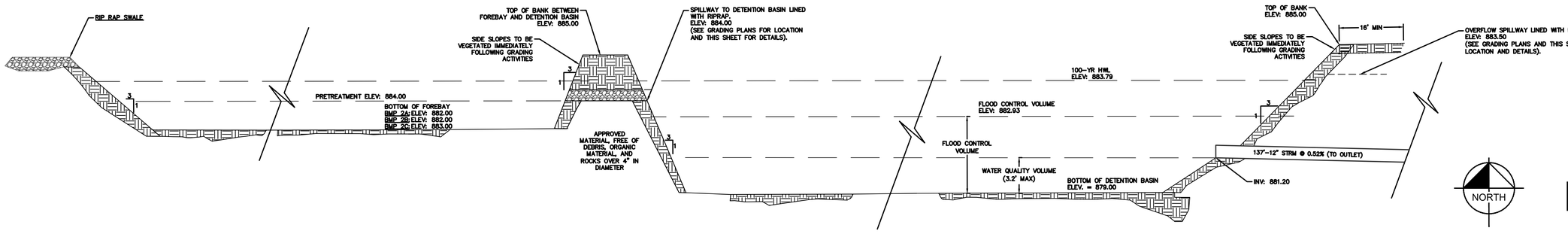


LEGEND

- PROPERTY LINE
- EXISTING CONTOUR (928)
- PROPOSED CONTOUR (925)
- PROPOSED SWALE
- PROPOSED STORM MANHOLE (SOLID CASTING)
- PROPOSED STORM MANHOLE (ROUND INLET CASTING)
- PROPOSED FLARED END SECTION
- PROPOSED RIPRAP
- PROPOSED STORM SEWER
- 0.0% PROPOSED DRAINAGE DIRECTION

STORM SEWER NOTES

1. INSTALL STORM SEWER IN ACCORDANCE WITH APPLICABLE TOWNSHIP OR STATE SPECIFICATIONS, STATE PLUMBING CODE, AND BUILDING PERMIT REQUIREMENTS.
2. CONTACT STATE 811 CALL-BEFORE-YOU-DIG LOCATING SERVICE AT LEAST TWO WORKING DAYS PRIOR TO EXCAVATION FOR UNDERGROUND UTILITY LOCATIONS.
3. STORM SEWER PIPE SHALL BE:
   RCP: ASTM C-76
   HDPE: ASTM F-714, F-894
   PVC: ASTM D-2729
   PVC SCH40: ASTM D-1785, D-2665, F-794
   DRAIN TILE SHALL BE:
   PE: ASTM F-6667
   PVC: ASTM D-2729
   FITTINGS SHALL BE:
   RCP: ASTM C-76, JOINTS PER ASTM C-361, C-990, AND C-443
   HDPE: ASTM D-3212
   PVC: ASTM D-2729, JOINTS PER ASTM D-3212
   PVC SCH40: ASTM D-2665, F-794, F-1866
4. CONTRACTOR IS RESPONSIBLE FOR ALL HORIZONTAL AND VERTICAL CONTROL.
5. FIELD VERIFY THE LOCATIONS AND ELEVATIONS OF EXISTING UTILITIES AND TOPOGRAPHIC FEATURES PRIOR TO THE START OF LAND DISTURBING ACTIVITIES. NOTIFY THE PROJECT ENGINEER OF ANY DISCREPANCIES OR VARIATIONS IMPACTING THE PROPOSED DESIGN OF THE PROJECT.
6. EXCAVATE DRAINAGE TRENCHES TO FOLLOW PROPOSED STORM SEWER ALIGNMENTS. REFER TO THE UTILITY PLANS FOR LAYOUT AND ELEVATIONS FOR PROPOSED SANITARY SEWER, WATER MAIN, AND OTHER BUILDING UTILITY SERVICE CONNECTIONS. REFER TO THE GRADING PLAN FOR DETAILED SURFACE ELEVATIONS.
7. EXCESS MATERIAL, BITUMINOUS SURFACING, CONCRETE ITEMS, ABANDONED UTILITY ITEMS, AND OTHER UNSTABLE MATERIALS SHALL BECOME THE PROPERTY OF THE CONTRACTOR AND SHALL BE DISPOSED OF OFF THE CONSTRUCTION SITE.
8. COORDINATE WITH THE PLUMBING PLANS FOR THE LOCATION, SIZE AND ELEVATION OF THE PROPOSED UNDERGROUND ROOF DRAIN CONNECTIONS.
9. WHERE STORM SEWER ROOF DRAINS HAVE LESS THAN 4-FEET OF COVER IN PAVED AREAS OR 3-FEET OF COVER IN LANDSCAPE AREAS, PROVIDE 3-INCH THICK INSULATION A MINIMUM OF 5-FEET IN WIDTH, CENTERED ON THE PIPE.
10. ALL STORM SEWER PIPE JOINTS SHALL BE WATER-TIGHT CONNECTIONS.
11. ALL STORM SEWER PIPE CONNECTIONS TO MANHOLES SHALL BE GASKETED AND WATER TIGHT. BOOTED COUPLERS AT THE STRUCTURE OR A WATER STOP WITH NON-SHRINK GROUT MAY BE USED IN ACCORDANCE WITH LOCAL CODES.
12. CONTRACTOR SHALL AIR TEST ALL STORM SEWER PIPE IN ACCORDANCE WITH LOCAL CODE REQUIREMENTS.



SEDIMENT FOREBAY W/ SPILLWAY DETAIL
N.T.S.

INFILTRATION BASIN W/ OUTLET CONTROL DETAIL
N.T.S.

NORTH

GRAPHIC SCALE IN FEET
0 15 30 60

MISS DIG 811

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STATE OF MICHIGAN
BRIAN GAMMON
ENGINEER
NO. 6201312404
PROFESSIONAL ENGINEER

Brian Gammon

KHA PROJECT	161262002
DATE	06/08/2026
SCALE	AS SHOWN
DESIGNED BY	JLL
DRAWN BY	EAS
CHECKED BY	BPG

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STORMWATER MANAGEMENT PLAN

SWAN BESS AND CYGNET BESS
PREPARED FOR
SWAN ENERGY STORAGE LLC AND CYGNET ENERGY STORGAGE LLC
COMSTOCK TOWNSHIP
MI

SHEET NUMBER
C510

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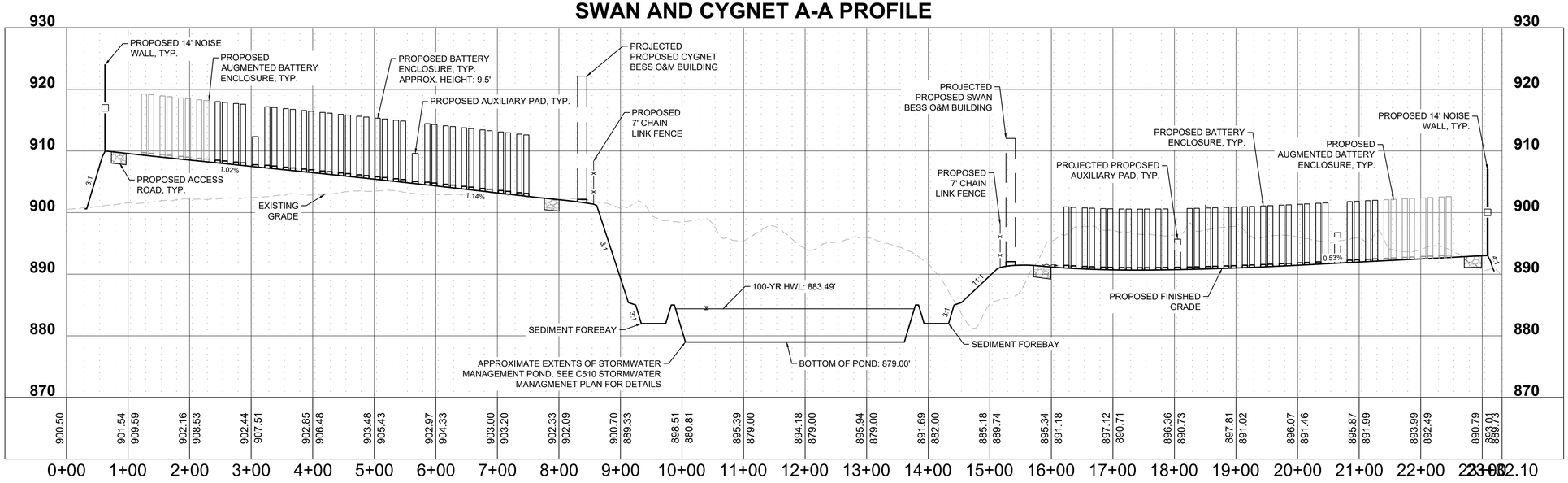
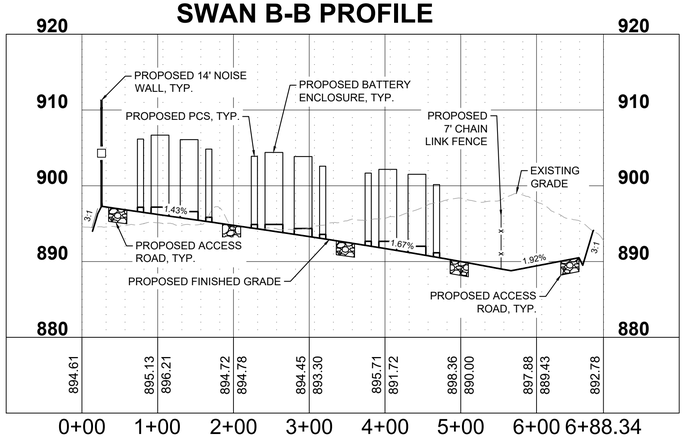
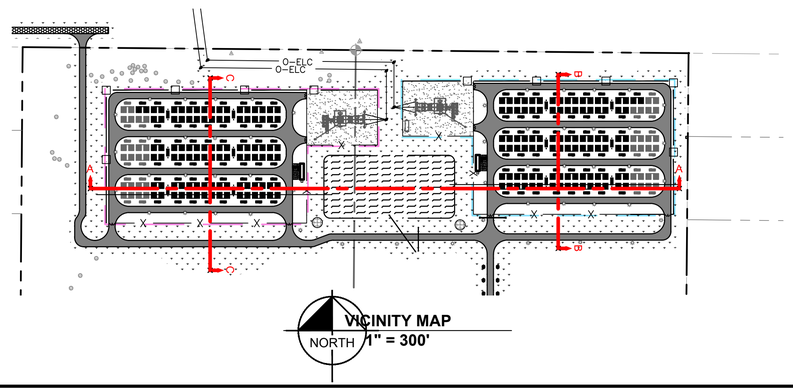
SWAN AND CYGNET A-A PROFILE



SWAN B-B PROFILE

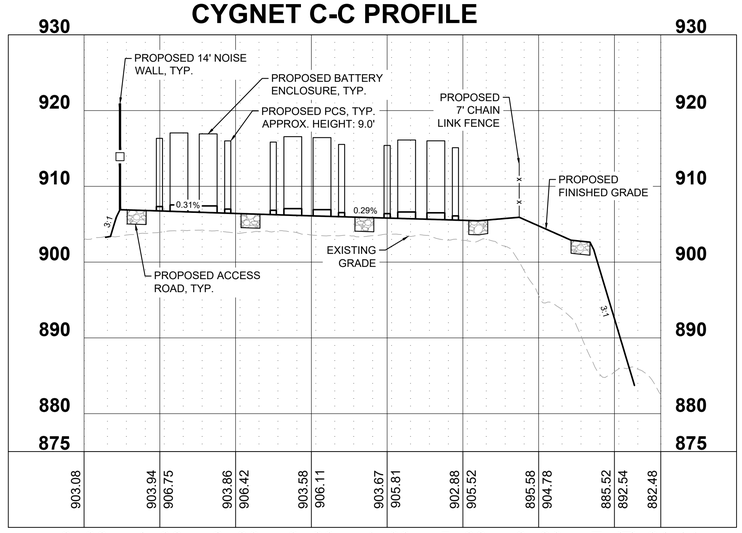




GRAPHIC SCALE IN FEET
0 50 100 200
HORIZONTAL

VERTICAL
20
10
5
0

CYGNET C-C PROFILE



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CIP
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STATE OF MICHIGAN BRIAN DAMON ENGINEER NO. 6201312904 PROFESSIONAL ENGINEER
Brian Gammon

KHA PROJECT 161282002			
DATE	06/08/2026		
SCALE	########	DESIGNED BY	JLL
		DRAWN BY	CJC
		CHECKED BY	BPG

SITE PROFILES

SWAN BESS AND CYGNET BESS MI
PREPARED FOR
SWAN ENERGY STORAGE LLC AND CYGNET ENERGY STORGAGE LLC
COMSTOCK TOWNSHIP

SHEET NUMBER
C520

MISS DIG 811

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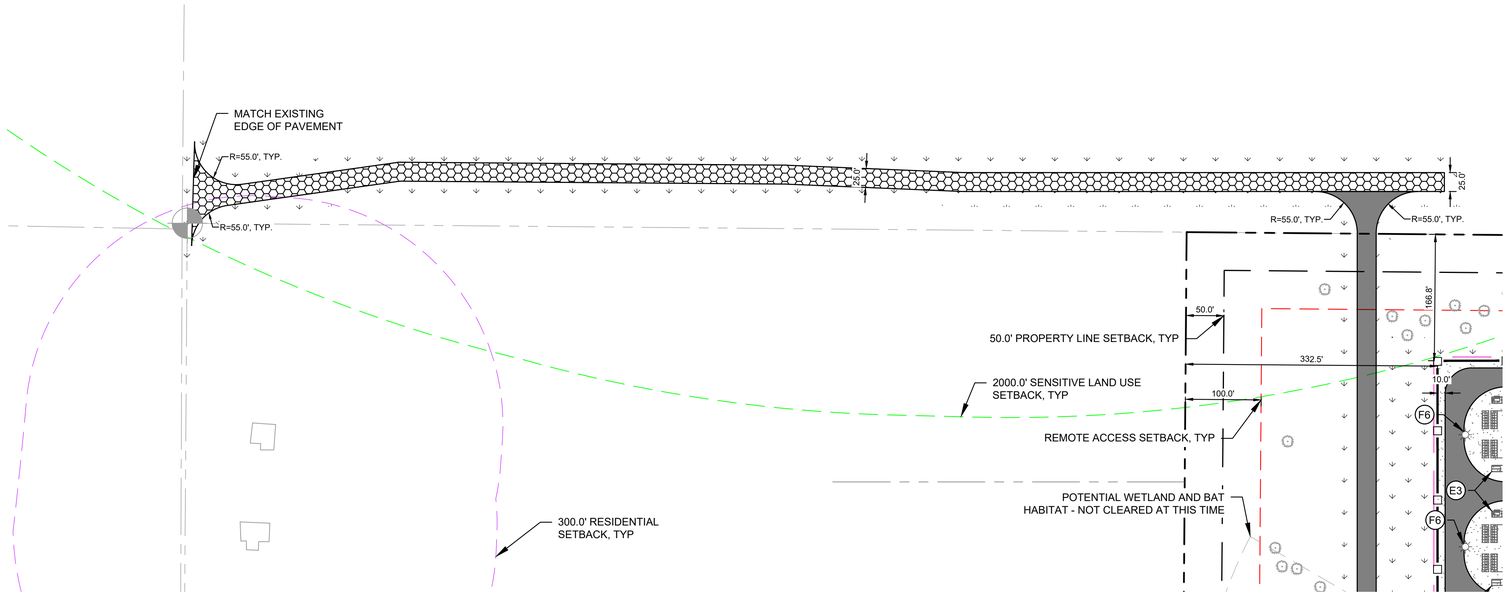

LEGEND

- PROPERTY BOUNDARY
- INTERNAL PARCEL PROPERTY LINE
- ADJACENT PARCEL PROPERTY LINE
- PROPERTY SETBACK LINE
- NFPA 855 REMOTE LOCATION SETBACK LINE
- SENSITIVE LAND USE SETBACK LINE
- OCCUPIED BUILDING SETBACK
- RIGHT-OF-WAY SETBACK
- EX. JURISDICTIONAL WETLAND (PER USSH)
- EX. MAN MADE POND (PER USSH)
- WETLAND SETBACK
- POTENTIAL WETLAND AND BAT HABITAT - SUBJECT TO TREE CLEARING REQUIREMENTS
- TREE LINE BOUNDARY
- PROPOSED SITE FENCE
- PROPOSED NOISE WALL
- PROPOSED GATE
- BATTERY ENCLOSURE
- BATTERY ENCLOSURE (AUGMENTED)
- PROPOSED ACCESS ROAD - COMPACTED AGGREGATE
- PROPOSED IMPROVED ACCESS ROAD
- PROPOSED LANDSCAPING, SEE LANDSCAPING PLANS
- BESS YARD ROCK, SIZE AND DEPTH TBD
- SUBSTATION YARD ROCK, SIZE AND DEPTH TBD
- CONCRETE PAVEMENT
- PROPOSED STORM WATER POND
- SWAN BESS LIMITS
- CYGNET BESS LIMITS
- FIRE WATER TANK
- LIGHT FIXTURE
- EXISTING TREE

KEYNOTE LEGEND

EQUIPMENT

- (E1) BATTERY ENCLOSURE
- (E2) PCS
- (E3) FUTURE AUGMENTATION BATTERY ENCLOSURE
- (E4) FUTURE AUGMENTATION PCS
- (E5) AUXILIARY PAD
- (E6) SUBSTATION ENCLOSURE, BY OTHERS

CURB, SIDEWALK & PAVEMENT

- (C1) ACCESS ROAD
- (C2) CONCRETE PAVEMENT

SITE FIXTURES

- (F1) 6' CHAIN-LINK FENCE WITH 1' BARBED WIRE - SEE DETAIL 1, SHEET C700
- (F2) CHAIN-LINK FENCE SWING GATE - SEE DETAIL 2, SHEET C700
- (F3) STORMWATER MANAGEMENT AREA
- (F4) 30,000 GALLON WATER TANK, BY OTHERS
- (F5) 14' NOISE WALL - SEE DETAIL 3, SHEET C700
- (F6) LIGHT FIXTURE

PAVEMENT MARKINGS

- (P1) ACCESSIBLE PARKING SYMBOL & LOADING AREA - SEE DETAIL 4, SHEET C701
- (P2) STRIPED WHITE CROSS-HATCH AREA 4" SOLID LINES @ 45° 2' O.C.
- (P3) 4" WIDE WHITE PAINTED SOLID PARKING LOT LINE

SIGNAGE

- (S1) ADA PARKING SIGN IN BOLLARD - SEE DETAIL 1, SHEET C701

NORTH

GRAPHIC SCALE IN FEET
0 ## ### ###

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STATE OF MICHIGAN
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NO. 6201312454
PROFESSIONAL ENGINEER

Brian Gammon

KHA PROJECT	161262002
DATE	06/08/2026
SCALE	AS SHOWN
DESIGNED BY	JLL
DRAWN BY	EAS
CHECKED BY	BPG

OFFSITE ROAD IMPROVEMENT PLAN

SWAN BESS AND CYGNET BESS
PREPARED FOR
SWAN ENERGY STORAGE LLC AND CYGNET ENERGY STORGAGE LLC
COMSTOCK TOWNSHIP
MI

SHEET NUMBER
C530

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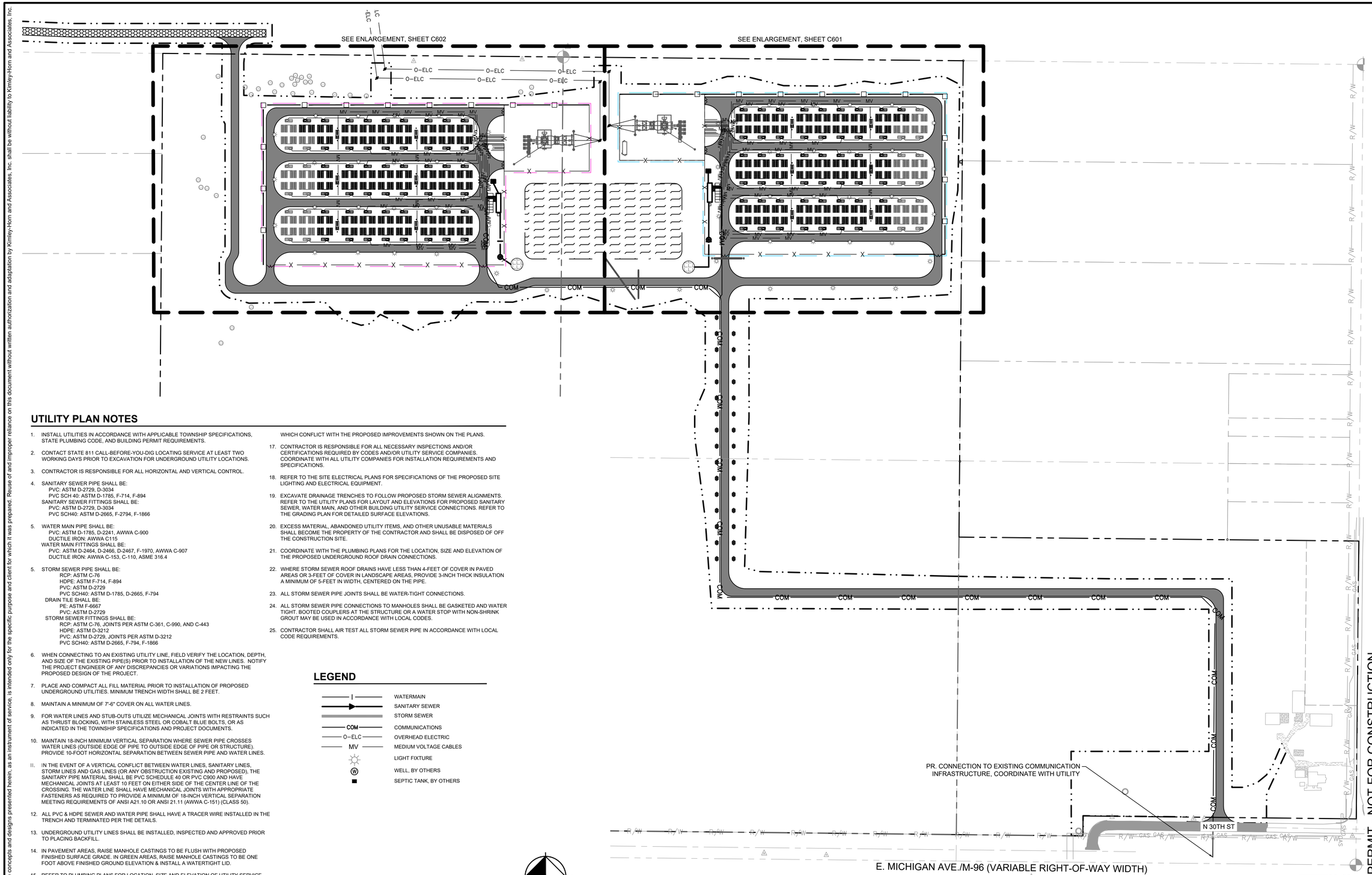

UTILITY PLAN NOTES

1. INSTALL UTILITIES IN ACCORDANCE WITH APPLICABLE TOWNSHIP SPECIFICATIONS, STATE PLUMBING CODE, AND BUILDING PERMIT REQUIREMENTS.
2. CONTACT STATE 811 CALL-BEFORE-YOU-DIG LOCATING SERVICE AT LEAST TWO WORKING DAYS PRIOR TO EXCAVATION FOR UNDERGROUND UTILITY LOCATIONS.
3. CONTRACTOR IS RESPONSIBLE FOR ALL HORIZONTAL AND VERTICAL CONTROL.
4. SANITARY SEWER PIPE SHALL BE:
   PVC: ASTM D-2729, D-3034
   PVC SCH 40: ASTM D-1785, F-714, F-894
   SANITARY SEWER FITTINGS SHALL BE:
   PVC: ASTM D-2729, D-3034
   PVC SCH40: ASTM D-2665, F-2794, F-1866
5. WATER MAIN PIPE SHALL BE:
   PVC: ASTM D-1785, D-2241, AWWA C-900
   DUCTILE IRON: AWWA C115
   WATER MAIN FITTINGS SHALL BE:
   PVC: ASTM D-2464, D-2466, D-2467, F-1970, AWWA C-907
   DUCTILE IRON: AWWA C-153, C-110, ASME 316.4
5. STORM SEWER PIPE SHALL BE:
   RCP: ASTM C-76
   HDPE: ASTM F-714, F-894
   PVC: ASTM D-2729
   PVC SCH40: ASTM D-1785, D-2665, F-794
   DRAIN TILE SHALL BE:
   PE: ASTM F-6667
   PVC: ASTM D-2729
   STORM SEWER FITTINGS SHALL BE:
   RCP: ASTM C-76, JOINTS PER ASTM C-361, C-990, AND C-443
   HDPE: ASTM D-3212
   PVC: ASTM D-2729, JOINTS PER ASTM D-3212
   PVC SCH40: ASTM D-2665, F-794, F-1866
6. WHEN CONNECTING TO AN EXISTING UTILITY LINE, FIELD VERIFY THE LOCATION, DEPTH, AND SIZE OF THE EXISTING PIPE(S) PRIOR TO INSTALLATION OF THE NEW LINES. NOTIFY THE PROJECT ENGINEER OF ANY DISCREPANCIES OR VARIATIONS IMPACTING THE PROPOSED DESIGN OF THE PROJECT.
7. PLACE AND COMPACT ALL FILL MATERIAL PRIOR TO INSTALLATION OF PROPOSED UNDERGROUND UTILITIES. MINIMUM TRENCH WIDTH SHALL BE 2 FEET.
8. MAINTAIN A MINIMUM OF 7'-6" COVER ON ALL WATER LINES.
9. FOR WATER LINES AND STUB-OUTS UTILIZE MECHANICAL JOINTS WITH RESTRAINTS SUCH AS THRUST BLOCKING, WITH STAINLESS STEEL OR COBALT BLUE BOLTS, OR AS INDICATED IN THE TOWNSHIP SPECIFICATIONS AND PROJECT DOCUMENTS.
10. MAINTAIN 18-INCH MINIMUM VERTICAL SEPARATION WHERE SEWER PIPE CROSSES WATER LINES (OUTSIDE EDGE OF PIPE TO OUTSIDE EDGE OF PIPE OR STRUCTURE). PROVIDE 10-FOOT HORIZONTAL SEPARATION BETWEEN SEWER PIPE AND WATER LINES.
11. IN THE EVENT OF A VERTICAL CONFLICT BETWEEN WATER LINES, SANITARY LINES, STORM LINES AND GAS LINES (OR ANY OBSTRUCTION EXISTING AND PROPOSED), THE SANITARY PIPE MATERIAL SHALL BE PVC SCHEDULE 40 OR PVC C900 AND HAVE MECHANICAL JOINTS AT LEAST 10 FEET ON EITHER SIDE OF THE CENTER LINE OF THE CROSSING. THE WATER LINE SHALL HAVE MECHANICAL JOINTS WITH APPROPRIATE FASTENERS AS REQUIRED TO PROVIDE A MINIMUM OF 18-INCH VERTICAL SEPARATION MEETING REQUIREMENTS OF ANSI A21.10 OR ANSI 21.11 (AWWA C-151) (CLASS 50).
12. ALL PVC & HDPE SEWER AND WATER PIPE SHALL HAVE A TRACER WIRE INSTALLED IN THE TRENCH AND TERMINATED PER THE DETAILS.
13. UNDERGROUND UTILITY LINES SHALL BE INSTALLED, INSPECTED AND APPROVED PRIOR TO PLACING BACKFILL.
14. IN PAVEMENT AREAS, RAISE MANHOLE CASTINGS TO BE FLUSH WITH PROPOSED FINISHED SURFACE GRADE. IN GREEN AREAS, RAISE MANHOLE CASTINGS TO BE ONE FOOT ABOVE FINISHED GROUND ELEVATION & INSTALL A WATERTIGHT LID.
15. REFER TO PLUMBING PLANS FOR LOCATION, SIZE AND ELEVATION OF UTILITY SERVICE CONNECTIONS AND ROOF DRAINS TO THE INTERIOR BUILDING SYSTEMS. BACKFLOW DEVICES (DDCV AND PRZ ASSEMBLIES) & METERS ARE LOCATED INSIDE THE BUILDING.
16. CONTRACTOR IS SPECIFICALLY CAUTIONED THAT THE LOCATION AND/OR ELEVATION OF EXISTING UTILITIES AS SHOWN ON THESE PLANS IS BASED ON RECORDS OF THE VARIOUS UTILITY COMPANIES, AND WHERE POSSIBLE, MEASUREMENTS TAKEN IN THE FIELD. THE INFORMATION IS NOT TO BE RELIED ON AS BEING EXACT OR COMPLETE. THE CONTRACTOR MUST CALL THE APPROPRIATE UTILITY COMPANIES AT LEAST 72 HOURS BEFORE ANY EXCAVATION TO REQUEST EXACT FIELD LOCATION OF UTILITIES. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO RELOCATE ALL EXISTING UTILITIES WHICH CONFLICT WITH THE PROPOSED IMPROVEMENTS SHOWN ON THE PLANS.
17. CONTRACTOR IS RESPONSIBLE FOR ALL NECESSARY INSPECTIONS AND/OR CERTIFICATIONS REQUIRED BY CODES AND/OR UTILITY SERVICE COMPANIES. COORDINATE WITH ALL UTILITY COMPANIES FOR INSTALLATION REQUIREMENTS AND SPECIFICATIONS.
18. REFER TO THE SITE ELECTRICAL PLANS FOR SPECIFICATIONS OF THE PROPOSED SITE LIGHTING AND ELECTRICAL EQUIPMENT.
19. EXCAVATE DRAINAGE TRENCHES TO FOLLOW PROPOSED STORM SEWER ALIGNMENTS. REFER TO THE UTILITY PLANS FOR LAYOUT AND ELEVATIONS FOR PROPOSED SANITARY SEWER, WATER MAIN, AND OTHER BUILDING UTILITY SERVICE CONNECTIONS. REFER TO THE GRADING PLAN FOR DETAILED SURFACE ELEVATIONS.
20. EXCESS MATERIAL, ABANDONED UTILITY ITEMS, AND OTHER UNUSABLE MATERIALS SHALL BECOME THE PROPERTY OF THE CONTRACTOR AND SHALL BE DISPOSED OF OFF THE CONSTRUCTION SITE.
21. COORDINATE WITH THE PLUMBING PLANS FOR THE LOCATION, SIZE AND ELEVATION OF THE PROPOSED UNDERGROUND ROOF DRAIN CONNECTIONS.
22. WHERE STORM SEWER ROOF DRAINS HAVE LESS THAN 4-FEET OF COVER IN PAVED AREAS OR 3-FEET OF COVER IN LANDSCAPE AREAS, PROVIDE 3-INCH THICK INSULATION A MINIMUM OF 5-FEET IN WIDTH, CENTERED ON THE PIPE.
23. ALL STORM SEWER PIPE JOINTS SHALL BE WATER-TIGHT CONNECTIONS.
24. ALL STORM SEWER PIPE CONNECTIONS TO MANHOLES SHALL BE GASKETED AND WATER TIGHT. BOOTED COUPLERS AT THE STRUCTURE OR A WATER STOP WITH NON-SHRINK GROUT MAY BE USED IN ACCORDANCE WITH LOCAL CODES.
25. CONTRACTOR SHALL AIR TEST ALL STORM SEWER PIPE IN ACCORDANCE WITH LOCAL CODE REQUIREMENTS.

LEGEND

- WATERMAIN
- SANITARY SEWER
- STORM SEWER
- COMMUNICATIONS
- OVERHEAD ELECTRIC
- MEDIUM VOLTAGE CABLES
- LIGHT FIXTURE
- WELL, BY OTHERS
- SEPTIC TANK, BY OTHERS

NORTH

GRAPHIC SCALE IN FEET
0 75 150 300

No.	REVISIONS	DATE	BY
1	ENTITLEMENT SET	06/08/2026	BPG

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(312) 726 9445

CIP
Copenhagen Infrastructure Partners

STATE OF MICHIGAN
BRIAN GAMMON
ENGINEER
6201212454
PROFESSIONAL ENGINEER

Brian Gammon

KHA PROJECT 161262002
DATE 06/08/2026
SCALE AS SHOWN
DESIGNED BY JLL
DRAWN BY CJC
CHECKED BY BPG

ISSUED FOR PERMIT - NOT FOR CONSTRUCTION

OVERALL UTILITY PLAN

SWAN BESS AND CYGNET BESS
PREPARED FOR
SWAN ENERGY STORAGE LLC AND CYGNET ENERGY STORGAGE LLC
COMSTOCK TOWNSHIP
MI

SHEET NUMBER
C600

MISS DIG 811

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LEGEND

- WATERMAIN
- SANITARY SEWER
- TELEPHONE
- OVERHEAD ELECTRIC
- MEDIUM VOLTAGE CABLES
- LIGHT FIXTURE
- WELL, BY OTHERS
- SEPTIC TANK, BY OTHERS

PR. UTILITY POLE, TYP, BY OTHERS

PR. SINGLE LIGHT FIXTURE, TYP.

PR. SINGLE LIGHT FIXTURE

PR. SINGLE LIGHT FIXTURE

PR. SEPTIC FIELD, BY OTHERS

PR. 4" PVC SANITARY SEWER LINE

PR. 2" DOMESTIC WATER SERVICE

PR. WELL, BY OTHERS

UTILITY CROSSING. MAINTAIN MIN 18" VERTICAL CLEARANCE

PR. SINGLE LIGHT FIXTURE

PR. 30,000 GALLON WATER STORAGE TANK, BY OTHERS

NORTH

GRAPHIC SCALE IN FEET
0 25 50 100

MISS DIG 811

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(312) 726 9445

CIP Copenhagen Infrastructure Partners

STATE OF MICHIGAN — BRIAN GAMMON — ENGINEER — 6201372404 — PROFESSIONAL ENGINEER

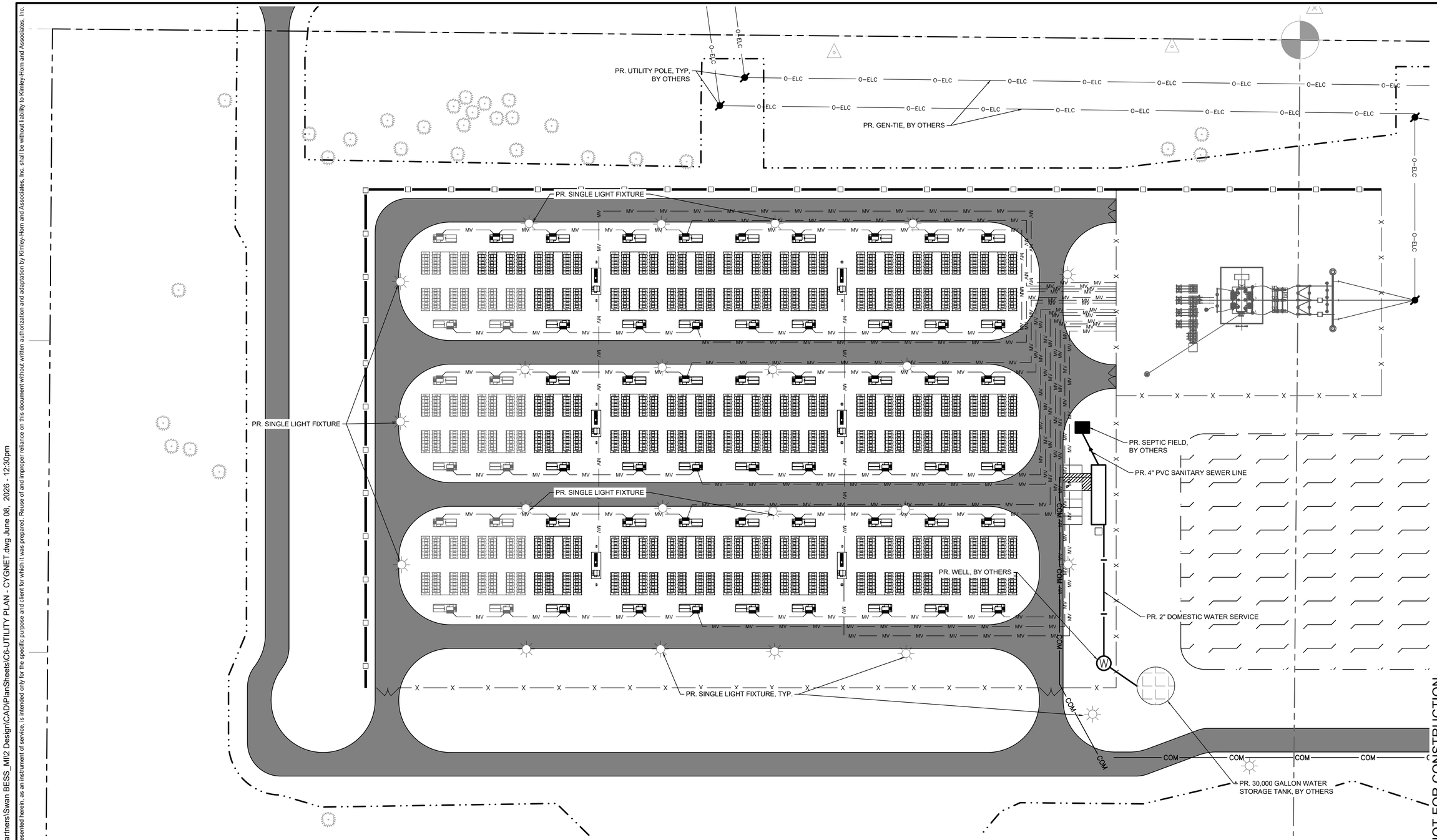
Brian Gammon

KHA PROJECT 161262002
DATE 06/08/2026
SCALE AS SHOWN
DESIGNED BY JLL
DRAWN BY CJC
CHECKED BY BPG

UTILITY PLAN ENLARGEMENT

SWAN BESS AND CYGNET BESS
PREPARED FOR
SWAN ENERGY STORAGE LLC AND CYGNET ENERGY STORGAGE LLC
COMSTOCK TOWNSHIP
MI

SHEET NUMBER
C601



LEGEND

- WATERMAIN
- SANITARY SEWER
- STORM SEWER
- COM — TELEPHONE
- O-ELC — OVERHEAD ELECTRIC
- MV — MEDIUM VOLTAGE CABLES
- LIGHT FIXTURE
- (W) — WELL, BY OTHERS
- ■ — SEPTIC TANK, BY OTHERS

NORTH

GRAPHIC SCALE IN FEET
0 25 50 100

MISS DIG 811

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CIP
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STATE OF MICHIGAN
BRIAN GAMMON
ENGINEER
6201312404
PROFESSIONAL ENGINEER

Brian Gammon

KHA PROJECT	161262002
DATE	06/08/2026
SCALE	AS SHOWN
DESIGNED BY	JLL
DRAWN BY	CJC
CHECKED BY	BPG

UTILITY PLAN ENLARGEMENT

SWAN BESS AND CYGNET BESS

PREPARED FOR
SWAN ENERGY STORAGE LLC AND
CYGNET ENERGY STORGAGE LLC
COMSTOCK
TOWNSHIP
MI

SHEET NUMBER
C602

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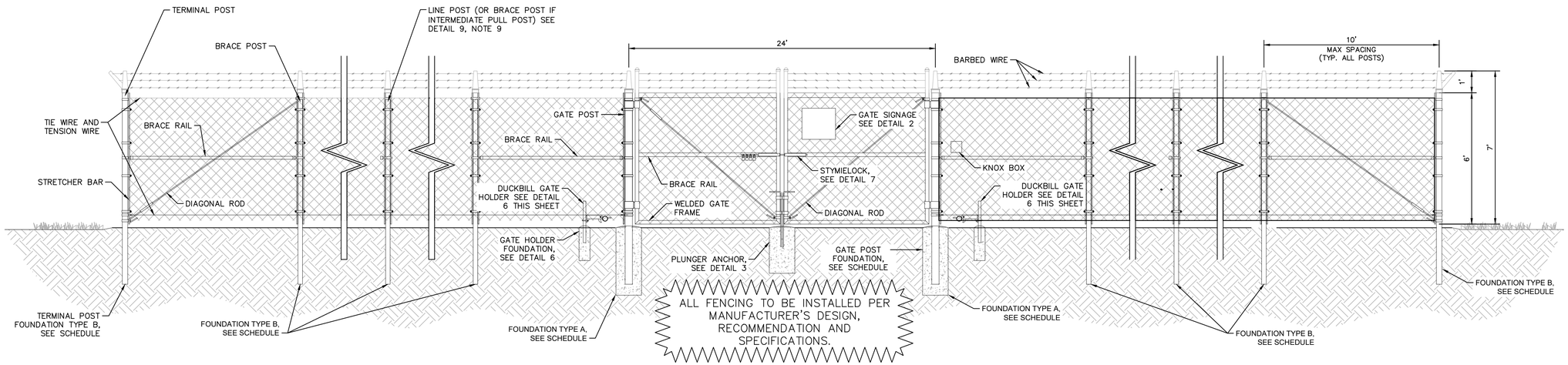
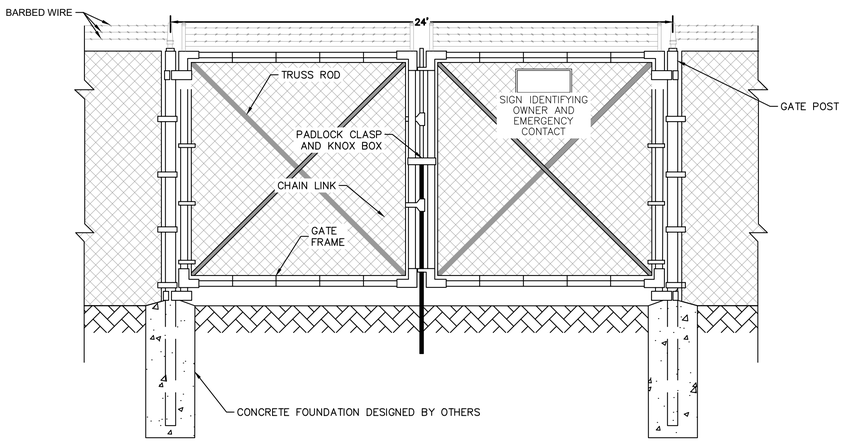


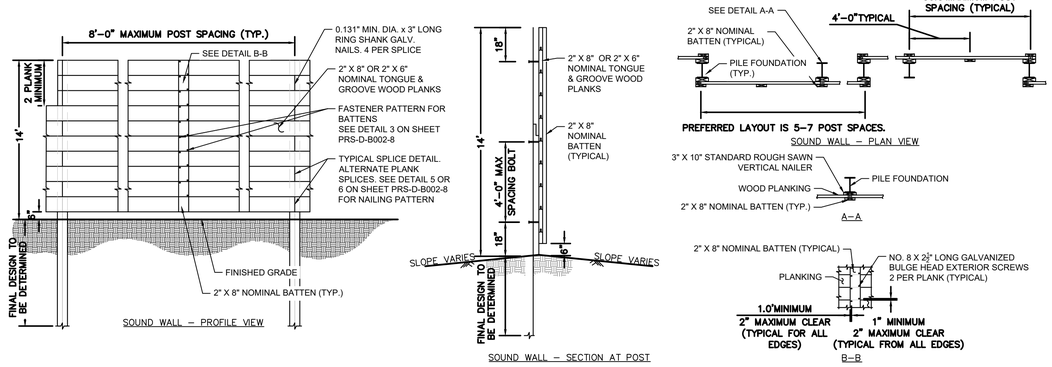
1 CHAIN LINK FENCE - BARBED WIRE DETAIL

NO SCALE



2 DOUBLE SWING GATE DETAIL WITH BARBED WIRE

NO SCALE



3 SOUND WALL - FOR REFERENCE ONLY

NO SCALE

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STATE OF MICHIGAN BRIAN GAMMON ENGINEER NO. 6201372903 LICENSED PROFESSIONAL ENGINEER
Brian Gammon

KHA PROJECT	161262002
DATE	06/08/2026
SCALE	AS SHOWN
DESIGNED BY	JLL
DRAWN BY	CJC
CHECKED BY	BPG

CIVIL DETAILS

ISSUED FOR PERMIT - NOT FOR CONSTRUCTION

SWAN BESS AND CYGNET BESS
PREPARED FOR
SWAN ENERGY STORAGE LLC AND CYGNET ENERGY STORGAGE LLC
COMSTOCK TOWNSHIP
MI

SHEET NUMBER
C700

MISS DIG 811

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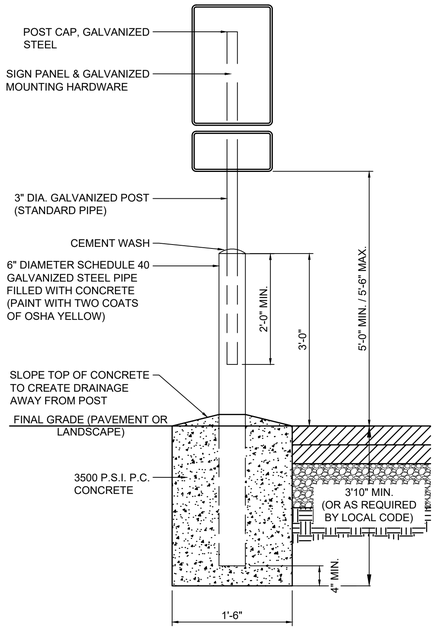
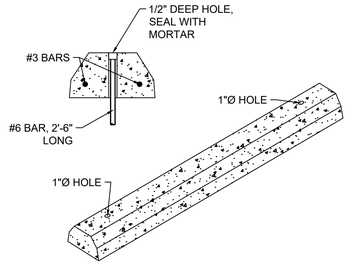


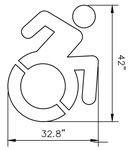
1 ACCESSIBLE PARKING SIGN IN BOLLARD

NO SCALE



2 PRECAST WHEEL STOP

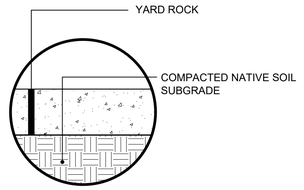
NO SCALE



3 ACCESSIBLE PARKING SYMBOL

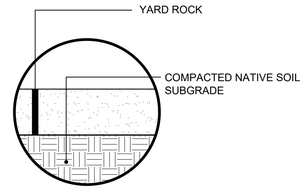
NO SCALE

PAVEMENT SECTIONS SHOWN ARE PROVIDED AS A REFERENCE ONLY. REFER TO GEOTECHNICAL REPORT FOR ALL PAVEMENT, SUBGRADE PREPARATION AND COMPACTION REQUIREMENTS.



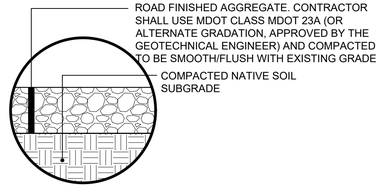
7 CONCRETE PAVEMENT

NO SCALE



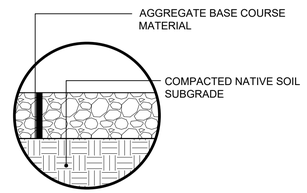
8 BESS YARD SECTION (REFER TO ELECTRICAL PLANS)

NO SCALE



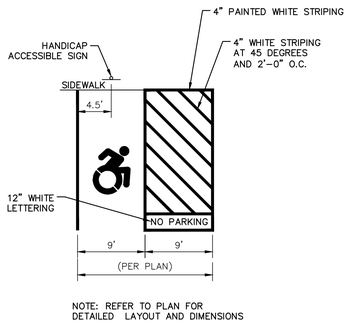
9 ACCESS ROAD PAVEMENT SECTION

SCALE: NTS



10 TEMPORARY LAYDOWN AREA SECTION

NO SCALE



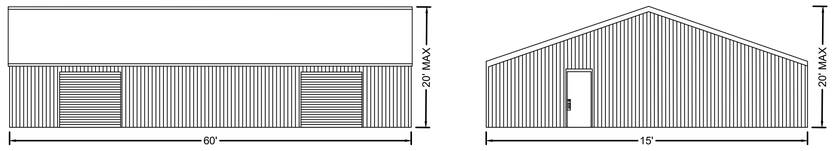
4 TYPICAL HANDICAP STRIPING

NO SCALE



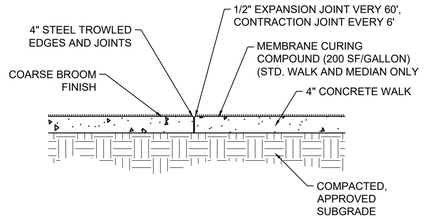
5 HP-3-1218 ADA PARKING SIGN

NO SCALE



6 OPERATIONS & MAINTENANCE BUILDING - FOR REFERENCE ONLY

NO SCALE



NOTES:

1. ALL EXCAVATION, COMPACTION AND BACKFILL INCIDENTAL TO UNIT PRICE BID FOR 4" SIDEWALK

11 CONCRETE SIDEWALK

NO SCALE

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STATE OF MICHIGAN — BRIAN GAMMON — ENGINEER — NO. 6201312904 — LICENSED PROFESSIONAL ENGINEER

Brian Gammon

KHA PROJECT	161262002
DATE	06/08/2026
SCALE	AS SHOWN
DESIGNED BY	JLL
DRAWN BY	EAS
CHECKED BY	BPG

ISSUED FOR PERMIT - NOT FOR CONSTRUCTION

CIVIL DETAILS

SWAN BESS AND CYGNET BESS
PREPARED FOR
SWAN ENERGY STORAGE LLC AND CYGNET ENERGY STORAGE LLC
COMSTOCK TOWNSHIP
MI

SHEET NUMBER
C701

MISS DIG 811

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14"

DANGER

HIGH VOLTAGE

UNAUTHORIZED PERSONNEL

KEEP OUT

10"

LOCATION(S): SIGN SHALL BE ATTACHED TO BESS SYSTEM FENCE LINE AT MINIMUM 100FT INTERVALS AND AT GATES
APPEARANCE: BLACK TEXT ON WHITE BACKGROUND WITH WHITE "DANGER" TEXT ON RED BACKGROUND

14"

DANGER

HIGH VOLTAGE FACILITIES

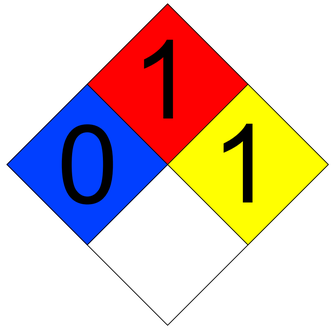
IN CASE OF EMERGENCY OR FOR INFORMATION REGARDING THIS GRID STORAGE SYSTEM

CONTACT <INSERT PROJECT OPERATOR> XXX-XXX-XXXX

10"

LOCATION(S): SIGN SHALL BE ATTACHED TO SUBSTATION POINT OF ENTRY

APPEARANCE: BLACK TEXT ON WHITE BACKGROUND WITH WHITE "DANGER" TEXT ON RED BACKGROUND



NFPA 704 LABEL

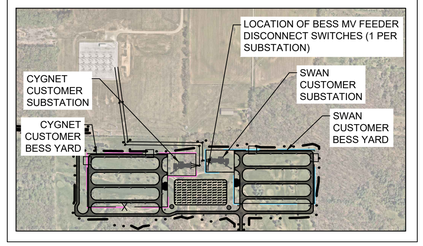
PLACE AT GATE TO BATTERY ENERGY STORAGE SYSTEM AREA

GENERAL NOTES:

1. PLACARDS AND LABELS SHALL BE APPLIED TO THE APPROPRIATE COMPONENTS IN ACCORDANCE WITH NEC.
2. COMPONENTS IN BATTERY CONTAINERS ARE SUPPLIED FROM THE MANUFACTURER WITH MARKINGS PRE-APPLIED TO MEET THE REQUIREMENTS OF NEC.
3. MARKING IDENTIFIED AS PLACARDS WILL BE ETCHED WITH WHITE GRAPHICS ONTO 1/16" PLASTIC PLACARDS WITH COLORS AS SHOWN. THE PLACARDS WILL BE ATTACHED MECHANICALLY OR WITH DOUBLE-SIDED ADHESIVE TO THE APPROPRIATE COMPONENT ENCLOSURES IN RELEVANT AND CONSPICUOUS LOCATIONS.
4. MARKS IDENTIFIED AS LABELS WILL BE ADHESIVE VINYL LABELS. THOSE SHOWN AS RED SHALL BE REFLECTIVE RED VINYL WITH WHITE LETTERING; THOSE SHOWN AS ORANGE SHALL HAVE AN ORANGE "WARNING" HEADER WITH WHITE BODY AND BLACK TEXT.
5. MARKINGS IDENTIFIED AS SIGNS SHALL BE METAL OR UV-RESISTANT PLASTIC SUITABLE FOR THE EXTERIOR ENVIRONMENT.

WARNING:

MULTIPLE POWER SOURCES CONNECTED TO THIS SERVICE WITH DISCONNECTS AS SHOWN:



LOCATION(S): IDENTIFICATION PLACARD SHALL BE LOCATED AT THE CUSTOMER BESS YARD

APPEARANCE: WHITE TEXT ON RED BACKGROUND

5"

WARNING

ARC FLASH AND SHOCK HAZARD
APPROPRIATE PPE REQUIRED.

FAILURE TO COMPLY
CAN RESULT IN DEATH OR INJURY.

3"

1/4"

LOCATION(S): SIGN SHALL BE PLACED ON DC AND AC ELECTRICAL EQUIPMENT, INCLUDING DISCONNECTS, INVERTERS, PANELBOARDS, METERS, ETC. UNLESS SUCH WORDS ALREADY EXIST.

APPEARANCE: BLACK TEXT ON WHITE BACKGROUND WITH BLACK "WARNING" TEXT ON ORANGE BACKGROUND

5"

WARNING

ELECTRIC SHOCK HAZARD.
DO NOT TOUCH TERMINALS.
TERMINALS ON BOTH THE LINE AND LOAD SIDES MAY BE ENERGIZED IN THE OPEN POSITION

3"

1/4"

LOCATION(S): SIGN SHALL BE PLACED ON DC AND AC ELECTRICAL EQUIPMENT UNLESS SUCH WORDS ALREADY EXIST. EQUIPMENT RADIALLY FED (IE. AUXILIARY AND CONTROL CIRCUITS) DO NOT REQUIRE THIS LABEL.
APPEARANCE: BLACK TEXT ON WHITE BACKGROUND WITH BLACK "WARNING" TEXT ON ORANGE BACKGROUND

AUXILIARY TRANSFORMER UNIT

AUXTX-10B-0X

WARNING:
ARC FLASH AND SHOCK HAZARD.
APPROPRIATE PPE REQUIRED.
FAILURE TO COMPLY CAN RESULT IN DEATH OR INJURY.

AUXILIARY TRANSFORMER UNIT

AUXTX-22C-0X

WARNING:
ARC FLASH AND SHOCK HAZARD.
APPROPRIATE PPE REQUIRED.
FAILURE TO COMPLY CAN RESULT IN DEATH OR INJURY.

LOCATION(S): PLACARD SHALL BE APPLIED TO EACH AUXILIARY TRANSFORMER
APPEARANCE: WHITE TEXT ON RED BACKGROUND

AUXSWB-10B-0X

OPERATING CURRENT: XXXX.XA
OPERATING VOLTAGE: 480V

AUXSWB-22C-0X

OPERATING CURRENT: XXXX.XA
OPERATING VOLTAGE: 480V

WHITE TEXT ON RED BACKGROUND. TEXT HEIGHT: 3/8" MIN.
PLACE ON AC COLLECTOR SWITCHBOARD

MEDIUM VOLTAGE SYSTEM

INV10XX-XX

AUTHORIZED PERSONNEL ONLY

WARNING! ELECTRICAL SHOCK HAZARD
DO NOT TOUCH TERMINALS
TERMINALS ON BOTH LINE & LOAD SIDES
MAY BE ENERGIZED IN OPEN POSITION

THIS UNIT IS FED BY MULTIPLE SOURCES:
THE UTILITY AND THE
BATTERY ENERGY STORAGE SYSTEM

MEDIUM VOLTAGE SYSTEM

INV11XX-XX

AUTHORIZED PERSONNEL ONLY

WARNING! ELECTRICAL SHOCK HAZARD
DO NOT TOUCH TERMINALS
TERMINALS ON BOTH LINE & LOAD SIDES
MAY BE ENERGIZED IN OPEN POSITION

THIS UNIT IS FED BY MULTIPLE SOURCES:
THE UTILITY AND THE
BATTERY ENERGY STORAGE SYSTEM

MEDIUM VOLTAGE SYSTEM

INV22XX-XX

AUTHORIZED PERSONNEL ONLY

WARNING! ELECTRICAL SHOCK HAZARD
DO NOT TOUCH TERMINALS
TERMINALS ON BOTH LINE & LOAD SIDES
MAY BE ENERGIZED IN OPEN POSITION

THIS UNIT IS FED BY MULTIPLE SOURCES:
THE UTILITY AND THE
BATTERY ENERGY STORAGE SYSTEM

LOCATION(S): IDENTIFICATION LABEL SHALL BE APPLIED TO DC CABINET OF POWER CONVERSION SYSTEM ENCLOSURE.
APPEARANCE: WHITE TEXT ON RED BACKGROUND

ENERGY STORAGE CABINET

CON10XX-XX-A-XX

AUTHORIZED PERSONNEL ONLY

WARNING! ELECTRICAL SHOCK HAZARD
DO NOT TOUCH TERMINALS
TERMINALS ON BOTH LINE & LOAD SIDES
MAY BE ENERGIZED IN OPEN POSITION

THIS UNIT IS FED FROM MEDIUM VOLTAGE TRANSFORMER

ENERGY STORAGE CABINET

CON11XX-XX-A-XX

AUTHORIZED PERSONNEL ONLY

WARNING! ELECTRICAL SHOCK HAZARD
DO NOT TOUCH TERMINALS
TERMINALS ON BOTH LINE & LOAD SIDES
MAY BE ENERGIZED IN OPEN POSITION

THIS UNIT IS FED FROM MEDIUM VOLTAGE TRANSFORMER

ENERGY STORAGE CABINET

CON22XX-XX-A-XX

AUTHORIZED PERSONNEL ONLY

WARNING! ELECTRICAL SHOCK HAZARD
DO NOT TOUCH TERMINALS
TERMINALS ON BOTH LINE & LOAD SIDES
MAY BE ENERGIZED IN OPEN POSITION

THIS UNIT IS FED FROM MEDIUM VOLTAGE TRANSFORMER

LOCATION(S): PLACARD SHALL BE APPLIED TO EACH BESS CONTAINER
APPEARANCE: WHITE TEXT ON RED BACKGROUND

No.	REVISIONS	DATE	BY
1	ENTITLEMENT SET	06/08/2026	BPG

Kimley»Horn of Michigan, Inc.
© 2026 KIMLEY-HORN OF MICHIGAN
3000 TOWN CENTER, SUITE 2600
SOUTHFIELD, MI 48075
(312) 726 9445

CIP
Copenhagen Infrastructure Partners

STATE OF MICHIGAN
BRIAN GAMMON
ENGINEER
NO. E0013129OA
LICENSED PROFESSIONAL ENGINEER

Brian Gammon

KHA PROJECT	161262002
DATE	06/08/2026
SCALE	AS SHOWN
DESIGNED BY	JLL
DRAWN BY	EAS
CHECKED BY	BPG

ISSUED FOR PERMIT - NOT FOR CONSTRUCTION

SIGNAGE DETAILS

SWAN BESS AND CYGNET BESS
PREPARED FOR
SWAN ENERGY STORAGE LLC AND CYGNET ENERGY STORAGE LLC
COMSTOCK TOWNSHIP
MI

SHEET NUMBER
C800

MISS DIG 811

K:\TCW_LDEV\Copenhagen Infrastructure Partners\Swan BESS_MI\2 Design\CAD\PlanSheets\C8-SIGNAGE PLAN.dwg June 08, 2026 - 12:30pm
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2' - 0"

1' - 6"

NO TRESPASSING

Private property.
Unauthorized entry prohibited.
Violators will be prosecuted under Michigan Compiled Laws §750.552 (TRESPASS).

1

2' - 0"

1' - 6"

PELIGRO
PROHIBIDO EL PASO

Alto voltaje puede causar la muerte.
Prohibida la entrada no autorizada - infractores seran procesados.

En caso de EMERGENCIA llamar
XXX-XXX-XXXX

2

2' - 0"

1' - 6"

WARNING

THESE FACILITIES ARE MONITORED BY VIDEO & ELECTRONIC SECURITY EQUIPMENT

3

2' - 0"

1' - 6"

DANGER

High Voltage.

KEEP OUT

4

2' – 0"

1' – 6"

DANGER

Lithium-ion Batteries. Fire and Explosion Risk.

Do NOT open doors without ROCC authorization
XXX-XXX-XXXX

5

2' - 0"

1' - 6"

XXXX ENERGY STORAGE LLC

COMSTOCK
TOWNSHIP, MI 49041

6

2' - 0"

1' - 6"

NOTICE

IN CASE OF EMERGENCY
CALL
XXX-XXX-XXXX

7

2' - 0"

1' - 6"

WARNING

ANYONE DAMAGING, VANDALIZING, OR INTERFERING WITH THE OPERATION OF THIS FACILITY IS IN VIOLATION OF TITLE 18, UNITED STATES CODE SECTION 1366 AND PUNISHABLE BY 10 YEARS IMPRISONMENT and $50,000 FINE.

8

1 ' - 6"

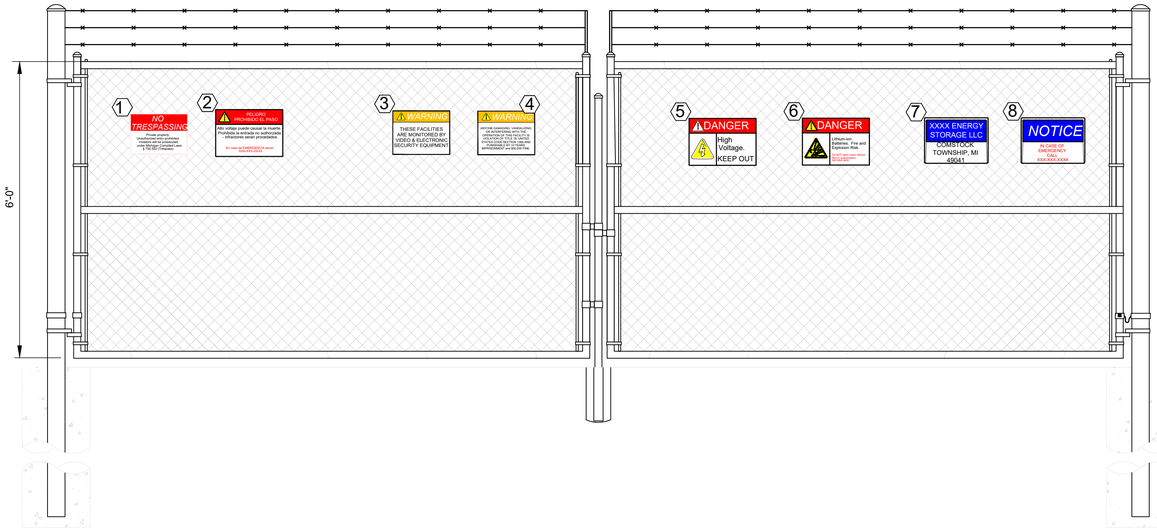
1' - 0"

DANGER

Alarm indicates fire system is Active. Lithium-ion Batteries. Fire and Explosion Risk.

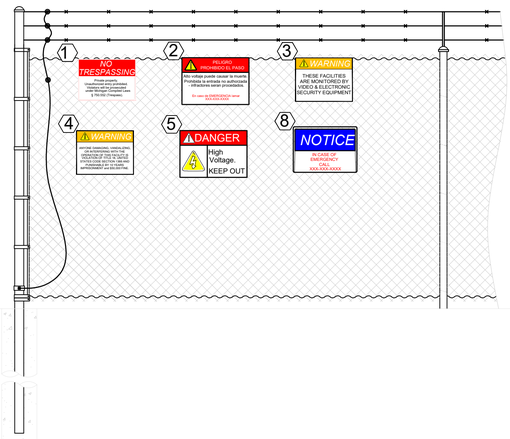
Do NOT open door without ROCC authorization XXX-XXX-XXXX

9



1 VEHICLE GATE FENCE

Scale: N.T.S.



2 CORNER POST FENCE

Scale: N.T.S.

NOTES:

1. THE SIGN DESIGNER OR INSTALLER SHALL ENSURE ALL SIGNS ARE OF DURABLE MATERIAL, FORMATTED CONSISTENTLY IN A HORIZONTAL ORIENTATION, 18"x24" FOR GATE/FENCE SIGNS AND 12"x18" FOR EQUIPMENT/CONTAINER SIGNS. SIGNS FOR ACCESS GATES/FENCE SHALL BE MOUNTED USING GALVANIZED OR STAINLESS STEEL HOG RINGS.
2. REQUIRED SIGNS SHALL BE MAINTAINED VISIBLE, WITHOUT OBSTRUCTIONS. IF SECURITY AND SAFETY SIGNS ARE DAMAGED, WEATHERED, OR MISSING THEY SHALL BE PROMPTLY REPLACED.
3. ARC FLASH STICKERS SHALL BE INSTALLED ON EACH ELECTRICAL EQUIPMENT DOOR OR COVER THAT MAY BE OPENED OR REMOVED FOR MAINTENANCE SERVICE. ALL DOORS ON SWITCHGEAR AND MOTOR CONTROL CENTERS SHALL BE LABELED, EVEN IF OPENING A DOOR DOES NOT EXPOSE UN INSULATED CONDUCTORS.
4. ARC FLASH STICKERS SHALL BE INSTALLED BASED ON ARC FLASH CALCULATIONS. PER SOPR/SMS 301.4., SOPR 272, AND SMS 270. STICKERS ON EQUIPMENT SHALL NOT BE REMOVED OR COVERED.

MISS DIG 811

No.	REVISIONS	DATE	BY
1	ENTITLEMENT SET	06/08/2026	BPG

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(312) 726 9445

CIP
Copenhagen Infrastructure Partners

STATE OF MICHIGAN
BRIAN DAMMON
ENGINEER
6201372404
PROFESSIONAL ENGINEER

Brian Jammon

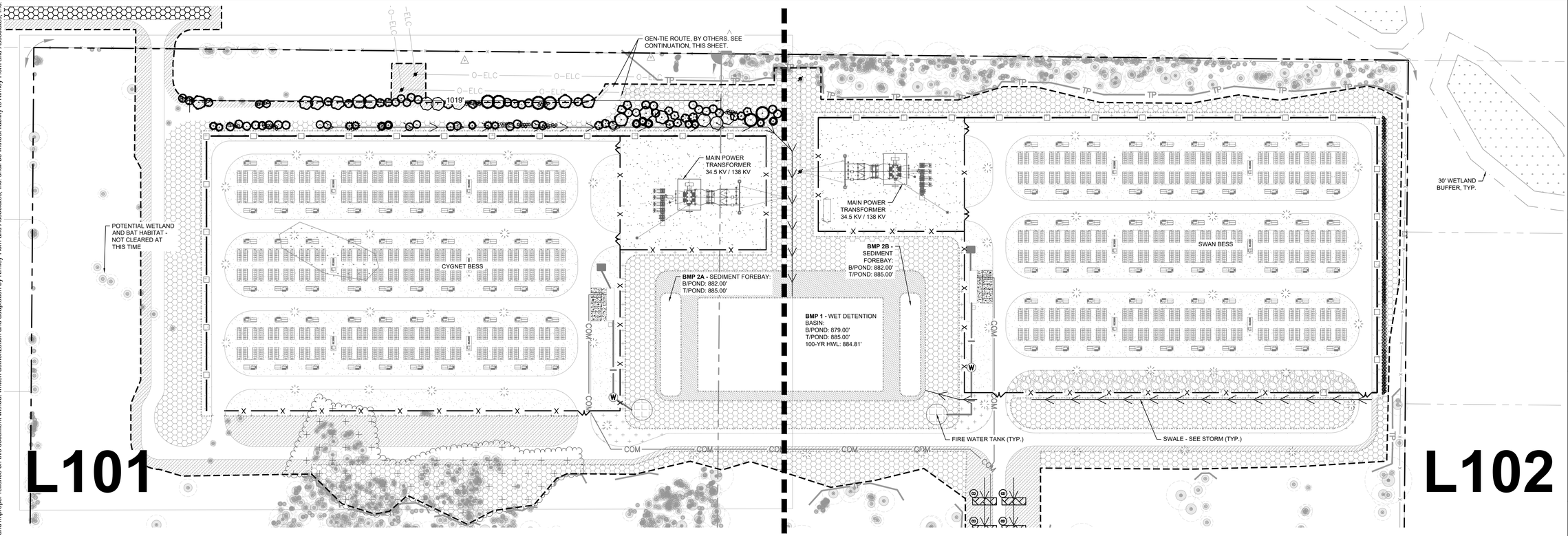
KHA PROJECT	161262002
DATE	06/08/2026
SCALE	AS SHOWN
DESIGNED BY	JLL
DRAWN BY	EAS
CHECKED BY	BPG

ISSUED FOR PERMIT - NOT FOR CONSTRUCTION

SIGNAGE PLAN

SWAN BESS AND CYGNET BESS
PREPARED FOR
SWAN ENERGY STORAGE LLC AND CYGNET ENERGY STORGAGE LLC
COMSTOCK TOWNSHIP
MI

SHEET NUMBER
C801



LANDSCAPE SUMMARY

NORTH GREENSPACE PLANTINGS FOR WEST PROPERTY:

REQUIRED GREENSPACE CANOPY TREES:	31 TREES = 1,019 L.F. / 100 L.F. * 3
PROVIDED GREENSPACE CANOPY TREES:	31 TREES = 23 PROPOSED + 8 EXISTING
REQUIRED GREENSPACE UNDERSTORY TREES:	62 TREES = 1,019 L.F. / 100 L.F. * 6
PROVIDED GREENSPACE UNDERSTORY TREES:	62 TREES
REQUIRED GREENSPACE CONIFEROUS TREES:	21 TREES = 1,019 L.F. / 100 L.F. * 2
PROVIDED GREENSPACE CONIFEROUS TREES:	21 TREES = 19 PROPOSED + 2 EXISTING
REQUIRED GREENSPACE SHRUBS:	92 SHRUBS = 1,019 L.F. / 100 L.F. * 9
PROVIDED GREENSPACE SHRUBS:	94 SHRUBS

NORTH GREENSPACE PLANTINGS FOR EAST PROPERTY:
- DENSE EXISTING VEGETATION, NO PROPOSED PLANTINGS.

EAST GREENSPACE PLANTINGS:
- A NATURAL COMPACT PLANTING AREA OF NARROW UPRIGHT EVERGREENS PLANTED AT 4.5' FEET ON CENTER PLANTED AT 45 DEGREE ALTERNATE SPACING. EVERGREEN SHRUB SCREENING PROPOSED DUE TO SITE CONSTRAINTS.
-

SOUTH GREENSPACE SCREENING:
- NO SCREENING PROVIDED DUE TO EXISTING TREES.

WEST GREENSPACE SCREENING:
- NO SCREENING PROVIDED DUE TO EXISTING TREES

LANDSCAPE LEGEND

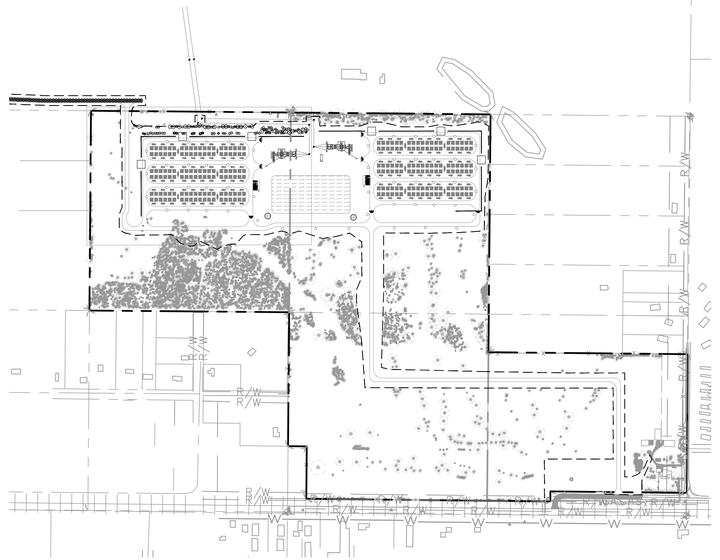
- APPROXIMATE LIMITS OF SEEDING, SEED ALL DISTURBED AREAS (TYP.)
- SEED / SOD EDGE (TYP.)
- MDOT CLASS A MIX (TYP.)
- BASIC SHORTGRASS PRAIRIE SEED MIX (TYP.)
- MESIC TALLGRASS PRAIRIE SEED MIX (TYP.)
- STORMWATER BASIN SEED MIX (TYP.)
- ROCK MULCH (TYP.)

SEEDING KEYNOTES

A	MDOT CLASS A MIX (TYP.)
SP	BASIC SHORTGRASS PRAIRIE SEED MIX (TYP.)
TP	MESIC TALLGRASS PRAIRIE SEED MIX (TYP.)
SB	STORMWATER BASIN SEED MIX (TYP.)

NORTH

GRAPHIC SCALE IN FEET
0 50 100 200



VICINITY MAP

NORTH

GRAPHIC SCALE IN FEET
0 250 500 1000

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Copenhagen Infrastructure Partners

KHA PROJECT 161262002
DATE 06/08/2026
SCALE AS SHOWN
DESIGNED BY CPK
DRAWN BY ATK
CHECKED BY CALW

GROUNDCOVER AND VEGETATION ESTABLISHMENT AND MANAGEMENT PLAN

SWAN BESS AND CYGNET BESS
PREPARED FOR
SWAN ENERGY STORAGE LLC AND CYGNET ENERGY STORGAGE LLC
COMSTOCK TOWNSHIP MI

SHEET NUMBER
L100

MISS DIG 811

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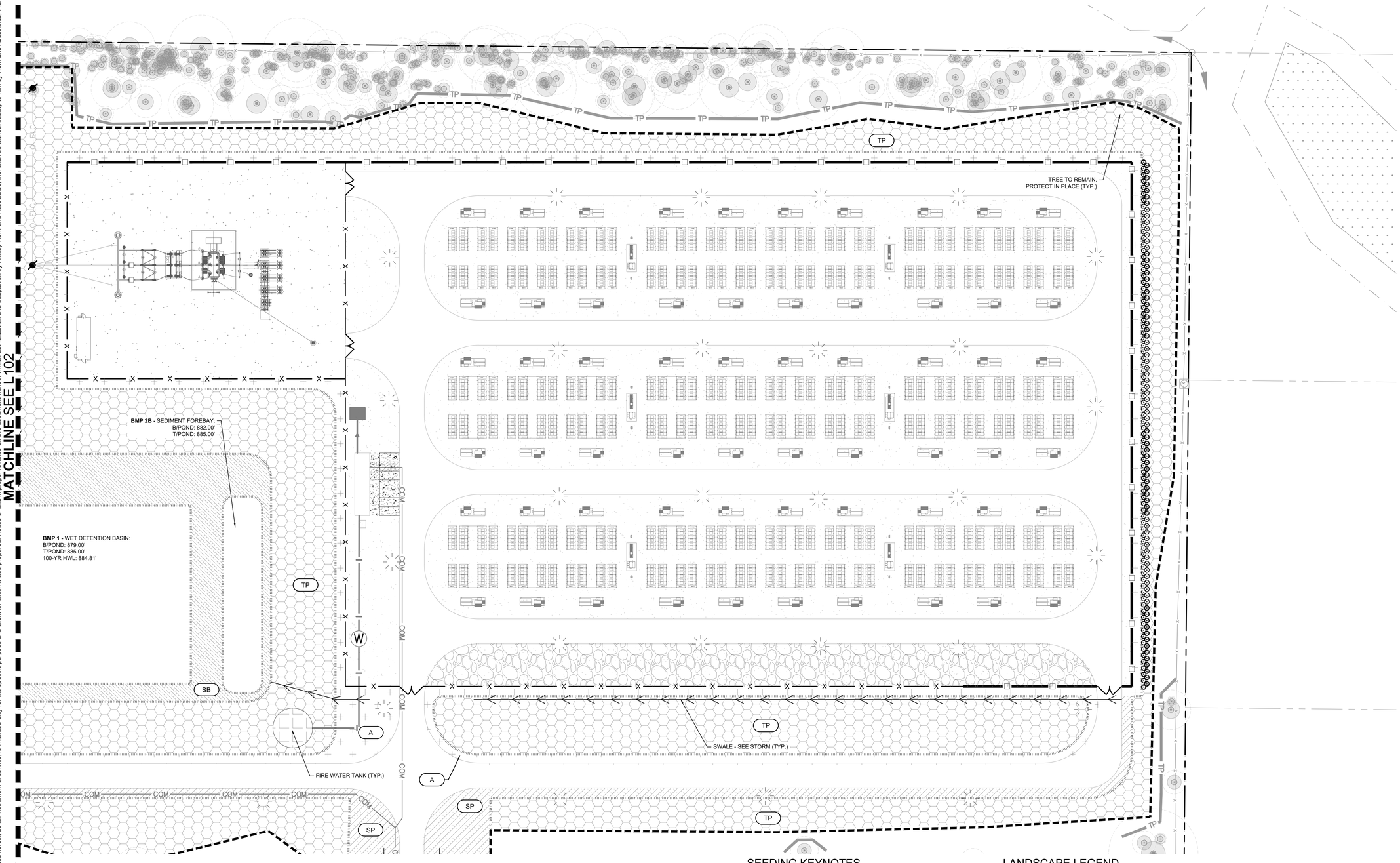
MATCHLINE SEE L102



SEEDING KEYNOTES

A	MDOT CLASS A MIX (TYP.)
SP	BASIC SHORTGRASS PRAIRIE SEED MIX (TYP.)
TP	MESIC TALLGRASS PRAIRIE SEED MIX (TYP.)
SB	STORMWATER BASIN SEED MIX (TYP.)

LANDSCAPE LEGEND

- APPROXIMATE LIMITS OF SEEDING, SEED ALL DISTURBED AREAS (TYP.)
- SEED / SOD EDGE (TYP.)
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- BASIC SHORTGRASS PRAIRIE SEED MIX (TYP.)
- MESIC TALLGRASS PRAIRIE SEED MIX (TYP.)
- STORMWATER BASIN SEED MIX (TYP.)
- ROCK MULCH (TYP.)

NORTH

GRAPHIC SCALE IN FEET
0 25 50 100

MISS DIG 811

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No.	REVISIONS	DATE	BY
1	ENTITLEMENT SET	06/08/2026	BPG

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(312) 726 9445

CIP
Copenhagen Infrastructure Partners

KHA PROJECT 161262002
DATE 06/08/2026
SCALE AS SHOWN
DESIGNED BY CFK
DRAWN BY ATK
CHECKED BY CALW

GROUNDCOVER AND VEGETATION ESTABLISHMENT ENLARGEMENT PLAN

SWAN BESS AND CYGNET BESS
PREPARED FOR
SWAN ENERGY STORAGE LLC AND CYGNET ENERGY STORAGE LLC
COMSTOCK TOWNSHIP
MI

SHEET NUMBER
L101

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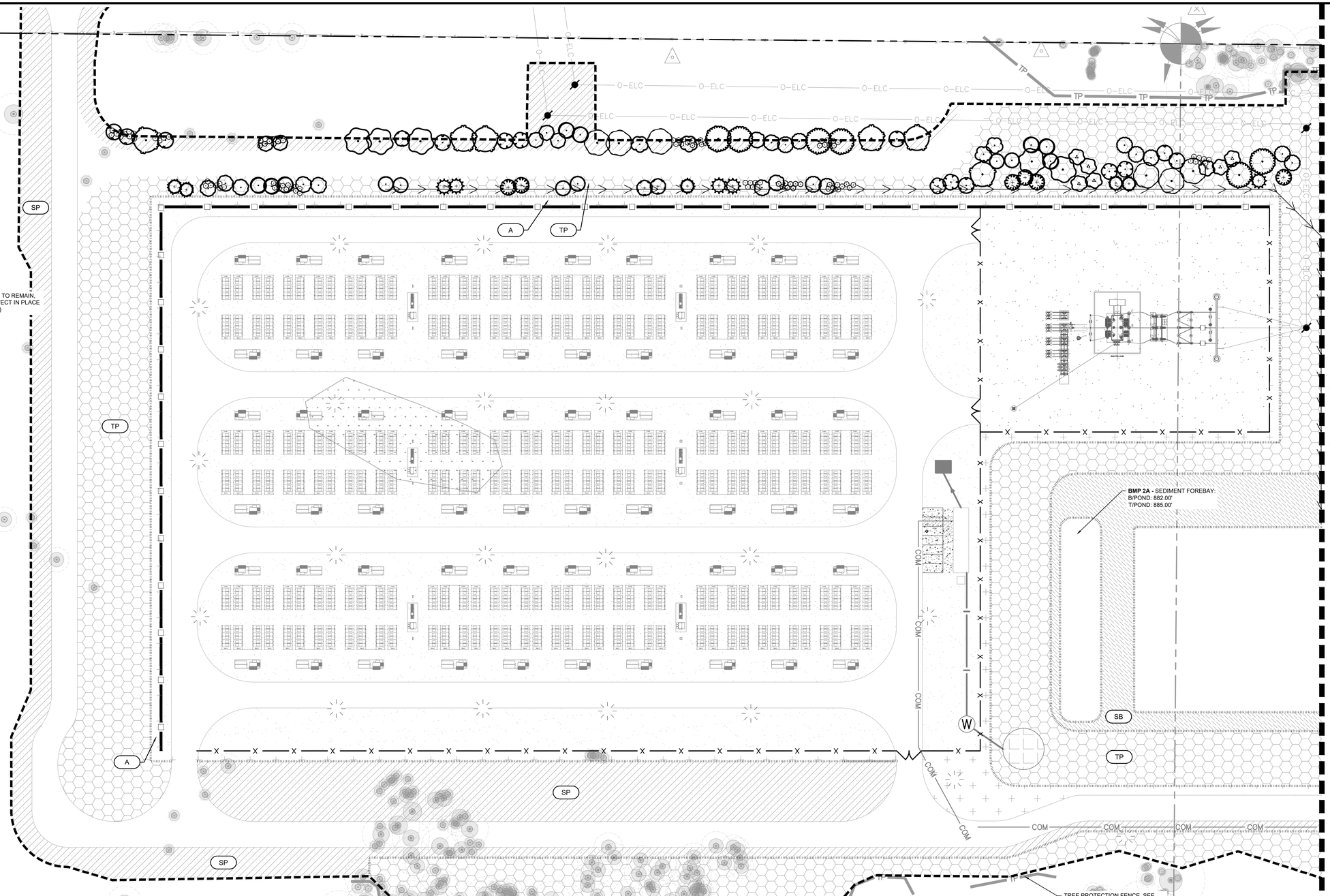

MATCHLINE SEE L101

SEEDING KEYNOTES

A	MDOT CLASS A MIX (TYP.)
SP	BASIC SHORTGRASS PRAIRIE SEED MIX (TYP.)
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LANDSCAPE LEGEND

- APPROXIMATE LIMITS OF SEEDING, SEED ALL DISTURBED AREAS (TYP.)
- SEED / SOD EDGE (TYP.)
- MDOT CLASS A MIX (TYP.)
- BASIC SHORTGRASS PRAIRIE SEED MIX (TYP.)
- MESIC TALLGRASS PRAIRIE SEED MIX (TYP.)
- STORMWATER BASIN SEED MIX (TYP.)
- ROCK MULCH (TYP.)

NORTH

GRAPHIC SCALE IN FEET
0 25 50 100

MISS DIG 811

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GROUNDCOVER AND VEGETATION ESTABLISHMENT ENLARGEMENT PLAN

SWAN BESS AND CYGNET BESS
PREPARED FOR
SWAN ENERGY STORAGE LLC AND CYGNET ENERGY STORGAGE LLC
COMSTOCK TOWNSHIP
MI

SHEET NUMBER
L102

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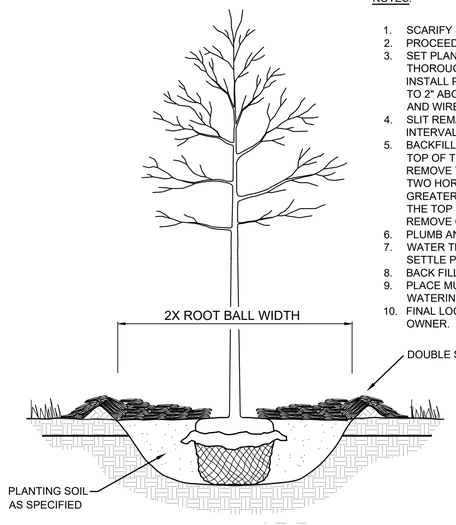
PLANT SCHEDULE

SYMBOL	CODE	QTY	COMMON NAME	BOTANICAL NAME	CAL	HT
CONIFEROUS TREE						
	ERC	5	EASTERN REDCEDAR	JUNIPERUS VIRGINIANA	B & B	5` HT.
	RDP	3	RED PINE	PINUS RESINOSA	B & B	5` HT.
	WHC	6	WHITE CEDAR	THUJA OCCIDENTALIS	B & B	5` HT.
	WHP	5	WHITE PINE	PINUS STROBUS	B & B	5` HT.
ORNAMENTAL TREE						
	ABS	4	AUTUMN BRILLIANCE APPLE SERVICEBERRY	AMELANCHIER X GRANDIFLORA 'AUTUMN BRILLIANCE'	B & B	1.5" CAL.
	AHB	8	AMERICAN HORNBEAM	CARPINUS CAROLINIANA	B & B	1.5" CAL.
	AMP	9	AMERICAN PLUM	PRUNUS AMERICANA	B & B	1.5" CAL.
	ERB	8	EASTERN REDBUD	CERCIS CANADENSIS	B & B	1.5" CAL.
	PPW	6	PAWPAW	ASIMINA TRILOBA	B & B	1.5" CAL.
	PRC	6	PRAIRIE ROSE CRABAPPLE	MALUS IOENSIS 'PRAIRIE ROSE'	B & B	1.5" CAL.
	PTB	9	PRAIRIE TORCH® BUCKEYE	AESCULUS X 'BERGESON'	B & B	1.5" CAL.
	RVB	7	RIVER BIRCH MULTI-TRUNK	BETULA NIGRA	B & B	6` HT.
	YWB	5	YELLOW BIRCH	BETULA ALLEGHANIENSIS	B & B	1.5" CAL.
OVERSTORY TREE						
	GMM	6	GREEN MOUNTAIN SUGAR MAPLE	ACER SACCHARUM `GREEN MOUNTAIN`	B & B	2" CAL.
	RDL	5	REDMOND AMERICAN LINDEN	TILIA AMERICANA `REDMOND`	B & B	2.5" CAL.
	RDO	6	RED OAK	QUERCUS RUBRA	B & B	2" CAL.
	SBH	6	SHAGBARK HICKORY	CARYA OVATA	B & B	2" CAL.

SYMBOL	CODE	QTY	COMMON NAME	BOTANICAL NAME	CONT	SPACING
DECIDUOUS SHRUBS						
	BTB	19	BUTTONBUSH	CEPHALANTHUS OCCIDENTALIS	BARE ROOT	5` O.C.
	GDW	20	GRAY DOGWOOD	CORNUS RACEMOSA	#5 CONT.	5` O.C.
	NBV	15	NANNYBERRY	VIBURNUM LENTAGO	BARE ROOT	5` O.C.
	ROD	24	RED-OSIER DOGWOOD	CORNUS SERICEA	#5 CONT.	5` O.C.
	SUM	16	SMOOTH SUMAC	RHUS GLABRA	BARE ROOT	5` O.C.
EVERGREEN SHRUBS						
	BFS	43	BOULEVARD FALSE-CYPRESS	CHAMAECYPARIS PISIFERA 'BOULEVARD'	#5 CONT.	4.5' O.C.
	RGA	54	RHEINGOLD ARBORVITAE	THUJA OCCIDENTALIS 'RHEINGOLD'	#5 CONT.	4.5' O.C.
	SPJ	42	SPARTAN JUNIPER	JUNIPERUS CHINENSIS 'SPARTAN'	#5 CONT.	4.5' O.C.
	TCA	28	TECHNY ARBORVITAE	THUJA OCCIDENTALIS 'TECHNY'	#5 CONT.	4.5' O.C.

NOTE:
QUANTITIES ON PLAN SUPERSEDE LIST QUANTITIES IN THE EVENT OF A DISCREPANCY.

ABBREVIATIONS:
B&B = BALLED AND BURLAPPED CAL. = CALIPER HT. = HEIGHT MIN. = MINIMUM
O.C. = ON CENTER SP. = SPECIES QTY. = QUANTITY



NOTES:

1. SCARIFY SIDES AND BOTTOM OF HOLE.
2. PROCEED WITH CORRECTIVE PRUNING.
3. SET PLANT ON UNDISTURBED NATIVE SOIL OR THOROUGHLY COMPACTED PLANTING SOIL. INSTALL PLANT SO THE ROOT FLARE IS AT OR UP TO 2" ABOVE THE FINISHED GRADE WITH BURLAP AND WIRE BASKET, (IF USED), INTACT.
4. SLIT REMAINING TREATED BURLAP AT 6" INTERVALS.
5. BACKFILL TO WITHIN APPROXIMATELY 12" OF THE TOP OF THE ROOTBALL, THEN WATER PLANT. REMOVE THE TOP 1/3 OF THE BASKET OR THE TOP TWO HORIZONTAL RINGS WHICHEVER IS GREATER. REMOVE ALL BURLAP AND NAILS FROM THE TOP 1/3 OF THE BALL. REMOVE ALL TWINE. REMOVE OR CORRECT STEM GIRDLING ROOTS.
6. PLUMB AND BACKFILL WITH PLANTING SOIL.
7. WATER THOROUGHLY WITHIN 2 HOURS TO SETTLE PLANTS AND FILL VOIDS.
8. BACK FILL VOIDS AND WATER SECOND TIME.
9. PLACE MULCH WITHIN 48 HOURS OF THE SECOND WATERING UNLESS SOIL MOISTURE IS EXCESSIVE.
10. FINAL LOCATION OF TREE TO BE APPROVED BY OWNER.

1 TREE PLANTING DETAIL

SCALE: N.T.S. L200

NOTES:

1. SCARIFY SIDES AND BOTTOM OF HOLE.
2. PROCEED WITH CORRECTIVE PRUNING OF TOP AND ROOT.
3. REMOVE CONTAINER AND SCORE OUTSIDE OF SOIL MASS TO REDIRECT AND PREVENT CIRCLING FIBROUS ROOTS. REMOVE OR CORRECT STEM GIRDLING ROOTS.
4. PLUMB AND BACKFILL WITH PLANTING SOIL.
5. WATER THOROUGHLY WITHIN 2 HOURS TO SETTLE PLANTS AND FILL VOIDS.
6. BACK FILL VOIDS AND WATER SECOND TIME.
7. PLACE MULCH WITHIN 48 HOURS OF THE SECOND WATERING UNLESS SOIL MOISTURE IS EXCESSIVE.
8. MIX IN 3-4" OF ORGANIC COMPOST.

2 SHRUB / PERENNIAL PLANTING DETAIL

SCALE: N.T.S. L200

LANDSCAPE NOTES

PLANTING

1. CONTACT COMMON GROUND ALLIANCE AT 811 OR CALL811.COM TO VERIFY LOCATIONS OF ALL UNDERGROUND UTILITIES PRIOR TO INSTALLATION OF ANY PLANTS OR LANDSCAPE MATERIAL.
2. ACTUAL LOCATION OF PLANT MATERIAL IS SUBJECT TO FIELD AND SITE CONDITIONS.
3. NO PLANTING WILL BE INSTALLED UNTIL ALL GRADING AND CONSTRUCTION HAS BEEN COMPLETED IN THE IMMEDIATE AREA.
4. ALL SUBSTITUTIONS MUST BE APPROVED BY THE LANDSCAPE ARCHITECT PRIOR TO SUBMISSION OF ANY BID AND/OR QUOTE BY THE LANDSCAPE CONTRACTOR.
5. PROVIDE TWO YEAR GUARANTEE OF ALL PLANT MATERIALS. THE GUARANTEE BEGINS ON THE DATE OF THE LANDSCAPE ARCHITECT'S OR OWNER'S WRITTEN ACCEPTANCE OF THE INITIAL PLANTING. REPLACEMENT PLANT MATERIAL SHALL HAVE A ONE YEAR GUARANTEE COMMENCING UPON PLANTING.
6. ALL PLANTS TO BE SPECIMEN GRADE, MICHIGAN-GROWN AND/OR HARDY. SPECIMEN GRADE SHALL ADHERE TO, BUT IS NOT LIMITED BY, THE FOLLOWING STANDARDS:
   ALL PLANTS SHALL BE FREE FROM DISEASE, PESTS, WOUNDS, SCARS, ETC.
   ALL PLANTS SHALL BE FREE FROM NOTICEABLE GAPS, HOLES, OR DEFORMITIES.
   ALL PLANTS SHALL BE FREE FROM BROKEN OR DEAD BRANCHES.
   ALL PLANTS SHALL HAVE HEAVY, HEALTHY BRANCHING AND LEAFING.
   CONIFEROUS TREES SHALL HAVE AN ESTABLISHED MAIN LEADER AND A HEIGHT TO WIDTH RATIO OF NO LESS THAN 5:3.
7. PLANTS TO MEET AMERICAN STANDARD FOR NURSERY STOCK (ANSI Z60.1-2014 OR MOST CURRENT VERSION) REQUIREMENTS FOR SIZE AND TYPE SPECIFIED.
8. PLANTS TO BE INSTALLED AS PER ANSI STANDARD PLANTING PRACTICES.
9. INSTALL PLANTS BY PLANT INSTALLATION PERIOD INFORMATION IN THE LATEST STANDARD PLANTING DETAILS FROM MDOT. PLANTINGS BEFORE OR AFTER THESE DATES ARE DONE AT RISK.
10. PLANTS SHALL BE IMMEDIATELY PLANTED UPON ARRIVAL AT SITE. PROPERLY HEEL-IN MATERIALS IF NECESSARY; TEMPORARY ONLY.
11. PRIOR TO PLANTING, FIELD VERIFY THAT THE ROOT COLLAR/ROOT FLARE IS LOCATED AT THE TOP OF THE BALLED & BURLAP TREE. IF THIS IS NOT THE CASE, SOIL SHALL BE REMOVED DOWN TO THE ROOT COLLAR/ROOT FLARE. WHEN THE BALLED & BURLAP TREE IS PLANTED, THE ROOT COLLAR/ROOT FLARE SHALL BE EVEN OR SLIGHTLY ABOVE FINISHED GRADE.
12. OPEN TOP OF BURLAP ON BB MATERIALS; REMOVE POT ON POTTED PLANTS; SPLIT AND BREAK APART PEAT POTS.
13. PRUNE PLANTS AS NECESSARY - PER STANDARD NURSERY PRACTICE AND TO CORRECT POOR BRANCHING OF EXISTING AND PROPOSED TREES.
14. WRAP ALL SMOOTH-BARKED TREES - FASTEN TOP AND BOTTOM. REMOVE BY APRIL 1ST.
15. STAKING OF TREES AS REQUIRED; REPOSITION, PLUMB AND STAKE IF NOT PLUMB AFTER ONE YEAR.

SOIL

16. TOPSOIL SHALL BE LOCAL FERTILE AGRICULTURAL SOIL FREE OF SUBSOILS, ROCKS LARGER THAN ONE INCH, CLAYS, PLANTS, WEEDS, ROOTS AND OTHER IMPURITIES. PH VALUE TO BE BETWEEN 5.4 AND 7.0. REMOVE DEBRIS AND WEEDS FROM SUBSOIL. MINIMUM 4" DEPTH TOPSOIL FOR ALL LAWN GRASS AREAS AND 12" DEPTH TOPSOIL FOR TREES, SHRUBS AND PERENNIALS. LIGHTLY COMPACT TOPSOIL AFTER PLACEMENT AND PROHIBIT CONSTRUCTION TRAFFIC FROM AREAS WITH TOPSOIL.
17. THE NEED FOR SOIL AMENDMENTS SHALL BE DETERMINED UPON SITE SOIL CONDITIONS PRIOR TO PLANTING. LANDSCAPE CONTRACTOR SHALL NOTIFY LANDSCAPE ARCHITECT FOR THE NEED OF ANY SOIL AMENDMENTS.

MULCH

18. MULCH TO BE AT ALL TREE, SHRUB, PERENNIAL, AND MAINTENANCE AREAS. TREE AND SHRUB PLANTING BEDS SHALL HAVE 4" DEPTH OF DOUBLE SHREDDED HARDWOOD MULCH. DOUBLE SHREDDED HARDWOOD MULCH TO BE USED AROUND ALL PLANTS WITHIN TURF AREAS. PERENNIAL AND ORNAMENTAL GRASS BEDS SHALL HAVE 2" DEPTH DOUBLE SHREDDED HARDWOOD MULCH. MULCH TO BE FREE OF DELETERIOUS MATERIAL AND NATURAL IN COLOR (DYE-FREE), OR APPROVED EQUAL. APPLY PRE-EMERGENT HERBICIDE PRIOR TO MULCH PLACEMENT PER MANUFACTURER RECOMMENDATIONS, USE PREEN OR PRE-APPROVED EQUAL. ROCK MULCH TO BE ON COMMERCIAL GRADE FILTER FABRIC, BY TYPAR, OR APPROVED EQUAL WITH NO EXPOSURE. MULCH AND FABRIC TO BE APPROVED BY OWNER PRIOR TO INSTALLATION. MULCH TO MATCH EXISTING CONDITIONS (WHERE APPLICABLE).

SEED/SOD

19. ALL DISTURBED AREAS TO BE SEEDED, UNLESS OTHERWISE NOTED. ALL TOPSOIL AREAS TO BE RAKED TO REMOVE DEBRIS AND ENSURE DRAINAGE. SLOPES OF 3:1 OR GREATER SHALL BE STAKED. SEED AS SPECIFIED, PER MDOT SPECIFICATIONS AND SUPPLIER/MANUFACTURER RECOMMENDATIONS. IF NOT INDICATED ON LANDSCAPE PLAN, SEE EROSION CONTROL PLAN.

ESTABLISHMENT

20. PROVIDE NECESSARY WATERING OF PLANT MATERIALS UNTIL THE PLANT IS FULLY ESTABLISHED OR IRRIGATION SYSTEM IS OPERATIONAL. OWNER WILL NOT PROVIDE WATER FOR CONTRACTOR.
21. REPAIR, REPLACE, OR PROVIDE SOD/SEED AS REQUIRED FOR ANY ROADWAY BOULEVARD AREAS ADJACENT TO THE SITE DISTURBED DURING CONSTRUCTION.

WARRANTY

22. REPAIR ALL DAMAGE TO PROPERTY FROM PLANTING OPERATIONS AT NO COST TO OWNER.
23. MAINTAIN TREES, SHRUBS, SEED AND OTHER PLANTS UNTIL PROJECT COMPLETION, BUT IN NO CASE, LESS THAN FOLLOWING PERIOD; 1 YEAR AFTER PROJECT COMPLETION. MAINTAIN TREES, SHRUBS, SEED AND OTHER PLANTS BY PRUNING, CULTIVATING, AND WEEDING AS REQUIRED FOR HEALTHY GROWTH. RESTORE PLANTING SAUCERS. TIGHTEN AND REPAIR STAKE AND GUY SUPPORTS AND RESET TREES AND SHRUBS TO PROPER GRADES OR VERTICAL POSITION AS REQUIRED. RESTORE OR REPLACE DAMAGED WRAPPINGS. SPRAY AS REQUIRED TO KEEP TREES AND SHRUBS FREE OF INSECTS AND DISEASE. REPLENISH MULCH TO THE REQUIRED DEPTH. MAINTAIN LAWNS FOR 60 DAYS AFTER INSTALLING SOD INCLUDING MOWING WHEN SOD RECITES 4" IN HEIGHT. WEED PLANTING BEDS AND MULCH SAUCERS AT MINIMUM ONCE A MONTH DURING THE GROWING SEASON. PROVIDE A MONTHLY REPORT TO THE OWNER ON WEEDING AND OTHER MAINTENANCE RESPONSIBILITIES.

No.	REVISIONS	DATE	BY
1	ENTITLEMENT SET	06/08/2026	BPG

Kimley»Horn of Michigan, Inc.
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Copenhagen Infrastructure Partners

KHA PROJECT	161262002
DATE	06/08/2026
SCALE	AS SHOWN
DESIGNED BY	CFK
DRAWN BY	ATK
CHECKED BY	CALW

ISSUED FOR PERMIT - NOT FOR CONSTRUCTION

LANDSCAPE DETAILS

SWAN BESS AND CYGNET BESS
PREPARED FOR
SWAN ENERGY STORAGE LLC AND CYGNET ENERGY STORGAGE LLC
COMSTOCK TOWNSHIP
MI

MISS DIG 811

SHEET NUMBER
L200

MDOT CLASS A SEED MIX

SEED	MINIMUM PURITY	MINIMUM GERMINATION	MIXTURE
CREEPING RED FESCUE	98.5%	85%	40%
KENTUCKY BLUE GRASS	98.5%	75%	30%
PERENNIAL RYEGRASS	99.5%	85%	30%

Native Connections
3815 N Westnedge Ave, Kalamazoo, MI 49004
(P) 269.459.6900
info@nativeconnections.net
www.nativeconnections.net

Basic Mesic Tallgrass Prairie Mix

This is the base version of our Mesic Tallgrass Prairie Mix. The lower diversity and seed density still provide more than adequate coverage to establish a simple tallgrass prairie in dry to mesic soils.

Total Seeding Rate: 31.28 lbs per acre
3.88 lbs grasses • 2.41 lbs forbs • 25 lbs nurse crop
39.42 native seeds per sq ft • up to 8 ft

Call, email or visit our website for pricing.

Grasses		PLS Oz/acre	Seeds/sq ft
Andropogon gerardii	Big Bluestem	10.00	2.30
Elymus canadensis	Canada Wild Rye	16.00	1.91
Panicum virgatum	Switchgrass	8.00	2.57
Schizachyrium scoparium	Little Bluestem	20.00	6.89
Sorghastrum nutans	Indian Grass	8.00	2.20
	Total Grasses	**62.00**	**15.87**

Forbs		PLS Oz/acre	Seeds/sq ft
Asclepias syriaca	Common Milkweed	2.00	0.18
Asclepias tuberosa	Butterfly Milkweed	2.00	0.20
Baptisia lactea (B. leucantha, B. alba)	White Wild Indigo	1.00	0.04
Chamaecrista fasciculata	Partridge Pea	8.00	0.50
Echinacea purpurea	Purple Coneflower	6.00	0.91
Heliopsis helianthoides	False sunflower	4.00	0.58
Liatris spicata	Marsh Blazingstar	1.50	0.38
Monarda fistulosa	Wild Bergamot	2.00	3.21
Penstemon digitalis	Foxglove Beardtongue	1.50	4.48
Ratibida pinnata	Yellow Coneflower	2.50	1.72
Rudbeckia hirta	Black-eyed Susan	4.00	8.45
Silphium integrifolium	Rosinweed	0.25	0.01
Solidago rigida	Stiff Goldenrod	1.00	0.94
Symphyotrichum novae-angliae	New England Aster	1.00	1.52
Zizia aurea	Golden Alexander	1.75	0.44
	Total Forbs	**38.50**	**23.56**

Temporary Grass Cover		Oz/acre	Seeds/sq ft
Lolium multiflorum	Annual Ryegrass	80.00	24.79
Avena sativa	Seed Oats	320.00	7.35
	Total Temp Grasses	**400.00**	**32.14**

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Stormwater Mix

This mix is designed to withstand the low water quality and highly variable condtions associated with stormwater features. Most of the species are salt tolerant and most species will do well in mesic to wet hydrology with others filling in the wettest and driest ends of the spectrum. The high native seed count and heavy annual nurse crop in this mix ensure full and aggressive establishment.

Total Seeding Rate: 35.98 lbs per acre
3.13 lbs grasses • 2.85 lbs forbs • 30 lbs nurse crop
113.11 native seeds per sq ft

Call, email or visit our website for pricing.

Grasses, Sedges & Rushes		PLS Oz/acre	Seeds/sq ft
Andropogon gerardii	Big Bluestem	3.00	0.69
Carex vulpinoidea	Fox Sedge	2.00	4.59
Eleocharis palustris	Great Spike Rush	0.40	0.47
Elymus canadensis	Canada Wild Rye	12.00	1.430
Elymus virginicus	Virginia Wild Rye	12.00	1.16
Glyceria striata	Fowl Manna Grass	1.20	4.410
Juncus effusus	Soft Rush	0.40	9.18
Juncus tenuis	Path Rush	0.40	9.18
Panicum virgatum	Switchgrass	4.00	1.29
Schizachyrium scoparium	Little Bluestem	8.00	2.750
Scirpus cyperinus	Wool Grass	0.40	15.610
Scirpus validus (S. tabernaemontanii)	Soft-stem Bulrush	1.00	0.85
Sorghastrum nutans	Indian Grass	4.00	0.83
Spartina pectinata	Prairie Cordgrass	2.00	0.300
	Total Grasses	**50.80**	**52.74**

Forbs		PLS Oz/acre	Seeds/sq ft
Allium cernuum	Nodding Wild Onion	2.00	0.35
Asclepias incarnata	Swamp Milkweed	2.40	0.26
Asclepias tuberosa	Butterfly Milkweed	2.40	0.24
Bidens cernua	Nodding Bur Marigold	0.80	0.39
Doellingeria umbellata	Flat-topped Aster	0.40	0.62
Echinacea purpurea	Purple Coneflower	8.00	1.21
Eutrochium purpureum	Sweet Joe Pye Weed	1.20	1.16
Helenium autumnale	Sneezeweed	0.80	2.39
Heliopsis helianthoides	False sunflower	4.00	0.58
Lobelia siphilitica	Great Blue Lobelia	0.40	4.59
Mimulus ringens	Monkey Flower	0.40	21.12
Monarda fistulosa	Wild Bergamot	0.80	1.29
Penstemon digitalis	Foxglove Beardtongue	1.20	3.58
Physostegia virginiana	Obedient Plant	0.40	0.10
Polygonum pensylvanicum (Persicaria p.)	Pennsylvania Smartweed	4.00	1.19
Pycnanthemum virginianum	Mountain mint	0.40	2.02
Ratibida pinnata	Yellow Coneflower	1.60	1.10
Rudbeckia hirta	Black-eyed Susan	6.00	12.67
Senna hebecarpa	Wild Senna	4.00	0.13
Solidago riddellii	Riddell's Goldenrod	0.40	0.85
Symphyotrichum novae-angliae	New England Aster	0.40	0.61
Verbena hastata	Blue Vervain	1.60	3.42
Zizia aurea	Golden Alexander	2.00	0.51
	Total Forbs	**45.60**	**60.38**

Temporary Grass Cover		Oz/acre	Seeds/sq ft
Lolium multiflorum	Annual Ryegrass	112.00	34.71
Avena sativa	Seed Oats	368.00	8.45
	Total Temp Grasses	**480.00**	**43.16**

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www.nativeconnections.net

Basic Shortgrass Prairie Mix

This is the economy version of our Dry Shortgrass Prairie Mix. Though the diversity and seed density are greatly reduced, this is a great starter prairie where a low stature on dry soils is needed or desired.

Total Seeding Rate: 31.25 lbs per acre
4 lbs grasses • 2.25 lbs forbs • 25 lbs nurse crop
43 native seeds per sq ft

Call, email or visit our website for pricing.

Grasses		PLS Oz/acre	Seeds/sq ft
Bouteloua curtipendula	Side-oats Grama	22.00	3.03
Carex brevior	Plains Oval Sedge	1.00	0.67
Elymus canadensis	Canada Wild Rye	8.50	1.01
Koeleria cristata	June Grass	0.25	1.15
Schizachyrium scoparium	Little Bluestem	32.00	11.02
Sporobolus heterolepis	Prairie Dropseed	0.25	0.09
	Total Grasses	**64.00**	**16.97**

Forbs		PLS Oz/acre	Seeds/sq ft
Asclepias tuberosa	Butterfly Milkweed	0.50	0.05
Aster azureus (A. oolentangiensis)	Arrow-leaved Aster	0.50	0.92
Cassia fasciculata (Chamaecrista f.)	Partridge Pea	8.00	0.50
Coreopsis lanceolata	Lance-leaf Coreopsis	7.00	3.21
Dalea purpurea (Petalostemum p.)	Purple Prairie Clover	4.00	1.65
Echinacea purpurea	Purple Coneflower	7.00	1.06
Monarda fistulosa	Wild Bergamot	0.50	0.80
Penstemon digitalis	Foxglove Beardtongue	0.50	1.49
Potentilla arguta (Drymocallis a.)	Prairie Cinquefoil	0.50	2.64
Ratibida pinnata	Yellow Coneflower	0.70	0.48
Rudbeckia hirta	Black-eyed Susan	5.25	11.09
Solidago nemoralis	Old-field Goldenrod	0.25	1.72
Solidago rigida	Stiff Goldenrod	0.70	0.66
Verbena stricta	Hoary Vervain	0.60	0.39
	Total Forbs	**36.00**	**26.66**

Temporary Grass Cover		Oz/acre	Seeds/sq ft
Lolium multiflorum	Annual Ryegrass	80.00	24.79
Avena sativa	Seed Oats	320.00	7.35
	Total Temp Grasses	**400.00**	**32.14**

PERFORMANCE STANDARDS

SATISFACTORY GROUNDCOVER DEVELOPMENT ASSOCIATED WITH NATURALIZED VEGETATION SHOULD BE EVALUATED AT EACH MONITORING PERIOD AND BASED ON THE FOLLOWING CRITERIA.

UPON COMPLETION OF PROJECT CONSTRUCTION:

ALL DISTURBED AREAS OR AREAS IDENTIFIED AS BARE SOILS MEASURING ONE SQUARE METER WITH NO VEGETATION SHOULD RECEIVE EITHER TEMPORARY COVER CROP OR PERMANENT SEED APPLICATION. NO AREAS OF BARE SOILS SHOULD REMAIN AFTER SUBSTANTIAL COMPLETION OF THE PROJECT.

THREE MONTHS AFTER SEEDING:

WITHIN THREE MONTHS OF SEED APPLICATION, OR THREE MONTHS AFTER THE START OF THE GROWING SEASON FOLLOWING DORMANT SEEDING, APPROXIMATELY 60 PERCENT OF THE SEEDED AREA (EXCLUDING PAVING OR OTHER HARDSCAPE AREAS), AS MEASURED BY AERIAL COVER, SHOULD BE VEGETATED OR OTHERWISE STABILIZED AGAINST EROSION. TEMPORARY COVER CROP MAY BE INCLUDED IN STABILIZATION AND SEEDED AREA PERCENTAGE. SUPPLEMENTAL USE OF STRAW MULCH OR BLANKET SHOULD NOT BE INCLUDED IN THE SEEDED AREA PERCENTAGE, UNLESS NEW GROWTH GERMINATION IS IDENTIFIED WITHIN THE STRAW OR BLANKETED AREAS. ANY AREAS OF IDENTIFIED BARE SOILS MEASURING ONE SQUARE METER OR MORE WITH NO VEGETATION SHOULD BE RE-SEEDED.

AFTER THE FIRST YEAR:

BY THE END OF THE FIRST FULL GROWING SEASON, ALL SEEDED AREAS SHOULD HAVE 80 PERCENT MINIMUM VEGETATION (EXCLUDING PAVING OR OTHER HARDSCAPE AREAS), AS MEASURED BY AERIAL COVER. TEMPORARY COVER CROP MAY BE INCLUDED IN SEEDED AREA PERCENTAGES. ANY AREAS OF IDENTIFIED BARE SOILS MEASURING ONE SQUARE METER OR MORE WITH NO VEGETATION SHOULD BE RE-SEEDED.

AFTER THE SECOND YEAR:

BY THE END OF THE SECOND GROWING SEASON, ALL SEEDED AREAS SHOULD HAVE A MINIMUM OF 90 PERCENT VEGETATION GROUND COVER, OF WHICH 50 PERCENT SHOULD BE NATIVE AND NATURALIZED SPECIES IDENTIFIED IN FINAL SEED MIX (EXCLUDING PAVING OR OTHER HARDSCAPE AREAS). NATIVE AND NATURALIZED SPECIES PERCENTAGE SHOULD NOT INCLUDE TEMPORARY COVER CROP, EROSION CONTROL MEASURES, OR UNDESIRABLE AND INVASIVE PLANT SPECIES. ANY AREAS OF IDENTIFIED BARE SOILS MEASURING ONE SQUARE METER OR MORE WITH NO VEGETATION SHOULD BE RE-SEEDED.

AFTER THE THIRD YEAR, AND SUBSEQUENT YEARS:

BY THE END OF THE THIRD GROWING SEASON, ALL SEEDED AREAS SHOULD HAVE A MINIMUM OF 75 PERCENT GROUND COVER BY NATIVE AND NATURALIZED SPECIES IDENTIFIED IN FINAL SEED MIX (EXCLUDING PAVING OR OTHER HARDSCAPE AREAS). THIS SHOULD NOT INCLUDE TEMPORARY COVER CROP, EROSION CONTROL MEASURES, OR UNDESIRABLE AND INVASIVE PLANT SPECIES. NO AREAS IDENTIFIED AS BARE SOILS OF ONE SQUARE METER OR LARGER SHOULD BE PRESENT WITHIN SEEDED AREAS. ANY AREAS OF IDENTIFIED BARE SOILS MEASURING ONE SQUARE METER OR MORE WITH NO VEGETATION SHOULD BE RE-SEEDED.

IF PERFORMANCE STANDARDS ARE NOT MET AT EACH OBSERVATION PERIOD, THE LANDSCAPE CONTRACTOR SHOULD NOTIFY THE OWNER AND PROPOSE CORRECTIVE ACTION IN ORDER TO MEET THE PERFORMANCE STANDARD BY THE NEXT OBSERVATION PERIOD. CORRECTIVE ACTION MAY INCLUDE OVERSEEDING, ESPECIALLY AREAS IDENTIFIED WITH BARE SOILS, ADDITIONAL EROSION CONTROL MEASURES, OR HERBICIDE TREATMENTS.

GROUNDCOVER MAINTENANCE AND MONITORING

A THREE-YEAR STEWARDSHIP PROGRAM IS NECESSARY TO ENSURE PROPER ESTABLISHMENT AND HEALTH OF GROUND COVER, TO CONTROL INVASIVE SPECIES, AND TO PREVENT OVERGROWTH AND SHADING OF EQUIPMENT. AFTER THE THIRD GROWING SEASON, THE PROGRAM IS TO BE REDUCED TO A MINIMUM OF ONE VISIT PER YEAR, DEPENDENT UPON SITE CONDITIONS AND REQUIRED STRATEGIES TO MAINTAIN GOOD HEALTH OF THE SITE SUCH AS DETHATCHING, ADDITIONAL MOWING, OR HERBICIDE TREATMENTS. ALL ASSESSMENTS MADE DURING MONITORING VISITS SHOULD IDENTIFY ANY PRESENCE OF INVASIVE SPECIES AS DEFINED BY THE MINNESOTA BOARD OF WATER AND SOIL RESOURCES, INCLUDING ADDITIONAL SPECIES OF INVASIVE OR WEEDY VEGETATION AS DEFINED BY THE MINNESOTA DEPARTMENT OF NATURAL RESOURCES, UNIVERSITY OF MINNESOTA, AND THE U.S. DEPARTMENT OF AGRICULTURE. ASSESSMENTS SHOULD INCLUDE PLANNED ACTION TO MANAGE AND REMOVE IDENTIFIED WEEDY SPECIES.

FIRST YEAR:

THE EARLIEST POSSIBLE SEED APPLICATION MAY OCCUR IN THE SPRING OF THE FIRST YEAR. NO MAINTENANCE ACTIONS ARE REQUIRED TO BE PERFORMED DURING THE FIRST SEASON OF APPLICATION. IF SEED APPLICATION TAKES PLACE IN SUMMER OR FALL OF THE FIRST YEAR, MAINTENANCE AND MONITORING SHOULD START THE FOLLOWING SEASON.

SITE VISITS ARE RECOMMENDED TO BE PERFORMED ONE TO THREE TIMES THROUGHOUT THE SUMMER AND AN ADDITIONAL ONE TO THREE TIMES THROUGHOUT THE FALL, WITH MONITORING AND EVALUATION OF VEGETATION HEIGHT AND PRESENCE OF INVASIVE SPECIES OCCURRING AT EACH VISIT. IF WEEDY SPECIES ARE IDENTIFIED DURING AN OBSERVATION, MEASURES TO CONTROL INVASIVE WOODY AND HERBACEOUS FLORA THROUGH PHYSICAL REMOVAL OR SPOT HERBICIDE TREATMENTS ARE REQUIRED. MOWING SHOULD BE CONDUCTED DURING THE FIRST YEAR IN AREAS OF THE SITE IDENTIFIED TO HAVE VEGETATION OVER 18 INCHES IN HEIGHT. AREAS WITH GROUNDCOVER HEIGHT UNDER 18 INCHES MAY REMAIN UNTIL THE NEXT SCHEDULED MONITORING VISIT. NEWLY SEEDED AREAS SHOULD BE CUT BACK TO 9 INCHES IN HEIGHT, IF POSSIBLE, AS THE LOWER MOWING HEIGHT HELPS TO REDUCE OPPORTUNISTIC WEEDY SPECIES.

SECOND YEAR:

SITE VISITS ARE RECOMMENDED TO BE PERFORMED ONE TO THREE TIMES THROUGHOUT THE SPRING, SUMMER, AND FALL, WITH MONITORING AND EVALUATION OF VEGETATION HEIGHT AND PRESENCE OF INVASIVE SPECIES OCCURRING AT EACH VISIT. DURING THE FIRST VISIT OF THE YEAR, MOWING SHOULD OCCUR TO CUT BACK ANY VEGETATION TO A HEIGHT OF 9 INCHES AND REMOVE DEAD STALKS AND SEED HEADS FROM THE PREVIOUS GROWING SEASON. IF WEEDY SPECIES ARE IDENTIFIED DURING AN OBSERVATION, MEASURES TO CONTROL INVASIVE WOODY AND HERBACEOUS FLORA THROUGH PHYSICAL REMOVAL OR SPOT HERBICIDE TREATMENTS ARE REQUIRED.

MOWING SHOULD BE CONDUCTED AT EACH ADDITIONAL VISIT IN AREAS OF THE SITE IDENTIFIED TO HAVE VEGETATION OVER 24 INCHES IN HEIGHT. AREAS WITH GROUNDCOVER HEIGHT UNDER 24 INCHES MAY REMAIN UNTIL THE NEXT SCHEDULED MONITORING VISIT. VEGETATIVE AREAS SHOULD BE CUT BACK TO 12 INCHES IN HEIGHT.

THIRD YEAR:

SITE VISITS ARE RECOMMENDED TO BE PERFORMED ONE-TO-TWO TIMES DURING THE EARLY SPRING, SUMMER, AND FALL WITH MONITORING AND EVALUATION OF VEGETATION HEIGHT AND PRESENCE OF INVASIVE SPECIES OCCURRING AT EACH VISIT. DURING THE FIRST VISIT OF THE YEAR, MOWING SHOULD OCCUR TO CUT BACK ANY VEGETATION TO A HEIGHT BETWEEN 9 AND 12 INCHES TO REMOVE DEAD STALKS AND SEED HEADS FROM THE PREVIOUS GROWING SEASON. IF WEEDY SPECIES ARE IDENTIFIED DURING AN OBSERVATION, MEASURES TO CONTROL INVASIVE WOODY AND HERBACEOUS FLORA THROUGH PHYSICAL REMOVAL OR SPOT HERBICIDE TREATMENTS ARE REQUIRED.

MOWING SHOULD BE CONDUCTED IN AREAS OF THE SITE IDENTIFIED TO HAVE VEGETATION OVER 36 INCHES IN HEIGHT. AREAS WITH GROUNDCOVER HEIGHT UNDER 36 INCHES MAY REMAIN UNTIL THE NEXT SCHEDULED MONITORING VISIT. VEGETATIVE AREAS SHOULD BE CUT BACK TO 12 INCHES IN HEIGHT.

FOLLOWING THE THIRD YEAR:

SITE VISITS ARE RECOMMENDED TO BE PERFORMED AT LEAST ONCE A YEAR, DURING THE EARLY SPRING, WITH MONITORING AND EVALUATION OF VEGETATION HEIGHT AND PRESENCE OF INVASIVE SPECIES OCCURRING DURING THE VISIT. DURING THE SPRING, MOWING SHOULD OCCUR TO CUT BACK ANY VEGETATION TO A HEIGHT BETWEEN 9 AND 12 INCHES TO REMOVE DEAD STALKS AND SEED HEADS FROM THE PREVIOUS GROWING SEASON. IF WEEDY SPECIES ARE IDENTIFIED DURING AN OBSERVATION, MEASURES TO CONTROL INVASIVE WOODY AND HERBACEOUS FLORA THROUGH PHYSICAL REMOVAL OR SPOT HERBICIDE TREATMENTS ARE REQUIRED.

FOR THE REMAINDER OF THE YEAR, MOWING MAY ONLY BE NECESSARY IN AREAS THAT ARE IDENTIFIED TO HAVE INVASIVE OR WEEDY VEGETATION. VEGETATIVE AREAS SHOULD BE CUT BACK TO 12 INCHES IN HEIGHT.

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KHA PROJECT 161262002
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SWAN BESS AND CYGNET BESS
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SWAN ENERGY STORAGE LLC AND CYGNET ENERGY STORGAGE LLC
COMSTOCK TOWNSHIP MI

LANDSCAPE DETAILS

SHEET NUMBER
L201

MISS DIG 811

K:\TCW_LDEV\Copenhagen Infrastructure Partners\Swan BESS_MI\2 Design\CAD\PlanSheets\L1-LANDSCAPE DETAILS.DWG June 05, 2026 - 11:48am
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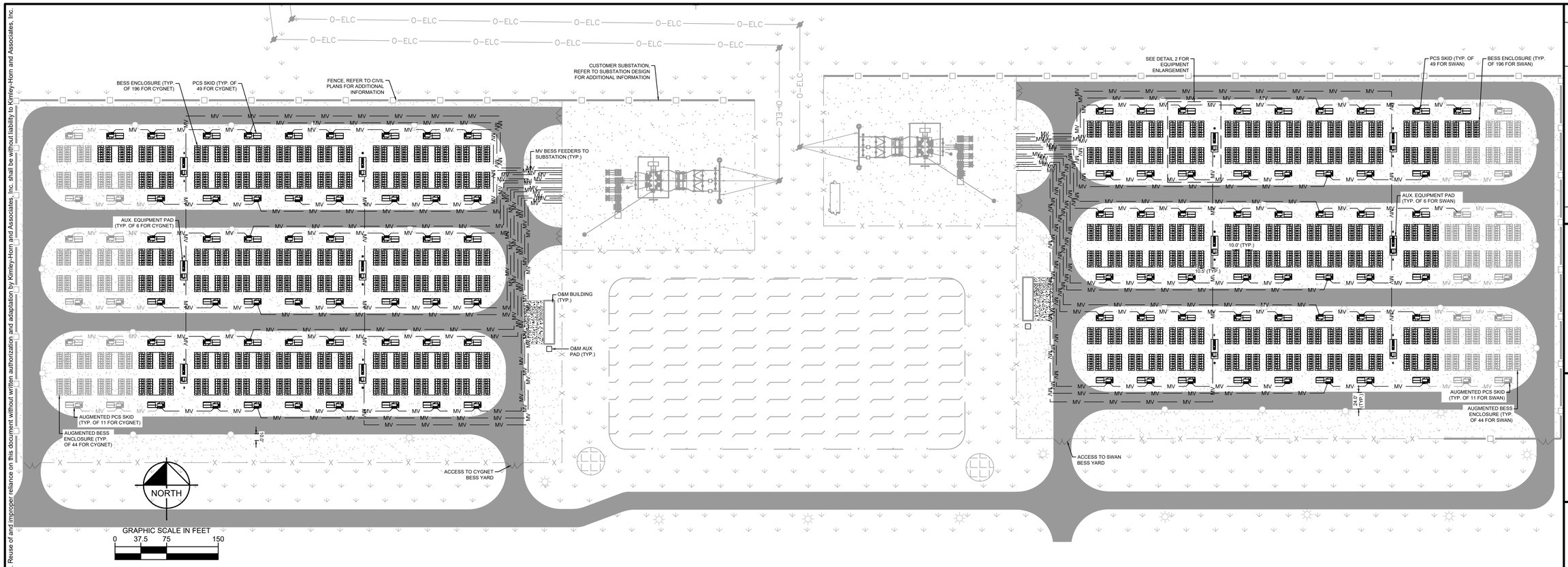


GENERAL NOTES:

1. CONTRACTOR TO VERIFY EXISTING SITE CONDITIONS AND EQUIPMENT LOCATIONS PRIOR TO STARTING ANY WORK.
2. CONDUIT ROUTING IS SHOWN DIAGRAMMATICALLY ON PLANS AND IS ONLY AN APPROXIMATION. THE EXACT ROUTING SHALL BE FIELD VERIFIED AND INSTALLED PER JURISDICTIONAL, MANUFACTURER, AND CLIENT REQUIREMENTS.
3. REFER TO CIVIL PLANS FOR ROAD AND OTHER CIVIL FEATURES.
4. GRAYED OUT EQUIPMENT IS TO BE INSTALLED AT A LATER DATE AS PART OF AUGMENTATION SCOPE.
5. CONTRACTOR TO ENSURE AUGMENTATION AREA IS FREE FROM CONDUITS.
6. CONTRACTOR TO PLACE CONDUITS STUB-OUTS WITH ENDCAPS FOR TIE-IN OF FUTURE AUGMENTATION EQUIPMENT.
7. TRENCH DRAWING IS DIAGRAMMATIC ONLY AND IS INTENDED TO SHOW TRENCH DEPTHS AND CONDUIT/CONDUCTOR SPACING RELATIVE TO THE SITE POWER DISTRIBUTION REQUIREMENTS. AMPACITY STUDY TO BE CONDUCTED DURING FUTURE REVISIONS TO DETERMINE CIRCUIT TRENCH SPACING.
8. TRENCHING AND CABLE INSTALLATION MUST BE COORDINATED TO AVOID ALL OBSTRUCTIONS. REFER TO CIVIL AND STRUCTURAL DRAWINGS FOR EQUIPMENT LOCATIONS, GRADING AND UNDERGROUND OBSTRUCTIONS.
9. INSTALL 6" WIDE RED DETECTABLE MARKER TAPE IN ALL TRENCHES.
10. WIDEN TRENCH AS NEEDED TO SUPPORT FEEDER QUANTITY.

LEGEND:

MV — MV FEEDER CABLES

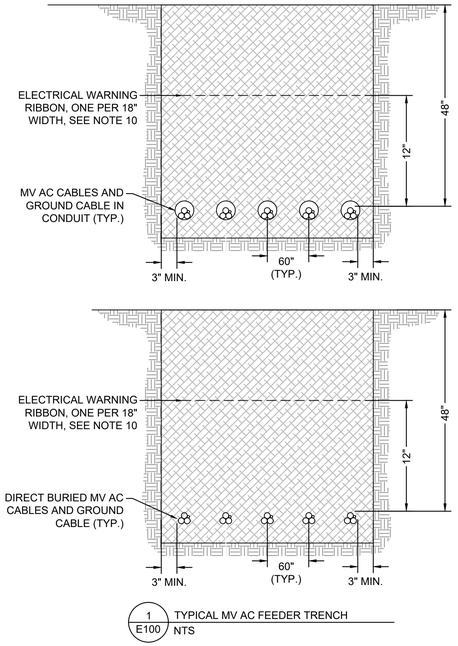
LIGHT FIXTURE

UNDISTURBED EARTH

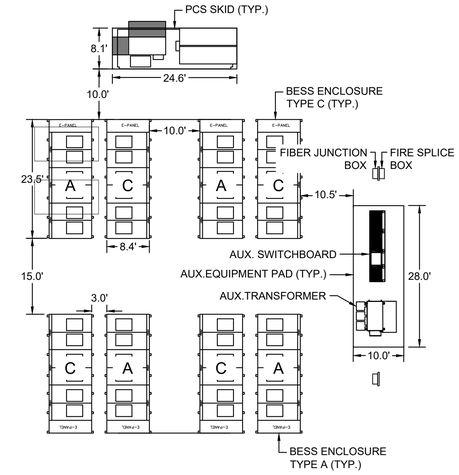
BACKFILL WITH CLEAN ENGINEERED MATERIAL, REFER TO GEOTECHNICAL SPECIFICATIONS FOR GRADATION AND COMPACTION REQUIREMENTS. REMOVE NATIVE MATERIAL IN ACCORDANCE WITH ENVIRONMENTAL REMEDIATION PLAN.

CYGNET BESS SYSTEM DESCRIPTION	
BESS OPERATING CAPACITY	200 MW / 800 MWh
INTERCONNECTION VOLTAGE	138 kV
SITE LAT/LONG	42.2936, -85.4782
POWER CONVERSION STATION INVERTER	
MAKE	EPC POWER
MODEL	M SYSTEM +M10
QUANTITY	(49) 5.3 MVA PCS (11) 5.3 MVA AUGMENTED PCS) (CURTAILED TO MEET 200MW AT POI)
ENERGY STORAGE SYSTEM	
MAKE	LG
MODEL	JF2 DC LINK
CONFIGURATION TO GRID	AC COUPLED
DURATION (@ MAX)	4 HOURS
CONTAINER CAPACITY (@ MAX)	1,278 kW / 5112 kWh
CONTAINER QUANTITY	98 TYPE A (22 AUGMENTED) 98 TYPE C (22 AUGMENTED)
AUXILIARY EQUIPMENT	
AUX SWITCHBOARD MODEL	TBD
AUX SWITCHBOARD QUANTITY	6
AUX TRANSFORMER MODEL	TBD
AUX TRANSFORMER QUANTITY	6
BATTERY MANAGEMENT SYSTEM	
MAKE	LG
MODEL	STANDARD
AUGMENTATION SCHEDULE	
YEAR 5	102.2 MWh
YEAR 11	122.7 MWh

SWAN BESS SYSTEM DESCRIPTION	
BESS OPERATING CAPACITY	200 MW / 800 MWh
INTERCONNECTION VOLTAGE	138 kV
SITE LAT/LONG	42.2936, -85.4782
POWER CONVERSION STATION INVERTER	
MAKE	EPC POWER
MODEL	M SYSTEM +M10
QUANTITY	(49) 5.3 MVA PCS (11) 5.3 MVA AUGMENTED PCS) (CURTAILED TO MEET 200MW AT POI)
ENERGY STORAGE SYSTEM	
MAKE	LG
MODEL	JF2 DC LINK
CONFIGURATION TO GRID	AC COUPLED
DURATION (@ MAX)	4 HOURS
CONTAINER CAPACITY (@ MAX)	1,278 kW / 5112 kWh
CONTAINER QUANTITY	98 TYPE A (22 AUGMENTED) 98 TYPE C (22 AUGMENTED)
AUXILIARY EQUIPMENT	
AUX SWITCHBOARD MODEL	TBD
AUX SWITCHBOARD QUANTITY	6
AUX TRANSFORMER MODEL	TBD
AUX TRANSFORMER QUANTITY	6
BATTERY MANAGEMENT SYSTEM	
MAKE	LG
MODEL	STANDARD
AUGMENTATION SCHEDULE	
YEAR 5	102.2 MWh
YEAR 11	122.7 MWh



1 E100 TYPICAL MV AC FEEDER TRENCH
NTS



2 E100 EQUIPMENT ENLARGEMENT
1" = 15'

ISSUED FOR PERMIT - NOT FOR CONSTRUCTION

REVISIONS	XX/XX/XX	XXX
1		

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3000 TOWN CENTER, SUITE 2600
SOUTHFIELD, MI 48075
(312) 726 9445

CIP
Copenhagen Infrastructure Partners

KHA PROJECT 161262002
DATE 03/27/2026
SCALE AS SHOWN
DESIGNED BY NJA
DRAWN BY TOZ
CHECKED BY JMM

SITE PLAN

SWAN BESS AND CYGNET BESS
PREPARED FOR
SWAN ENERGY STORAGE LLC AND CYGNET ENERGY STORGAGE LLC
COMSTOCK TOWNSHIP
MI

SHEET NUMBER
E100

MISS DIG 811

This document, together with the concepts and designs presented herein, as an instrument of service, is intended only for the specific purpose and client for which it was prepared. Reuse of and improper reliance on this document without written authorization and adaptation by Kimley-Horn and Associates, Inc. shall be without liability to Kimley-Horn and Associates, Inc.
K:\TCW_LDE\Copenhagen Infrastructure Partners\Swan BESS_MI2 Design\CAD\PlanSheets\E-100 - SITE PLAN.dwg June 08, 2026 - 12:40pm

\\TCWfiler01\Projects01\MW_TCW\Data\TCW_LDEV\Copenhagen Infrastructure Partners\Swan BESS_MI2 Design\CAD\PlanSheets\PP100-PHOTOMETRICS PLAN.dwg June 08, 2026 - 12:49pm

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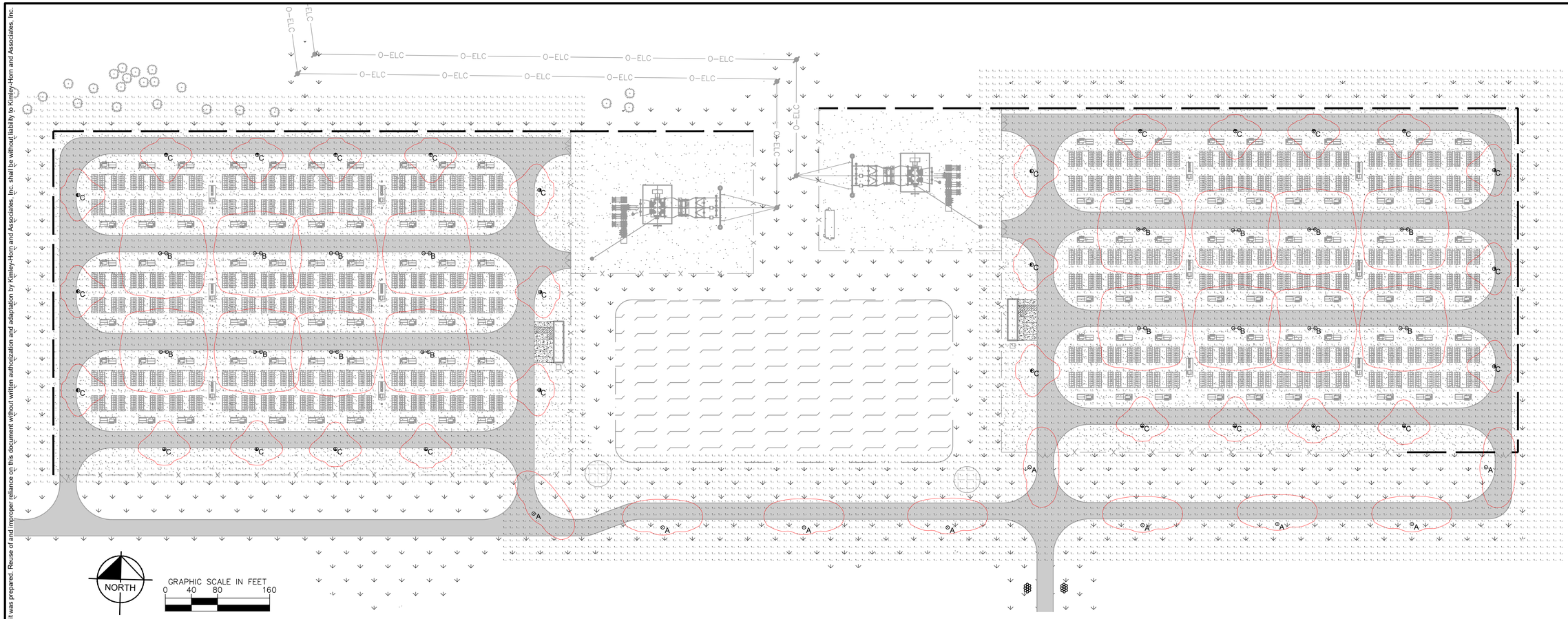


GENERAL NOTES

1. PROPOSED POLE MOUNTED LUMINAIRES TO BE POST TOP MOUNTED ON A 25 FOOT POLE ATOP A CONCRETE BASE FLUSHED MOUNTED WITH THE GROUND UNLESS OTHERWISE SPECIFIED. POLE MOUNTING HEIGHT CHOSEN TO COMPLY WITH THE TOWNSHIP OF COMSTOCK TOWNSHIP, MICHIGAN JURISDICTIONAL STANDARDS.
2. CALCULATED VALUES ARE DERIVED THROUGH A COMPUTER BASED MODEL WITH LIGHT FIXTURE DATA AS SUPPLIED BY MANUFACTURER THROUGH IES FILES.
3. ANY DEVIATION FROM SPECIFIED FIXTURE MODELS AND MOUNTING HEIGHTS IN THIS EXHIBIT WILL DISCOUNT THE VALIDITY OF THESE CALCULATIONS.
4. NO EXCESS OF 0.2 FOOT-CANDLE MEASURED AT THE PROPERTY LINE.
5. ALL LUMINAIRE SYMBOLS ARE DIAGRAMMATIC ONLY. CONTRACTOR TO FIELD COORDINATE EXACT LOCATIONS AND SETBACKS AGAINST UNDERGROUND UTILITY AND OTHER OBSTRUCTIONS.
6. ALL PROPOSED LUMINAIRES SHALL BE DARK SKY COMPLIANT AND SHALL HAVE A CORRELATED COLOR TEMPERATURE (CCT) OF 3000K OR LOWER. LUMINAIRES SHALL BE DESIGNED AND INSTALLED TO MINIMIZE UPLIGHT, GLARE, AND LIGHT TRESPASS IN ACCORDANCE WITH APPLICABLE LOCAL ORDINANCES.

LIGHT DISTRIBUTION AND RANGE (FC)	
———	> 1.0

LIGHT FIXTURE SCHEDULE

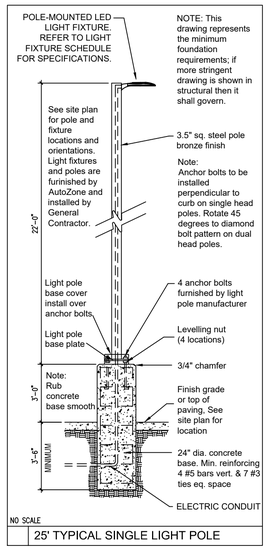
FIXTURE TAG	SYMBOL	QTY	DESCRIPTION	ARRANGEMENT	LLF	LUMENS	LUMINAIRE WATTS	MOUNTING HEIGHT(FT)
A		9	DSX1 LED P7 30K 70CRI T2M HS	SINGLE	0.9	18277	184	25
B		16	DSX1 LED P7 30K 70CRI T5W	BACK-TO-BACK	0.9	22609	184	25
C		28	DSX1 LED P7 30K 70CRI T5W HS	SINGLE	0.9	15358	184	25

CYGNET CALCULATION SUMMARY

LABEL	CALC TYPE	UNITS	AVG	MAX	MIN	AVG/MIN	MAX/MIN
CYGNET SITE CALC	ILLUMINANCE	FC	0.94	3.00	0.00	N/A	N/A
CYGNET ISLAND 1	ILLUMINANCE	FC	0.80	2.30	0.00	N/A	N/A
CYGNET ISLAND 2	ILLUMINANCE	FC	1.15	3.00	0.00	N/A	N/A
CYGNET ISLAND 3	ILLUMINANCE	FC	0.95	3.00	0.00	N/A	N/A
CYGNET O&M PARKING	ILLUMINANCE	FC	0.73	0.90	0.60	1.22	1.50
CYGNET ROAD	ILLUMINANCE	FC	2.03	2.90	0.70	2.90	4.14

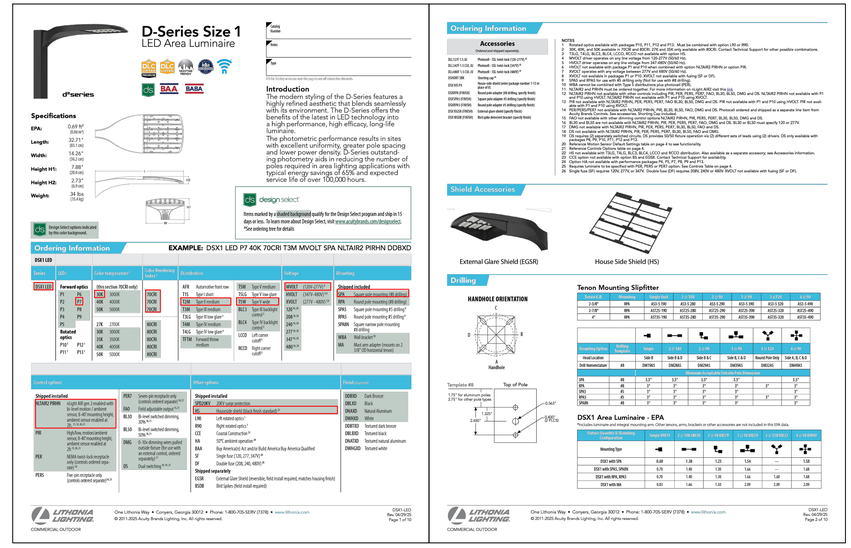
SWAN CALCULATION SUMMARY

LABEL	CALC TYPE	UNITS	AVG	MAX	MIN	AVG/MIN	MAX/MIN
SWAN SITE CALC	ILLUMINANCE	FC	0.88	3.00	0.00	N/A	N/A
SWAN ISLAND 1	ILLUMINANCE	FC	0.70	2.30	0.00	N/A	N/A
SWAN ISLAND 2	ILLUMINANCE	FC	0.97	3.00	0.00	N/A	N/A
SWAN ISLAND 3	ILLUMINANCE	FC	0.79	3.00	0.00	N/A	N/A
SWAN O&M PARKING	ILLUMINANCE	FC	0.58	0.90	0.40	1.45	2.25
SWAN ROAD	ILLUMINANCE	FC	2.05	3.00	0.50	4.10	6.00



NO SCALE

25' TYPICAL SINGLE LIGHT POLE



KHA PROJECT	
161262002	
DATE	
03/27/2026	
SCALE	AS SHOWN
DESIGNED BY	NJA
DRAWN BY	TOZ
CHECKED BY	JMM

REVISIONS	XX/XX/XX	XXX

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SWAN BESS AND CYGNET BESS

PREPARED FOR
SWAN ENERGY STORAGE LLC AND
CYGNET ENERGY STORGAGE LLC
COMSTOCK
TOWNSHIP

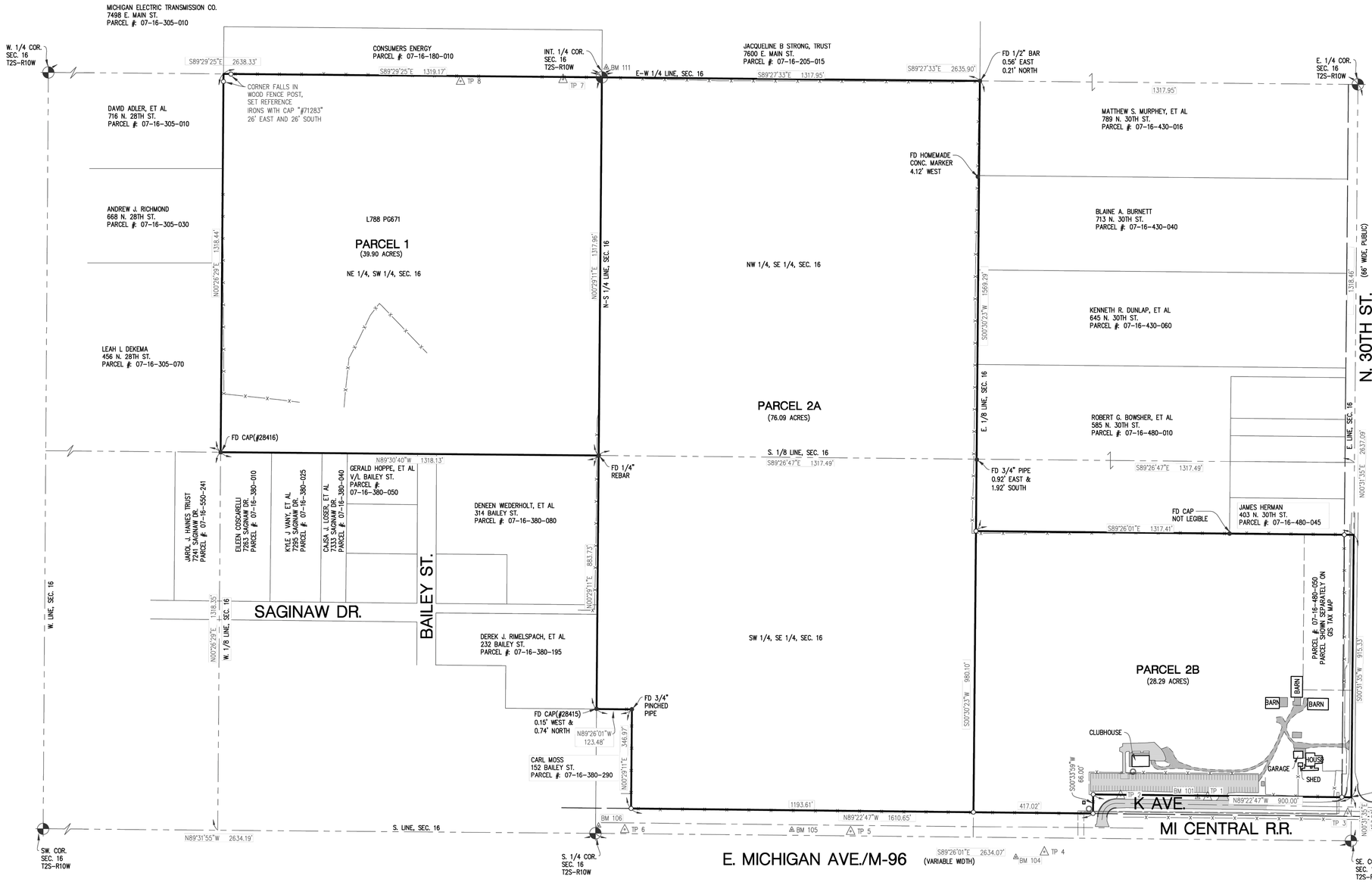
MI

PHOTOMETRICS PLAN

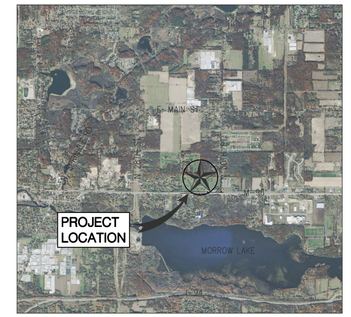
SHEET NUMBER
PP100

MISS DIG 811

EXHIBIT B: DRAFT ALTA SURVEY



LOCATION MAP: N.T.S.





LEGEND

- TRAVERSE POINT
- BENCHMARK
- SET IRON
- FOUND IRON
- SECTION & 1/4 CORNER
- WATER WELL
- ONE POST TRAFFIC SIGN
- GUY WIRE
- UTILITY POLE
- ROUND CATCHBASIN
- CENTERLINE OF ROAD
- FENCE
- BUILDING
- SECTION LINE
- PROPERTY LINE (APPROX)
- U.G. GAS LINE
- EDGE OF CONCRETE
- EDGE OF ASPHALT
- EDGE OF GRAVEL

CERTIFICATION:

TO:
KIMLEY HORN OF MICHIGAN, INC
CI IV MASTER DEVCO, LLC
FIRST AMERICAN TITLE INSURANCE COMPANY

THIS IS TO CERTIFY THAT THIS MAP OR PLAT AND THE SURVEY ON WHICH IT IS BASED WERE MADE IN ACCORDANCE WITH THE 2021 MINIMUM STANDARD DETAIL REQUIREMENTS FOR ALTA/NSPS LAND TITLE SURVEYS, JOINTLY ESTABLISHED AND ADOPTED BY ALTA AND NSPS, AND INCLUDES ITEMS 1, 3, 4, 5, 8, 9, 11, 13 AND 16 OF TABLE A THEREOF. THE FIELDWORK WAS COMPLETED ON FEBRUARY 24, 2026.

DATE OF PLAT OR MAP [2026-03-06] [ROBERT A. CHURCH & 4001071293]

PRELIMINARY: MAY 22, 2026

PLAN DATE: 3/6/26
PROJECT MGR: RAC
REVIEWER: RAC
SCALE: 1" = 200'

ROWE PROFESSIONAL SERVICES COMPANY
507 36th Street SE
Grand Rapids, MI 49548
O: (616) 272-7125
www.rowepsc.com

ALTA/NSPS LAND TITLE SURVEY PREPARED FOR
CI IV MASTER DEVCO, LLC.
SWAN BESS PROJECT
PART OF SECTION 16, T2S, R10W
COMSTOCK TOWNSHIP, KALAMAZOO COUNTY, MICHIGAN

REV:
V100
SHT# 1 OF 2
JOB No: 2600026

PLOTTED: 5/22/2026 10:17 AM R:\Projects\2600026\Survey\SV-2600026-ALTA.dwg

LEGAL DESCRIPTION PER FIRST AMERICAN TITLE INSURANCE COMPANY COMMITMENT NO. NCS-FA500MI27-NRG, DATED DECEMBER 02, 2025 AT 8:00AM

RECORD LEGAL DESCRIPTION:

LAND IN THE TOWNSHIP OF COMSTOCK, KALAMAZOO COUNTY, MI, DESCRIBED AS FOLLOWS:

PARCEL 1:

THE NORTHEAST QUARTER OF THE SOUTHWEST QUARTER OF SECTION 16, TOWN 2 SOUTH, RANGE 10 WEST.

PARCEL 2A:

THE WEST HALF OF THE SOUTHEAST QUARTER OF SECTION 16, TOWN 2 SOUTH, RANGE 10 WEST, EXCEPT BEGINNING AT THE INTERSECTION OF THE NORTH AND SOUTH QUARTER LINE OF SAID SECTION WITH THE NORTH LINE OF THE RIGHT OF WAY OF THE MICHIGAN CENTRAL RAILROAD AND RUNNING THENCE NORTH 0 DEGREES 8 MINUTES WEST ALONG SAID QUARTER LINE 347 FEET, THENCE SOUTH 89 DEGREES 58 MINUTES EAST PARALLEL TO THE NORTH LINE OF SAID RIGHT OF WAY 123.47 FEET; THENCE SOUTH 0 DEGREES 8 MINUTES EAST PARALLEL TO SAID QUARTER LINE 347 FEET TO THE NORTH LINE OF SAID RAILROAD RIGHT OF WAY; THENCE NORTH 89 DEGREES 58 MINUTES WEST ALONG THE NORTH LINE OF SAID RIGHT OF WAY 123.47 FEET TO THE PLACE OF BEGINNING; ALSO EXCEPT THE RIGHT OF WAY OF THE MICHIGAN CENTRAL RAILROAD AS LOCATED OVER AND ACROSS THE FIRST ABOVE DESCRIBED PARCEL OF LAND.

PARCEL 2B:

PART OF THE EAST 1/2 OF THE SOUTHEAST 1/4 OF SECTION 16 OF TOWN 2 SOUTH, RANGE 10 WEST, DESCRIBED AS COMMENCING AT THE INTERSECTION OF THE EAST LINE OF SAID SECTION 16 WITH THE NORTH LINE OF THE RIGHT OF WAY OF THE MICHIGAN CENTRAL RAILROAD; THENCE NORTH ON THE EAST SECTION LINE 980 FEET; THENCE WEST PARALLEL WITH THE NORTH LINE OF SAID RIGHT OF WAY OF THE MICHIGAN CENTRAL RAILROAD TO THE NORTH AND SOUTH 1/8 LINE OF SAID SOUTHEAST 1/4 OF SECTION 16, THENCE SOUTH THEREON 980 FEET TO THE NORTH LINE OF SAID MICHIGAN CENTRAL RAILROAD RIGHT OF WAY; THENCE EAST THEREON TO THE PLACE OF BEGINNING, EXCEPT THE SOUTH 66 FEET OF THE EAST 900 FEET THEREOF.

UTILITY INFORMATION:

PER MISS DIG TICKET NUMBER: 202600900273-000, SUBMITTED ON 2/9/2026

MISS DIG TICKET RESPONDERS (AS OF 3/6/2026):

ATT	MAP PROVIDED-SITE CLEAR
CONSUMERS ENERGY ELECTRIC	MAP PROVIDED-SITE CLEAR
CONSUMERS ENERGY GAS	MAPS PROVIDED-APPROXIMATE LOCATIONS SHOWN HEREON
KALAMAZOO CITY WATER	MAP PROVIDED-SITE CLEAR, MAIN IN M-96 RIGHT OF WAY
LEVEL 3(LUMEN) FIBER OPTICS	MAP PROVIDED-SITE CLEAR, LINES IN M-96 RIGHT OF WAY

MISS DIG TICKET NON-RESPONDERS (AS OF 3/6/2026):
COMSTOCK CHARTER TWP SANITARY SEWER
CHARTER CABLE TV
U.S. SIGNAL CORPS FIBER OPTICS

THERE MAY BE ABOVE GROUND AND BELOW GROUND UTILITIES THAT WERE NOT GRAPHICALLY SHOWN ON THE DRAWING DUE TO MISS DIG TICKET MEMBERS NOT RESPONDING TO THE ABOVE MENTIONED TICKET.

TRAVERSE POINTS:

TP #1
SET 1/2" X 18" REROD WITH ROWE TRAV CAP 30'± WEST OF CENTERLINE OF DRIVE TO GOLF COURSE 18'± NORTH OF CENTERLINE K AVE
NORTHING = 289448.390
EASTING = 12823526.635

TP #2
SET 1/2" X 18" REROD WITH ROWE TRAV CAP 25'± NORTH OF CENTERLINE K AVE 20'± EAST OF POWER POLE
NORTHING = 289453.838
EASTING = 12823223.140

TP #3
SET 1/2" X 18" REROD WITH ROWE TRAV CAP 20'± NORTH OF CENTERLINE K AVE 10'± WEST OF K AVE AND 30TH ST SIGN
NORTHING = 289391.579
EASTING = 12824015.001

TP #4
SET 1/2" X 18" REROD WITH ROWE TRAV CAP 40'± SOUTH OF M-96 CENTERLINE 100'± WEST OF CENTERLINE 30TH AVE
NORTHING = 289257.421
EASTING = 12822957.361

TP #5
SET 1/2" X 18" REROD WITH ROWE TRAV CAP 18'± NORTH OF M-96 CENTERLINE 110'± EAST OF LANDALE ST TO SOUTH
NORTHING = 289328.435
EASTING = 12822281.747

TP #6
SET 1/2" X 18" REROD WITH ROWE TRAV CAP 20'± NORTH OF M-96 CENTERLINE 75'± WEST OF CENTERLINE ELLIOT ST CENTERLINE
NORTHING = 289334.845
EASTING = 12821494.400

TP #7
SET 1/2" X 18" REROD WITH ROWE TRAV CAP 7'± SOUTH OF EAST-WEST FENCE 40'± WEST OF NORTH-SOUTH TREE LINE
NORTHING = 291949.894
EASTING = 12821279.511

TP #8
SET 1/2" X 18" REROD WITH ROWE TRAV CAP 15'± SOUTH OF EAST-WEST FENCE 15'± S15W OF 4X4 POST
NORTHING = 291943.852
EASTING = 12823491.749

ALL COORDINATE VALUES ARE GRID.

SCHEDULE B, PART II, EXCEPTIONS, PER FIRST AMERICAN TITLE INSURANCE COMPANY COMMITMENT NO. NCS-FA500MI27-NRG, DATED DECEMBER 02, 2025 AT 8:00AM

1. ANY DEFECT, LIEN, ENCUMBRANCE, ADVERSE CLAIM, OR OTHER MATTER THAT APPEARS FOR THE FIRST TIME IN THE PUBLIC RECORDS OR IS CREATED, ATTACHES, OR IS DISCLOSED BETWEEN THE COMMITMENT DATE AND THE DATE ON WHICH ALL OF THE SCHEDULE B, PART I—REQUIREMENTS ARE MET.
   LEGAL IN NATURE, NOT A MATTER OF SURVEYING
2. ANY FACTS, RIGHTS, INTERESTS OR CLAIMS THAT ARE NOT SHOWN BY THE PUBLIC RECORDS BUT THAT COULD BE ASCERTAINED BY AN INSPECTION OF THE LAND OR BY MAKING INQUIRY OF PERSONS IN POSSESSION OF THE LAND.
   LEGAL IN NATURE, NOT A MATTER OF SURVEYING
3. EASEMENTS, LIENS OR ENCUMBRANCES, OR CLAIMS THEREOF, NOT SHOWN BY THE PUBLIC RECORDS.
   LEGAL IN NATURE, NOT A MATTER OF SURVEYING
4. ANY ENCROACHMENT, ENCUMBRANCE, VIOLATION, VARIATION, OR ADVERSE CIRCUMSTANCE AFFECTING THE TITLE INCLUDING DISCREPANCIES, CONFLICTS IN BOUNDARY LINES, SHORTAGE IN AREA, OR ANY OTHER FACTS THAT WOULD BE DISCLOSED BY AN ACCURATE AND COMPLETE LAND SURVEY OF THE LAND, AND THAT ARE NOT SHOWN IN THE PUBLIC RECORDS.
   NONE OBSERVED DURING FIELD SURVEY OR DISCOVERED AS A RESULT OF FURTHER RESEARCH
5. TAXES AND ASSESSMENTS NOT DUE AND PAYABLE AT COMMITMENT DATE.
   LEGAL IN NATURE, NOT A MATTER OF SURVEYING
6. ANY LIEN OR RIGHT TO A LIEN, IMPOSED BY LAW, AS A RESULT OF SERVICES, LABOR, AND/OR MATERIALS USED, OR TO BE USED, FOR IMPROVEMENT TO THE LAND.
   LEGAL IN NATURE, NOT A MATTER OF SURVEYING
7. WATER RIGHTS, CLAIMS OR TITLE TO WATER, WHETHER OR NOT SHOWN BY THE PUBLIC RECORDS.
   LEGAL IN NATURE, NOT A MATTER OF SURVEYING
8. ANY CLAIM TO (A) OWNERSHIP OF OR RIGHTS TO MINERALS AND SIMILAR SUBSTANCES, INCLUDING BUT NOT LIMITED TO ORES, METALS, COAL, LIGNITE, OIL, GAS, URANIUM, CLAY, ROCK, SAND, AND GRAVEL LOCATED IN, ON, OR UNDER THE LAND OR PRODUCED FROM THE LAND, WHETHER SUCH OWNERSHIP OR RIGHTS ARISE BY LEASE, GRANT, EXCEPTION, CONVEYANCE, RESERVATION, OR OTHERWISE; AND (B) ANY RIGHTS, PRIVILEGES, IMMUNITIES, RIGHTS OF WAY, AND EASEMENTS ASSOCIATED THEREWITH OR APPURTENANT THERETO, WHETHER OR NOT THE INTERESTS OR RIGHTS EXCEPTED IN (A) OR (B) APPEAR IN THE PUBLIC RECORDS OR ARE SHOWN IN SCHEDULE B.
   LEGAL IN NATURE, NO SUCH CLAIMS OR INTERESTS DISCOVERED AS A RESULT OF THIS SURVEY
9. ALL TAX MAP NUMBERS REFERRED TO IN THE TITLE REPORT AND FINAL POLICY ARE FOR INFORMATIONAL PURPOSES ONLY AND FIRST AMERICAN TITLE INSURANCE COMPANY DOES NOT INSURE, NOR LIMIT THE EXCEPTIONS, TO THE TAX MAP NUMBERS INDICATED.
   ADJOINING PARCEL LINES AND OWNER INFORMATION SHOWN PER AVAILABLE GIS/TAX MAP AND ARE APPROXIMATE
10. COVENANTS, CONDITIONS, TERMS AND/OR RESTRICTIONS CONTAINED IN A WARRANTY DEED RECORDED MARCH 29, 1962 IN/AS LIBER 788, PAGE 671, OF KALAMAZOO COUNTY RECORDS.
    DEED INCLUDES PARCEL 1, DEEDED RESTRICTIONS DO NOT APPLY TO THE SUBJECT PARCEL
11. EASEMENT DEED BY COURT ORDER IN SETTLEMENT OF LANDOWNER ACTION BY AND BETWEEN DAVID K DART AND DEBRA L DART AND SPRINT COMMUNICATIONS COMPANY L.P., QWEST COMMUNICATIONS COMPANY, LLC, LEVEL 3 COMMUNICATIONS, LLC, AND WILTEL COMMUNICATIONS, LLC CREATED BY INSTRUMENT RECORDED SEPTEMBER 17, 2013 IN/AS INSTRUMENT NO. 2013-038710, OF KALAMAZOO COUNTY RECORDS. (AFFECTS PARCEL 2A AND 2B)
    EASEMENT NOT PLOTTABLE DUE TO LACK OF INFORMATION REGARDING UNDERGROUND CABLES
12. INTEREST OF OTHERS IN OIL, GAS AND MINERAL RIGHTS, IF ANY, WHETHER OR NOT RECORDED IN THE PUBLIC RECORDS.
    LEGAL IN NATURE, NOT A MATTER OF SURVEYING
13. INTEREST, IF ANY, OF THE UNITED STATES, STATE OF MICHIGAN, OR ANY POLITICAL SUBDIVISION THEREOF, IN THE OIL, GAS AND MINERALS IN AND UNDER AND THAT MAY BE PRODUCED FROM THE LAND.
    LEGAL IN NATURE, NOT A MATTER OF SURVEYING
14. RIGHTS OF TENANTS UNDER UNRECORDED LEASES.
    LEGAL IN NATURE, NOT A MATTER OF SURVEYING
15. TO THE EXTENT A TRACT IS BOUNDED BY A PUBLIC ROAD, RIGHTS OF OTHERS IN AND TO ANY PORTION OF THE PROPERTY THAT LIES WITHIN SAID ROAD.
    RIGHTS OF WAY SHOWN HEREON

SURVEYOR'S NOTES:

1. VERTICAL DATUM IS NAVD88.
2. HORIZONTAL DATUM IS MICHIGAN STATE PLANE COORDINATE SYSTEM, SOUTH ZONE NAD83 (2011).
3. GRID DISTANCE / 0.999932637 = GROUND DISTANCE.
4. BEARINGS ARE BASED UPON MICHIGAN STATE PLANE COORDINATE SYSTEM, SOUTH ZONE NAD83 (2011).
5. THE SUBJECT PROPERTY IS THE SAME AS THE PROPERTY DESCRIBED IN SCHEDULE A OF THE PROVIDED TITLE COMMITMENT.
6. THE LEGAL DESCRIPTION PROVIDED IN SCHEDULE C OF THE PROVIDED TITLE COMMITMENT CONTAINS PROPERTY MEASUREMENTS AS RECORDED.
8. ALL PROPERTY BOUNDARY MEASUREMENTS SHOWN HEREON ARE MEASURED, DISTANCES AND AREAS HAVE BEEN CONVERTED TO GROUND DISTANCES (REFER TO NOTE 3).
9. ALL SECTION CORNERS SHOWN HEREON WERE FOUND IN GOOD CONDITION
10. ALL TITLE DOCUMENTS ARE SHOWN AND/OR NOTED HEREON, INCLUDING THOSE FOR OFFSITE FEATURES/EASEMENTS, IF PROVIDED TO ROWE.
11. RAILROAD RIGHT OF WAY SHOWN BASED ON BEST FIT CENTERLINE OF FIELD OBSERVATIONS, AND QUIT CLAIM DEED AS RECORDED IN LIBER M, PAGE 16, KALAMAZOO COUNTY RECORDS

ALTA STANDARDS - TABLE A NOTES:

1. MONUMENTS PLACED (OR A REFERENCE MONUMENT OR WITNESS TO THE CORNER) AT ALL MAJOR CORNERS OF THE BOUNDARY OF THE SURVEYED PROPERTY, UNLESS ALREADY MARKED OR REFERENCED BY EXISTING MONUMENTS OR WITNESSES IN CLOSE PROXIMITY TO THE CORNER.
   ALL CORNERS HAVE BEEN SET
3. FLOOD ZONE CLASSIFICATION (WITH PROPER ANNOTATION BASED ON FEDERAL FLOOD INSURANCE RATE MAPS OR THE STATE OR LOCAL EQUIVALENT) DEPICTED BY SCALED MAP LOCATION AND GRAPHIC PLOTTING ONLY.
   THE SUBJECT PARCEL(S) IS FULLY WITHIN FLOOD ZONE X (AREA OF MINIMAL FLOOD HAZARD) PER FEMA FIRM MAP 26077C0215E EFFECTIVE 7/31/2024
4. GROSS LAND AREA (AND OTHER AREAS IF SPECIFIED BY THE CLIENT).
   PARCEL 1 = 39.90 ACRES
   PARCEL 2A = 76.09 ACRES
   PARCEL 2B = 28.29 ACRES
   TOTAL = 144.28 ACRES
5. VERTICAL RELIEF WITH THE SOURCE OF INFORMATION (E.G., GROUND SURVEY, AERIAL MAP), CONTOUR INTERVAL, DATUM, WITH ORIGINATING BENCHMARK, WHEN APPROPRIATE.
   VERTICAL RELIEF DETERMINED BY AERIAL LiDAR AND GROUND SURVEY
8. SUBSTANTIAL FEATURES OBSERVED IN THE PROCESS OF CONDUCTING THE FIELDWORK (IN ADDITION TO THE IMPROVEMENTS AND FEATURES REQUIRED PURSUANT TO SECTION 5 ABOVE) (E.G., PARKING LOTS, BILLBOARDS, SIGNS, SWIMMING POOLS, LANDSCAPED AREAS, SUBSTANTIAL AREAS OF REFUSE).
   ALL IMPROVEMENTS OBSERVED DURING SURVEY ARE SHOWN HEREON.
9. NUMBER AND TYPE (E.G., DISABLED, MOTORCYCLE, REGULAR, AND OTHER MARKED SPECIALIZED TYPES) OF CLEARLY IDENTIFIABLE PARKING SPACES ON SURFACE PARKING AREAS, LOTS, AND IN PARKING STRUCTURES. STRIPING OF CLEARLY IDENTIFIABLE PARKING SPACES ON SURFACE PARKING AREAS AND LOTS.
   115 TOTAL PARKING SPACES (112 STANDARD, 3 HANDICAPPED)
11. EVIDENCE OF UNDERGROUND UTILITIES EXISTING ON OR SERVING THE SURVEYED PROPERTY (IN ADDITION TO THE OBSERVED EVIDENCE OF UTILITIES REQUIRED PURSUANT TO SECTION 5.E.IV.) AS DETERMINED BY:
    a. PLANS AND/OR REPORTS PROVIDED BY CLIENT (WITH REFERENCE AS TO THE SOURCES OF INFORMATION)
    PLANS AND INFORMATION RECEIVED VIA MISS DIG DESIGN TICKET NO. 202602090027 3-000 SHOWN AND NOTED HEREON AS APPLICABLE
    b. MARKINGS COORDINATED BY THE SURVEYOR PURSUANT TO A PRIVATE UTILITY LOCATE REQUEST.
    VISIBLE UTILITIES SHOWN HEREON, MICHIGAN MISS DIG DOES NOT MARK UTILITIES FOR SURVEYING OR ENGINEERING PURPOSES
    NOTE TO THE CLIENT, INSURER, AND LENDER – WITH REGARD TO TABLE A, ITEM 11, INFORMATION FROM THE SOURCES CHECKED ABOVE WILL BE COMBINED WITH OBSERVED EVIDENCE OF UTILITIES PURSUANT TO SECTION 5.E.IV. TO DEVELOP A VIEW OF THE UNDERGROUND UTILITIES. HOWEVER, LACKING EXCAVATION, THE EXACT LOCATION OF UNDERGROUND FEATURES CANNOT BE ACCURATELY, COMPLETELY, AND RELIABLY DEPICTED. IN ADDITION, IN SOME JURISDICTIONS, 811 OR OTHER SIMILAR UTILITY LOCATE REQUESTS FROM SURVEYORS MAY BE IGNORED OR RESULT IN AN INCOMPLETE RESPONSE, IN WHICH CASE THE SURVEYOR SHALL NOTE ON THE PLAT OR MAP HOW THIS AFFECTED THE SURVEYOR'S ASSESSMENT OF THE LOCATION OF THE UTILITIES. WHERE ADDITIONAL OR MORE DETAILED INFORMATION IS REQUIRED, THE CLIENT IS ADVISED THAT EXCAVATION MAY BE NECESSARY.
13. NAMES OF ADJOINING OWNERS ACCORDING TO CURRENT TAX RECORDS. IF MORE THAN ONE OWNER, IDENTIFY THE FIRST OWNER'S NAME LISTED IN THE TAX RECORDS FOLLOWED BY "ET AL."
    ADJOINER NAME AND PARCEL NUMBER SHOWN HEREON
16. EVIDENCE OF RECENT EARTH MOVING WORK, BUILDING CONSTRUCTION, OR BUILDING ADDITIONS OBSERVED IN THE PROCESS OF CONDUCTING THE FIELDWORK.
    NO RECENT ACTIVITY OBSERVED DURING FIELD SURVEY

BENCHMARKS:

BM #101
SET SPIKE IN NORTH SIDE OF POWER POLE 100'± WEST OF CENTERLINE DRIVE TO GOLF COURSE
NORTHING = 289447
EASTING = 12823491
ELEVATION = 805.68

BM #104
SET SPIKE IN NORTH SIDE OF POWER POLE 150'± WEST OF CENTERLINE K AVE AT RR CROSSING
NORTHING = 289238
EASTING = 12822857
ELEVATION = 802.64

BM #105
SET SPIKE IN SOUTH SIDE OF GUY POLE 15'± WEST OF CENTERLINE LANDALE ST
NORTHING = 289333
EASTING = 12822076
ELEVATION = 798.95

BM #106
CHISELED SQUARE IN SOUTHEAST CORNER OF HEADWALL 115'± WEST OF CENTERLINE ELLIOT ST 25'± NORTH OF CENTERLINE M-96
NORTHING = 289348
EASTING = 12821403
ELEVATION = 797.35

BM #111
CHISELED 'X' IN WEST SIDE OF CONCRETE BASE OF METAL POLE #8611
NORTHING = 291991
EASTING = 12821430
ELEVATION = 901.83

ALL COORDINATE VALUES ARE GRID

PRELIMINARY: MAY 22, 2026

PLAN DATE: 3/6/2026
PROJECT MGR: RAC
REVIEWER: RAC
SCALE: N/A

ROWE PROFESSIONAL SERVICES COMPANY
507 36th Street SE
Grand Rapids, MI 49548
O: (616) 272-7125
www.rowepsc.com

ALTA/NSPS LAND TITLE SURVEY PREPARED FOR
CI IV MASTER DEVCO, LLC.
SWAN BESS PROJECT
PART OF SECTION 16, T2S, R10W
COMSTOCK TOWNSHIP, KALAMAZOO COUNTY, MICHIGAN

REV:

SHT# V101
JOB No: 2600026

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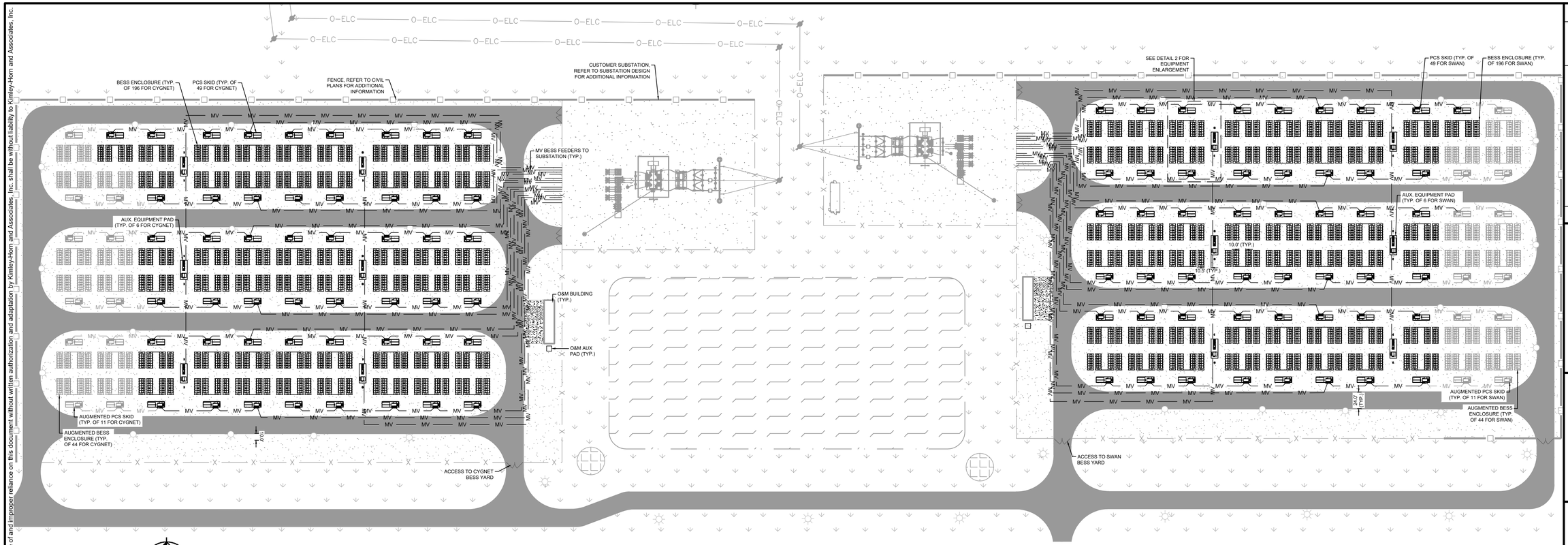
EXHIBIT C: PRELIMINARY ELECTRICAL PLANS



NORTH

GRAPHIC SCALE IN FEET

0 37.5 75 150

GENERAL NOTES:

1. CONTRACTOR TO VERIFY EXISTING SITE CONDITIONS AND EQUIPMENT LOCATIONS PRIOR TO STARTING ANY WORK.
2. CONDUIT ROUTING IS SHOWN DIAGRAMMATICALLY ON PLANS AND IS ONLY AN APPROXIMATION. THE EXACT ROUTING SHALL BE FIELD VERIFIED AND INSTALLED PER JURISDICTIONAL, MANUFACTURER, AND CLIENT REQUIREMENTS.
3. REFER TO CIVIL PLANS FOR ROAD AND OTHER CIVIL FEATURES.
4. GRAYED OUT EQUIPMENT IS TO BE INSTALLED AT A LATER DATE AS PART OF AUGMENTATION SCOPE.
5. CONTRACTOR TO ENSURE AUGMENTATION AREA IS FREE FROM CONDUITS.
6. CONTRACTOR TO PLACE CONDUITS STUB-OUTS WITH ENDCAPS FOR TIE-IN OF FUTURE AUGMENTATION EQUIPMENT.
7. TRENCH DRAWING IS DIAGRAMMATIC ONLY AND IS INTENDED TO SHOW TRENCH DEPTHS AND CONDUIT/CONDUCTOR SPACING RELATIVE TO THE SITE POWER DISTRIBUTION REQUIREMENTS. AMPACITY STUDY TO BE CONDUCTED DURING FUTURE REVISIONS TO DETERMINE CIRCUIT TRENCH SPACING.
8. TRENCHING AND CABLE INSTALLATION MUST BE COORDINATED TO AVOID ALL OBSTRUCTIONS. REFER TO CIVIL AND STRUCTURAL DRAWINGS FOR EQUIPMENT LOCATIONS, GRADING AND UNDERGROUND OBSTRUCTIONS.
9. INSTALL 6" WIDE RED DETECTABLE MARKER TAPE IN ALL TRENCHES.
10. WIDEN TRENCH AS NEEDED TO SUPPORT FEEDER QUANTITY.

LEGEND:

MV — MV FEEDER CABLES

LIGHT FIXTURE

UNDISTURBED EARTH

BACKFILL WITH CLEAN ENGINEERED MATERIAL, REFER TO GEOTECHNICAL SPECIFICATIONS FOR GRADATION AND COMPACTION REQUIREMENTS. REMOVE NATIVE MATERIAL IN ACCORDANCE WITH ENVIRONMENTAL REMEDIATION PLAN.

CYGNET BESS SYSTEM DESCRIPTION	
BESS OPERATING CAPACITY	200 MW / 800 MWh
INTERCONNECTION VOLTAGE	138 kV
SITE LAT/LONG	42.2936, -85.4782
POWER CONVERSION STATION INVERTER	
MAKE	EPC POWER
MODEL	M SYSTEM +M10
QUANTITY	(49) 5.3 MVA PCS (11) 5.3 MVA AUGMENTED PCS) (CURTAILED TO MEET 200MW AT POI)
ENERGY STORAGE SYSTEM	
MAKE	LG
MODEL	JF2 DC LINK
CONFIGURATION TO GRID	AC COUPLED
DURATION (@ MAX)	4 HOURS
CONTAINER CAPACITY (@ MAX)	1,278 kW / 5112 kWh
CONTAINER QUANTITY	98 TYPE A (22 AUGMENTED) 98 TYPE C (22 AUGMENTED)
AUXILIARY EQUIPMENT	
AUX SWITCHBOARD MODEL	TBD
AUX SWITCHBOARD QUANTITY	6
AUX TRANSFORMER MODEL	TBD
AUX TRANSFORMER QUANTITY	6
BATTERY MANAGEMENT SYSTEM	
MAKE	LG
MODEL	STANDARD
AUGMENTATION SCHEDULE	
YEAR X	XXX MWh
YEAR X	XXX MWh
YEAR X	XXX MWh

SWAN BESS SYSTEM DESCRIPTION	
BESS OPERATING CAPACITY	200 MW / 800 MWh
INTERCONNECTION VOLTAGE	138 kV
SITE LAT/LONG	42.2936, -85.4782
POWER CONVERSION STATION INVERTER	
MAKE	EPC POWER
MODEL	M SYSTEM +M10
QUANTITY	(49) 5.3 MVA PCS (11) 5.3 MVA AUGMENTED PCS) (CURTAILED TO MEET 200MW AT POI)
ENERGY STORAGE SYSTEM	
MAKE	LG
MODEL	JF2 DC LINK
CONFIGURATION TO GRID	AC COUPLED
DURATION (@ MAX)	4 HOURS
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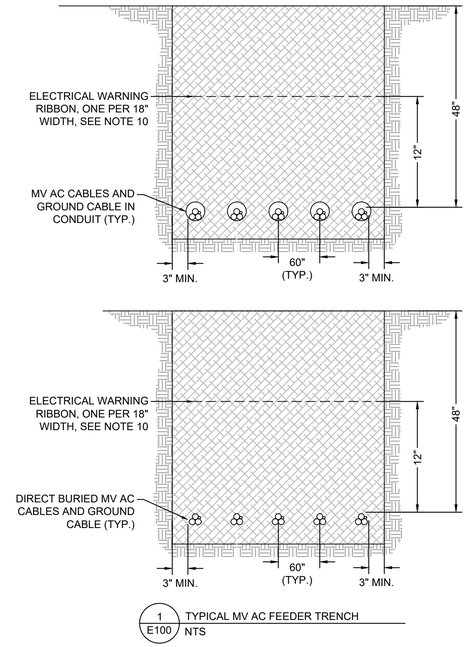
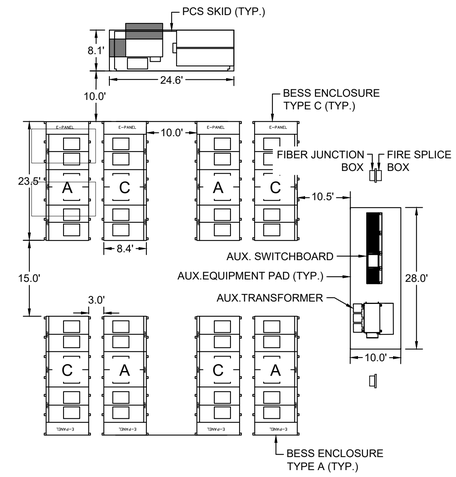
AUX SWITCHBOARD MODEL	TBD
AUX SWITCHBOARD QUANTITY	6
AUX TRANSFORMER MODEL	TBD
AUX TRANSFORMER QUANTITY	6
BATTERY MANAGEMENT SYSTEM	
MAKE	LG
MODEL	STANDARD
AUGMENTATION SCHEDULE	
YEAR X	XXX MWh
YEAR X	XXX MWh
YEAR X	XXX MWh



1 / E100 TYPICAL MV AC FEEDER TRENCH
NTS



2 / E100 EQUIPMENT ENLARGEMENT
1" = 15'

ISSUED FOR PERMIT - NOT FOR CONSTRUCTION

REVISIONS	XX/XX/XX	XXX
1		

Kimley»Horn of Michigan, Inc.

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3000 TOWN CENTER, SUITE 2600
SOUTHFIELD, MI 48075
(312) 726 9445

CIP
Copenhagen Infrastructure Partners

KHA PROJECT 161262002
DATE 03/27/2026
SCALE AS SHOWN
DESIGNED BY NJA
DRAWN BY TOZ
CHECKED BY JMM

SITE PLAN

SWAN BESS AND CYGNET BESS
PREPARED FOR
SWAN ENERGY STORAGE LLC AND CYGNET ENERGY STORGAGE LLC
COMSTOCK TOWNSHIP MI

SHEET NUMBER
E100

MISS DIG 811

K:\TCW_LDEV\Copenhagen Infrastructure Partners\Swan BESS_MI2 Design\CAD\PlanSheets\E-100 - SITE PLAN.dwg June 05, 2026 - 2:08pm

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EXHIBIT D: STORMWATER REPORT

STORMWATER REPORT

Swan BESS and Cygnet BESS

65 N 30th St

Comstock Township, Kalamazoo County, MI

Prepared by:
Kimley-Horn of Michigan, Inc.
3000 Town Ctr., Suite 2600
Southfield, MI 48075
Contact: Brian Gammon, P.E.

Prepared on: June 8, 2026

Kimley»Horn
of Michigan, Inc.

TABLE OF CONTENTS

1. PROJECT DESCRIPTION 3
1.1. Pre-development Conditions 3
1.2. Post-development Conditions 3
2. STORMWATER SUMMARY 4
2.1. Rate Control Summary 4
2.2. Water Quality Summary 5
2.3. Pre-Treatment Summary 5
3. SUMMARY 6

EXHIBITS

Exhibit 1 – Pre-Development Drainage Area Map

Exhibit 2 – Post-Development Drainage Area Map

Exhibit 3 – Green Calculator – Kalamazoo County Spreadsheet

Exhibit 4 – Rational Method Detention – Kalamazoo County Spreadsheet

Exhibit 5 – Stormwater Calculations Worksheet – Comstock Township

Exhibit 6 – Pre-Development HydroCAD Model

Exhibit 7 – Post-Development HydroCAD Model

Exhibit 8 – FEMA Firm Map

Exhibit 9 – USGS Map

Exhibit 10 – NRCS Soil Report

1. PROJECT DESCRIPTION

The proposed projects consist of the development of two Battery Energy Storage System (BESS) facilities located at 65 N 30th St in Comstock Township, Kalamazoo County, Michigan. The project site is located on two properties that combine for 144.28 acres. The study area will be approximately 40 acres and will include battery enclosures, Power Conversion System (PCS), customer substations, access roads, and stormwater management features. This report summarizes the stormwater management approach for the BESS project, including compliance with all applicable Comstock Township, Kalamazoo County Drain Commission, and State requirements.

Kimley-Horn has evaluated the existing and proposed drainage conditions of the site. This report provides computations for all applicable stormwater requirements of Comstock Township and Kalamazoo County. The existing and proposed drainage systems were analyzed using Kalamazoo County's Green Calculator and Rational Method Detention spreadsheets, as well as Comstock Township's Stormwater Calculations spreadsheet. Peak runoff rate comparisons were calculated using HydroCAD, Version 10.20-5c. a computer aided design system for modeling stormwater runoff hydrology. The calculations are based on the Soil Conservation Service (SCS/NRCS) techniques. The HydroCAD model utilizes TR-55 Curve Number methodology analysis and is based on the regulatory standards and best management practices for BESS facilities.

1.1. Pre-development Conditions

The existing site is currently being utilized as a golf course. Surface drainage generally flows from north to south towards County Road 96 and eventually discharges to Morrow Lake. The site soils are classified as sandy loam and loam, with a hydrologic soil type of A and C. See **Exhibit 10** for the NRCS Hydrologic Soil Group Report. Due to hydrologic properties of the existing on-site soils, it is assumed that infiltration is a feasible stormwater management BMP. There are currently no on-site stormwater management or water quality treatment practices in place. See **Exhibit 1** for the Pre-Development Drainage Map.

A summary of the pervious and impervious coverage of existing conditions is included below:

- *Total Drainage Study Area = 39.52 acres*
    - *Existing Pervious Area = 39.52 acres (100.0%)*
    - *Existing Impervious Area = 0.0 acres (0.0%)*
    - *Weighted Curve Number (CN) = 55*

1.2. Post-development Conditions

The proposed BESS facility will include battery enclosures, PCS skids, project substations, and stormwater management infrastructure. The BESS equipment will be surrounded by gravel pads and interior access roads, with an access driveway along N 30th St. Although the proposed aggregate access roads, yard rock, and the substation pads allow for some permeability, they are modeled as impervious (CN=98) to allow flexibility in the final placement, material selection, and compaction of the BESS pads and access roads. Stormwater runoff from the proposed improvements will be routed to on-site stormwater management treatment train through sheet flow and vegetated swales to an infiltration detention basin that meets Comstock Township and Kalamazoo County stormwater requirements. See **Exhibit 2** for the Proposed Drainage Map.

A summary of the pervious and impervious coverage for proposed conditions is included below.

- *Total Drainage Study Area = 39.52 acres*
  - *Proposed Pervious Area = 16.40 acres (41.6%)*
  - *Proposed Impervious Area = 23.12 acres (58.4%)*
  - *Weighted Curve Number (CN) = 83 (Kalamazoo County), 41 (Comstock Township)*

2. STORMWATER SUMMARY

2.1. Rate Control Summary

Kalamazoo County

Stormwater rate control is required to ensure that the post-development peak runoff rates do not exceed pre-development rates for the 1-, 2-, 10-, and 25-year, 24-hour storm events. For **Channel Protection/Stream Protection Volume**, Kalamazoo County requires that the post-development runoff rate and volume shall not exceed the pre-development rate and volume for all storms up to and including the 2-year, 24-hour storm. For **Flood Control**, Kalamazoo County requires retention or detention of the 25-year, 24-hour storm with a maximum allowable release rate of 0.15 cfs/acre is also required. Per the Kalamazoo County Green Calculator, the proposed development has a minimum required stream protection volume of **136,172 cf.** Based on the project area of 39.36 acres, the allowable release rate for the 25-year, 24-hour storm is **5.93 cfs**. The proposed infiltration detention basin provides a credit of **148,171 cf** of Stream Protection volume to meet the requirement.

The required storage volume for Kalamazoo County is **347,751 cf**. The proposed infiltration detention basin provides **442,349 cf** of storage volume.

Comstock Township

Per the Comstock Township Stormwater Calculations Workbook, the proposed development has a minimum required 2-year, 24-hour channel protection volume of **110,432 cf**, and a minimum required 10-year, 24-hour channel protection volume of **156,445 cf.** The proposed infiltration detention basin provides **442,349 cf** of storage volume.

The Comstock Township water quality treatment volume requires **142,891 cf** of treatment volume. The proposed infiltration detention basin provides a credit of **148,171 cf** of infiltration volume to meet the requirement.

The proposed stormwater management system is designed to meet or exceed these requirements by providing adequate detention/infiltration and controlled discharge as outlined in *Table 1* and *Table 2* below. See **Exhibit 3, 4, and 5** for inputs and results of the County Green Calculator, Rational Method, and Township Stormwater Calculations Worksheet and **Exhibits 6 and 7** for inputs and results of the HydroCAD model.

Table 1: Rate Attenuation

	1 Year (2.28 in.)	*2 Year (2.57 in.)*	*10 Year (3.65 in.)*	**25 Year (4.46 in.)*
Pre-Development Rate (CFS)	2.57	3.69	9.71	16.57
Post-Development Rate (CFS)	2.39	3.00	5.77	14.17

*Maximum allowable runoff rate for post-development 25-yr, 24-hr event is 5.93 cfs

Table 2: Runoff Volume

	1-Year	**2-Year**
Pre-Development Runoff Volume (AC-FT)	0.418 AC-FT	0.603 AC-FT
Post-Development Runoff Volume (AC-FT)	***0.163 AC-FT***	***0.209 AC-FT***

2.2. Water Quality Summary

Kalamazoo County states the water quality volume is required to treat the "first flush" of Stormwater runoff that typically carries with it the highest concentration of pollutants. Capturing and treating the first 1.0" of runoff from directly connected impervious areas to achieve 80% decrease in total suspended solids (TSS), or discharge concentrations of TSS less than 80 mg/L is required. Directly connected pervious surfaces also require a minimum water quality volume of 900 cf/acre within the disturbed area. Per the Kalamazoo County Green Calculator, the proposed development has a minimum required water quality volume of **52,965 cf.** See **Exhibit 3** for inputs and results of the Green Calculator.

Comstock Township calculates the required water quality volume by dividing the total site area in square feet by 12. Per the Comstock Township Stormwater Calculations Workbook, the proposed development has a minimum required water quality volume of **142,891 cf.** See **Exhibit 5** for inputs and results of the Stormwater Calculations Workbook.

The proposed stormwater management facility is designed to meet the water quality volume through the use of an infiltration basin. Per the Green Calculator, this site assumes an average design infiltration rate of 0.52 in/hr. With an allowable drawdown time of 72 hours, infiltration can be credited for the bottom 3.2' of the proposed basin or below the first pond outlet, whichever is lower. Infiltration practices provide 100% treatment volume for the contributing drainage area.

The Comstock Township water quality volume is more conservative than the Kalamazoo County value and has been used for the design of the infiltration basin. The provided water quality of the proposed detention basin is **148,171 cf**.

2.3. Pre-Treatment Summary

Pre-treatment provides for the removal or fine sediment, trash and debris, and is required by Kalamazoo County to preserve the longevity and function of stormwater BMPs, particularly with

infiltration practices. A minimum pre-treatment volume equivalent to 15% of the water quality volume is required for sediment forebays.

Comstock Township does not require pre-treatment volume.

The required Kalamazoo County water quality volume is 52,965 cf, therefore the required pre-treatment volume is **7,945 cf.** The pre-treatment volume is met using two (2) - 3' deep sediment forebays and one (1) – 2' deep sediment forebay with a total volume of **58,736 cf** as outlined in *Table 3* below.

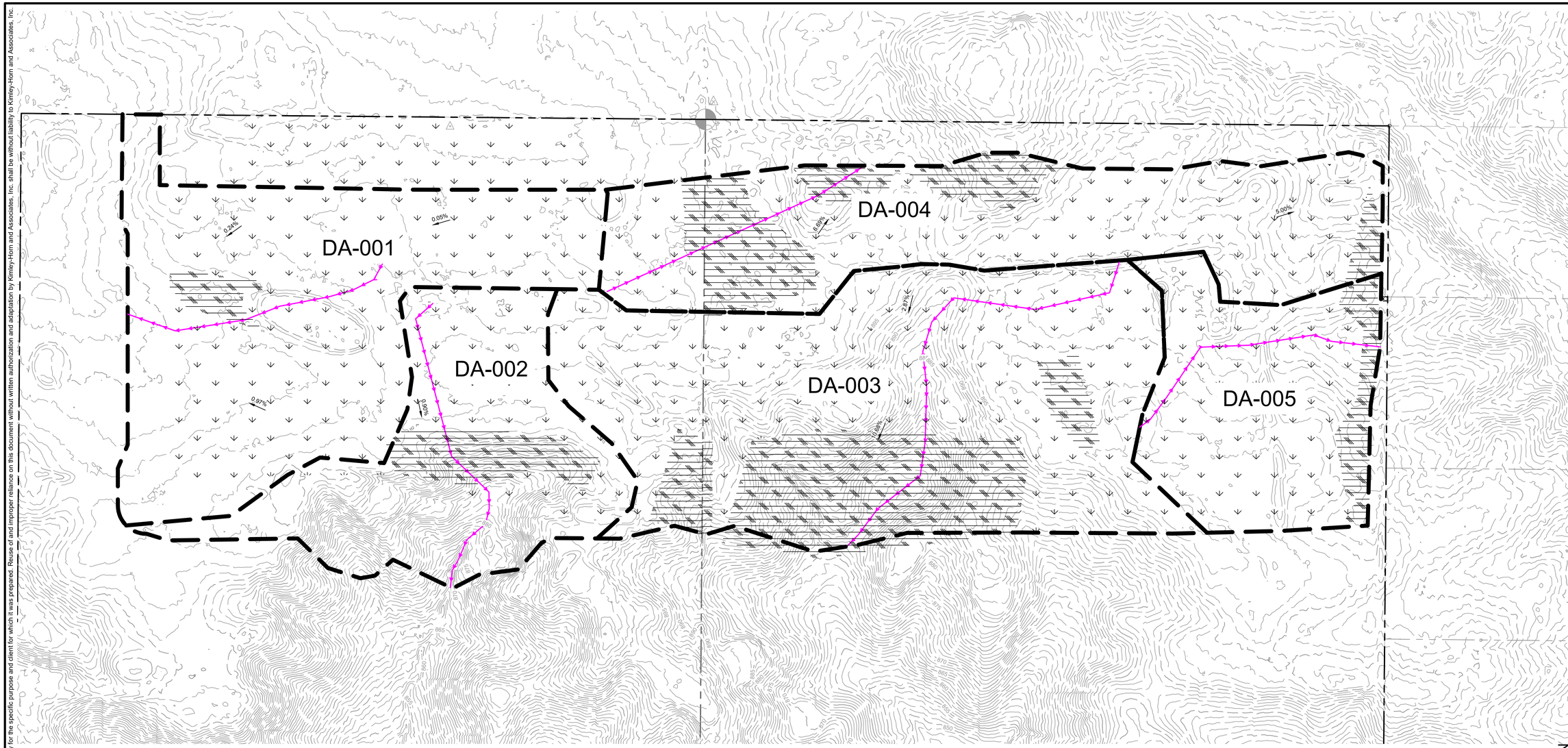
Table 3: Volume Reduction Summary

	Pre-treatment Volume Provided (cf)
BMP 2A Sediment Forebay	23,806
BMP 2B Sediment Forebay	29,657
BMP 2C Sediment Forebay	5,273
Total	**58,736**

3. SUMMARY

The proposed stormwater management system has been designed in accordance with the Kalamazoo County Drain Commissioner Design Standards for Stormwater Management and Comstock Township Stormwater Calculations Workbook for channel protection/stream protection, flood control, water quality, and pre-treatment through the use of sediment forebays and an infiltration detention basin.

Exhibit 1 – Pre-Development Drainage Area Map



LEGEND

- PROPERTY LINE
- DRAINAGE AREA BOUNDARY
- TIME OF CONCENTRATION PATH
- GRASS LAND COVER
- WOOD LAND COVER

AREA SUMMARY TABLE	
TOTAL PROPERTY AREA	+/- 144.28 AC
BESS DEVELOPMENT AREA	+/- 39.22 AC
DRAINAGE STUDY AREA	+/- 39.52 AC
CONTRIBUTING DRAINAGE AREA BY LANDCOVER	
GRASS	+/- 34.32 AC
WOODS	+/- 5.20 AC
TOTAL	+/- 39.52 AC

GRAPHIC SCALE IN FEET
0 50 100 200

NORTH

MISS DIG 811

ISSUED FOR PERMIT - NOT FOR CONSTRUCTION

No.	REVISIONS	DATE	BY
1	ENTITLEMENT SET	06/08/2026	BPG

Kimley»Horn of Michigan, Inc.
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3000 TOWN CENTER, SUITE 2600
SOUTHFIELD, MI 48075
(312) 726 9445

CIP Copenhagen Infrastructure Partners

STATE OF MICHIGAN BRIAN GAMMON ENGINEER NO. E0013129O4 LICENSED PROFESSIONAL ENGINEER

Brian Gammon

KHA PROJECT 161262002
DATE 06/08/2026
SCALE AS SHOWN
DESIGNED BY JLL
DRAWN BY EAS
CHECKED BY BPG

PRE-DEVELOPMENT DRAINAGE AREA MAP

SWAN BESS AND CYGNET BESS
PREPARED FOR
SWAN ENERGY STORAGE LLC AND CYGNET ENERGY STORGAGE LLC
COMSTOCK TOWNSHIP MI

SHEET NUMBER
EX-1

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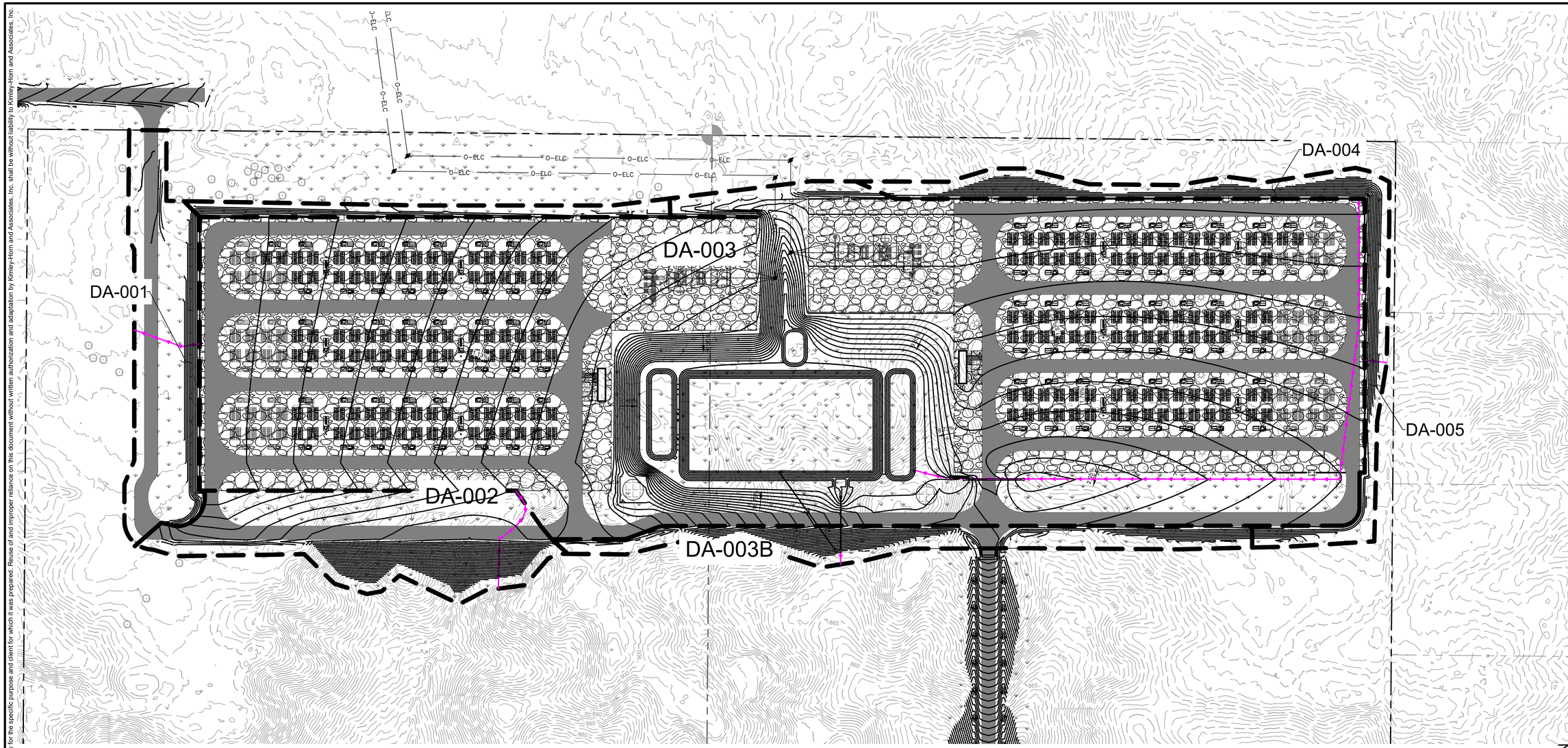
Exhibit 2 – Post-Development Drainage Area Map



LEGEND

- PROPERTY LINE
- DRAINAGE AREA BOUNDARY
- TIME OF CONCENTRATION PATH
- MEADOW LAND COVER
- GRAVEL ACCESS ROAD
- YARD ROCK LAND COVER

AREA SUMMARY TABLE	
PROPERTY AREA	+/- 144.28 AC
BESS DEVELOPMENT AREA	+/- 39.22 AC
DRAINAGE STUDY AREA	+/- 39.52 AC
CONTRIBUTING DRAINAGE AREA BY LANDCOVER	
MEADOW	+/- 17.49 AC
GRAVEL ACCESS ROAD	+/- 4.96 AC
YARD ROCK	+/- 17.03 AC
BUILDINGS	+/- 0.04 AC
TOTAL	+/- 39.52 AC

GRAPHIC SCALE IN FEET
0 50 100 200

NORTH

MISS DIG 811

ISSUED FOR PERMIT - NOT FOR CONSTRUCTION

No.	REVISIONS	DATE	BY
1	ENTITLEMENT SET	06/08/2026	BPG

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3000 TOWN CENTER, SUITE 2600
SOUTHFIELD, MI 48075
(312) 726 9445

CIP Copenhagen Infrastructure Partners

STATE OF MICHIGAN BRIAN GAMMON ENGINEER NO. E201312904 LICENSED PROFESSIONAL ENGINEER

Brian Gammon

KHA PROJECT 161262002
DATE 06/08/2026
SCALE AS SHOWN
DESIGNED BY JLL
DRAWN BY EAS
CHECKED BY BPG

POST-DEVELOPMENT DRAINAGE AREA MAP

SWAN BESS AND CYGNET BESS
PREPARED FOR
SWAN ENERGY STORAGE LLC AND CYGNET ENERGY STORGAGE LLC
COMSTOCK TOWNSHIP MI

SHEET NUMBER
EX-2

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Exhibit 3 – Green Calculator – Kalamazoo County Spreadsheet

Green Calculator
Low Impact Development Hydrologic Analysis Tool

Version 2.0

Notes:

1) After opening spreadsheet you may be required to enable use of programmed macro. Look for security warning above.

2) Data is entered in yellow cells. Green cells allow selection of items from pull down menus.

3) This spreadsheet is intended for all areas contributing to a single treatment train on the site. A site with multiple (parallel) treatment trains requires one spreadsheet for each treatment train.

1. Project Description

Name:	**Swan BESS & Cygnet BESS**
Number:	**161262002**
Date:	**6/5/2026**
Engineer:	**Brian Gammon**
Michigan County:	***Kalamazoo***
Local Unit:	
Description:	
Redevelopment credit?	No

2. Time of Concentration

	Worksheet	***User Spec.***	***User Spec.***
Existing and pre-development [hr]	0.55	1.00	1.00
Developed (w/ retention BMPs) [hr]	88.73	1.00	1.00

3. Area Summary

	Area [ac]	***% Total***	
Total site area contributing to treatment train	39.52		
Disturbed area	39.52	100%	
Protected area	0.00	0%	**Disturbed area greater than total area.**

4. Runoff from Disturbed and Minimally Disturbed Areas

4a. Existing

Land Use	***HSG***	***Area***	***Units***	***SCS CN***
Impervious (paved, roof, concrete, etc.)			*acre*	98
Open (lawns, parks, etc.) - good	A	16.22	*acre*	39
Open (lawns, parks, etc.) - good	C	18.10	*acre*	74
Woods - fair	A	4.76	*acre*	36
Woods - fair	C	0.44	*acre*	73
			acre	
			acre	
			acre	
			acre	
		39.52	*acre*	

4b. Pre-development

Land Use	***HSG***	***Area***	***Units***	***SCS CN***
Impervious (paved, roof, concrete, etc.)			*acre*	98
Meadow	A	16.22	*acre*	30
Meadow	C	18.10	*acre*	71
Woods - good	A	4.76	*acre*	30
Woods - good	C	0.44	*acre*	70
			acre	
			acre	
			acre	
			acre	
		39.52	*acre*	

4c. Developed

Land Use	***HSG***	***Area***	***Units***	***SCS CN***
Impervious (include pervious pavement and green roof)			*acre*	98
Impervious area with stormwater disconnect	A	11.80	*acre*	98
Impervious area with stormwater disconnect	C	11.17	*acre*	98
Disturbed pervious area: Open space - fair	A	9.22	*acre*	49
Disturbed pervious area: Open space - fair	C	7.18	*acre*	79
			acre	
			acre	
			acre	
			acre	
		39.36	*acre*	

Green Calculator

5. Water Quality Volume

Directly connected impervious area [ac]	23.12	
Directly connected disturbed pervious area [ac]	14.67	
Minimum required Water Quality Volume	**52,965.30**	*cft*

6. Stream Protection Volume

2-year, 24-hour runoff volume for proposed development condition	137,444.92	*cft*
2-year, 24-hour runoff volume for pre-development condition	1,272.81	*cft*
Minimum required Stream Protection Volume	**136,172.11**	*cft*

Structural BMP	***Data Columns Required***	***Area of BMP, A [sqft]***	***Available Water Storage Volume, V [cft]***	***Average Design Infiltration Rate, i [in/hr]***	***Stream Protection Volume Credit [cft]***
Infiltration practices	*A, V, & i*	63,780	148,171	0.52	164,753.80
					0.00
					0.00
					0.00
					0.00
					0.00
					0.00
					0.00
					0.00
				Total Stream Protection Volume credit [cft]	**164,753.80**
				Stream Protection Volume credit limit by total site runoff [cft]	**137,444.92**
				Adequate Stream Protection Volume? YES	

Percentage of Stream Protection Volume met by retention	101%
Average site CN for developed condition	83
Site area requiring extended detention [ac]	0.00
Extended detention volume [cft]	**N.A.**
Extended detention release rate [cfs]	**N.A.**

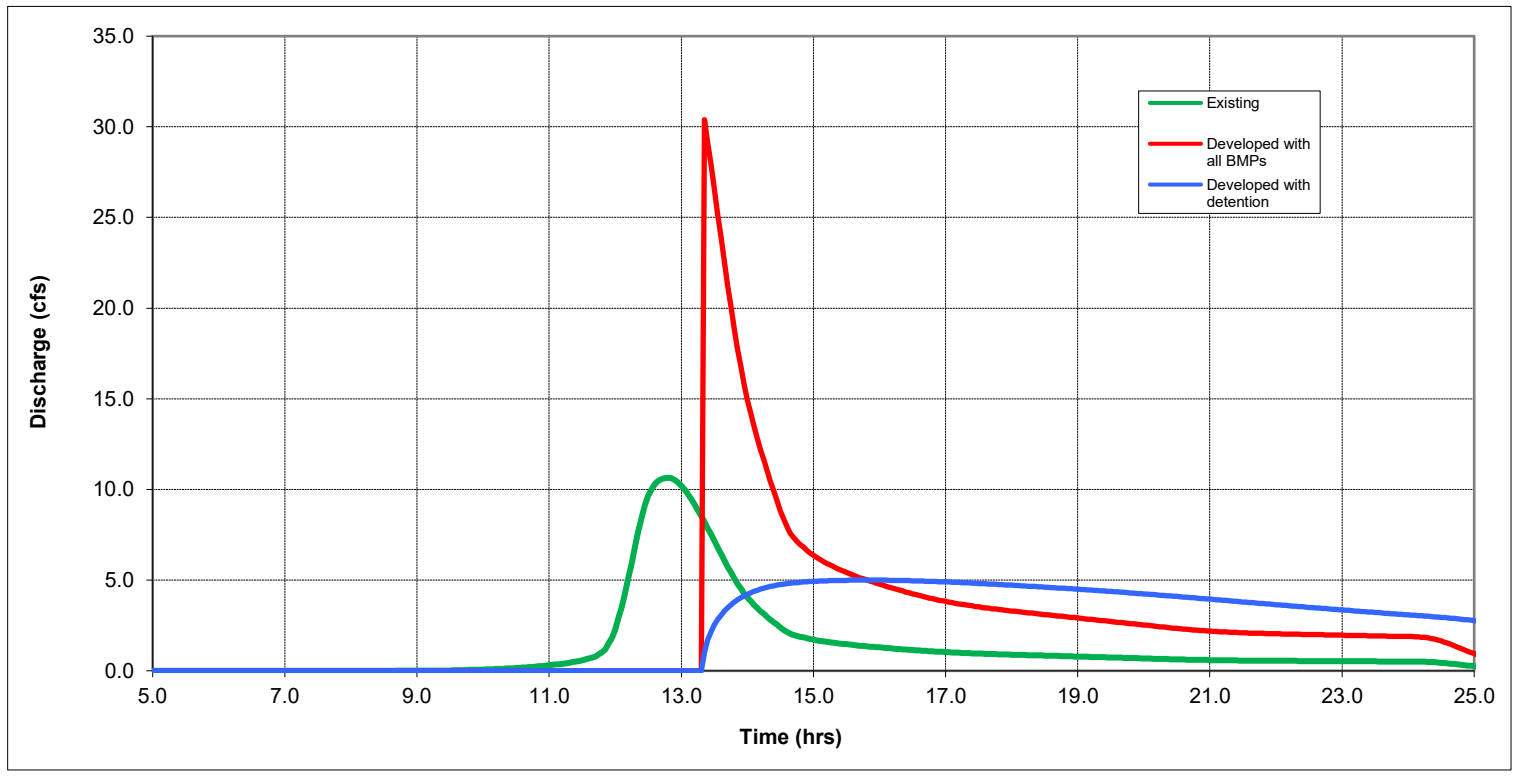
7. Detention Storage

Design storm	***25-year***		
Developed peak discharge [cfs]	30.40		
Standard allowable discharge [cfs] - 0.15 cfs/ac	5.93		
Other allowable discharge [cfs]			
Detention storage required?	Yes		
Desired peak discharge [cfs]	5.00		
Calculated peak discharge [cfs]	5.00	**Detention storage volume calculated.**	
Required detention volume	**66,271.78**	cft	

Calculate detention storage volume

Notes:

Green Calculator
8. Hydrographs



Note: This hydrograph plot does not include the impact of extended detention.

Rainfall

Rainfall frequency	25-year
Rainfall depth (inches)	4.45

Pre-develpment Conditions

Pervious Curve Number	49
Average runoff [in]	0.45
Peak discharge [cfs]	6.61
Runoff volume [ac-ft]	1.48

Existing Conditions

Pervious Curve Number	55
Average runoff [in]	0.72
Peak discharge [cfs]	10.64
Runoff volume [ac-ft]	2.38

Developed (with non-structural BMP credits)

Pervious Curve Number	83
Average runoff [in]	2.69
Runoff volume [ac-ft]	8.81

Developed with all BMPs

Volume stored [ac-ft]	3.78
Volume released [ac-ft]	5.03
Peak discharge [cfs]	30.40

Developed with all BMPs and Detention Storage

Maximum volume detained [ac-ft]	1.52
Peak discharge [cfs]	5.00

Disclaimer: This Excel spreadsheet is furnished by the Kalamazoo County Drain Commissioner and FTC&H for the convenience of the recipient to show compliance with the Kalamazoo County Site Development Rules.

Any additional conclusions or information obtained or derived from this spreadsheet program will be at the user's sole risk.

Exhibit 4 – Rational Method Detention – Kalamazoo County Spreadsheet

Rational Method
Detention Basin Sizing Tool

Version 1.0

Location: Kalamazoo County
Project: Swan & Cygnet BESS
Job No.: 161262002
Date: 3/27/2026
By: Brian Gammon

Contributing Area [ac] =	39.52
Runoff "C" Value =	0.83
Allowable Release Rate [cfs/ac] =	0.15
Rainfall Frequency =	25-year
Site Release Rate [cfs] =	5.928
Factor of Safety =	1.25
Required Storage Volume [cft] =	347751
Time to Empty [hr] =	16.3

Time [hr]	*Rainfall Intensity [in/hr]*	*Runoff Volume [cft]*	*Discharge Volume [cft]*	*Storage Volume [cft]*	*Storage Volume [ac-ft]*	*Time to Empty [hr]*
0.167	5.580	110735	3557	133973	3.08	6.3
0.250	4.800	142884	5335	171936	3.95	8.1
0.333	4.160	165122	7114	197511	4.53	9.3
0.500	3.300	196465	10670	232243	5.33	10.9
0.667	2.749	218209	14227	254978	5.85	11.9
0.750	2.543	227112	16006	263883	6.06	12.4
0.833	2.369	235075	17784	271614	6.24	12.7
1.000	2.090	248856	21341	284394	6.53	13.3
2.000	1.290	307200	42682	330648	7.59	15.5
3.000	0.950	339349	64022	344158	7.90	16.1
4.000	0.763	363564	85363	347751	7.98	16.3
5.000	0.642	382347	106704	344553	7.91	16.1
6.000	0.557	397693	128045	337060	7.74	15.8
7.000	0.494	411728	149386	327928	7.53	15.4
8.000	0.445	423885	170726	316448	7.26	14.8
9.000	0.406	434608	192067	303176	6.96	14.2
10.000	0.373	444201	213408	288491	6.62	13.5
12.000	0.323	460800	256090	255888	5.87	12.0
18.000	0.232	497712	384134	141972	3.26	6.7
24.000	0.185	529861	512179	22102	0.51	1.0

Notes:

1. Runoff volume is calculated by multiplying the Rational formula discharge, *CIA,* by the time, *t*. $V_R = (CIA)\ t$

2. Discharge volume is calculated by multiplying the site release rate, Q_o, by the time, *t*. $V_o = Q_o\ t$

3. Storage volume is calculated by subtracting the discharge volume from the runoff volume and multiplying by the factor of safety. $V_s = (V_R - V_o)\ f_s$

4 The time to empty is the storage volume divided by the site release rate.

Disclaimer:

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Any additional conclusions or information obtained or derived from this spreadsheet program will be at the user's sole risk.

Exhibit 5 – Stormwater Calculations Worksheet – Comstock Township

Stormwater Calculations Worksheet

PRE-DEVELOPMENT CONDITIONS

Surface Cover	Runoff Coefficient, C	Area of Surface Cover (ft^2)
Lawns	0.1	1,488,123
Forest	0.15	226,573
Gardens	0.25	
Meadow	0.3	
Gravel	0.6	
Brick/Pavers	0.8	
Asphalt/Concrete	0.9	
Roofs	0.9	
Total Site Size (ft^2)		1,714,696
Total Site Size (acres)		39.36
Runoff Coefficient (weighted average)		0.11
Flow Rate (ft^3/s): 1 year - 30 minute event		6.92
Runoff Volume (ft^3): 2 year - 24 hour event		39,158
Runoff Volume (ft^3): 10 year - 24 hour event		55,474
Treatment Volume = Site Area x 0.083 ft	Standard 1	
i = 1.65 inches/hour for Treatment (1 year - 0.5 hour)	Standard 1	
i = 0.108 inches/hour for Storage (2 year - 24 hour)	Standard 2, 3	
i = 0.153 inches/hour for Storage (10 year - 24 hour)	Standard 3, 7 NFP	

POST-DEVELOPMENT CONDITIONS

Surface Cover	Runoff Coefficient, C	Area of Surface Cover (ft^2)
Lawns	0.1	664,401
Forest	0.15	
Gardens	0.25	
Meadow	0.3	
Gravel	0.6	1,044,626
Brick/Pavers	0.8	
Asphalt/Concrete	0.9	3,779
Roofs	0.9	1,890
Total Site Size (ft^2)		1,714,696
Total Site Size (acres)		39.36
Runoff Coefficient (weighted average)		0.41
Flow Rate (ft^3/s): 1 year - 30 minute event		26.45
Runoff Volume (ft^3): 2 year - 24 hour event		149,590
Runoff Volume (ft^3): 10 year - 24 hour event		211,919
Required Treatment Volume (ft^3)		142,891
Required Treatment Flow Rate (ft^3/s)		26.45
Required Storage Volume (ft^3): 2 year - 24 hour		110,432
Required Storage Volume (ft^3): 10 year - 24 hour		156,445

***Rational Method Used for All Calculations, where Q = CiA (unless stated otherwise)**

***Instructions: Input the areas (ft^2) of the site for each type of surface cover**

***For determining required detention/retention volumes, Pre-Development Conditions shall be 100% forested with a 50% allowance for existing impervious coverage (example: if a site is 100% impervious, existing conditions shall be 50% forested and 50% impervious).**

UNIFORM STORMWATER STANDARD 1: WATER QUALITY TREATMENT VOLUME & MTD WORKSHEET

**Applies to Sites ≥ 0.5 Acres and Large Parking Lots with ≥ 20 Spaces and/or > 6,000 ft^2

*** If not NJCAT Verified and NJDEP Certified, provide further documentation for the proposed BMPs

List All Proposed Treatment BMPs below and Show Locations on the Plans				
Proposed Treatment BMP	**NJCAT Verified?**	**NJDEP Certified?**	**Maximum Treatment Volume, ft^3**	**Maximum Treatment Flow Rate, ft^3/s**
Infiltration Basin	**NA**	**NA**	148,171	NA
Proposed Total Treatment Volume and Flow Rate			**148,171**	**0.00**
Required Treatment Volume and Flow Rate from Stormwater Calculations Worksheet			**142,891**	**26.45**
Difference Between Required and Proposed Treatment Volume and Flow Rate			-5,280	
Are Volume and Flow Rate Requirements Met? If difference is greater than zero, NO			**YES**	**NO**

*****Attach this form and supporting documentation for selected BMPs to the Storm Water Calculations Worksheet*****

UNIFORM STORMWATER STANDARD 2: CHANNEL PROTECTION VOLUME WORKSHEET

**Applies to Sites where Standard 2, 3 and 7 apply **10-year 24 hour is for Standard 3.

***Detention and Retention BMPs shall drain between runoff events

List All Proposed Detention/Retention BMPs below and Show Locations on the Plans	
Proposed Detention/Retention BMP	**Volume Detained/Retained, ft^3**
Infiltration Detention Basin	442,663
Proposed Total Volume	**442,663**
Required Storage Volume (ft^3): 2 year - 24 hour	**110,432**
Difference Between Required and Proposed Volume	-332,231
Is Sufficient Volume Retained/Detained? If difference is greater than zero, NO	**YES**
Required Storage Volume (ft^3): 10 year - 24 hour	**156,445**
Difference Between Required and Proposed Volume	-286,218
Is Sufficient Volume Retained/Detained? If difference is greater than zero, NO	**YES**

*****Attach this form and supporting documentation for selected BMPs to the Storm Water Calculations Worksheet*****

Detention Basin Calculation
Stormwater Volume: Rational Method

100 YEAR STORM EVENT

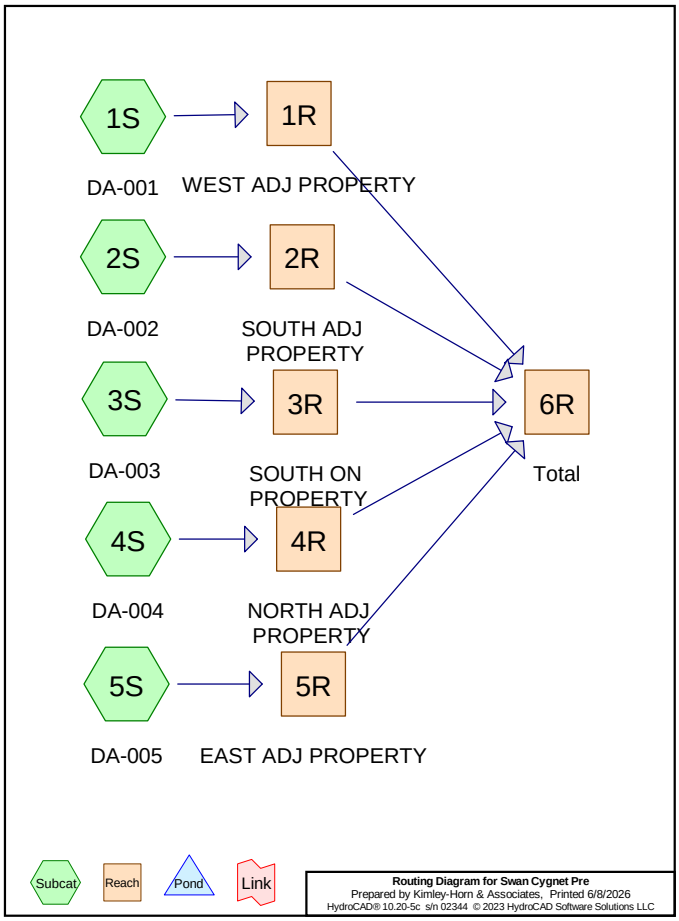
PROJECT NAME:	Swan BESS & Cygnet BESS
Job No.:	161262002
Date:	June 5, 2026
By:	Jordan Lang

RUNOFF COEFFICIENT	C=	**0.41**	Value pulled from Stormwater Calculations Tab
AREA(acres)	A=	**39.36**	
INFILTRATIVE RATE(in/hr)	IR=	**0.52**	Use 1/2 USDA Soil Survey Permiability, Maximum of 3in/hr
INFILTRATIVE AREA(sqft)	IA=	**67008.65**	Area of pond 1 ft. above pond bottom
RELEASE RATE(cfs/acre)	Qout	**0.07**	If applicable; Max 0.15 CFS/Acre

DURATION	**INTENSITY I**	**RUNOFF**	**VOLUME**	**RELEASE RATE**	**DISCHARGE VOLUME**	**INFILTRATIVE VOLUME**	**STORAGE VOLUME REQUIRED**	**TIME TO EMPTY**
TIME, t (hrs.)	(100 YEAR) (in/hr)	Qin (cfs)= CiA	VOLUME (cft)= Qin*(t)	Qout (cfs)= Release Rate	VOLUME (cft)= (t)Qout	VOLUME (cft)= IR*IA*(t)	STORAGE VOLUME (cft)= VOL(runoff)-(VOL(infiltrative)+VOL(release rate))	(Hr)
0.17	7.74	125.11	75,218	0.07	1,656	483	73,078	5.7
0.25	6.64	107.32	96,590	0.07	2,480	723	93,387	7.3
0.33	5.75	92.97	111,452	0.07	3,303	963	107,186	8.4
0.50	4.56	73.70	132,666	0.07	4,959	1,446	126,261	9.8
0.67	3.80	61.42	147,480	0.07	6,616	1,929	138,936	10.8
0.75	3.52	56.83	153,439	0.07	7,439	2,169	143,831	11.2
0.83	3.28	52.93	158,738	0.07	8,262	2,409	148,067	11.5
1	2.89	46.71	168,160	0.07	9,919	2,892	155,349	12.1
2	1.79	28.85	207,727	0.07	19,837	5,784	182,105	14.2
3	1.31	21.22	229,198	0.07	29,756	8,676	190,766	14.9
4	1.055	17.05	245,549	0.07	39,675	11,568	194,305	15.2
5	0.887	14.34	258,059	0.07	49,594	14,460	194,005	15.1
6	0.768	12.41	268,125	0.07	59,512	17,353	191,260	14.9
7	0.682	11.02	277,784	0.07	69,431	20,245	188,108	14.7
8	0.615	9.94	286,279	0.07	79,350	23,137	183,793	14.3
9	0.56	9.05	293,262	0.07	89,268	26,029	177,964	13.9
10	0.516	8.34	300,244	0.07	99,187	28,921	172,136	13.4
12	0.446	7.21	311,416	0.07	119,025	34,705	157,686	12.3
18	0.321	5.19	336,204	0.07	178,537	52,058	105,609	8.2
24	0.256	4.14	357,500	0.07	238,049	69,410	50,041	3.9

CHOOSE MAX. VALUE FOR STORAGE(cuft)= **194,305**

Exhibit 6 – Pre-Development HydroCAD Model



Rainfall Events Listing (selected events)

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC	P2 (inches)
1	1YR-24HR	Type II 24-hr		Default	24.00	1	2.28	2	2.57
2	2YR-24HR	Type II 24-hr		Default	24.00	1	2.57	2	2.57
3	10YR-24HR	Type II 24-hr		Default	24.00	1	3.65	2	2.57
4	25YR-24HR	Type II 24-hr		Default	24.00	1	4.46	2	2.57
5	100YR-24HR	Type II 24-hr		Default	24.00	1	5.93	2	2.57

Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: DA-001 Runoff Area=9.286 ac 0.00% Impervious Runoff Depth=0.49"
Flow Length=548' Tc=40.3 min CN=74 Runoff=2.57 cfs 0.378 af

Subcatchment 2S: DA-002 Runoff Area=5.638 ac 0.00% Impervious Runoff Depth=0.06"
Flow Length=604' Tc=42.6 min CN=56 Runoff=0.04 cfs 0.028 af

Subcatchment 3S: DA-003 Runoff Area=12.195 ac 0.00% Impervious Runoff Depth=0.00"
Flow Length=928' Tc=38.9 min CN=49 Runoff=0.01 cfs 0.004 af

Subcatchment 4S: DA-004 Runoff Area=7.840 ac 0.00% Impervious Runoff Depth=0.01"
Flow Length=552' Tc=88.6 min CN=51 Runoff=0.01 cfs 0.008 af

Subcatchment 5S: DA-005 Runoff Area=4.564 ac 0.00% Impervious Runoff Depth=0.00"
Flow Length=511' Tc=26.9 min CN=39 Runoff=0.00 cfs 0.000 af

Reach 1R: WEST ADJ PROPERTY Inflow=2.57 cfs 0.378 af
Outflow=2.57 cfs 0.378 af

Reach 2R: SOUTH ADJ PROPERTY Inflow=0.04 cfs 0.028 af
Outflow=0.04 cfs 0.028 af

Reach 3R: SOUTH ON PROPERTY Inflow=0.01 cfs 0.004 af
Outflow=0.01 cfs 0.004 af

Reach 4R: NORTH ADJ PROPERTY Inflow=0.01 cfs 0.008 af
Outflow=0.01 cfs 0.008 af

Reach 5R: EAST ADJ PROPERTY Inflow=0.00 cfs 0.000 af
Outflow=0.00 cfs 0.000 af

Reach 6R: Total Inflow=2.57 cfs 0.418 af
Outflow=2.57 cfs 0.418 af

Total Runoff Area = 39.523 ac Runoff Volume = 0.418 af Average Runoff Depth = 0.13"
100.00% Pervious = 39.523 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment 1S: DA-001

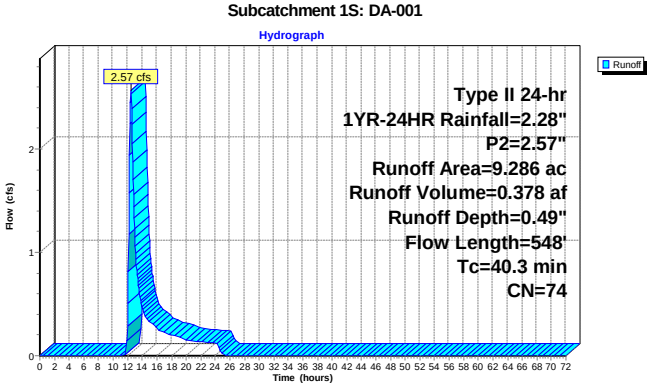
Runoff = 2.57 cfs @ 12.43 hrs, Volume= 0.378 af, Depth= 0.49"
Routed to Reach 1R : WEST ADJ PROPERTY

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type II 24-hr 1YR-24HR Rainfall=2.28", P2=2.57"

Area (ac)	CN	Description
9.019	74	Pasture/grassland/range, Good, HSG C
0.267	73	Woods, Fair, HSG C
9.286	74	Weighted Average
9.286		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
34.7	300	0.0100	0.14		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.57"
5.6	248	0.0110	0.73		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
40.3	548	Total			

Subcatchment 1S: DA-001



Summary for Subcatchment 2S: DA-002

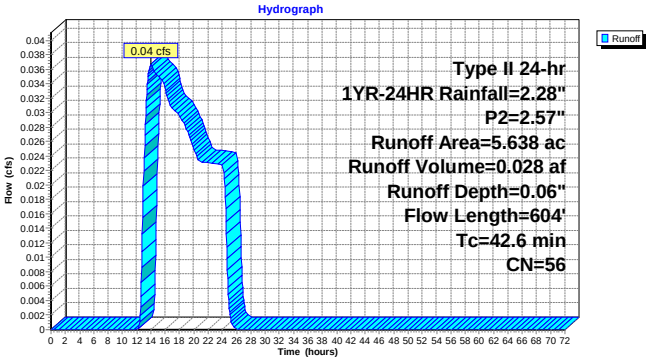
Runoff = 0.04 cfs @ 14.04 hrs, Volume= 0.028 af, Depth= 0.06"
Routed to Reach 2R : SOUTH ADJ PROPERTY

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type II 24-hr 1YR-24HR Rainfall=2.28", P2=2.57"

Area (ac)	CN	Description
2.247	39	Pasture/grassland/range, Good, HSG A
2.610	74	Pasture/grassland/range, Good, HSG C
0.635	36	Woods, Fair, HSG A
0.146	73	Woods, Fair, HSG C
5.638	56	Weighted Average
5.638		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
34.8	264	0.0077	0.13		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.57"
4.5	36	0.1704	0.13		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.57"
3.3	304	0.0918	1.51		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
42.6	604	Total			

Subcatchment 2S: DA-002



Summary for Subcatchment 3S: DA-003

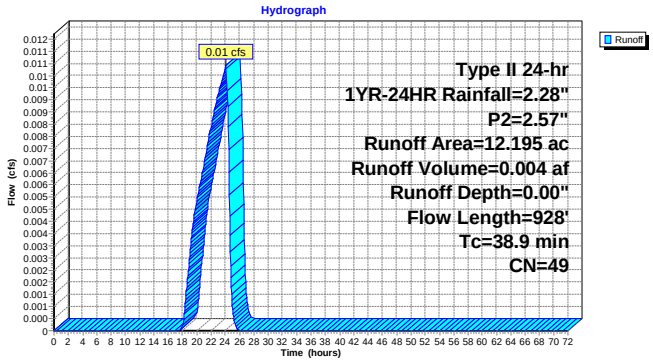
Runoff = 0.01 cfs @ 24.09 hrs, Volume= 0.004 af, Depth= 0.00"
Routed to Reach 3R : SOUTH ON PROPERTY

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type II 24-hr 1YR-24HR Rainfall=2.28", P2=2.57"

Area (ac)	CN	Description
5.599	39	Pasture/grassland/range, Good, HSG A
3.802	74	Pasture/grassland/range, Good, HSG C
2.794	36	Woods, Fair, HSG A
12.195	49	Weighted Average
12.195		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
27.8	300	0.0174	0.18		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.57"
4.0	349	0.0432	1.45		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
7.1	279	0.0171	0.65		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
38.9	928	Total			

Subcatchment 3S: DA-003



Summary for Subcatchment 4S: DA-004

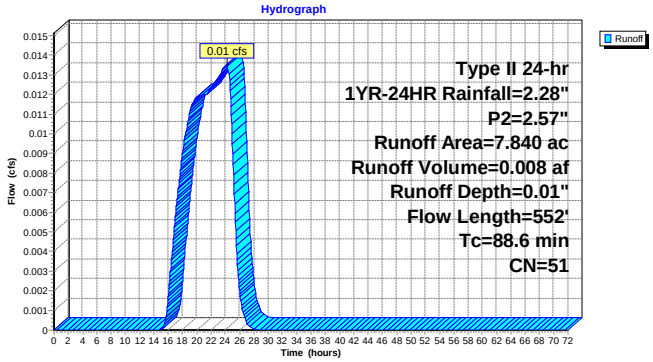
Runoff = 0.01 cfs @ 24.20 hrs, Volume= 0.008 af, Depth= 0.01"
Routed to Reach 4R : NORTH ADJ PROPERTY

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type II 24-hr 1YR-24HR Rainfall=2.28", P2=2.57"

Area (ac)	CN	Description
4.299	39	Pasture/grassland/range, Good, HSG A
2.671	74	Pasture/grassland/range, Good, HSG C
0.841	36	Woods, Fair, HSG A
0.029	73	Woods, Fair, HSG C
7.840	51	Weighted Average
7.840		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
25.2	163	0.0066	0.11		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.57"
39.2	137	0.0110	0.06		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.57"
1.3	133	0.0633	1.76		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
22.9	119	0.0003	0.09		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
88.6	552	Total			

Subcatchment 4S: DA-004



Summary for Subcatchment 5S: DA-005

[45] Hint: Runoff=Zero

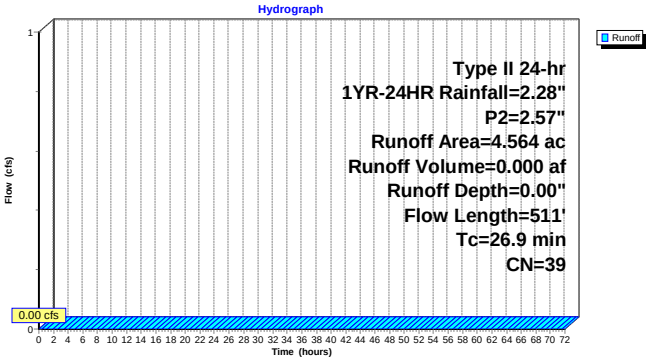
Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"
Routed to Reach 5R : EAST ADJ PROPERTY

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type II 24-hr 1YR-24HR Rainfall=2.28", P2=2.57"

Area (ac)	CN	Description
4.075	39	Pasture/grassland/range, Good, HSG A
0.489	36	Woods, Fair, HSG A
4.564	39	Weighted Average
4.564		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
23.5	300	0.0265	0.21		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.57"
3.4	211	0.0219	1.04		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
26.9	511	Total			

Subcatchment 5S: DA-005



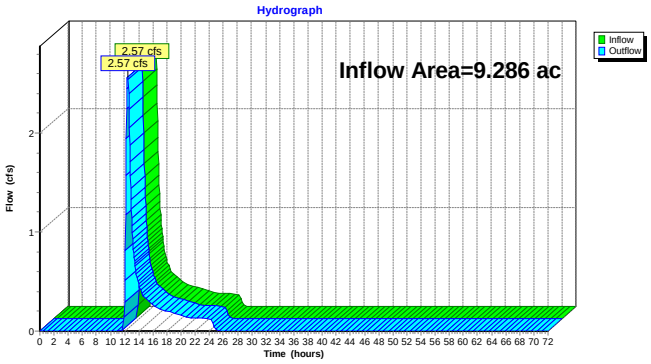
Summary for Reach 1R: WEST ADJ PROPERTY

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 9.286 ac, 0.00% Impervious, Inflow Depth = 0.49" for 1YR-24HR event
Inflow = 2.57 cfs @ 12.43 hrs, Volume= 0.378 af
Outflow = 2.57 cfs @ 12.43 hrs, Volume= 0.378 af, Atten= 0%, Lag= 0.0 min
Routed to Reach 6R : Total

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach 1R: WEST ADJ PROPERTY



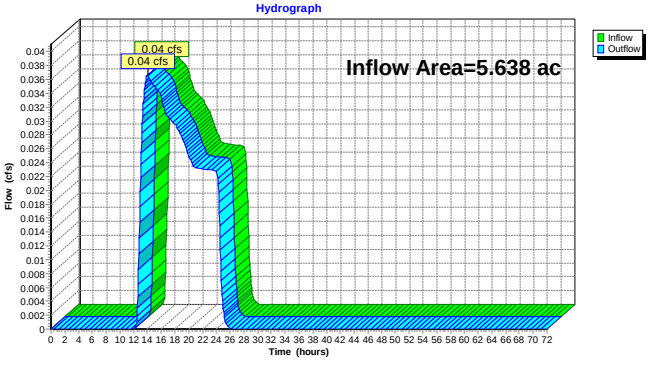
Summary for Reach 2R: SOUTH ADJ PROPERTY

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 5.638 ac, 0.00% Impervious, Inflow Depth = 0.06" for 1YR-24HR event
Inflow = 0.04 cfs @ 14.04 hrs, Volume= 0.028 af
Outflow = 0.04 cfs @ 14.04 hrs, Volume= 0.028 af, Atten= 0%, Lag= 0.0 min
Routed to Reach 6R : Total

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach 2R: SOUTH ADJ PROPERTY



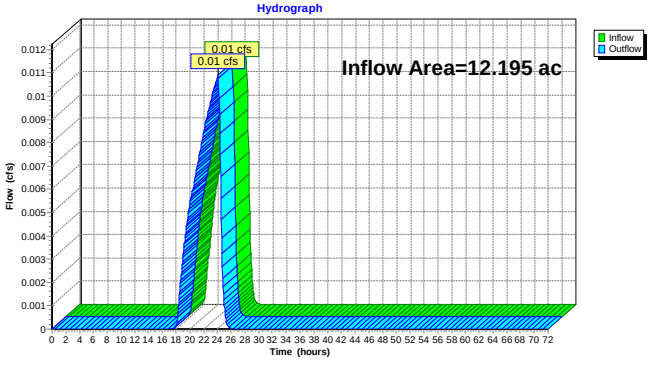
Summary for Reach 3R: SOUTH ON PROPERTY

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 12.195 ac, 0.00% Impervious, Inflow Depth = 0.00" for 1YR-24HR event
Inflow = 0.01 cfs @ 24.09 hrs, Volume= 0.004 af
Outflow = 0.01 cfs @ 24.09 hrs, Volume= 0.004 af, Atten= 0%, Lag= 0.0 min
Routed to Reach 6R : Total

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach 3R: SOUTH ON PROPERTY



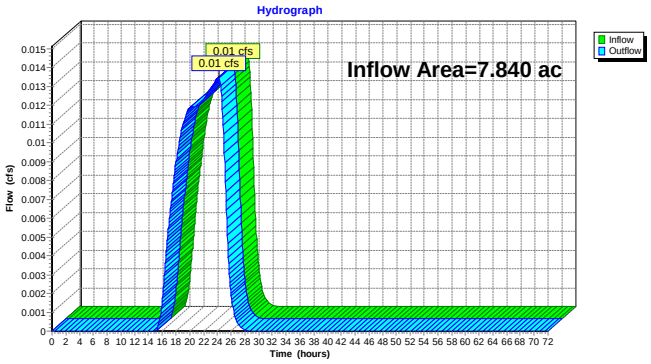
Summary for Reach 4R: NORTH ADJ PROPERTY

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 7.840 ac, 0.00% Impervious, Inflow Depth = 0.01" for 1YR-24HR event
Inflow = 0.01 cfs @ 24.20 hrs, Volume= 0.008 af
Outflow = 0.01 cfs @ 24.20 hrs, Volume= 0.008 af, Atten= 0%, Lag= 0.0 min
Routed to Reach 6R : Total

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach 4R: NORTH ADJ PROPERTY



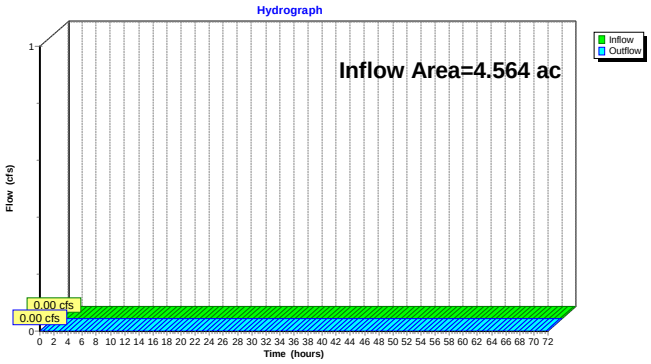
Summary for Reach 5R: EAST ADJ PROPERTY

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 4.564 ac, 0.00% Impervious, Inflow Depth = 0.00" for 1YR-24HR event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min
Routed to Reach 6R : Total

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach 5R: EAST ADJ PROPERTY



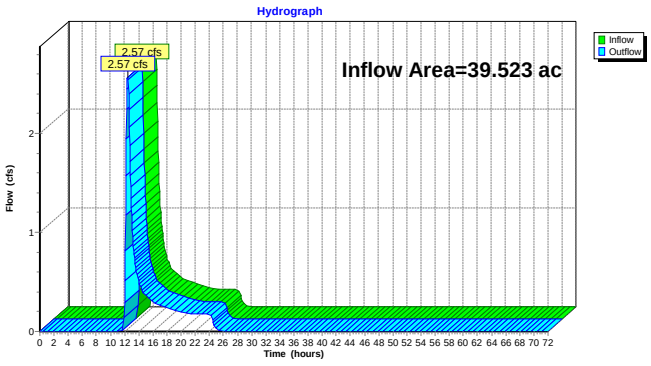
Summary for Reach 6R: Total

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 39.523 ac, 0.00% Impervious, Inflow Depth = 0.13" for 1YR-24HR event
Inflow = 2.57 cfs @ 12.43 hrs, Volume= 0.418 af
Outflow = 2.57 cfs @ 12.43 hrs, Volume= 0.418 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach 6R: Total



Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: DA-001 Runoff Area=9.286 ac 0.00% Impervious Runoff Depth=0.65"
Flow Length=548' Tc=40.3 min CN=74 Runoff=3.65 cfs 0.501 af

Subcatchment 2S: DA-002 Runoff Area=5.638 ac 0.00% Impervious Runoff Depth=0.11"
Flow Length=604' Tc=42.6 min CN=56 Runoff=0.10 cfs 0.053 af

Subcatchment 3S: DA-003 Runoff Area=12.195 ac 0.00% Impervious Runoff Depth=0.02"
Flow Length=928' Tc=38.9 min CN=49 Runoff=0.03 cfs 0.022 af

Subcatchment 4S: DA-004 Runoff Area=7.840 ac 0.00% Impervious Runoff Depth=0.04"
Flow Length=552' Tc=88.6 min CN=51 Runoff=0.03 cfs 0.027 af

Subcatchment 5S: DA-005 Runoff Area=4.564 ac 0.00% Impervious Runoff Depth=0.00"
Flow Length=511' Tc=26.9 min CN=39 Runoff=0.00 cfs 0.000 af

Reach 1R: WEST ADJ PROPERTY Inflow=3.65 cfs 0.501 af
Outflow=3.65 cfs 0.501 af

Reach 2R: SOUTH ADJ PROPERTY Inflow=0.10 cfs 0.053 af
Outflow=0.10 cfs 0.053 af

Reach 3R: SOUTH ON PROPERTY Inflow=0.03 cfs 0.022 af
Outflow=0.03 cfs 0.022 af

Reach 4R: NORTH ADJ PROPERTY Inflow=0.03 cfs 0.027 af
Outflow=0.03 cfs 0.027 af

Reach 5R: EAST ADJ PROPERTY Inflow=0.00 cfs 0.000 af
Outflow=0.00 cfs 0.000 af

Reach 6R: Total Inflow=3.69 cfs 0.603 af
Outflow=3.69 cfs 0.603 af

Total Runoff Area = 39.523 ac Runoff Volume = 0.603 af Average Runoff Depth = 0.18"
100.00% Pervious = 39.523 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment 1S: DA-001

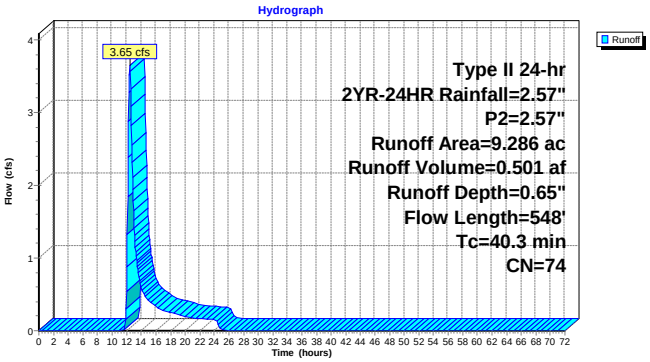
Runoff = 3.65 cfs @ 12.42 hrs, Volume= 0.501 af, Depth= 0.65"
Routed to Reach 1R : WEST ADJ PROPERTY

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type II 24-hr 2YR-24HR Rainfall=2.57", P2=2.57"

Area (ac)	CN	Description
9.019	74	Pasture/grassland/range, Good, HSG C
0.267	73	Woods, Fair, HSG C
9.286	74	Weighted Average
9.286		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
34.7	300	0.0100	0.14		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.57"
5.6	248	0.0110	0.73		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
40.3	548	Total			

Subcatchment 1S: DA-001



Summary for Subcatchment 2S: DA-002

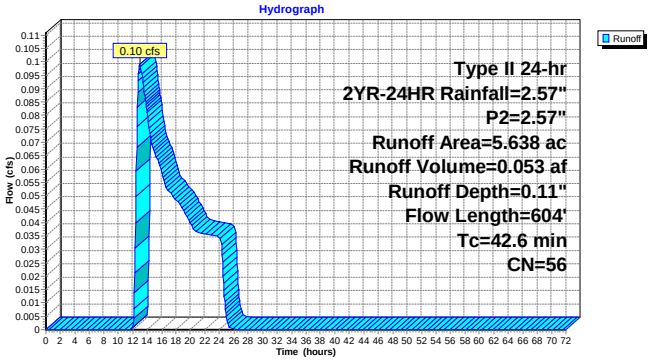
Runoff = 0.10 cfs @ 12.99 hrs, Volume= 0.053 af, Depth= 0.11"
Routed to Reach 2R : SOUTH ADJ PROPERTY

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type II 24-hr 2YR-24HR Rainfall=2.57", P2=2.57"

Area (ac)	CN	Description
2.247	39	Pasture/grassland/range, Good, HSG A
2.610	74	Pasture/grassland/range, Good, HSG C
0.635	36	Woods, Fair, HSG A
0.146	73	Woods, Fair, HSG C
5.638	56	Weighted Average
5.638		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
34.8	264	0.0077	0.13		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.57"
4.5	36	0.1704	0.13		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.57"
3.3	304	0.0918	1.51		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
42.6	604	Total			

Subcatchment 2S: DA-002



Summary for Subcatchment 3S: DA-003

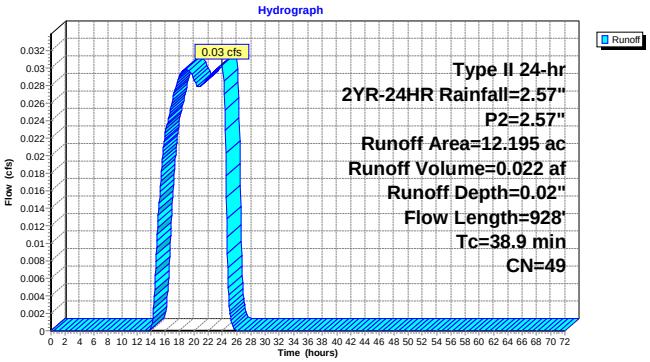
Runoff = 0.03 cfs @ 24.01 hrs, Volume= 0.022 af, Depth= 0.02"
Routed to Reach 3R : SOUTH ON PROPERTY

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type II 24-hr 2YR-24HR Rainfall=2.57", P2=2.57"

Area (ac)	CN	Description
5.599	39	Pasture/grassland/range, Good, HSG A
3.802	74	Pasture/grassland/range, Good, HSG C
2.794	36	Woods, Fair, HSG A
12.195	49	Weighted Average
12.195		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
27.8	300	0.0174	0.18		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.57"
4.0	349	0.0432	1.45		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
7.1	279	0.0171	0.65		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
38.9	928	Total			

Subcatchment 3S: DA-003



Summary for Subcatchment 4S: DA-004

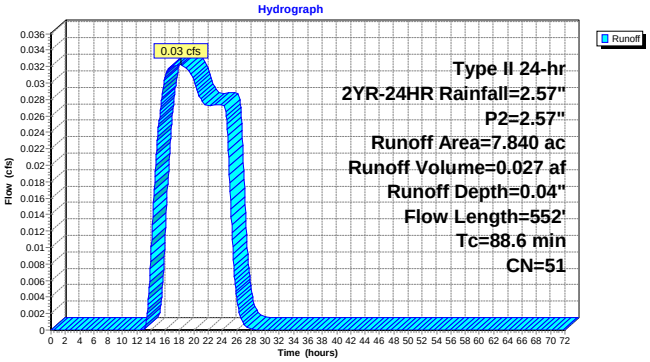
Runoff = 0.03 cfs @ 18.21 hrs, Volume= 0.027 af, Depth= 0.04"
Routed to Reach 4R : NORTH ADJ PROPERTY

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type II 24-hr 2YR-24HR Rainfall=2.57", P2=2.57"

Area (ac)	CN	Description
4.299	39	Pasture/grassland/range, Good, HSG A
2.671	74	Pasture/grassland/range, Good, HSG C
0.841	36	Woods, Fair, HSG A
0.029	73	Woods, Fair, HSG C
7.840	51	Weighted Average
7.840		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
25.2	163	0.0066	0.11		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.57"
39.2	137	0.0110	0.06		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.57"
1.3	133	0.0633	1.76		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
22.9	119	0.0003	0.09		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
88.6	552	Total			

Subcatchment 4S: DA-004



Summary for Subcatchment 5S: DA-005

[45] Hint: Runoff=Zero

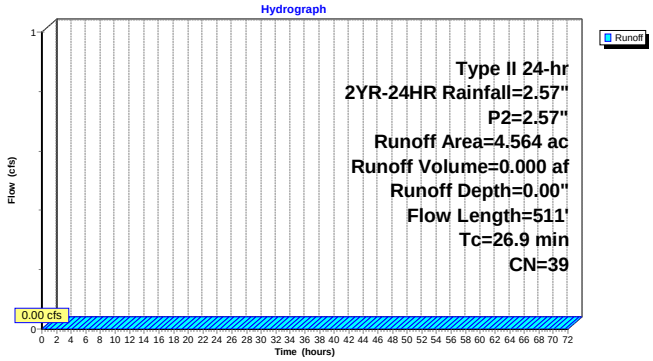
Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"
Routed to Reach 5R : EAST ADJ PROPERTY

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type II 24-hr 2YR-24HR Rainfall=2.57", P2=2.57"

Area (ac)	CN	Description
4.075	39	Pasture/grassland/range, Good, HSG A
0.489	36	Woods, Fair, HSG A
4.564	39	Weighted Average
4.564		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
23.5	300	0.0265	0.21		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.57"
3.4	211	0.0219	1.04		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
26.9	511	Total			

Subcatchment 5S: DA-005



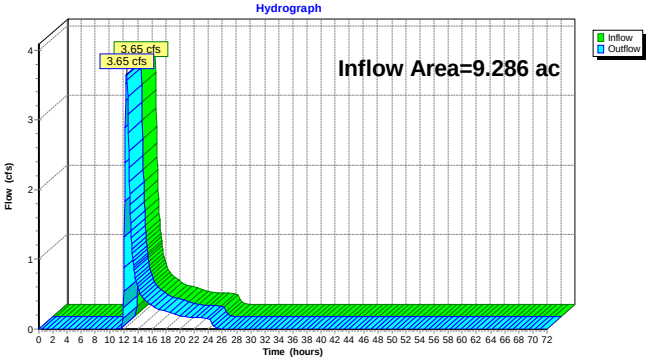
Summary for Reach 1R: WEST ADJ PROPERTY

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 9.286 ac, 0.00% Impervious, Inflow Depth = 0.65" for 2YR-24HR event
Inflow = 3.65 cfs @ 12.42 hrs, Volume= 0.501 af
Outflow = 3.65 cfs @ 12.42 hrs, Volume= 0.501 af, Atten= 0%, Lag= 0.0 min
Routed to Reach 6R : Total

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach 1R: WEST ADJ PROPERTY



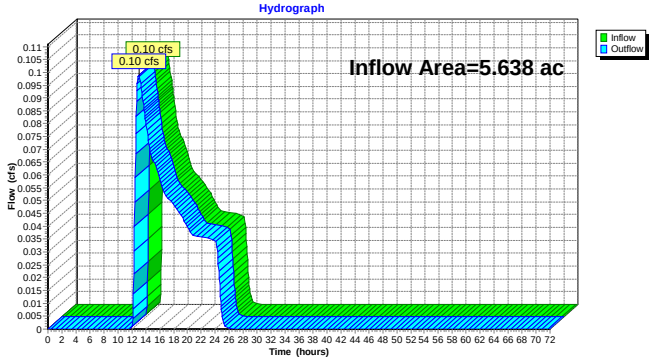
Summary for Reach 2R: SOUTH ADJ PROPERTY

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 5.638 ac, 0.00% Impervious, Inflow Depth = 0.11" for 2YR-24HR event
Inflow = 0.10 cfs @ 12.99 hrs, Volume= 0.053 af
Outflow = 0.10 cfs @ 12.99 hrs, Volume= 0.053 af, Atten= 0%, Lag= 0.0 min
Routed to Reach 6R : Total

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach 2R: SOUTH ADJ PROPERTY



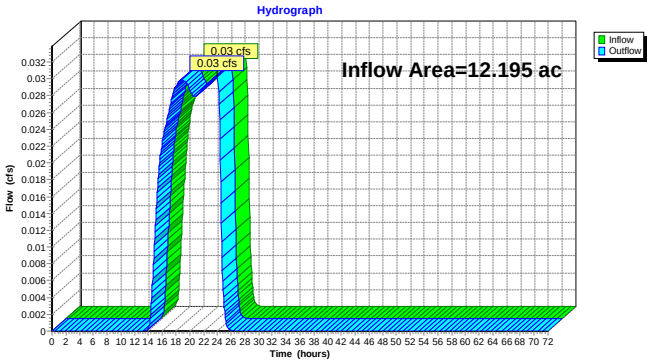
Summary for Reach 3R: SOUTH ON PROPERTY

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 12.195 ac, 0.00% Impervious, Inflow Depth = 0.02" for 2YR-24HR event
Inflow = 0.03 cfs @ 24.01 hrs, Volume= 0.022 af
Outflow = 0.03 cfs @ 24.01 hrs, Volume= 0.022 af, Atten= 0%, Lag= 0.0 min
Routed to Reach 6R : Total

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach 3R: SOUTH ON PROPERTY



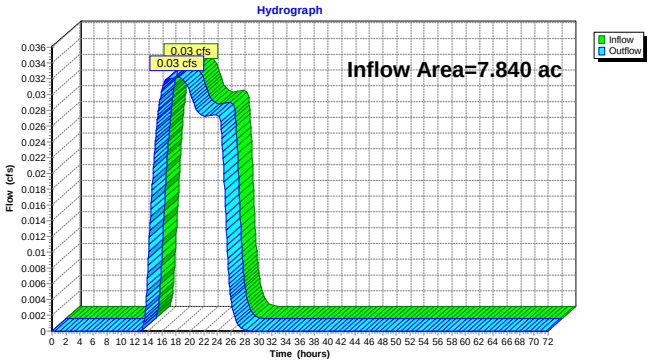
Summary for Reach 4R: NORTH ADJ PROPERTY

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 7.840 ac, 0.00% Impervious, Inflow Depth = 0.04" for 2YR-24HR event
Inflow = 0.03 cfs @ 18.21 hrs, Volume= 0.027 af
Outflow = 0.03 cfs @ 18.21 hrs, Volume= 0.027 af, Atten= 0%, Lag= 0.0 min
Routed to Reach 6R : Total

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach 4R: NORTH ADJ PROPERTY



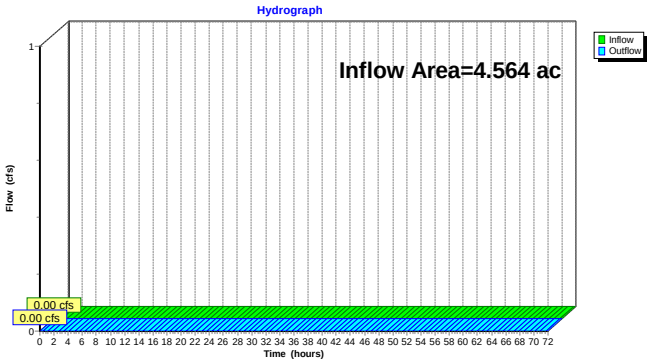
Summary for Reach 5R: EAST ADJ PROPERTY

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 4.564 ac, 0.00% Impervious, Inflow Depth = 0.00" for 2YR-24HR event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min
Routed to Reach 6R : Total

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach 5R: EAST ADJ PROPERTY



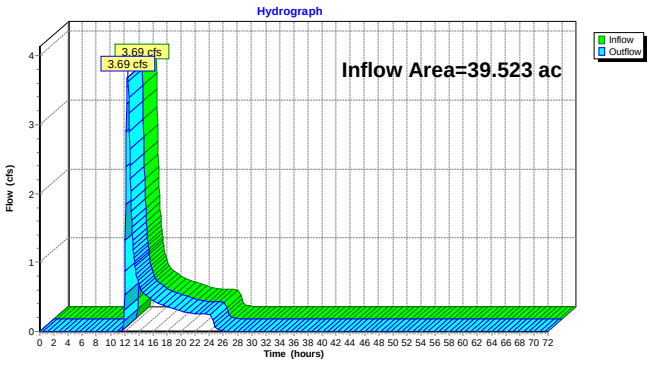
Summary for Reach 6R: Total

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 39.523 ac, 0.00% Impervious, Inflow Depth = 0.18" for 2YR-24HR event
Inflow = 3.69 cfs @ 12.42 hrs, Volume= 0.603 af
Outflow = 3.69 cfs @ 12.42 hrs, Volume= 0.603 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach 6R: Total



Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: DA-001 Runoff Area=9.286 ac 0.00% Impervious Runoff Depth=1.34"
Flow Length=548' Tc=40.3 min CN=74 Runoff=8.42 cfs 1.040 af

Subcatchment 2S: DA-002 Runoff Area=5.638 ac 0.00% Impervious Runoff Depth=0.43"
Flow Length=604' Tc=42.6 min CN=56 Runoff=0.96 cfs 0.204 af

Subcatchment 3S: DA-003 Runoff Area=12.195 ac 0.00% Impervious Runoff Depth=0.21"
Flow Length=928' Tc=38.9 min CN=49 Runoff=0.52 cfs 0.209 af

Subcatchment 4S: DA-004 Runoff Area=7.840 ac 0.00% Impervious Runoff Depth=0.26"
Flow Length=552' Tc=88.6 min CN=51 Runoff=0.37 cfs 0.172 af

Subcatchment 5S: DA-005 Runoff Area=4.564 ac 0.00% Impervious Runoff Depth=0.02"
Flow Length=511' Tc=26.9 min CN=39 Runoff=0.01 cfs 0.006 af

Reach 1R: WEST ADJ PROPERTY Inflow=8.42 cfs 1.040 af
Outflow=8.42 cfs 1.040 af

Reach 2R: SOUTH ADJ PROPERTY Inflow=0.96 cfs 0.204 af
Outflow=0.96 cfs 0.204 af

Reach 3R: SOUTH ON PROPERTY Inflow=0.52 cfs 0.209 af
Outflow=0.52 cfs 0.209 af

Reach 4R: NORTH ADJ PROPERTY Inflow=0.37 cfs 0.172 af
Outflow=0.37 cfs 0.172 af

Reach 5R: EAST ADJ PROPERTY Inflow=0.01 cfs 0.006 af
Outflow=0.01 cfs 0.006 af

Reach 6R: Total Inflow=9.71 cfs 1.632 af
Outflow=9.71 cfs 1.632 af

Total Runoff Area = 39.523 ac Runoff Volume = 1.632 af Average Runoff Depth = 0.50"
100.00% Pervious = 39.523 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment 1S: DA-001

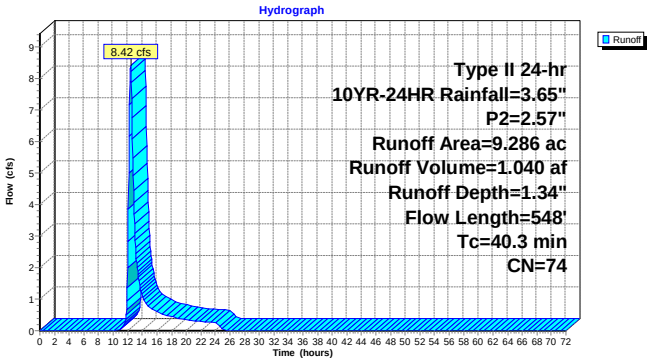
Runoff = 8.42 cfs @ 12.39 hrs, Volume= 1.040 af, Depth= 1.34"
Routed to Reach 1R : WEST ADJ PROPERTY

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type II 24-hr 10YR-24HR Rainfall=3.65", P2=2.57"

Area (ac)	CN	Description
9.019	74	Pasture/grassland/range, Good, HSG C
0.267	73	Woods, Fair, HSG C
9.286	74	Weighted Average
9.286		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
34.7	300	0.0100	0.14		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.57"
5.6	248	0.0110	0.73		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
40.3	548	Total			

Subcatchment 1S: DA-001



Summary for Subcatchment 2S: DA-002

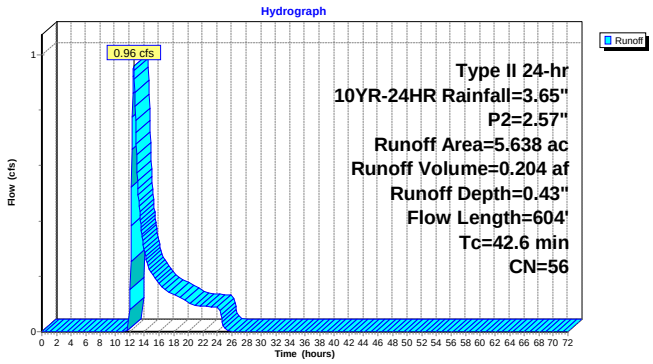
Runoff = 0.96 cfs @ 12.55 hrs, Volume= 0.204 af, Depth= 0.43"
Routed to Reach 2R : SOUTH ADJ PROPERTY

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type II 24-hr 10YR-24HR Rainfall=3.65", P2=2.57"

Area (ac)	CN	Description
2.247	39	Pasture/grassland/range, Good, HSG A
2.610	74	Pasture/grassland/range, Good, HSG C
0.635	36	Woods, Fair, HSG A
0.146	73	Woods, Fair, HSG C
5.638	56	Weighted Average
5.638		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
34.8	264	0.0077	0.13		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.57"
4.5	36	0.1704	0.13		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.57"
3.3	304	0.0918	1.51		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
42.6	604	Total			

Subcatchment 2S: DA-002



Summary for Subcatchment 3S: DA-003

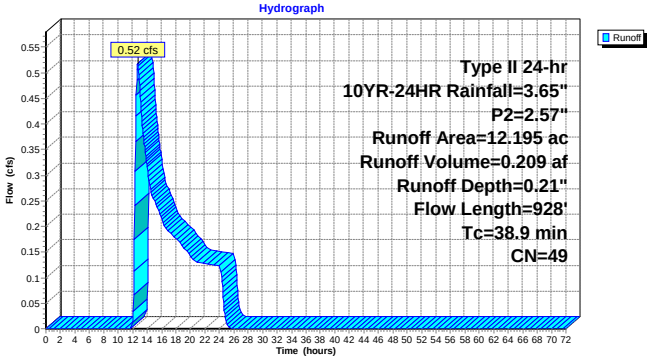
Runoff = 0.52 cfs @ 12.67 hrs, Volume= 0.209 af, Depth= 0.21"
Routed to Reach 3R : SOUTH ON PROPERTY

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type II 24-hr 10YR-24HR Rainfall=3.65", P2=2.57"

Area (ac)	CN	Description
5.599	39	Pasture/grassland/range, Good, HSG A
3.802	74	Pasture/grassland/range, Good, HSG C
2.794	36	Woods, Fair, HSG A
12.195	49	Weighted Average
12.195		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
27.8	300	0.0174	0.18		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.57"
4.0	349	0.0432	1.45		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
7.1	279	0.0171	0.65		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
38.9	928	Total			

Subcatchment 3S: DA-003



Summary for Subcatchment 4S: DA-004

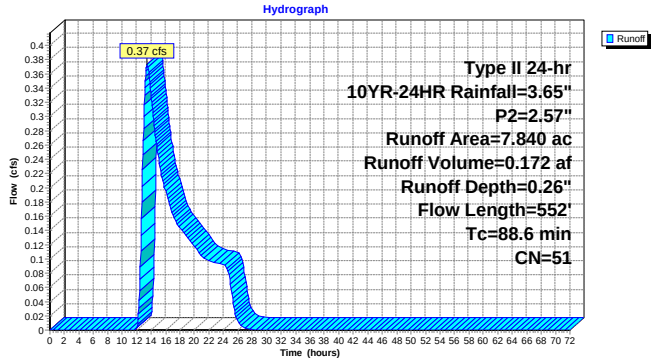
Runoff = 0.37 cfs @ 13.46 hrs, Volume= 0.172 af, Depth= 0.26"
Routed to Reach 4R : NORTH ADJ PROPERTY

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type II 24-hr 10YR-24HR Rainfall=3.65", P2=2.57"

Area (ac)	CN	Description
4.299	39	Pasture/grassland/range, Good, HSG A
2.671	74	Pasture/grassland/range, Good, HSG C
0.841	36	Woods, Fair, HSG A
0.029	73	Woods, Fair, HSG C
7.840	51	Weighted Average
7.840		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
25.2	163	0.0066	0.11		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.57"
39.2	137	0.0110	0.06		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.57"
1.3	133	0.0633	1.76		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
22.9	119	0.0003	0.09		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
88.6	552	Total			

Subcatchment 4S: DA-004



Summary for Subcatchment 5S: DA-005

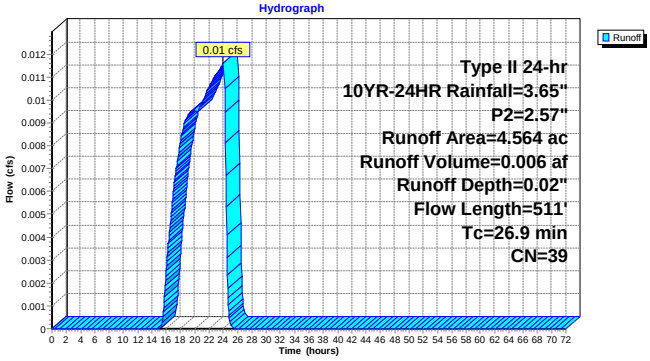
Runoff = 0.01 cfs @ 24.02 hrs, Volume= 0.006 af, Depth= 0.02"
Routed to Reach 5R : EAST ADJ PROPERTY

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type II 24-hr 10YR-24HR Rainfall=3.65", P2=2.57"

Area (ac)	CN	Description
4.075	39	Pasture/grassland/range, Good, HSG A
0.489	36	Woods, Fair, HSG A
4.564	39	Weighted Average
4.564		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
23.5	300	0.0265	0.21		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.57"
3.4	211	0.0219	1.04		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
26.9	511	Total			

Subcatchment 5S: DA-005



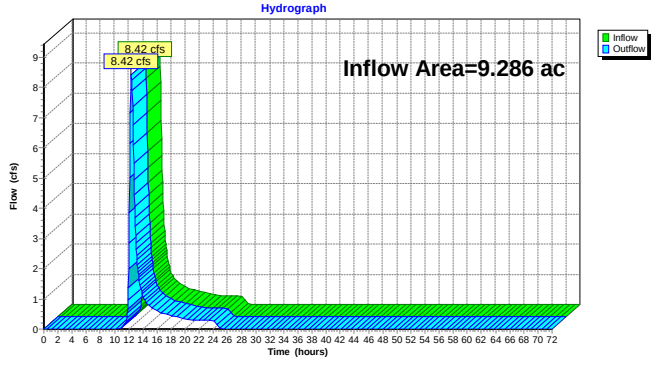
Summary for Reach 1R: WEST ADJ PROPERTY

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 9.286 ac, 0.00% Impervious, Inflow Depth = 1.34" for 10YR-24HR event
Inflow = 8.42 cfs @ 12.39 hrs, Volume= 1.040 af
Outflow = 8.42 cfs @ 12.39 hrs, Volume= 1.040 af, Atten= 0%, Lag= 0.0 min
Routed to Reach 6R : Total

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach 1R: WEST ADJ PROPERTY



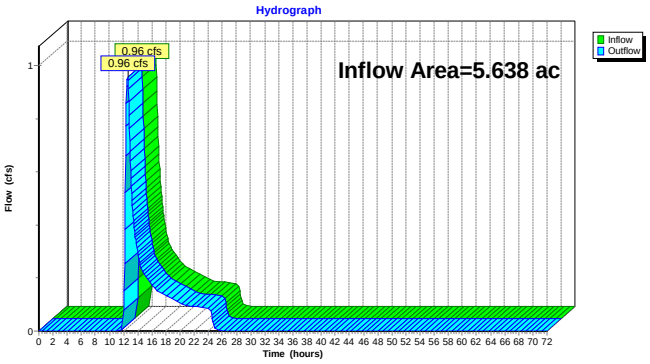
Summary for Reach 2R: SOUTH ADJ PROPERTY

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 5.638 ac, 0.00% Impervious, Inflow Depth = 0.43" for 10YR-24HR event
Inflow = 0.96 cfs @ 12.55 hrs, Volume= 0.204 af
Outflow = 0.96 cfs @ 12.55 hrs, Volume= 0.204 af, Atten= 0%, Lag= 0.0 min
Routed to Reach 6R : Total

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach 2R: SOUTH ADJ PROPERTY



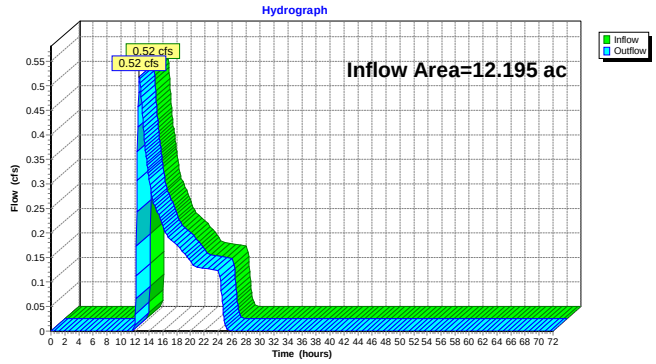
Summary for Reach 3R: SOUTH ON PROPERTY

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 12.195 ac, 0.00% Impervious, Inflow Depth = 0.21" for 10YR-24HR event
Inflow = 0.52 cfs @ 12.67 hrs, Volume= 0.209 af
Outflow = 0.52 cfs @ 12.67 hrs, Volume= 0.209 af, Atten= 0%, Lag= 0.0 min
Routed to Reach 6R : Total

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach 3R: SOUTH ON PROPERTY



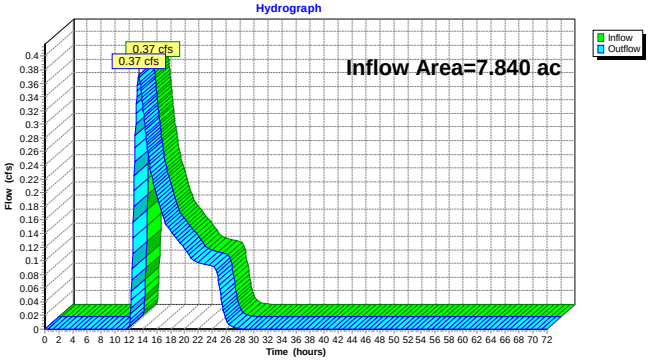
Summary for Reach 4R: NORTH ADJ PROPERTY

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 7.840 ac, 0.00% Impervious, Inflow Depth = 0.26" for 10YR-24HR event
Inflow = 0.37 cfs @ 13.46 hrs, Volume= 0.172 af
Outflow = 0.37 cfs @ 13.46 hrs, Volume= 0.172 af, Atten= 0%, Lag= 0.0 min
Routed to Reach 6R : Total

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach 4R: NORTH ADJ PROPERTY



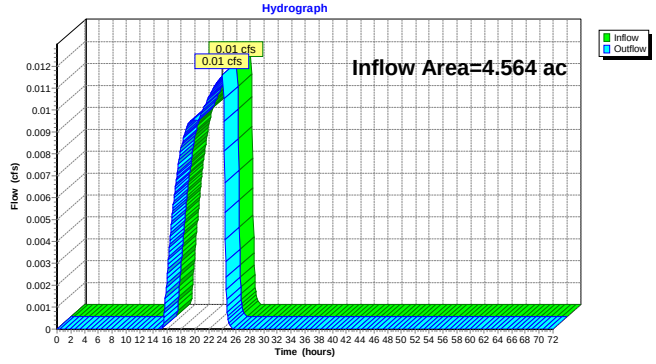
Summary for Reach 5R: EAST ADJ PROPERTY

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 4.564 ac, 0.00% Impervious, Inflow Depth = 0.02" for 10YR-24HR event
Inflow = 0.01 cfs @ 24.02 hrs, Volume= 0.006 af
Outflow = 0.01 cfs @ 24.02 hrs, Volume= 0.006 af, Atten= 0%, Lag= 0.0 min
Routed to Reach 6R : Total

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach 5R: EAST ADJ PROPERTY



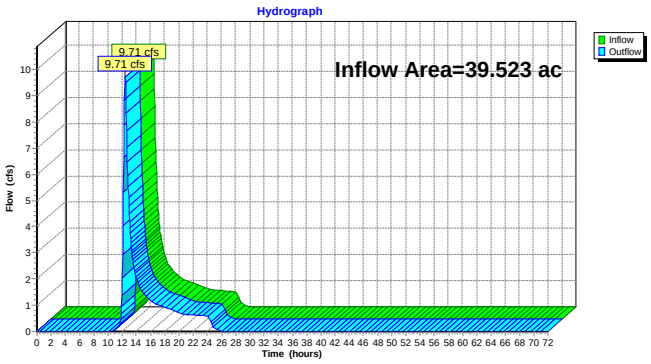
Summary for Reach 6R: Total

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 39.523 ac, 0.00% Impervious, Inflow Depth = 0.50" for 10YR-24HR event
Inflow = 9.71 cfs @ 12.42 hrs, Volume= 1.632 af
Outflow = 9.71 cfs @ 12.42 hrs, Volume= 1.632 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach 6R: Total



Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: DA-001 Runoff Area=9.286 ac 0.00% Impervious Runoff Depth=1.94"
Flow Length=548' Tc=40.3 min CN=74 Runoff=12.49 cfs 1.503 af

Subcatchment 2S: DA-002 Runoff Area=5.638 ac 0.00% Impervious Runoff Depth=0.78"
Flow Length=604' Tc=42.6 min CN=56 Runoff=2.15 cfs 0.365 af

Subcatchment 3S: DA-003 Runoff Area=12.195 ac 0.00% Impervious Runoff Depth=0.44"
Flow Length=928' Tc=38.9 min CN=49 Runoff=1.94 cfs 0.450 af

Subcatchment 4S: DA-004 Runoff Area=7.840 ac 0.00% Impervious Runoff Depth=0.53"
Flow Length=552' Tc=88.6 min CN=51 Runoff=1.02 cfs 0.347 af

Subcatchment 5S: DA-005 Runoff Area=4.564 ac 0.00% Impervious Runoff Depth=0.10"
Flow Length=511' Tc=26.9 min CN=39 Runoff=0.05 cfs 0.040 af

Reach 1R: WEST ADJ PROPERTY Inflow=12.49 cfs 1.503 af
Outflow=12.49 cfs 1.503 af

Reach 2R: SOUTH ADJ PROPERTY Inflow=2.15 cfs 0.365 af
Outflow=2.15 cfs 0.365 af

Reach 3R: SOUTH ON PROPERTY Inflow=1.94 cfs 0.450 af
Outflow=1.94 cfs 0.450 af

Reach 4R: NORTH ADJ PROPERTY Inflow=1.02 cfs 0.347 af
Outflow=1.02 cfs 0.347 af

Reach 5R: EAST ADJ PROPERTY Inflow=0.05 cfs 0.040 af
Outflow=0.05 cfs 0.040 af

Reach 6R: Total Inflow=16.57 cfs 2.703 af
Outflow=16.57 cfs 2.703 af

Total Runoff Area = 39.523 ac Runoff Volume = 2.703 af Average Runoff Depth = 0.82"
100.00% Pervious = 39.523 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment 1S: DA-001

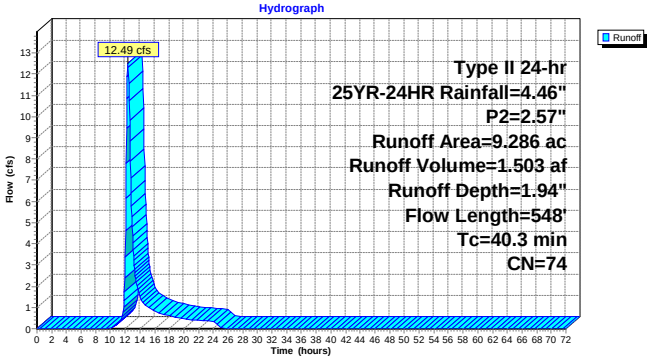
Runoff = 12.49 cfs @ 12.39 hrs, Volume= 1.503 af, Depth= 1.94"
Routed to Reach 1R : WEST ADJ PROPERTY

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type II 24-hr 25YR-24HR Rainfall=4.46", P2=2.57"

Area (ac)	CN	Description
9.019	74	Pasture/grassland/range, Good, HSG C
0.267	73	Woods, Fair, HSG C
9.286	74	Weighted Average
9.286		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
34.7	300	0.0100	0.14		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.57"
5.6	248	0.0110	0.73		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
40.3	548	Total			

Subcatchment 1S: DA-001



Summary for Subcatchment 2S: DA-002

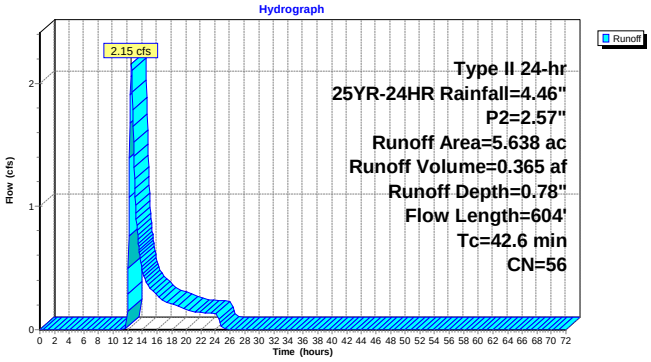
Runoff = 2.15 cfs @ 12.49 hrs, Volume= 0.365 af, Depth= 0.78"
Routed to Reach 2R : SOUTH ADJ PROPERTY

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type II 24-hr 25YR-24HR Rainfall=4.46", P2=2.57"

Area (ac)	CN	Description
2.247	39	Pasture/grassland/range, Good, HSG A
2.610	74	Pasture/grassland/range, Good, HSG C
0.635	36	Woods, Fair, HSG A
0.146	73	Woods, Fair, HSG C
5.638	56	Weighted Average
5.638		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
34.8	264	0.0077	0.13		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.57"
4.5	36	0.1704	0.13		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.57"
3.3	304	0.0918	1.51		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
42.6	604	Total			

Subcatchment 2S: DA-002



Summary for Subcatchment 3S: DA-003

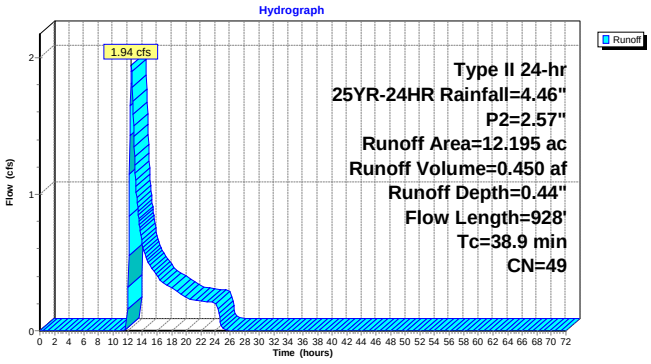
Runoff = 1.94 cfs @ 12.51 hrs, Volume= 0.450 af, Depth= 0.44"
Routed to Reach 3R : SOUTH ON PROPERTY

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type II 24-hr 25YR-24HR Rainfall=4.46", P2=2.57"

Area (ac)	CN	Description
5.599	39	Pasture/grassland/range, Good, HSG A
3.802	74	Pasture/grassland/range, Good, HSG C
2.794	36	Woods, Fair, HSG A
12.195	49	Weighted Average
12.195		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
27.8	300	0.0174	0.18		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.57"
4.0	349	0.0432	1.45		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
7.1	279	0.0171	0.65		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
38.9	928	Total			

Subcatchment 3S: DA-003



Summary for Subcatchment 4S: DA-004

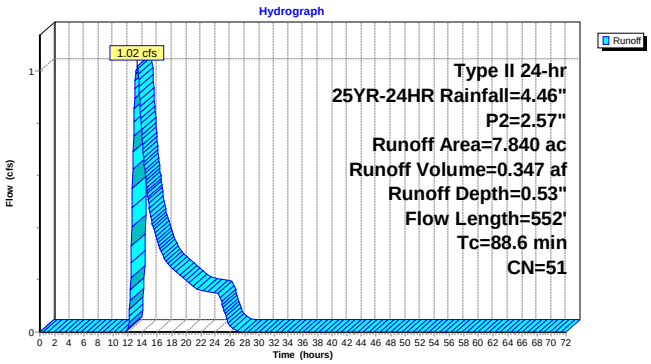
Runoff = 1.02 cfs @ 13.29 hrs, Volume= 0.347 af, Depth= 0.53"
Routed to Reach 4R : NORTH ADJ PROPERTY

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type II 24-hr 25YR-24HR Rainfall=4.46", P2=2.57"

Area (ac)	CN	Description
4.299	39	Pasture/grassland/range, Good, HSG A
2.671	74	Pasture/grassland/range, Good, HSG C
0.841	36	Woods, Fair, HSG A
0.029	73	Woods, Fair, HSG C
7.840	51	Weighted Average
7.840		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
25.2	163	0.0066	0.11		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.57"
39.2	137	0.0110	0.06		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.57"
1.3	133	0.0633	1.76		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
22.9	119	0.0003	0.09		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
88.6	552	Total			

Subcatchment 4S: DA-004



Summary for Subcatchment 5S: DA-005

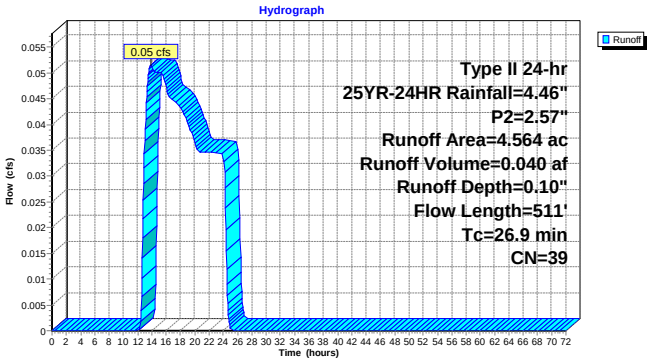
Runoff = 0.05 cfs @ 13.88 hrs, Volume= 0.040 af, Depth= 0.10"
Routed to Reach 5R : EAST ADJ PROPERTY

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type II 24-hr 25YR-24HR Rainfall=4.46", P2=2.57"

Area (ac)	CN	Description
4.075	39	Pasture/grassland/range, Good, HSG A
0.489	36	Woods, Fair, HSG A
4.564	39	Weighted Average
4.564		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
23.5	300	0.0265	0.21		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.57"
3.4	211	0.0219	1.04		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
26.9	511	Total			

Subcatchment 5S: DA-005



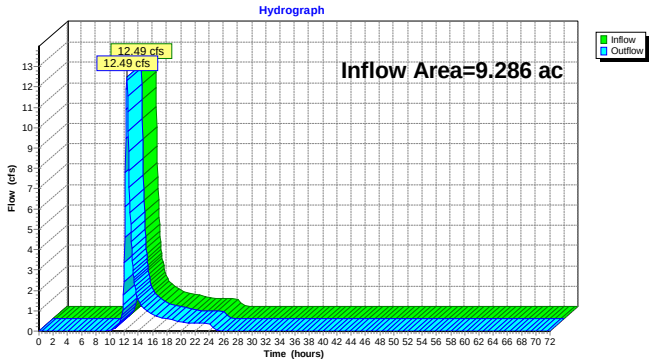
Summary for Reach 1R: WEST ADJ PROPERTY

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 9.286 ac, 0.00% Impervious, Inflow Depth = 1.94" for 25YR-24HR event
Inflow = 12.49 cfs @ 12.39 hrs, Volume= 1.503 af
Outflow = 12.49 cfs @ 12.39 hrs, Volume= 1.503 af, Atten= 0%, Lag= 0.0 min
Routed to Reach 6R : Total

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach 1R: WEST ADJ PROPERTY



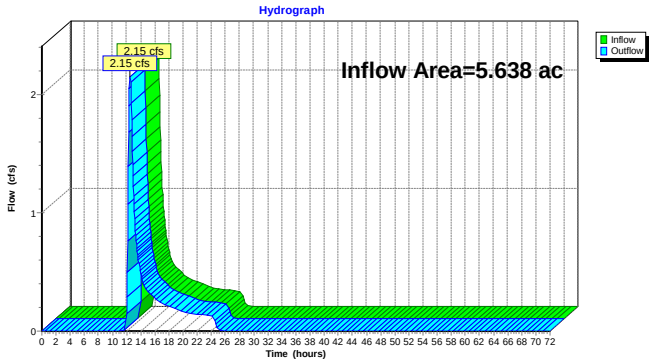
Summary for Reach 2R: SOUTH ADJ PROPERTY

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 5.638 ac, 0.00% Impervious, Inflow Depth = 0.78" for 25YR-24HR event
Inflow = 2.15 cfs @ 12.49 hrs, Volume= 0.365 af
Outflow = 2.15 cfs @ 12.49 hrs, Volume= 0.365 af, Atten= 0%, Lag= 0.0 min
Routed to Reach 6R : Total

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach 2R: SOUTH ADJ PROPERTY



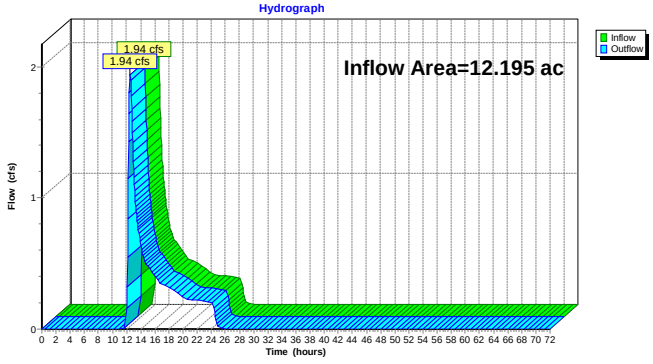
Summary for Reach 3R: SOUTH ON PROPERTY

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 12.195 ac, 0.00% Impervious, Inflow Depth = 0.44" for 25YR-24HR event
Inflow = 1.94 cfs @ 12.51 hrs, Volume= 0.450 af
Outflow = 1.94 cfs @ 12.51 hrs, Volume= 0.450 af, Atten= 0%, Lag= 0.0 min
Routed to Reach 6R : Total

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach 3R: SOUTH ON PROPERTY



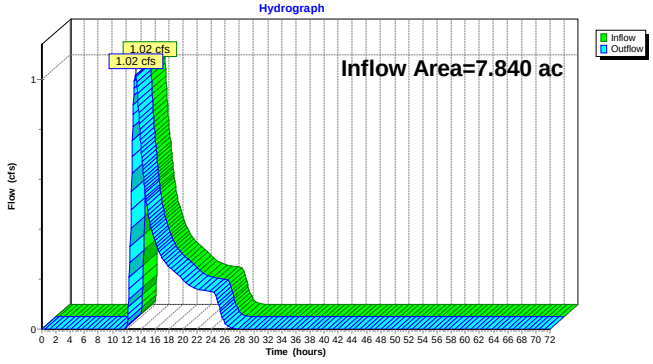
Summary for Reach 4R: NORTH ADJ PROPERTY

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 7.840 ac, 0.00% Impervious, Inflow Depth = 0.53" for 25YR-24HR event
Inflow = 1.02 cfs @ 13.29 hrs, Volume= 0.347 af
Outflow = 1.02 cfs @ 13.29 hrs, Volume= 0.347 af, Atten= 0%, Lag= 0.0 min
Routed to Reach 6R : Total

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach 4R: NORTH ADJ PROPERTY



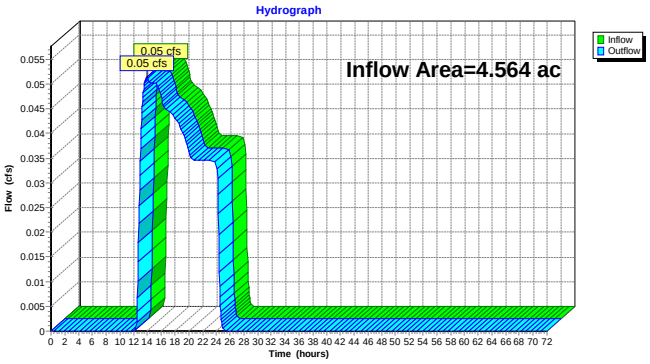
Summary for Reach 5R: EAST ADJ PROPERTY

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 4.564 ac, 0.00% Impervious, Inflow Depth = 0.10" for 25YR-24HR event
Inflow = 0.05 cfs @ 13.88 hrs, Volume= 0.040 af
Outflow = 0.05 cfs @ 13.88 hrs, Volume= 0.040 af, Atten= 0%, Lag= 0.0 min
Routed to Reach 6R : Total

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach 5R: EAST ADJ PROPERTY



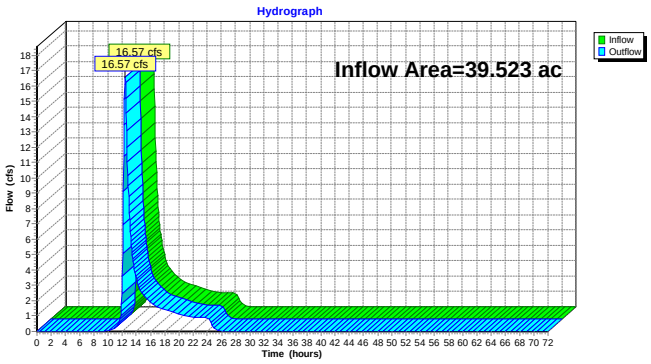
Summary for Reach 6R: Total

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 39.523 ac, 0.00% Impervious, Inflow Depth = 0.82" for 25YR-24HR event
Inflow = 16.57 cfs @ 12.42 hrs, Volume= 2.703 af
Outflow = 16.57 cfs @ 12.42 hrs, Volume= 2.703 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach 6R: Total



Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: DA-001 Runoff Area=9.286 ac 0.00% Impervious Runoff Depth=3.13"
Flow Length=548' Tc=40.3 min CN=74 Runoff=20.51 cfs 2.419 af

Subcatchment 2S: DA-002 Runoff Area=5.638 ac 0.00% Impervious Runoff Depth=1.56"
Flow Length=604' Tc=42.6 min CN=56 Runoff=5.17 cfs 0.731 af

Subcatchment 3S: DA-003 Runoff Area=12.195 ac 0.00% Impervious Runoff Depth=1.04"
Flow Length=928' Tc=38.9 min CN=49 Runoff=6.67 cfs 1.056 af

Subcatchment 4S: DA-004 Runoff Area=7.840 ac 0.00% Impervious Runoff Depth=1.18"
Flow Length=552' Tc=88.6 min CN=51 Runoff=2.87 cfs 0.771 af

Subcatchment 5S: DA-005 Runoff Area=4.564 ac 0.00% Impervious Runoff Depth=0.43"
Flow Length=511' Tc=26.9 min CN=39 Runoff=0.62 cfs 0.162 af

Reach 1R: WEST ADJ PROPERTY Inflow=20.51 cfs 2.419 af
Outflow=20.51 cfs 2.419 af

Reach 2R: SOUTH ADJ PROPERTY Inflow=5.17 cfs 0.731 af
Outflow=5.17 cfs 0.731 af

Reach 3R: SOUTH ON PROPERTY Inflow=6.67 cfs 1.056 af
Outflow=6.67 cfs 1.056 af

Reach 4R: NORTH ADJ PROPERTY Inflow=2.87 cfs 0.771 af
Outflow=2.87 cfs 0.771 af

Reach 5R: EAST ADJ PROPERTY Inflow=0.62 cfs 0.162 af
Outflow=0.62 cfs 0.162 af

Reach 6R: Total Inflow=33.57 cfs 5.138 af
Outflow=33.57 cfs 5.138 af

Total Runoff Area = 39.523 ac Runoff Volume = 5.138 af Average Runoff Depth = 1.56"
100.00% Pervious = 39.523 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment 1S: DA-001

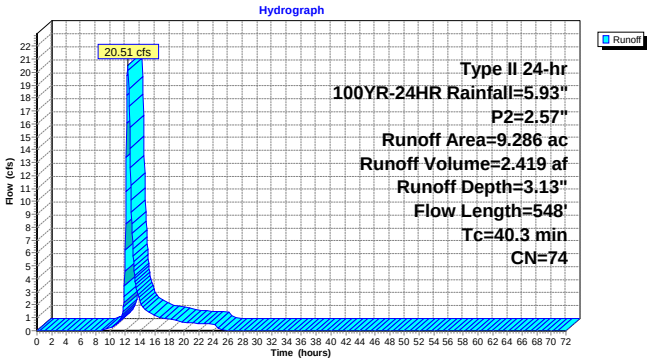
Runoff = 20.51 cfs @ 12.38 hrs, Volume= 2.419 af, Depth= 3.13"
Routed to Reach 1R : WEST ADJ PROPERTY

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type II 24-hr 100YR-24HR Rainfall=5.93", P2=2.57"

Area (ac)	CN	Description
9.019	74	Pasture/grassland/range, Good, HSG C
0.267	73	Woods, Fair, HSG C
9.286	74	Weighted Average
9.286		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
34.7	300	0.0100	0.14		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.57"
5.6	248	0.0110	0.73		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
40.3	548	Total			

Subcatchment 1S: DA-001



Summary for Subcatchment 2S: DA-002

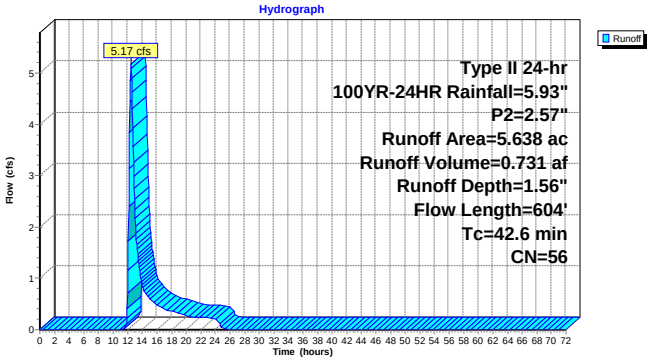
Runoff = 5.17 cfs @ 12.45 hrs, Volume= 0.731 af, Depth= 1.56"
Routed to Reach 2R : SOUTH ADJ PROPERTY

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type II 24-hr 100YR-24HR Rainfall=5.93", P2=2.57"

Area (ac)	CN	Description
2.247	39	Pasture/grassland/range, Good, HSG A
2.610	74	Pasture/grassland/range, Good, HSG C
0.635	36	Woods, Fair, HSG A
0.146	73	Woods, Fair, HSG C
5.638	56	Weighted Average
5.638		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
34.8	264	0.0077	0.13		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.57"
4.5	36	0.1704	0.13		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.57"
3.3	304	0.0918	1.51		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
42.6	604	Total			

Subcatchment 2S: DA-002



Summary for Subcatchment 3S: DA-003

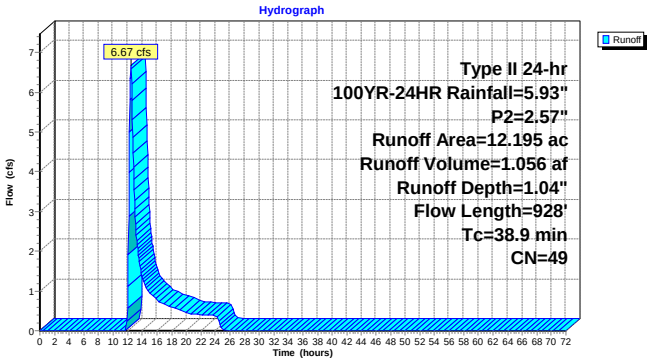
Runoff = 6.67 cfs @ 12.43 hrs, Volume= 1.056 af, Depth= 1.04"
Routed to Reach 3R : SOUTH ON PROPERTY

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type II 24-hr 100YR-24HR Rainfall=5.93", P2=2.57"

Area (ac)	CN	Description
5.599	39	Pasture/grassland/range, Good, HSG A
3.802	74	Pasture/grassland/range, Good, HSG C
2.794	36	Woods, Fair, HSG A
12.195	49	Weighted Average
12.195		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
27.8	300	0.0174	0.18		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.57"
4.0	349	0.0432	1.45		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
7.1	279	0.0171	0.65		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
38.9	928	Total			

Subcatchment 3S: DA-003



Summary for Subcatchment 4S: DA-004

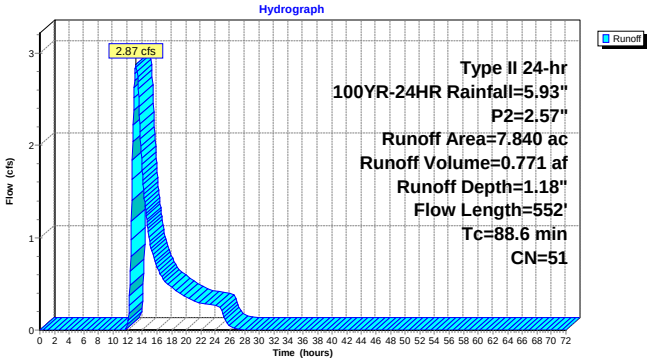
Runoff = 2.87 cfs @ 13.12 hrs, Volume= 0.771 af, Depth= 1.18"
Routed to Reach 4R : NORTH ADJ PROPERTY

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type II 24-hr 100YR-24HR Rainfall=5.93", P2=2.57"

Area (ac)	CN	Description
4.299	39	Pasture/grassland/range, Good, HSG A
2.671	74	Pasture/grassland/range, Good, HSG C
0.841	36	Woods, Fair, HSG A
0.029	73	Woods, Fair, HSG C
7.840	51	Weighted Average
7.840		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
25.2	163	0.0066	0.11		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.57"
39.2	137	0.0110	0.06		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.57"
1.3	133	0.0633	1.76		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
22.9	119	0.0003	0.09		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
88.6	552	Total			

Subcatchment 4S: DA-004



Summary for Subcatchment 5S: DA-005

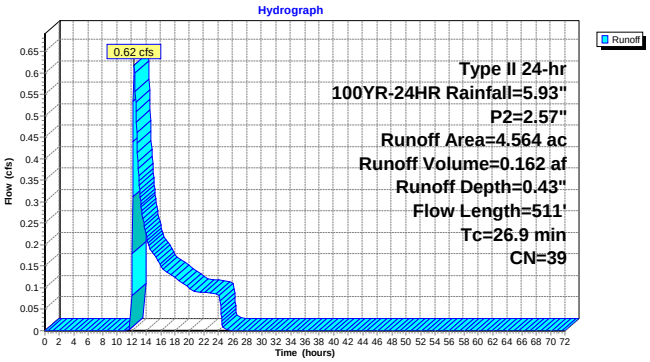
Runoff = 0.62 cfs @ 12.37 hrs, Volume= 0.162 af, Depth= 0.43"
Routed to Reach 5R : EAST ADJ PROPERTY

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type II 24-hr 100YR-24HR Rainfall=5.93", P2=2.57"

Area (ac)	CN	Description
4.075	39	Pasture/grassland/range, Good, HSG A
0.489	36	Woods, Fair, HSG A
4.564	39	Weighted Average
4.564		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
23.5	300	0.0265	0.21		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.57"
3.4	211	0.0219	1.04		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
26.9	511	Total			

Subcatchment 5S: DA-005



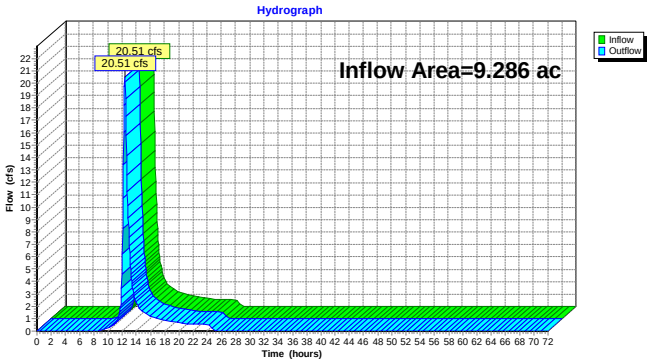
Summary for Reach 1R: WEST ADJ PROPERTY

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 9.286 ac, 0.00% Impervious, Inflow Depth = 3.13" for 100YR-24HR event
Inflow = 20.51 cfs @ 12.38 hrs, Volume= 2.419 af
Outflow = 20.51 cfs @ 12.38 hrs, Volume= 2.419 af, Atten= 0%, Lag= 0.0 min
Routed to Reach 6R : Total

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach 1R: WEST ADJ PROPERTY



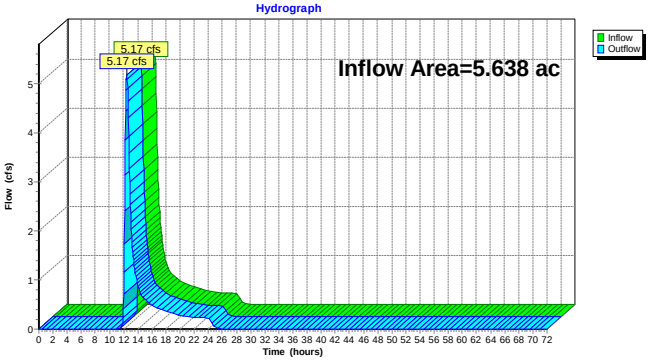
Summary for Reach 2R: SOUTH ADJ PROPERTY

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 5.638 ac, 0.00% Impervious, Inflow Depth = 1.56" for 100YR-24HR event
Inflow = 5.17 cfs @ 12.45 hrs, Volume= 0.731 af
Outflow = 5.17 cfs @ 12.45 hrs, Volume= 0.731 af, Atten= 0%, Lag= 0.0 min
Routed to Reach 6R : Total

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach 2R: SOUTH ADJ PROPERTY



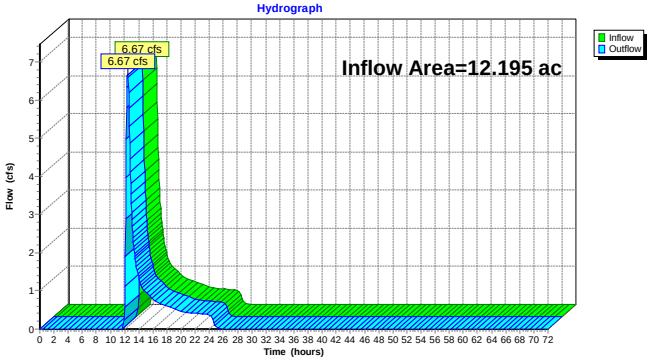
Summary for Reach 3R: SOUTH ON PROPERTY

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 12.195 ac, 0.00% Impervious, Inflow Depth = 1.04" for 100YR-24HR event
Inflow = 6.67 cfs @ 12.43 hrs, Volume= 1.056 af
Outflow = 6.67 cfs @ 12.43 hrs, Volume= 1.056 af, Atten= 0%, Lag= 0.0 min
Routed to Reach 6R : Total

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach 3R: SOUTH ON PROPERTY



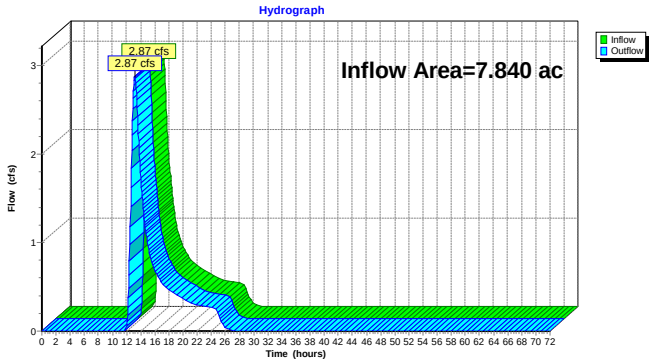
Summary for Reach 4R: NORTH ADJ PROPERTY

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 7.840 ac, 0.00% Impervious, Inflow Depth = 1.18" for 100YR-24HR event
Inflow = 2.87 cfs @ 13.12 hrs, Volume= 0.771 af
Outflow = 2.87 cfs @ 13.12 hrs, Volume= 0.771 af, Atten= 0%, Lag= 0.0 min
Routed to Reach 6R : Total

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach 4R: NORTH ADJ PROPERTY



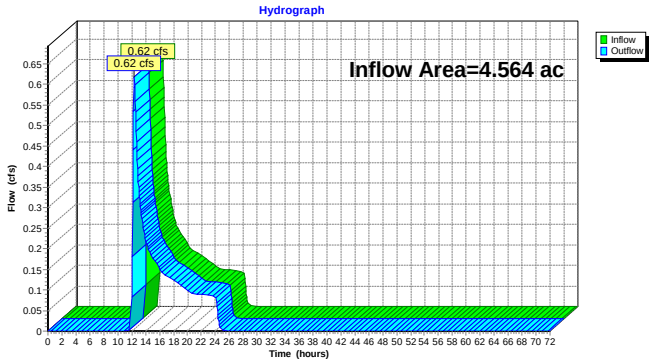
Summary for Reach 5R: EAST ADJ PROPERTY

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 4.564 ac, 0.00% Impervious, Inflow Depth = 0.43" for 100YR-24HR event
Inflow = 0.62 cfs @ 12.37 hrs, Volume= 0.162 af
Outflow = 0.62 cfs @ 12.37 hrs, Volume= 0.162 af, Atten= 0%, Lag= 0.0 min
Routed to Reach 6R : Total

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach 5R: EAST ADJ PROPERTY



Summary for Reach 6R: Total

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 39.523 ac, 0.00% Impervious, Inflow Depth = 1.56" for 100YR-24HR event
Inflow = 33.57 cfs @ 12.41 hrs, Volume= 5.138 af
Outflow = 33.57 cfs @ 12.41 hrs, Volume= 5.138 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach 6R: Total

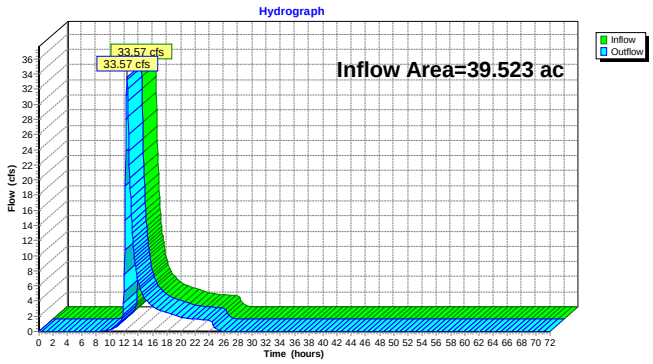
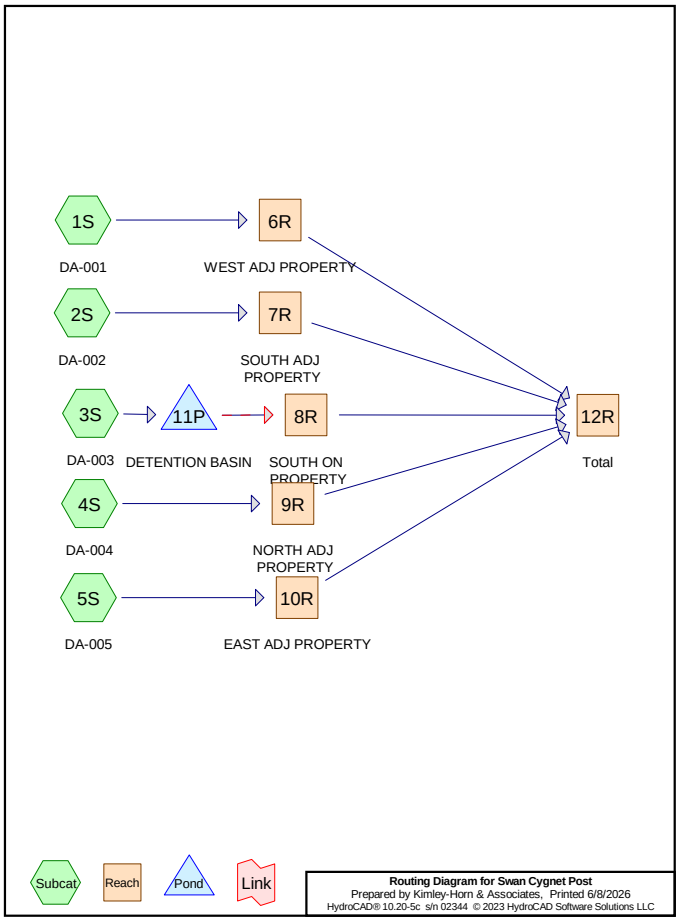


Exhibit 7 – Post-Development HydroCAD Model



Rainfall Events Listing (selected events)

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	1YR-24HR	Type II 24-hr		Default	24.00	1	2.28	2
2	2YR-24HR	Type II 24-hr		Default	24.00	1	2.57	2
3	10YR-24HR	Type II 24-hr		Default	24.00	1	3.65	2
4	25YR-24HR	Type II 24-hr		Default	24.00	1	4.46	2
5	100YR-24HR	Type II 24-hr		Default	24.00	1	5.93	2

Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: DA-001 Runoff Area=2.123 ac 21.95% Impervious Runoff Depth=0.89"
Flow Length=132' Slope=0.0846 '/' Tc=15.0 min CN=83 Runoff=2.39 cfs 0.158 af

Subcatchment 2S: DA-002 Runoff Area=0.946 ac 11.10% Impervious Runoff Depth=0.06"
Flow Length=214' Slope=0.1060 '/' Tc=15.0 min CN=56 Runoff=0.01 cfs 0.005 af

Subcatchment 3S: DA-003 Runoff Area=34.472 ac 66.66% Impervious Runoff Depth=1.26"
Flow Length=1,467' Tc=28.5 min CN=89 Runoff=38.94 cfs 3.632 af

Subcatchment 4S: DA-004 Runoff Area=1.019 ac 0.00% Impervious Runoff Depth=0.00"
Flow Length=26' Slope=0.1317 '/' Tc=15.0 min CN=49 Runoff=0.00 cfs 0.000 af

Subcatchment 5S: DA-005 Runoff Area=0.496 ac 5.04% Impervious Runoff Depth=0.01"
Flow Length=43' Slope=0.1886 '/' Tc=15.0 min CN=51 Runoff=0.00 cfs 0.001 af

Reach 6R: WEST ADJ PROPERTY Inflow=2.39 cfs 0.158 af
Outflow=2.39 cfs 0.158 af

Reach 7R: SOUTH ADJ PROPERTY Inflow=0.01 cfs 0.005 af
Outflow=0.01 cfs 0.005 af

Reach 8R: SOUTH ON PROPERTY Inflow=0.00 cfs 0.000 af
Outflow=0.00 cfs 0.000 af

Reach 9R: NORTH ADJ PROPERTY Inflow=0.00 cfs 0.000 af
Outflow=0.00 cfs 0.000 af

Reach 10R: EAST ADJ PROPERTY Inflow=0.00 cfs 0.001 af
Outflow=0.00 cfs 0.001 af

Reach 12R: Total Inflow=2.39 cfs 0.163 af
Outflow=2.39 cfs 0.163 af

Pond 11P: DETENTION BASIN Peak Elev=880.76' Storage=117,022 cf Inflow=38.94 cfs 3.632 af
Discarded=0.84 cfs 3.631 af Primary=0.00 cfs 0.000 af Secondary=0.00 cfs 0.000 af Outflow=0.84 cfs 3.631 af

Total Runoff Area = 39.056 ac Runoff Volume = 3.795 af Average Runoff Depth = 1.17"
39.64% Pervious = 15.480 ac 60.36% Impervious = 23.576 ac

Summary for Subcatchment 1S: DA-001

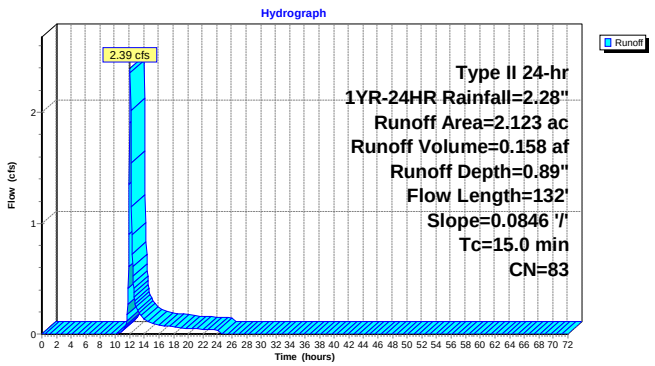
Runoff = 2.39 cfs @ 12.08 hrs, Volume= 0.158 af, Depth= 0.89"
Routed to Reach 6R : WEST ADJ PROPERTY

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type II 24-hr 1YR-24HR Rainfall=2.28"

Area (ac)	CN	Description
1.657	79	50-75% Grass cover, Fair, HSG C
0.466	98	Paved parking, HSG C
2.123	83	Weighted Average
1.657		78.05% Pervious Area
0.466		21.95% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.7	132	0.0846	0.29		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.57"
7.7	132	Total, Increased to minimum Tc = 15.0 min			

Subcatchment 1S: DA-001



Summary for Subcatchment 2S: DA-002

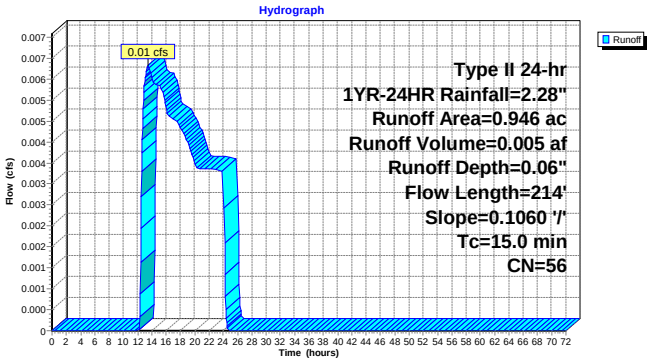
Runoff = 0.01 cfs @ 13.49 hrs, Volume= 0.005 af, Depth= 0.06"
Routed to Reach 7R : SOUTH ADJ PROPERTY

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type II 24-hr 1YR-24HR Rainfall=2.28"

Area (ac)	CN	Description
0.807	49	50-75% Grass cover, Fair, HSG A
0.105	98	Paved parking, HSG C
0.034	79	50-75% Grass cover, Fair, HSG C
0.946	56	Weighted Average
0.841		88.90% Pervious Area
0.105		11.10% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.3	214	0.1060	0.35		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.57"
10.3	214	Total, Increased to minimum Tc = 15.0 min			

Subcatchment 2S: DA-002



Summary for Subcatchment 3S: DA-003

[47] Hint: Peak is 2568% of capacity of segment #4

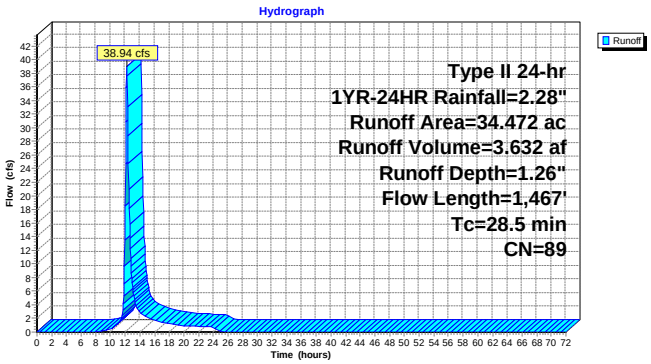
Runoff = 38.94 cfs @ 12.23 hrs, Volume= 3.632 af, Depth= 1.26"
Routed to Pond 11P : DETENTION BASIN

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type II 24-hr 1YR-24HR Rainfall=2.28"

Area (ac)	CN	Description
12.290	98	Paved parking, HSG A
10.690	98	Paved parking, HSG C
7.886	79	50-75% Grass cover, Fair, HSG C
3.606	49	50-75% Grass cover, Fair, HSG A
34.472	89	Weighted Average
11.492		33.34% Pervious Area
22.980		66.66% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.2	300	0.0103	1.18		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.57"
21.5	833	0.0085	0.65		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
1.9	229	0.0093	1.96		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.9	105	0.0067	1.93	1.52	**Pipe Channel, CMP_Round 12"** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.025 Corrugated metal
28.5	1,467	Total			

Subcatchment 3S: DA-003



Summary for Subcatchment 4S: DA-004

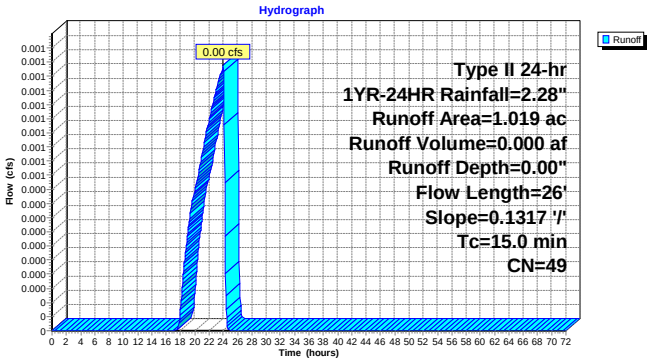
Runoff = 0.00 cfs @ 24.00 hrs, Volume= 0.000 af, Depth= 0.00"
Routed to Reach 9R : NORTH ADJ PROPERTY

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type II 24-hr 1YR-24HR Rainfall=2.28"

Area (ac)	CN	Description
1.019	49	50-75% Grass cover, Fair, HSG A
1.019		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.8	26	0.1317	0.25		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.57"
1.8	26	Total, Increased to minimum Tc = 15.0 min			

Subcatchment 4S: DA-004



Summary for Subcatchment 5S: DA-005

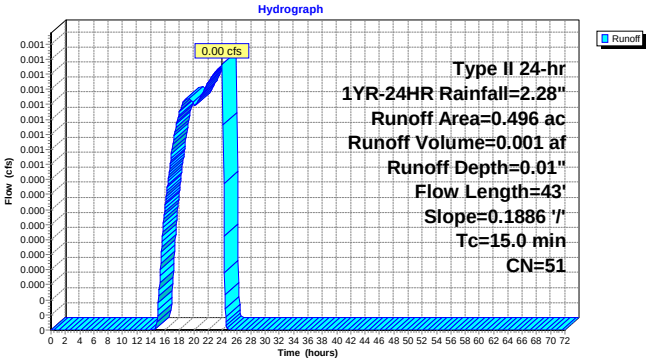
Runoff = 0.00 cfs @ 24.00 hrs, Volume= 0.001 af, Depth= 0.01"
Routed to Reach 10R : EAST ADJ PROPERTY

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type II 24-hr 1YR-24HR Rainfall=2.28"

Area (ac)	CN	Description
0.471	49	50-75% Grass cover, Fair, HSG A
0.025	98	Paved parking, HSG A
0.496	51	Weighted Average
0.471		94.96% Pervious Area
0.025		5.04% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.3	43	0.1886	0.32		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.57"
2.3	43	Total, Increased to minimum Tc = 15.0 min			

Subcatchment 5S: DA-005



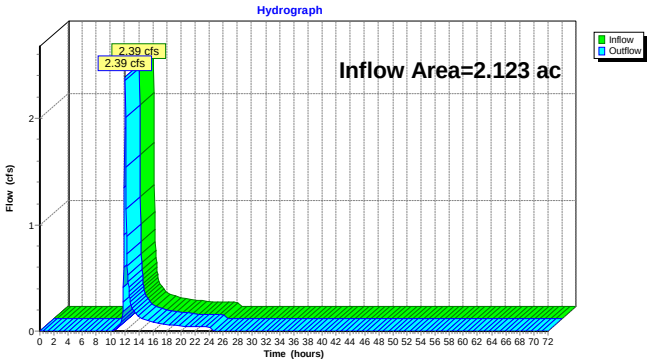
Summary for Reach 6R: WEST ADJ PROPERTY

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 2.123 ac, 21.95% Impervious, Inflow Depth = 0.89" for 1YR-24HR event
Inflow = 2.39 cfs @ 12.08 hrs, Volume= 0.158 af
Outflow = 2.39 cfs @ 12.08 hrs, Volume= 0.158 af, Atten= 0%, Lag= 0.0 min
Routed to Reach 12R : Total

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach 6R: WEST ADJ PROPERTY



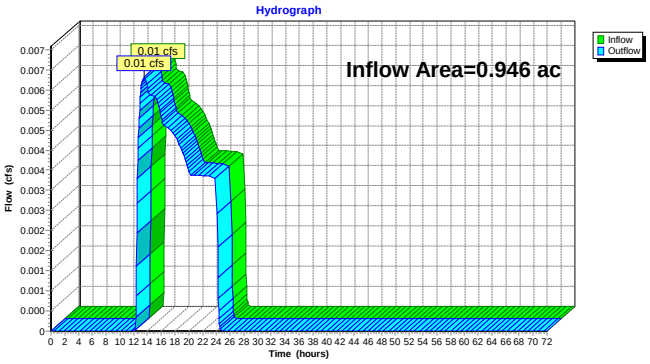
Summary for Reach 7R: SOUTH ADJ PROPERTY

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.946 ac, 11.10% Impervious, Inflow Depth = 0.06" for 1YR-24HR event
Inflow = 0.01 cfs @ 13.49 hrs, Volume= 0.005 af
Outflow = 0.01 cfs @ 13.49 hrs, Volume= 0.005 af, Atten= 0%, Lag= 0.0 min
Routed to Reach 12R : Total

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach 7R: SOUTH ADJ PROPERTY



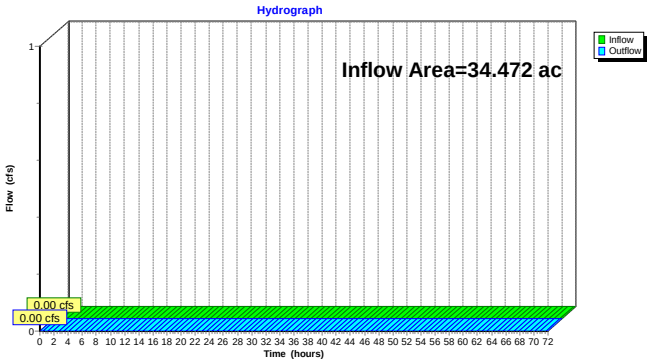
Summary for Reach 8R: SOUTH ON PROPERTY

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 34.472 ac, 66.66% Impervious, Inflow Depth = 0.00" for 1YR-24HR event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min
Routed to Reach 12R : Total

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach 8R: SOUTH ON PROPERTY



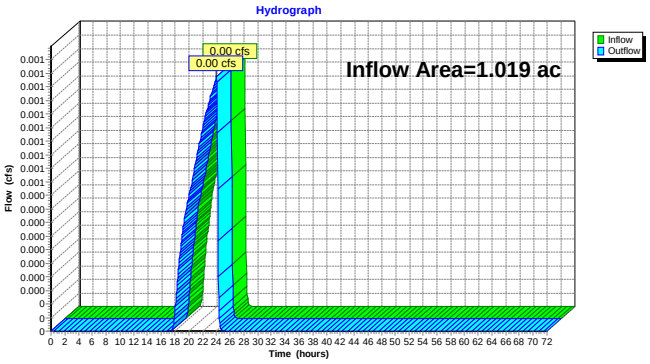
Summary for Reach 9R: NORTH ADJ PROPERTY

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 1.019 ac, 0.00% Impervious, Inflow Depth = 0.00" for 1YR-24HR event
Inflow = 0.00 cfs @ 24.00 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 24.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min
Routed to Reach 12R : Total

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach 9R: NORTH ADJ PROPERTY



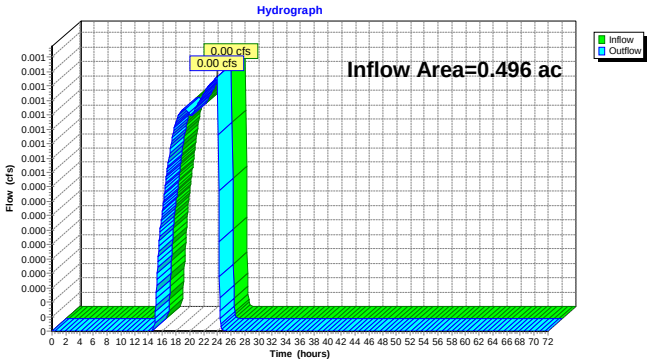
Summary for Reach 10R: EAST ADJ PROPERTY

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.496 ac, 5.04% Impervious, Inflow Depth = 0.01" for 1YR-24HR event
Inflow = 0.00 cfs @ 24.00 hrs, Volume= 0.001 af
Outflow = 0.00 cfs @ 24.00 hrs, Volume= 0.001 af, Atten= 0%, Lag= 0.0 min
Routed to Reach 12R : Total

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach 10R: EAST ADJ PROPERTY



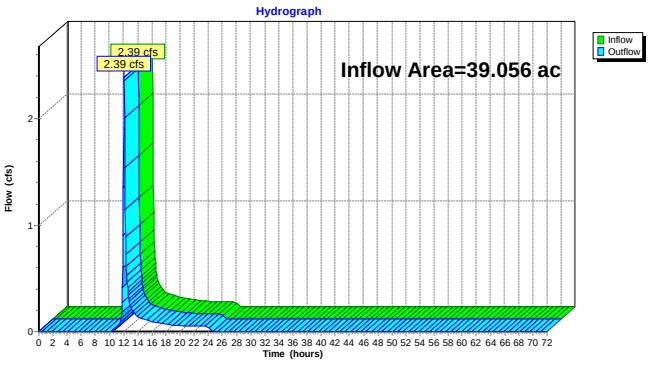
Summary for Reach 12R: Total

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 39.056 ac, 60.36% Impervious, Inflow Depth = 0.05" for 1YR-24HR event
Inflow = 2.39 cfs @ 12.08 hrs, Volume= 0.163 af
Outflow = 2.39 cfs @ 12.08 hrs, Volume= 0.163 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach 12R: Total



Summary for Pond 11P: DETENTION BASIN

Inflow Area = 34.472 ac, 66.66% Impervious, Inflow Depth = 1.26" for 1YR-24HR event
Inflow = 38.94 cfs @ 12.23 hrs, Volume= 3.632 af
Outflow = 0.84 cfs @ 21.61 hrs, Volume= 3.631 af, Atten= 98%, Lag= 562.9 min
Discarded = 0.84 cfs @ 21.61 hrs, Volume= 3.631 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Reach 8R : SOUTH ON PROPERTY
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Reach 8R : SOUTH ON PROPERTY

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 880.76' @ 21.61 hrs Surf.Area= 69,494 sf Storage= 117,022 cf

Plug-Flow detention time= 1,394.6 min calculated for 3.631 af (100% of inflow)
Center-of-Mass det. time= 1,394.6 min (2,237.7 - 843.1)

Volume	Invert	Avail.Storage	Storage Description
#1	879.00'	442,663 cf	**Detention Basin (Prismatic)** Listed below (Recalc)
#2	882.00'	23,806 cf	**Forebay Cygnet (Prismatic)** Listed below (Recalc) -Impervious
#3	882.00'	29,657 cf	**Forebay Swan (Prismatic)** Listed below (Recalc) -Impervious
#4	883.00'	5,273 cf	**Forebay North (Prismatic)** Listed below (Recalc)
		501,399 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
879.00	63,780	0	0
880.00	67,009	65,395	65,395
881.00	70,294	68,652	134,046
881.20	70,954	14,125	148,171
882.00	73,635	57,836	206,006
883.00	77,033	75,334	281,340
883.50	79,398	39,108	320,448
884.00	80,488	39,972	360,420
885.00	83,999	82,244	442,663

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
882.00	6,156	0	0
883.00	7,311	6,734	6,734
884.00	8,522	7,917	14,650
885.00	9,790	9,156	23,806

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
882.00	7,747	0	0
883.00	9,141	8,444	8,444
884.00	10,592	9,867	18,311
885.00	12,100	11,346	29,657

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
883.00	2,080	0	0
884.00	2,622	2,351	2,351
885.00	3,222	2,922	5,273

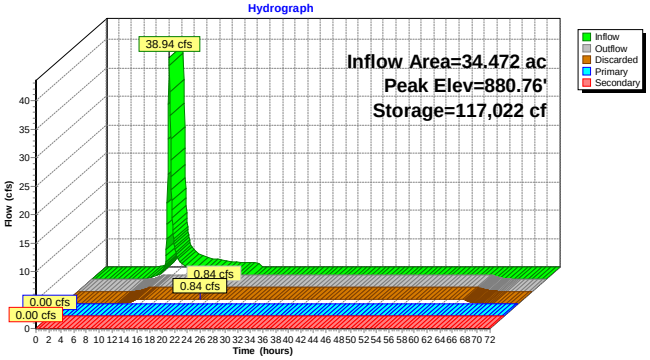
Device	Routing	Invert	Outlet Devices
#1	Primary	881.20'	**12.0" Round CMP_Round 12"** L= 177.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 881.20' / 879.68' S= 0.0086 '/' Cc= 0.900 n= 0.025 Corrugated metal, Flow Area= 0.79 sf
#2	Discarded	879.00'	**0.520 in/hr Exfiltration over Horizontal area**
#3	Secondary	883.50'	**20.0' long + 3.0 '/' SideZ x 18.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Discarded OutFlow Max=0.84 cfs @ 21.61 hrs HW=880.76' (Free Discharge)
2=Exfiltration (Exfiltration Controls 0.84 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=879.00' (Free Discharge)
1=CMP_Round 12" (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=879.00' (Free Discharge)
3=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond 11P: DETENTION BASIN



Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: DA-001 Runoff Area=2.123 ac 21.95% Impervious Runoff Depth=1.11"
Flow Length=132' Slope=0.0846 '/' Tc=15.0 min CN=83 Runoff=3.00 cfs 0.196 af

Subcatchment 2S: DA-002 Runoff Area=0.946 ac 11.10% Impervious Runoff Depth=0.11"
Flow Length=214' Slope=0.1060 '/' Tc=15.0 min CN=56 Runoff=0.02 cfs 0.009 af

Subcatchment 3S: DA-003 Runoff Area=34.472 ac 66.66% Impervious Runoff Depth=1.52"
Flow Length=1,467' Tc=28.5 min CN=89 Runoff=46.82 cfs 4.355 af

Subcatchment 4S: DA-004 Runoff Area=1.019 ac 0.00% Impervious Runoff Depth=0.02"
Flow Length=26' Slope=0.1317 '/' Tc=15.0 min CN=49 Runoff=0.00 cfs 0.002 af

Subcatchment 5S: DA-005 Runoff Area=0.496 ac 5.04% Impervious Runoff Depth=0.04"
Flow Length=43' Slope=0.1886 '/' Tc=15.0 min CN=51 Runoff=0.00 cfs 0.002 af

Reach 6R: WEST ADJ PROPERTY Inflow=3.00 cfs 0.196 af
Outflow=3.00 cfs 0.196 af

Reach 7R: SOUTH ADJ PROPERTY Inflow=0.02 cfs 0.009 af
Outflow=0.02 cfs 0.009 af

Reach 8R: SOUTH ON PROPERTY Inflow=0.00 cfs 0.000 af
Outflow=0.00 cfs 0.000 af

Reach 9R: NORTH ADJ PROPERTY Inflow=0.00 cfs 0.002 af
Outflow=0.00 cfs 0.002 af

Reach 10R: EAST ADJ PROPERTY Inflow=0.00 cfs 0.002 af
Outflow=0.00 cfs 0.002 af

Reach 12R: Total Inflow=3.00 cfs 0.209 af
Outflow=3.00 cfs 0.209 af

Pond 11P: DETENTION BASIN Peak Elev=881.17' Storage=146,048 cf Inflow=46.82 cfs 4.355 af
Discarded=0.85 cfs 4.196 af Primary=0.00 cfs 0.000 af Secondary=0.00 cfs 0.000 af Outflow=0.85 cfs 4.196 af

Total Runoff Area = 39.056 ac Runoff Volume = 4.564 af Average Runoff Depth = 1.40"
39.64% Pervious = 15.480 ac 60.36% Impervious = 23.576 ac

Summary for Subcatchment 1S: DA-001

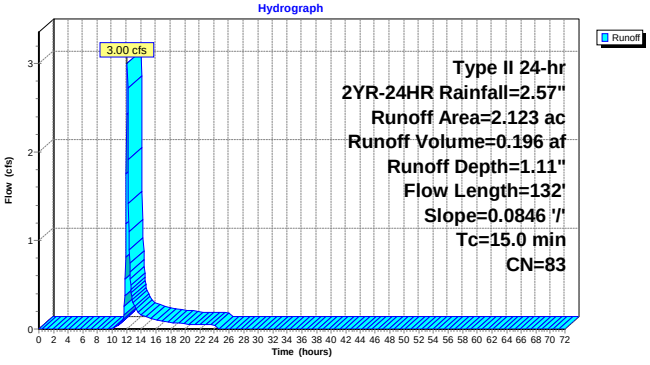
Runoff = 3.00 cfs @ 12.08 hrs, Volume= 0.196 af, Depth= 1.11"
Routed to Reach 6R : WEST ADJ PROPERTY

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type II 24-hr 2YR-24HR Rainfall=2.57"

Area (ac)	CN	Description
1.657	79	50-75% Grass cover, Fair, HSG C
0.466	98	Paved parking, HSG C
2.123	83	Weighted Average
1.657		78.05% Pervious Area
0.466		21.95% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.7	132	0.0846	0.29		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.57"
7.7	132	Total, Increased to minimum Tc = 15.0 min			

Subcatchment 1S: DA-001



Summary for Subcatchment 2S: DA-002

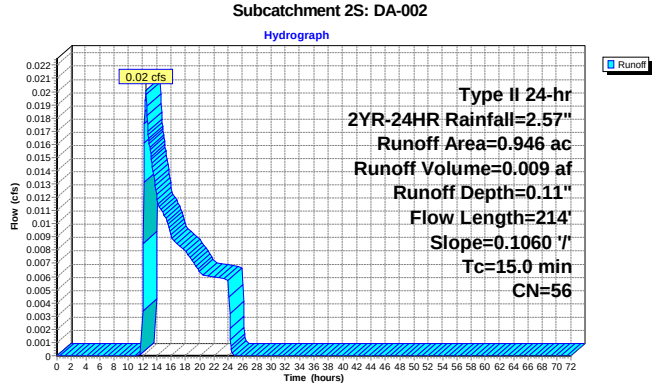
Runoff = 0.02 cfs @ 12.46 hrs, Volume= 0.009 af, Depth= 0.11"
Routed to Reach 7R : SOUTH ADJ PROPERTY

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type II 24-hr 2YR-24HR Rainfall=2.57"

Area (ac)	CN	Description
0.807	49	50-75% Grass cover, Fair, HSG A
0.105	98	Paved parking, HSG C
0.034	79	50-75% Grass cover, Fair, HSG C
0.946	56	Weighted Average
0.841		88.90% Pervious Area
0.105		11.10% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.3	214	0.1060	0.35		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.57"
10.3	214	Total, Increased to minimum Tc = 15.0 min			

Subcatchment 2S: DA-002



Summary for Subcatchment 3S: DA-003

[47] Hint: Peak is 3087% of capacity of segment #4

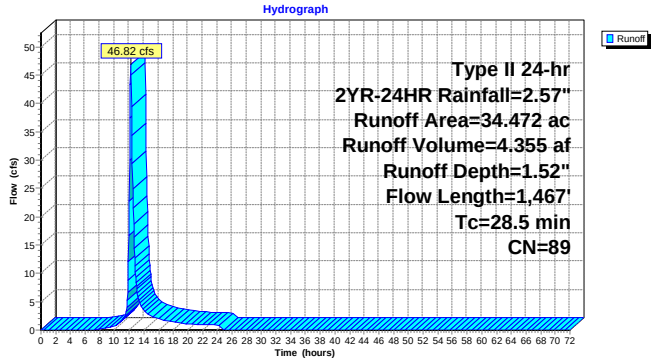
Runoff = 46.82 cfs @ 12.22 hrs, Volume= 4.355 af, Depth= 1.52"
Routed to Pond 11P : DETENTION BASIN

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type II 24-hr 2YR-24HR Rainfall=2.57"

Area (ac)	CN	Description
12.290	98	Paved parking, HSG A
10.690	98	Paved parking, HSG C
7.886	79	50-75% Grass cover, Fair, HSG C
3.606	49	50-75% Grass cover, Fair, HSG A
34.472	89	Weighted Average
11.492		33.34% Pervious Area
22.980		66.66% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.2	300	0.0103	1.18		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.57"
21.5	833	0.0085	0.65		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
1.9	229	0.0093	1.96		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.9	105	0.0067	1.93	1.52	**Pipe Channel, CMP_Round 12"** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.025 Corrugated metal
28.5	1,467	Total			

Subcatchment 3S: DA-003



Summary for Subcatchment 4S: DA-004

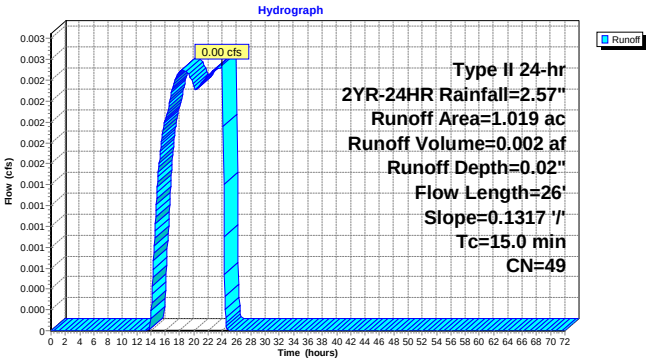
Runoff = 0.00 cfs @ 24.00 hrs, Volume= 0.002 af, Depth= 0.02"
Routed to Reach 9R : NORTH ADJ PROPERTY

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type II 24-hr 2YR-24HR Rainfall=2.57"

Area (ac)	CN	Description
1.019	49	50-75% Grass cover, Fair, HSG A
1.019		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.8	26	0.1317	0.25		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.57"
1.8	26	Total, Increased to minimum Tc = 15.0 min			

Subcatchment 4S: DA-004



Summary for Subcatchment 5S: DA-005

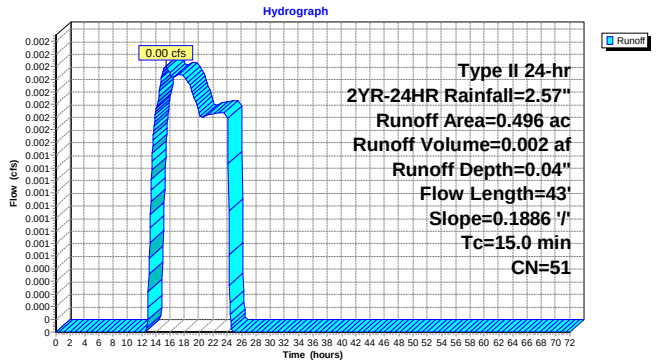
Runoff = 0.00 cfs @ 15.42 hrs, Volume= 0.002 af, Depth= 0.04"
Routed to Reach 10R : EAST ADJ PROPERTY

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type II 24-hr 2YR-24HR Rainfall=2.57"

Area (ac)	CN	Description
0.471	49	50-75% Grass cover, Fair, HSG A
0.025	98	Paved parking, HSG A
0.496	51	Weighted Average
0.471		94.96% Pervious Area
0.025		5.04% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.3	43	0.1886	0.32		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.57"
2.3	43	Total, Increased to minimum Tc = 15.0 min			

Subcatchment 5S: DA-005



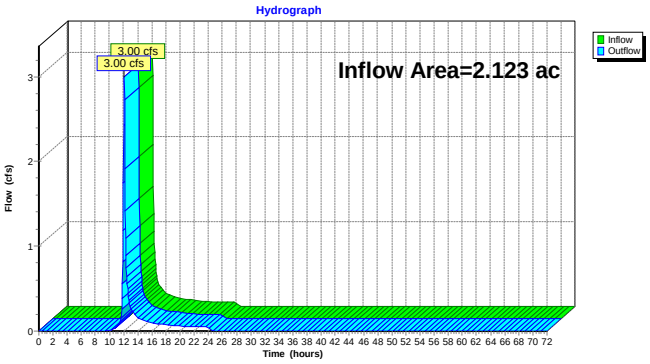
Summary for Reach 6R: WEST ADJ PROPERTY

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 2.123 ac, 21.95% Impervious, Inflow Depth = 1.11" for 2YR-24HR event
Inflow = 3.00 cfs @ 12.08 hrs, Volume= 0.196 af
Outflow = 3.00 cfs @ 12.08 hrs, Volume= 0.196 af, Atten= 0%, Lag= 0.0 min
Routed to Reach 12R : Total

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach 6R: WEST ADJ PROPERTY



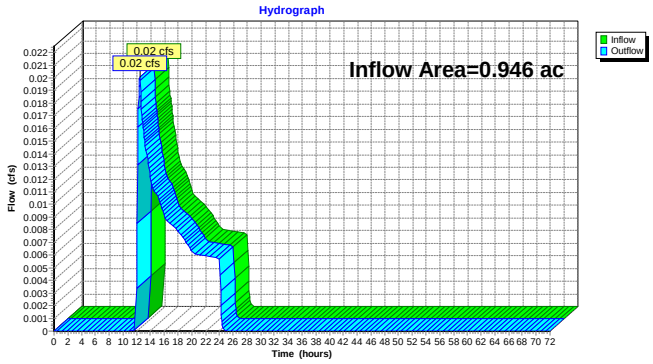
Summary for Reach 7R: SOUTH ADJ PROPERTY

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.946 ac, 11.10% Impervious, Inflow Depth = 0.11" for 2YR-24HR event
Inflow = 0.02 cfs @ 12.46 hrs, Volume= 0.009 af
Outflow = 0.02 cfs @ 12.46 hrs, Volume= 0.009 af, Atten= 0%, Lag= 0.0 min
Routed to Reach 12R : Total

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach 7R: SOUTH ADJ PROPERTY



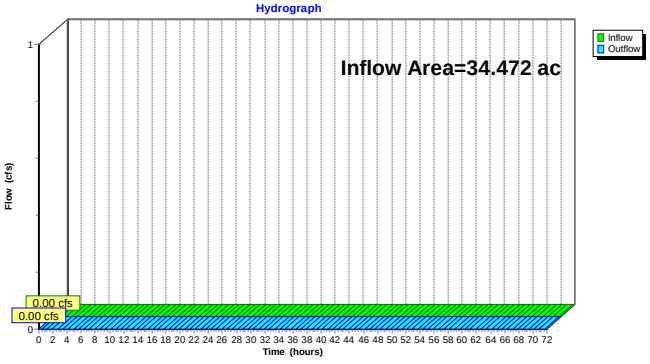
Summary for Reach 8R: SOUTH ON PROPERTY

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 34.472 ac, 66.66% Impervious, Inflow Depth = 0.00" for 2YR-24HR event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min
Routed to Reach 12R : Total

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach 8R: SOUTH ON PROPERTY



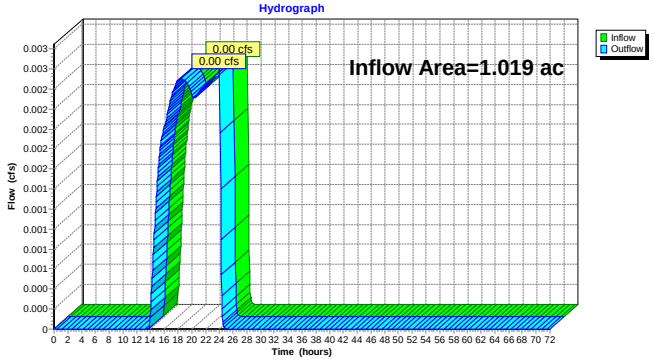
Summary for Reach 9R: NORTH ADJ PROPERTY

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 1.019 ac, 0.00% Impervious, Inflow Depth = 0.02" for 2YR-24HR event
Inflow = 0.00 cfs @ 24.00 hrs, Volume= 0.002 af
Outflow = 0.00 cfs @ 24.00 hrs, Volume= 0.002 af, Atten= 0%, Lag= 0.0 min
Routed to Reach 12R : Total

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach 9R: NORTH ADJ PROPERTY



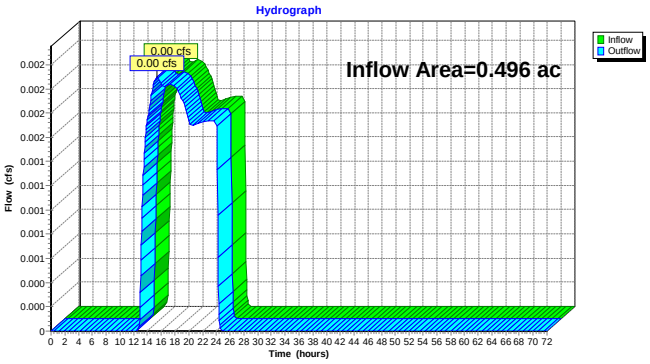
Summary for Reach 10R: EAST ADJ PROPERTY

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.496 ac, 5.04% Impervious, Inflow Depth = 0.04" for 2YR-24HR event
Inflow = 0.00 cfs @ 15.42 hrs, Volume= 0.002 af
Outflow = 0.00 cfs @ 15.42 hrs, Volume= 0.002 af, Atten= 0%, Lag= 0.0 min
Routed to Reach 12R : Total

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach 10R: EAST ADJ PROPERTY



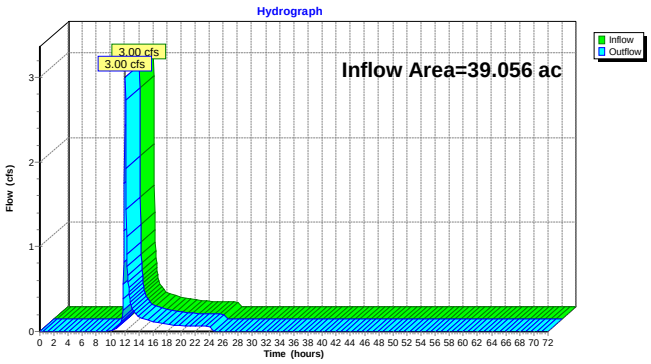
Summary for Reach 12R: Total

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 39.056 ac, 60.36% Impervious, Inflow Depth = 0.06" for 2YR-24HR event
Inflow = 3.00 cfs @ 12.08 hrs, Volume= 0.209 af
Outflow = 3.00 cfs @ 12.08 hrs, Volume= 0.209 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach 12R: Total



Summary for Pond 11P: DETENTION BASIN

Inflow Area = 34.472 ac, 66.66% Impervious, Inflow Depth = 1.52" for 2YR-24HR event
Inflow = 46.82 cfs @ 12.22 hrs, Volume= 4.355 af
Outflow = 0.85 cfs @ 24.14 hrs, Volume= 4.196 af, Atten= 98%, Lag= 714.7 min
Discarded = 0.85 cfs @ 24.14 hrs, Volume= 4.196 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Reach 8R : SOUTH ON PROPERTY
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Reach 8R : SOUTH ON PROPERTY

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 881.17' @ 24.14 hrs Surf.Area= 70,855 sf Storage= 146,048 cf

Plug-Flow detention time= 1,614.9 min calculated for 4.193 af (96% of inflow)
Center-of-Mass det. time= 1,594.4 min (2,432.3 - 837.9)

Volume	Invert	Avail.Storage	Storage Description
#1	879.00'	442,663 cf	**Detention Basin (Prismatic)** Listed below (Recalc)
#2	882.00'	23,806 cf	**Forebay Cygnet (Prismatic)** Listed below (Recalc) -Impervious
#3	882.00'	29,657 cf	**Forebay Swan (Prismatic)** Listed below (Recalc) -Impervious
#4	883.00'	5,273 cf	**Forebay North (Prismatic)** Listed below (Recalc)
		501,399 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
879.00	63,780	0	0
880.00	67,009	65,395	65,395
881.00	70,294	68,652	134,046
881.20	70,954	14,125	148,171
882.00	73,635	57,836	206,006
883.00	77,033	75,334	281,340
883.50	79,398	39,108	320,448
884.00	80,488	39,972	360,420
885.00	83,999	82,244	442,663

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
882.00	6,156	0	0
883.00	7,311	6,734	6,734
884.00	8,522	7,917	14,650
885.00	9,790	9,156	23,806

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
882.00	7,747	0	0
883.00	9,141	8,444	8,444
884.00	10,592	9,867	18,311
885.00	12,100	11,346	29,657

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
883.00	2,080	0	0
884.00	2,622	2,351	2,351
885.00	3,222	2,922	5,273

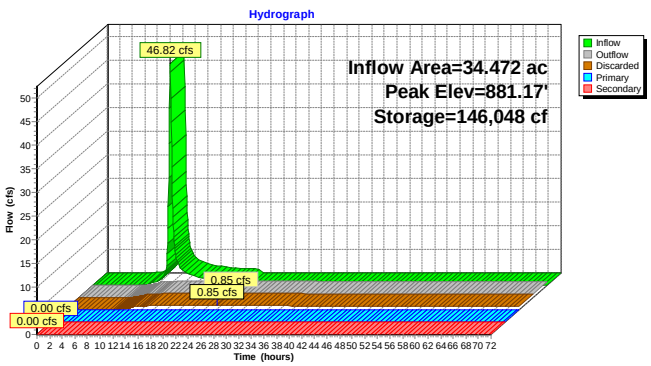
Device	Routing	Invert	Outlet Devices
#1	Primary	881.20'	**12.0" Round CMP_Round 12"** L= 177.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 881.20' / 879.68' S= 0.0086 '/' Cc= 0.900 n= 0.025 Corrugated metal, Flow Area= 0.79 sf
#2	Discarded	879.00'	**0.520 in/hr Exfiltration over Horizontal area**
#3	Secondary	883.50'	**20.0' long + 3.0 '/' SideZ x 18.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Discarded OutFlow Max=0.85 cfs @ 24.14 hrs HW=881.17' (Free Discharge)
2=Exfiltration (Exfiltration Controls 0.85 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=879.00' (Free Discharge)
1=CMP_Round 12" (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=879.00' (Free Discharge)
3=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond 11P: DETENTION BASIN



Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: DA-001 Runoff Area=2.123 ac 21.95% Impervious Runoff Depth=1.99"
Flow Length=132' Slope=0.0846 '/' Tc=15.0 min CN=83 Runoff=5.41 cfs 0.351 af

Subcatchment 2S: DA-002 Runoff Area=0.946 ac 11.10% Impervious Runoff Depth=0.43"
Flow Length=214' Slope=0.1060 '/' Tc=15.0 min CN=56 Runoff=0.33 cfs 0.034 af

Subcatchment 3S: DA-003 Runoff Area=34.472 ac 66.66% Impervious Runoff Depth=2.50"
Flow Length=1,467' Tc=28.5 min CN=89 Runoff=76.63 cfs 7.171 af

Subcatchment 4S: DA-004 Runoff Area=1.019 ac 0.00% Impervious Runoff Depth=0.21"
Flow Length=26' Slope=0.1317 '/' Tc=15.0 min CN=49 Runoff=0.06 cfs 0.017 af

Subcatchment 5S: DA-005 Runoff Area=0.496 ac 5.04% Impervious Runoff Depth=0.26"
Flow Length=43' Slope=0.1886 '/' Tc=15.0 min CN=51 Runoff=0.06 cfs 0.011 af

Reach 6R: WEST ADJ PROPERTY Inflow=5.41 cfs 0.351 af
Outflow=5.41 cfs 0.351 af

Reach 7R: SOUTH ADJ PROPERTY Inflow=0.33 cfs 0.034 af
Outflow=0.33 cfs 0.034 af

Reach 8R: SOUTH ON PROPERTY Inflow=1.55 cfs 1.669 af
Outflow=1.55 cfs 1.669 af

Reach 9R: NORTH ADJ PROPERTY Inflow=0.06 cfs 0.017 af
Outflow=0.06 cfs 0.017 af

Reach 10R: EAST ADJ PROPERTY Inflow=0.06 cfs 0.011 af
Outflow=0.06 cfs 0.011 af

Reach 12R: Total Inflow=5.77 cfs 2.083 af
Outflow=5.77 cfs 2.083 af

Pond 11P: DETENTION BASIN Peak Elev=882.17' Storage=220,887 cf Inflow=76.63 cfs 7.171 af
Discarded=0.89 cfs 4.440 af Primary=1.55 cfs 1.669 af Secondary=0.00 cfs 0.000 af Outflow=2.44 cfs 6.109 af

Total Runoff Area = 39.056 ac Runoff Volume = 7.585 af Average Runoff Depth = 2.33"
39.64% Pervious = 15.480 ac 60.36% Impervious = 23.576 ac

Summary for Subcatchment 1S: DA-001

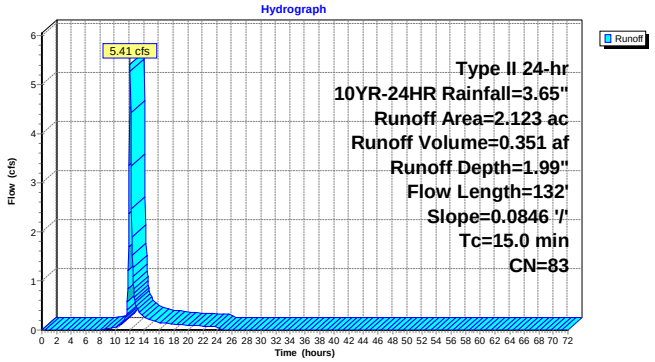
Runoff = 5.41 cfs @ 12.07 hrs, Volume= 0.351 af, Depth= 1.99"
Routed to Reach 6R : WEST ADJ PROPERTY

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type II 24-hr 10YR-24HR Rainfall=3.65"

Area (ac)	CN	Description
1.657	79	50-75% Grass cover, Fair, HSG C
0.466	98	Paved parking, HSG C
2.123	83	Weighted Average
1.657		78.05% Pervious Area
0.466		21.95% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.7	132	0.0846	0.29		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.57"
7.7	132	Total, Increased to minimum Tc = 15.0 min			

Subcatchment 1S: DA-001



Summary for Subcatchment 2S: DA-002

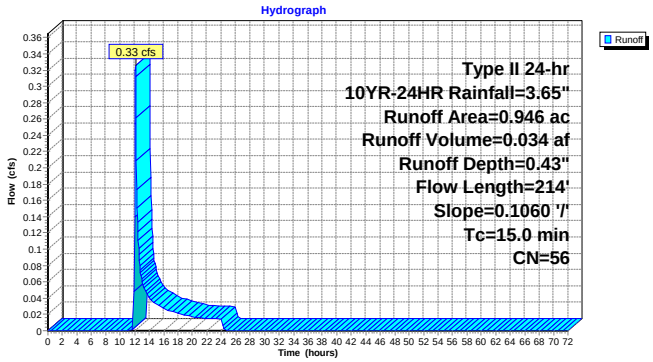
Runoff = 0.33 cfs @ 12.12 hrs, Volume= 0.034 af, Depth= 0.43"
Routed to Reach 7R : SOUTH ADJ PROPERTY

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type II 24-hr 10YR-24HR Rainfall=3.65"

Area (ac)	CN	Description
0.807	49	50-75% Grass cover, Fair, HSG A
0.105	98	Paved parking, HSG C
0.034	79	50-75% Grass cover, Fair, HSG C
0.946	56	Weighted Average
0.841		88.90% Pervious Area
0.105		11.10% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.3	214	0.1060	0.35		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.57"
10.3	214	Total, Increased to minimum Tc = 15.0 min			

Subcatchment 2S: DA-002



Summary for Subcatchment 3S: DA-003

[47] Hint: Peak is 5053% of capacity of segment #4

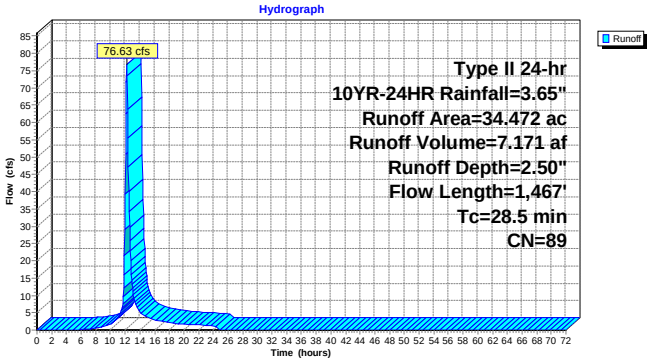
Runoff = 76.63 cfs @ 12.22 hrs, Volume= 7.171 af, Depth= 2.50"
Routed to Pond 11P : DETENTION BASIN

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type II 24-hr 10YR-24HR Rainfall=3.65"

Area (ac)	CN	Description
12.290	98	Paved parking, HSG A
10.690	98	Paved parking, HSG C
7.886	79	50-75% Grass cover, Fair, HSG C
3.606	49	50-75% Grass cover, Fair, HSG A
34.472	89	Weighted Average
11.492		33.34% Pervious Area
22.980		66.66% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.2	300	0.0103	1.18		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.57"
21.5	833	0.0085	0.65		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
1.9	229	0.0093	1.96		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.9	105	0.0067	1.93	1.52	**Pipe Channel, CMP_Round 12"** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.025 Corrugated metal
28.5	1,467	Total			

Subcatchment 3S: DA-003



Summary for Subcatchment 4S: DA-004

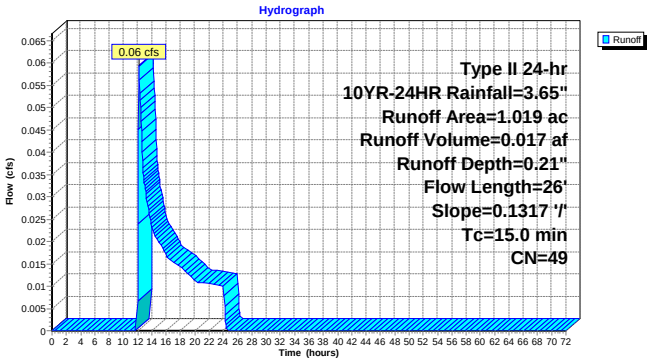
Runoff = 0.06 cfs @ 12.19 hrs, Volume= 0.017 af, Depth= 0.21"
Routed to Reach 9R : NORTH ADJ PROPERTY

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type II 24-hr 10YR-24HR Rainfall=3.65"

Area (ac)	CN	Description
1.019	49	50-75% Grass cover, Fair, HSG A
1.019		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.8	26	0.1317	0.25		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.57"
1.8	26	Total, Increased to minimum Tc = 15.0 min			

Subcatchment 4S: DA-004



Summary for Subcatchment 5S: DA-005

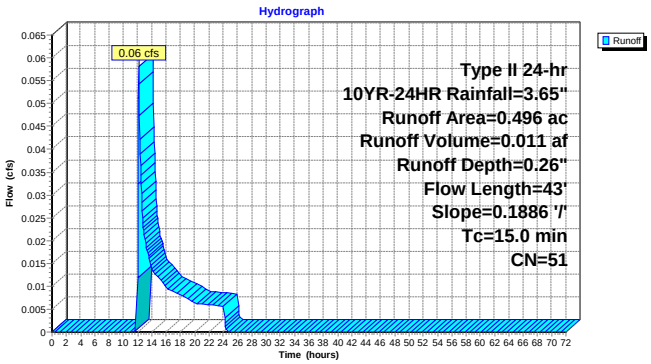
Runoff = 0.06 cfs @ 12.16 hrs, Volume= 0.011 af, Depth= 0.26"
Routed to Reach 10R : EAST ADJ PROPERTY

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type II 24-hr 10YR-24HR Rainfall=3.65"

Area (ac)	CN	Description
0.471	49	50-75% Grass cover, Fair, HSG A
0.025	98	Paved parking, HSG A
0.496	51	Weighted Average
0.471		94.96% Pervious Area
0.025		5.04% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.3	43	0.1886	0.32		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.57"
2.3	43	Total, Increased to minimum Tc = 15.0 min			

Subcatchment 5S: DA-005



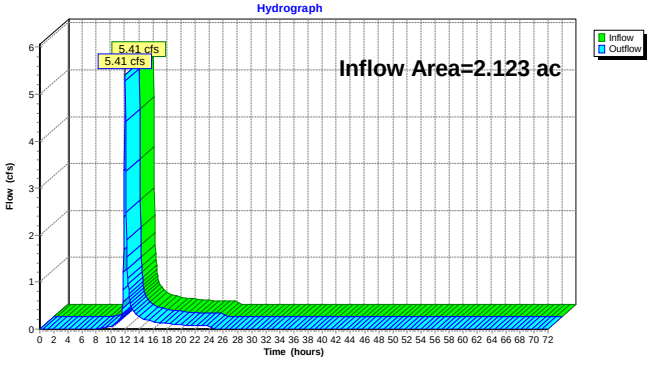
Summary for Reach 6R: WEST ADJ PROPERTY

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 2.123 ac, 21.95% Impervious, Inflow Depth = 1.99" for 10YR-24HR event
Inflow = 5.41 cfs @ 12.07 hrs, Volume= 0.351 af
Outflow = 5.41 cfs @ 12.07 hrs, Volume= 0.351 af, Atten= 0%, Lag= 0.0 min
Routed to Reach 12R : Total

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach 6R: WEST ADJ PROPERTY



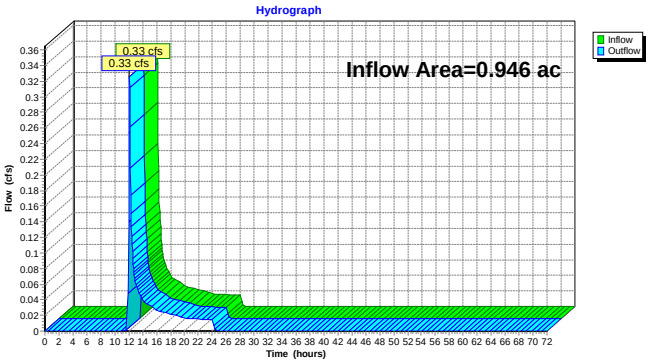
Summary for Reach 7R: SOUTH ADJ PROPERTY

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.946 ac, 11.10% Impervious, Inflow Depth = 0.43" for 10YR-24HR event
Inflow = 0.33 cfs @ 12.12 hrs, Volume= 0.034 af
Outflow = 0.33 cfs @ 12.12 hrs, Volume= 0.034 af, Atten= 0%, Lag= 0.0 min
Routed to Reach 12R : Total

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach 7R: SOUTH ADJ PROPERTY



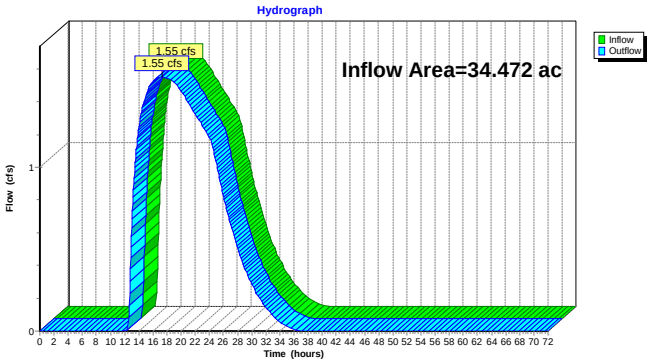
Summary for Reach 8R: SOUTH ON PROPERTY

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 34.472 ac, 66.66% Impervious, Inflow Depth = 0.58" for 10YR-24HR event
Inflow = 1.55 cfs @ 17.23 hrs, Volume= 1.669 af
Outflow = 1.55 cfs @ 17.23 hrs, Volume= 1.669 af, Atten= 0%, Lag= 0.0 min
Routed to Reach 12R : Total

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach 8R: SOUTH ON PROPERTY



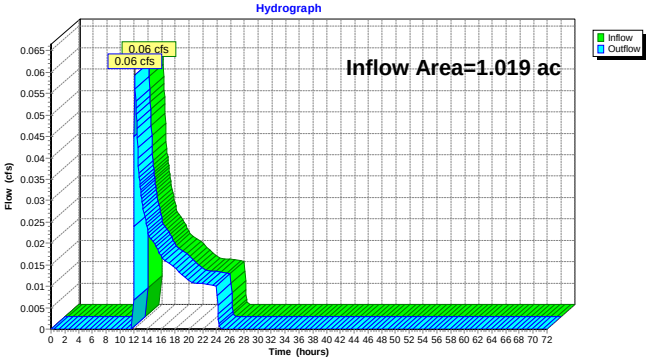
Summary for Reach 9R: NORTH ADJ PROPERTY

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 1.019 ac, 0.00% Impervious, Inflow Depth = 0.21" for 10YR-24HR event
Inflow = 0.06 cfs @ 12.19 hrs, Volume= 0.017 af
Outflow = 0.06 cfs @ 12.19 hrs, Volume= 0.017 af, Atten= 0%, Lag= 0.0 min
Routed to Reach 12R : Total

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach 9R: NORTH ADJ PROPERTY



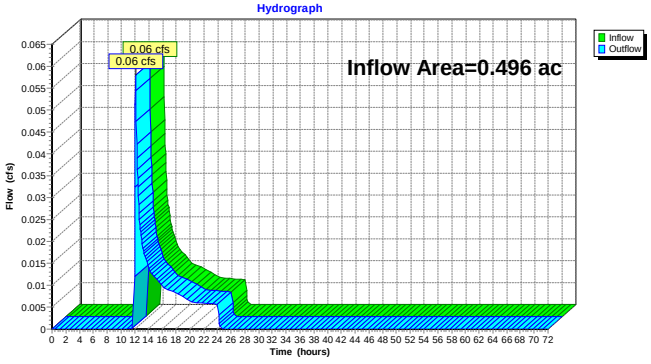
Summary for Reach 10R: EAST ADJ PROPERTY

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.496 ac, 5.04% Impervious, Inflow Depth = 0.26" for 10YR-24HR event
Inflow = 0.06 cfs @ 12.16 hrs, Volume= 0.011 af
Outflow = 0.06 cfs @ 12.16 hrs, Volume= 0.011 af, Atten= 0%, Lag= 0.0 min
Routed to Reach 12R : Total

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach 10R: EAST ADJ PROPERTY



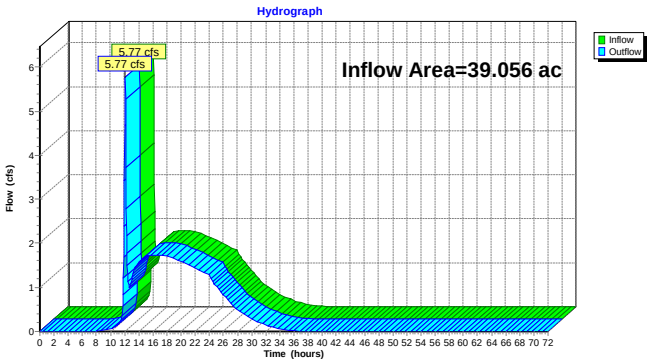
Summary for Reach 12R: Total

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 39.056 ac, 60.36% Impervious, Inflow Depth = 0.64" for 10YR-24HR event
Inflow = 5.77 cfs @ 12.08 hrs, Volume= 2.083 af
Outflow = 5.77 cfs @ 12.08 hrs, Volume= 2.083 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach 12R: Total



Summary for Pond 11P: DETENTION BASIN

Inflow Area = 34.472 ac, 66.66% Impervious, Inflow Depth = 2.50" for 10YR-24HR event
Inflow = 76.63 cfs @ 12.22 hrs, Volume= 7.171 af
Outflow = 2.44 cfs @ 17.23 hrs, Volume= 6.109 af, Atten= 97%, Lag= 300.9 min
Discarded = 0.89 cfs @ 17.23 hrs, Volume= 4.440 af
Primary = 1.55 cfs @ 17.23 hrs, Volume= 1.669 af
Routed to Reach 8R : SOUTH ON PROPERTY
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Reach 8R : SOUTH ON PROPERTY

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 882.17' @ 17.23 hrs Surf.Area= 74,209 sf Storage= 220,887 cf

Plug-Flow detention time= 1,311.2 min calculated for 6.105 af (85% of inflow)
Center-of-Mass det. time= 1,244.8 min (2,068.5 - 823.7)

Volume	Invert	Avail.Storage	Storage Description
#1	879.00'	442,663 cf	**Detention Basin (Prismatic)** Listed below (Recalc)
#2	882.00'	23,806 cf	**Forebay Cygnet (Prismatic)** Listed below (Recalc) -Impervious
#3	882.00'	29,657 cf	**Forebay Swan (Prismatic)** Listed below (Recalc) -Impervious
#4	883.00'	5,273 cf	**Forebay North (Prismatic)** Listed below (Recalc)
		501,399 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
879.00	63,780	0	0
880.00	67,009	65,395	65,395
881.00	70,294	68,652	134,046
881.20	70,954	14,125	148,171
882.00	73,635	57,836	206,006
883.00	77,033	75,334	281,340
883.50	79,398	39,108	320,448
884.00	80,488	39,972	360,420
885.00	83,999	82,244	442,663

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
882.00	6,156	0	0
883.00	7,311	6,734	6,734
884.00	8,522	7,917	14,650
885.00	9,790	9,156	23,806

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
882.00	7,747	0	0
883.00	9,141	8,444	8,444
884.00	10,592	9,867	18,311
885.00	12,100	11,346	29,657

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
883.00	2,080	0	0
884.00	2,622	2,351	2,351
885.00	3,222	2,922	5,273

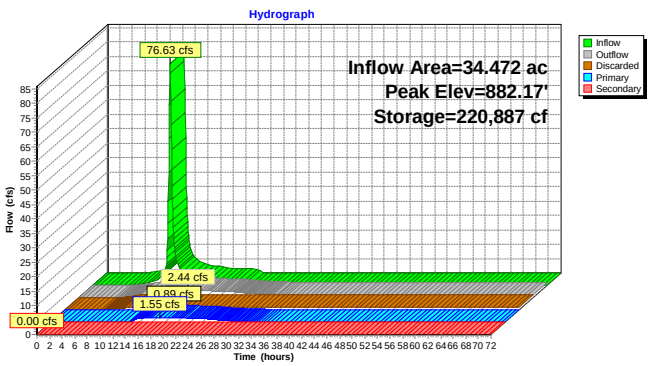
Device	Routing	Invert	Outlet Devices
#1	Primary	881.20'	**12.0" Round CMP_Round 12"** L= 177.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 881.20' / 879.68' S= 0.0086 '/' Cc= 0.900 n= 0.025 Corrugated metal, Flow Area= 0.79 sf
#2	Discarded	879.00'	**0.520 in/hr Exfiltration over Horizontal area**
#3	Secondary	883.50'	**20.0' long + 3.0 '/' SideZ x 18.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Discarded OutFlow Max=0.89 cfs @ 17.23 hrs HW=882.17' (Free Discharge)
└**2=Exfiltration** (Exfiltration Controls 0.89 cfs)

Primary OutFlow Max=1.55 cfs @ 17.23 hrs HW=882.17' (Free Discharge)
└**1=CMP_Round 12"** (Barrel Controls 1.55 cfs @ 2.54 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=879.00' (Free Discharge)
└**3=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 11P: DETENTION BASIN



Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: DA-001 Runoff Area=2.123 ac 21.95% Impervious Runoff Depth=2.69"
Flow Length=132' Slope=0.0846 '/' Tc=15.0 min CN=83 Runoff=7.31 cfs 0.476 af

Subcatchment 2S: DA-002 Runoff Area=0.946 ac 11.10% Impervious Runoff Depth=0.78"
Flow Length=214' Slope=0.1060 '/' Tc=15.0 min CN=56 Runoff=0.75 cfs 0.061 af

Subcatchment 3S: DA-003 Runoff Area=34.472 ac 66.66% Impervious Runoff Depth=3.26"
Flow Length=1,467' Tc=28.5 min CN=89 Runoff=99.24 cfs 9.357 af

Subcatchment 4S: DA-004 Runoff Area=1.019 ac 0.00% Impervious Runoff Depth=0.44"
Flow Length=26' Slope=0.1317 '/' Tc=15.0 min CN=49 Runoff=0.30 cfs 0.038 af

Subcatchment 5S: DA-005 Runoff Area=0.496 ac 5.04% Impervious Runoff Depth=0.53"
Flow Length=43' Slope=0.1886 '/' Tc=15.0 min CN=51 Runoff=0.21 cfs 0.022 af

Reach 6R: WEST ADJ PROPERTY Inflow=7.31 cfs 0.476 af
Outflow=7.31 cfs 0.476 af

Reach 7R: SOUTH ADJ PROPERTY Inflow=0.75 cfs 0.061 af
Outflow=0.75 cfs 0.061 af

Reach 8R: SOUTH ON PROPERTY Inflow=2.01 cfs 3.254 af
Outflow=2.01 cfs 3.254 af

Reach 9R: NORTH ADJ PROPERTY Inflow=0.30 cfs 0.038 af
Outflow=0.30 cfs 0.038 af

Reach 10R: EAST ADJ PROPERTY Inflow=0.21 cfs 0.022 af
Outflow=0.21 cfs 0.022 af

Reach 12R: Total Inflow=8.45 cfs 3.850 af
Outflow=8.45 cfs 3.850 af

Pond 11P: DETENTION BASIN Peak Elev=882.93' Storage=289,801 cf Inflow=99.24 cfs 9.357 af
Discarded=0.92 cfs 4.589 af Primary=2.01 cfs 3.254 af Secondary=0.00 cfs 0.000 af Outflow=2.94 cfs 7.843 af

Total Runoff Area = 39.056 ac Runoff Volume = 9.953 af Average Runoff Depth = 3.06"
39.64% Pervious = 15.480 ac 60.36% Impervious = 23.576 ac

Summary for Subcatchment 1S: DA-001

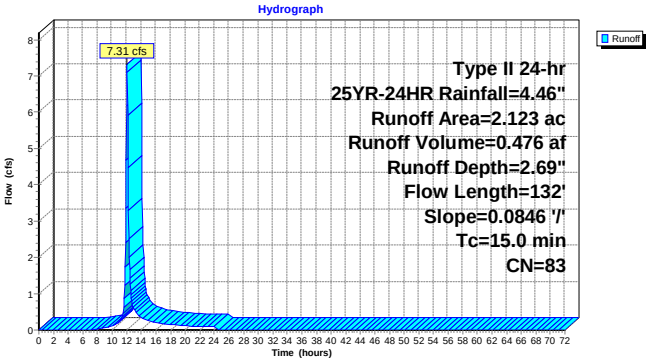
Runoff = 7.31 cfs @ 12.07 hrs, Volume= 0.476 af, Depth= 2.69"
Routed to Reach 6R : WEST ADJ PROPERTY

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type II 24-hr 25YR-24HR Rainfall=4.46"

Area (ac)	CN	Description
1.657	79	50-75% Grass cover, Fair, HSG C
0.466	98	Paved parking, HSG C
2.123	83	Weighted Average
1.657		78.05% Pervious Area
0.466		21.95% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.7	132	0.0846	0.29		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.57"
7.7	132	Total, Increased to minimum Tc = 15.0 min			

Subcatchment 1S: DA-001



Summary for Subcatchment 2S: DA-002

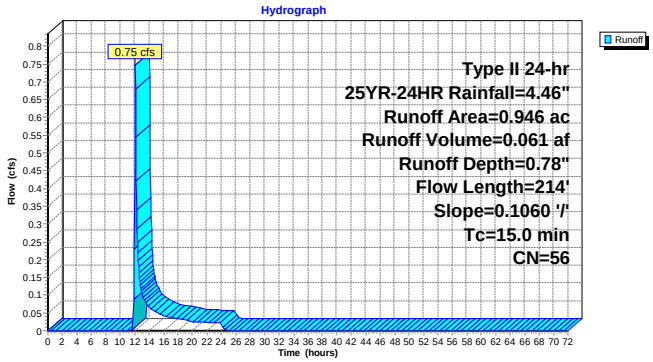
Runoff = 0.75 cfs @ 12.10 hrs, Volume= 0.061 af, Depth= 0.78"
Routed to Reach 7R : SOUTH ADJ PROPERTY

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type II 24-hr 25YR-24HR Rainfall=4.46"

Area (ac)	CN	Description
0.807	49	50-75% Grass cover, Fair, HSG A
0.105	98	Paved parking, HSG C
0.034	79	50-75% Grass cover, Fair, HSG C
0.946	56	Weighted Average
0.841		88.90% Pervious Area
0.105		11.10% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.3	214	0.1060	0.35		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.57"
10.3	214	Total, Increased to minimum Tc = 15.0 min			

Subcatchment 2S: DA-002



Summary for Subcatchment 3S: DA-003

[47] Hint: Peak is 6544% of capacity of segment #4

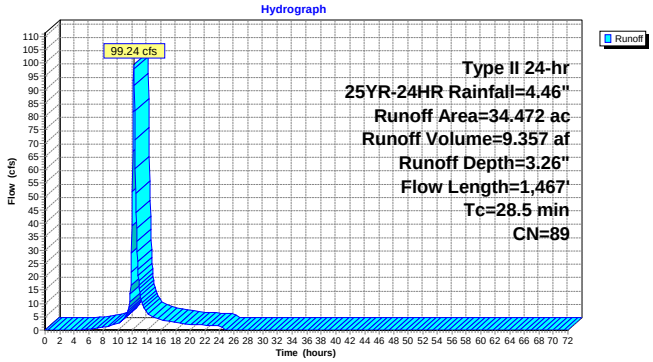
Runoff = 99.24 cfs @ 12.22 hrs, Volume= 9.357 af, Depth= 3.26"
Routed to Pond 11P : DETENTION BASIN

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type II 24-hr 25YR-24HR Rainfall=4.46"

Area (ac)	CN	Description
12.290	98	Paved parking, HSG A
10.690	98	Paved parking, HSG C
7.886	79	50-75% Grass cover, Fair, HSG C
3.606	49	50-75% Grass cover, Fair, HSG A
34.472	89	Weighted Average
11.492		33.34% Pervious Area
22.980		66.66% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.2	300	0.0103	1.18		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.57"
21.5	833	0.0085	0.65		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
1.9	229	0.0093	1.96		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.9	105	0.0067	1.93	1.52	**Pipe Channel, CMP_Round 12"** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.025 Corrugated metal
28.5	1,467	Total			

Subcatchment 3S: DA-003



Summary for Subcatchment 4S: DA-004

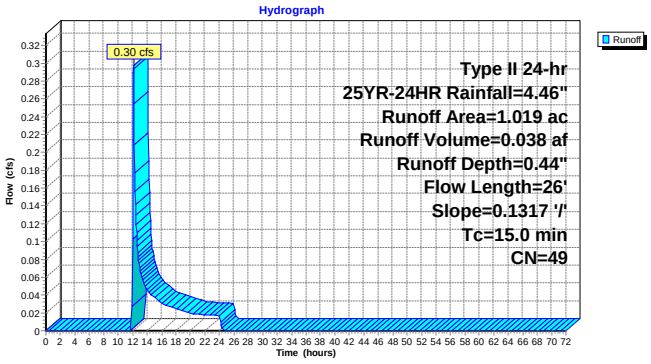
Runoff = 0.30 cfs @ 12.13 hrs, Volume= 0.038 af, Depth= 0.44"
Routed to Reach 9R : NORTH ADJ PROPERTY

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type II 24-hr 25YR-24HR Rainfall=4.46"

Area (ac)	CN	Description
1.019	49	50-75% Grass cover, Fair, HSG A
1.019		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.8	26	0.1317	0.25		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.57"
1.8	26	Total, Increased to minimum Tc = 15.0 min			

Subcatchment 4S: DA-004



Summary for Subcatchment 5S: DA-005

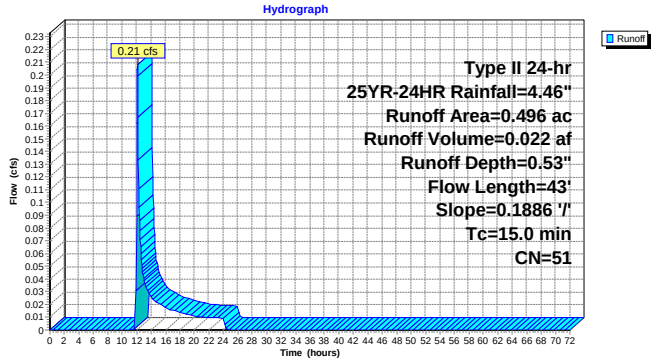
Runoff = 0.21 cfs @ 12.12 hrs, Volume= 0.022 af, Depth= 0.53"
Routed to Reach 10R : EAST ADJ PROPERTY

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type II 24-hr 25YR-24HR Rainfall=4.46"

Area (ac)	CN	Description
0.471	49	50-75% Grass cover, Fair, HSG A
0.025	98	Paved parking, HSG A
0.496	51	Weighted Average
0.471		94.96% Pervious Area
0.025		5.04% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.3	43	0.1886	0.32		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.57"
2.3	43	Total, Increased to minimum Tc = 15.0 min			

Subcatchment 5S: DA-005



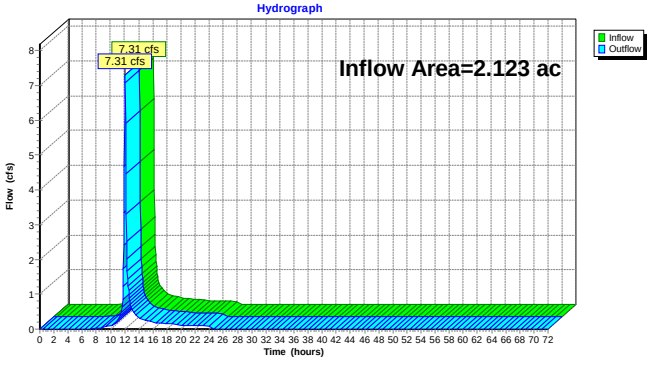
Summary for Reach 6R: WEST ADJ PROPERTY

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 2.123 ac, 21.95% Impervious, Inflow Depth = 2.69" for 25YR-24HR event
Inflow = 7.31 cfs @ 12.07 hrs, Volume= 0.476 af
Outflow = 7.31 cfs @ 12.07 hrs, Volume= 0.476 af, Atten= 0%, Lag= 0.0 min
Routed to Reach 12R : Total

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach 6R: WEST ADJ PROPERTY



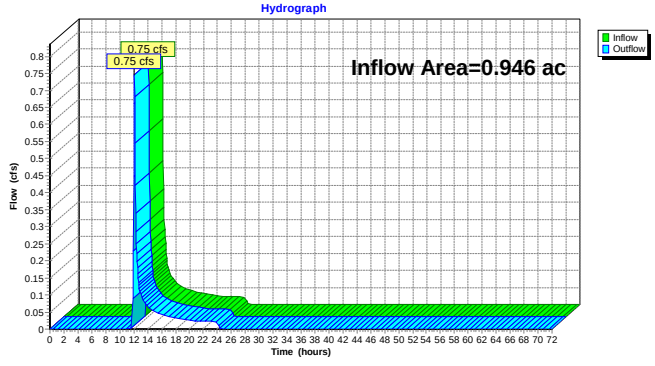
Summary for Reach 7R: SOUTH ADJ PROPERTY

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.946 ac, 11.10% Impervious, Inflow Depth = 0.78" for 25YR-24HR event
Inflow = 0.75 cfs @ 12.10 hrs, Volume= 0.061 af
Outflow = 0.75 cfs @ 12.10 hrs, Volume= 0.061 af, Atten= 0%, Lag= 0.0 min
Routed to Reach 12R : Total

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach 7R: SOUTH ADJ PROPERTY



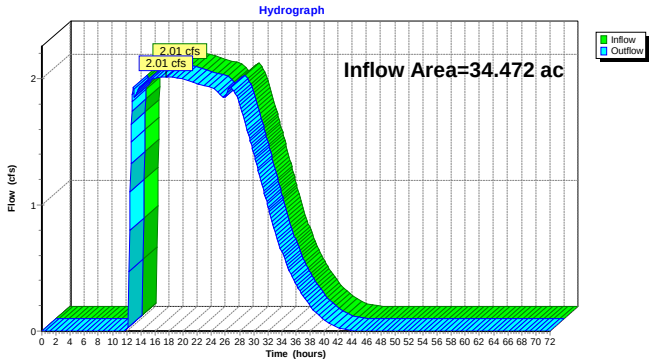
Summary for Reach 8R: SOUTH ON PROPERTY

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 34.472 ac, 66.66% Impervious, Inflow Depth = 1.13" for 25YR-24HR event
Inflow = 2.01 cfs @ 17.57 hrs, Volume= 3.254 af
Outflow = 2.01 cfs @ 17.57 hrs, Volume= 3.254 af, Atten= 0%, Lag= 0.0 min
Routed to Reach 12R : Total

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach 8R: SOUTH ON PROPERTY



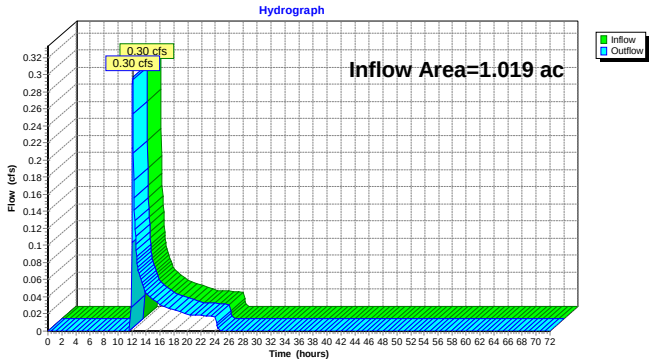
Summary for Reach 9R: NORTH ADJ PROPERTY

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 1.019 ac, 0.00% Impervious, Inflow Depth = 0.44" for 25YR-24HR event
Inflow = 0.30 cfs @ 12.13 hrs, Volume= 0.038 af
Outflow = 0.30 cfs @ 12.13 hrs, Volume= 0.038 af, Atten= 0%, Lag= 0.0 min
Routed to Reach 12R : Total

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach 9R: NORTH ADJ PROPERTY



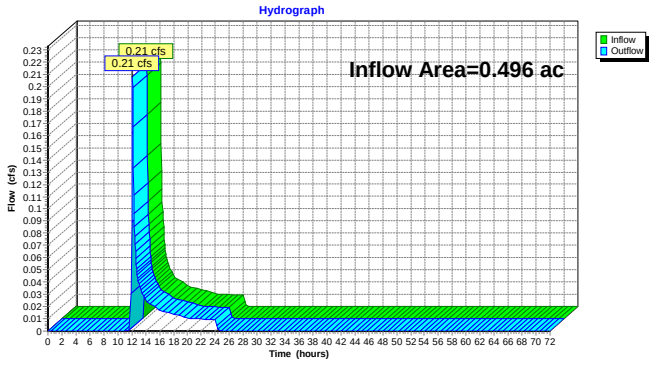
Summary for Reach 10R: EAST ADJ PROPERTY

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.496 ac, 5.04% Impervious, Inflow Depth = 0.53" for 25YR-24HR event
Inflow = 0.21 cfs @ 12.12 hrs, Volume= 0.022 af
Outflow = 0.21 cfs @ 12.12 hrs, Volume= 0.022 af, Atten= 0%, Lag= 0.0 min
Routed to Reach 12R : Total

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach 10R: EAST ADJ PROPERTY



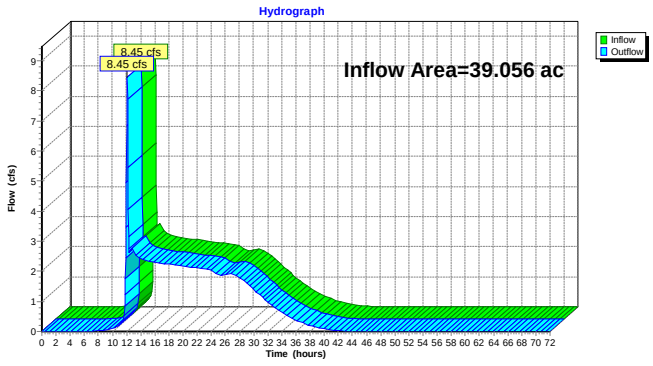
Summary for Reach 12R: Total

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 39.056 ac, 60.36% Impervious, Inflow Depth = 1.18" for 25YR-24HR event
Inflow = 8.45 cfs @ 12.08 hrs, Volume= 3.850 af
Outflow = 8.45 cfs @ 12.08 hrs, Volume= 3.850 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach 12R: Total



Summary for Pond 11P: DETENTION BASIN

Inflow Area = 34.472 ac, 66.66% Impervious, Inflow Depth = 3.26" for 25YR-24HR event
Inflow = 99.24 cfs @ 12.22 hrs, Volume= 9.357 af
Outflow = 2.94 cfs @ 17.57 hrs, Volume= 7.843 af, Atten= 97%, Lag= 321.4 min
Discarded = 0.92 cfs @ 17.57 hrs, Volume= 4.589 af
Primary = 2.01 cfs @ 17.57 hrs, Volume= 3.254 af
Routed to Reach 8R : SOUTH ON PROPERTY
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Reach 8R : SOUTH ON PROPERTY

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 882.93' @ 17.57 hrs Surf.Area= 76,788 sf Storage= 289,801 cf

Plug-Flow detention time= 1,199.3 min calculated for 7.838 af (84% of inflow)
Center-of-Mass det. time= 1,129.4 min (1,945.6 - 816.2)

Volume	Invert	Avail.Storage	Storage Description
#1	879.00'	442,663 cf	**Detention Basin (Prismatic)** Listed below (Recalc)
#2	882.00'	23,806 cf	**Forebay Cygnet (Prismatic)** Listed below (Recalc) -Impervious
#3	882.00'	29,657 cf	**Forebay Swan (Prismatic)** Listed below (Recalc) -Impervious
#4	883.00'	5,273 cf	**Forebay North (Prismatic)** Listed below (Recalc)
		501,399 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
879.00	63,780	0	0
880.00	67,009	65,395	65,395
881.00	70,294	68,652	134,046
881.20	70,954	14,125	148,171
882.00	73,635	57,836	206,006
883.00	77,033	75,334	281,340
883.50	79,398	39,108	320,448
884.00	80,488	39,972	360,420
885.00	83,999	82,244	442,663

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
882.00	6,156	0	0
883.00	7,311	6,734	6,734
884.00	8,522	7,917	14,650
885.00	9,790	9,156	23,806

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
882.00	7,747	0	0
883.00	9,141	8,444	8,444
884.00	10,592	9,867	18,311
885.00	12,100	11,346	29,657

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
883.00	2,080	0	0
884.00	2,622	2,351	2,351
885.00	3,222	2,922	5,273

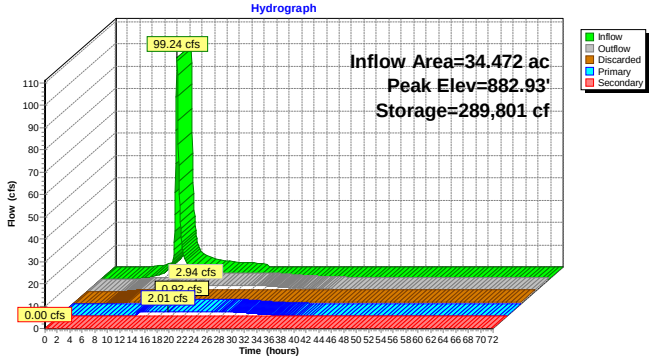
Device	Routing	Invert	Outlet Devices
#1	Primary	881.20'	**12.0" Round CMP_Round 12"** L= 177.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 881.20' / 879.68' S= 0.0086 '/' Cc= 0.900 n= 0.025 Corrugated metal, Flow Area= 0.79 sf
#2	Discarded	879.00'	**0.520 in/hr Exfiltration over Horizontal area**
#3	Secondary	883.50'	**20.0' long + 3.0 '/' SideZ x 18.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Discarded OutFlow Max=0.92 cfs @ 17.57 hrs HW=882.93' (Free Discharge)
2=Exfiltration (Exfiltration Controls 0.92 cfs)

Primary OutFlow Max=2.01 cfs @ 17.57 hrs HW=882.93' (Free Discharge)
1=CMP_Round 12" (Barrel Controls 2.01 cfs @ 2.56 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=879.00' (Free Discharge)
3=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond 11P: DETENTION BASIN



Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: DA-001 Runoff Area=2.123 ac 21.95% Impervious Runoff Depth=4.03"
Flow Length=132' Slope=0.0846 '/' Tc=15.0 min CN=83 Runoff=10.82 cfs 0.712 af

Subcatchment 2S: DA-002 Runoff Area=0.946 ac 11.10% Impervious Runoff Depth=1.56"
Flow Length=214' Slope=0.1060 '/' Tc=15.0 min CN=56 Runoff=1.74 cfs 0.123 af

Subcatchment 3S: DA-003 Runoff Area=34.472 ac 66.66% Impervious Runoff Depth=4.67"
Flow Length=1,467' Tc=28.5 min CN=89 Runoff=140.24 cfs 13.409 af

Subcatchment 4S: DA-004 Runoff Area=1.019 ac 0.00% Impervious Runoff Depth=1.04"
Flow Length=26' Slope=0.1317 '/' Tc=15.0 min CN=49 Runoff=1.08 cfs 0.088 af

Subcatchment 5S: DA-005 Runoff Area=0.496 ac 5.04% Impervious Runoff Depth=1.18"
Flow Length=43' Slope=0.1886 '/' Tc=15.0 min CN=51 Runoff=0.63 cfs 0.049 af

Reach 6R: WEST ADJ PROPERTY Inflow=10.82 cfs 0.712 af
Outflow=10.82 cfs 0.712 af

Reach 7R: SOUTH ADJ PROPERTY Inflow=1.74 cfs 0.123 af
Outflow=1.74 cfs 0.123 af

Reach 8R: SOUTH ON PROPERTY Inflow=11.12 cfs 6.671 af
Outflow=11.12 cfs 6.671 af

Reach 9R: NORTH ADJ PROPERTY Inflow=1.08 cfs 0.088 af
Outflow=1.08 cfs 0.088 af

Reach 10R: EAST ADJ PROPERTY Inflow=0.63 cfs 0.049 af
Outflow=0.63 cfs 0.049 af

Reach 12R: Total Inflow=14.17 cfs 7.643 af
Outflow=14.17 cfs 7.643 af

Pond 11P: DETENTION BASIN Peak Elev=883.79' Storage=374,477 cf Inflow=140.24 cfs 13.409 af
Discarded=0.99 cfs 4.815 af Primary=2.37 cfs 4.643 af Secondary=8.76 cfs 2.028 af Outflow=12.12 cfs 11.486 af

Total Runoff Area = 39.056 ac Runoff Volume = 14.381 af Average Runoff Depth = 4.42"
39.64% Pervious = 15.480 ac 60.36% Impervious = 23.576 ac

Summary for Subcatchment 1S: DA-001

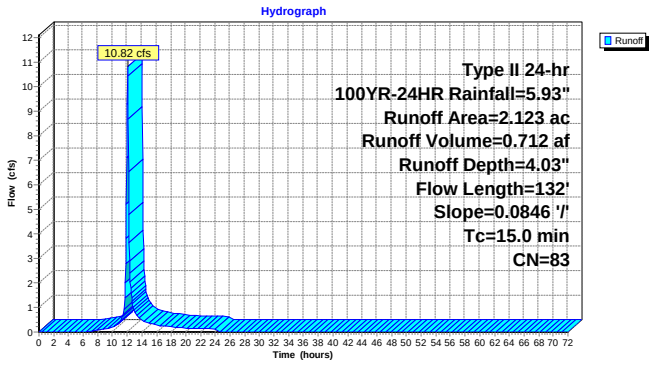
Runoff = 10.82 cfs @ 12.07 hrs, Volume= 0.712 af, Depth= 4.03"
Routed to Reach 6R : WEST ADJ PROPERTY

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type II 24-hr 100YR-24HR Rainfall=5.93"

Area (ac)	CN	Description
1.657	79	50-75% Grass cover, Fair, HSG C
0.466	98	Paved parking, HSG C
2.123	83	Weighted Average
1.657		78.05% Pervious Area
0.466		21.95% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.7	132	0.0846	0.29		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.57"
7.7	132	Total, Increased to minimum Tc = 15.0 min			

Subcatchment 1S: DA-001



Summary for Subcatchment 2S: DA-002

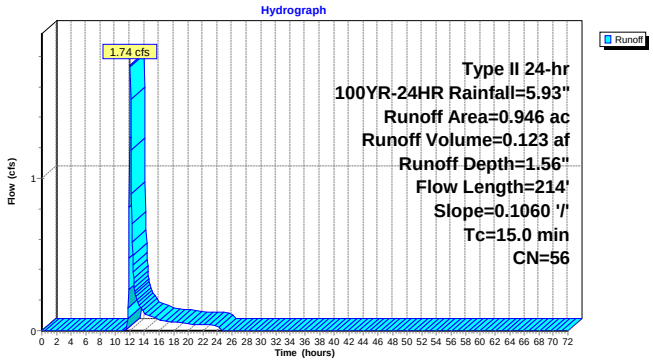
Runoff = 1.74 cfs @ 12.09 hrs, Volume= 0.123 af, Depth= 1.56"
Routed to Reach 7R : SOUTH ADJ PROPERTY

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type II 24-hr 100YR-24HR Rainfall=5.93"

Area (ac)	CN	Description
0.807	49	50-75% Grass cover, Fair, HSG A
0.105	98	Paved parking, HSG C
0.034	79	50-75% Grass cover, Fair, HSG C
0.946	56	Weighted Average
0.841		88.90% Pervious Area
0.105		11.10% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.3	214	0.1060	0.35		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.57"
10.3	214	Total, Increased to minimum Tc = 15.0 min			

Subcatchment 2S: DA-002



Summary for Subcatchment 3S: DA-003

[47] Hint: Peak is 9248% of capacity of segment #4

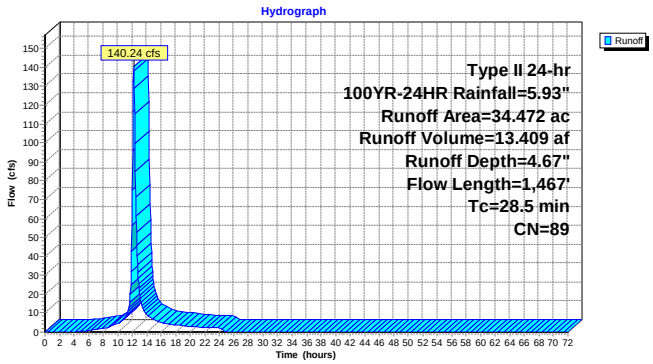
Runoff = 140.24 cfs @ 12.21 hrs, Volume= 13.409 af, Depth= 4.67"
Routed to Pond 11P : DETENTION BASIN

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type II 24-hr 100YR-24HR Rainfall=5.93"

Area (ac)	CN	Description
12.290	98	Paved parking, HSG A
10.690	98	Paved parking, HSG C
7.886	79	50-75% Grass cover, Fair, HSG C
3.606	49	50-75% Grass cover, Fair, HSG A
34.472	89	Weighted Average
11.492		33.34% Pervious Area
22.980		66.66% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.2	300	0.0103	1.18		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.57"
21.5	833	0.0085	0.65		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
1.9	229	0.0093	1.96		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.9	105	0.0067	1.93	1.52	**Pipe Channel, CMP_Round 12"** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.025 Corrugated metal
28.5	1,467	Total			

Subcatchment 3S: DA-003



Summary for Subcatchment 4S: DA-004

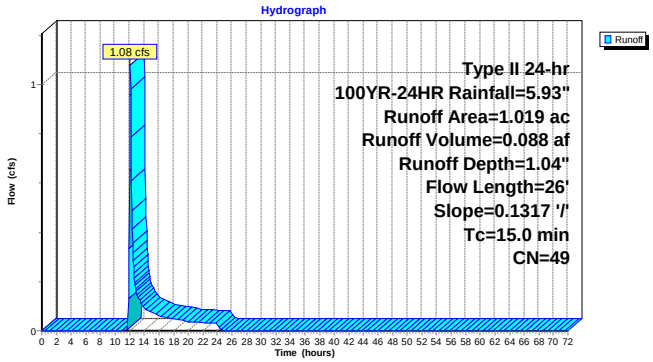
Runoff = 1.08 cfs @ 12.10 hrs, Volume= 0.088 af, Depth= 1.04"
Routed to Reach 9R : NORTH ADJ PROPERTY

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type II 24-hr 100YR-24HR Rainfall=5.93"

Area (ac)	CN	Description
1.019	49	50-75% Grass cover, Fair, HSG A
1.019		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.8	26	0.1317	0.25		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.57"
1.8	26	Total, Increased to minimum Tc = 15.0 min			

Subcatchment 4S: DA-004



Summary for Subcatchment 5S: DA-005

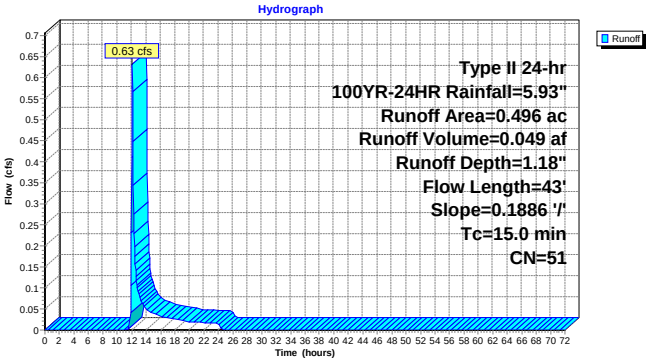
Runoff = 0.63 cfs @ 12.10 hrs, Volume= 0.049 af, Depth= 1.18"
Routed to Reach 10R : EAST ADJ PROPERTY

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type II 24-hr 100YR-24HR Rainfall=5.93"

Area (ac)	CN	Description
0.471	49	50-75% Grass cover, Fair, HSG A
0.025	98	Paved parking, HSG A
0.496	51	Weighted Average
0.471		94.96% Pervious Area
0.025		5.04% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.3	43	0.1886	0.32		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.57"
2.3	43	Total, Increased to minimum Tc = 15.0 min			

Subcatchment 5S: DA-005



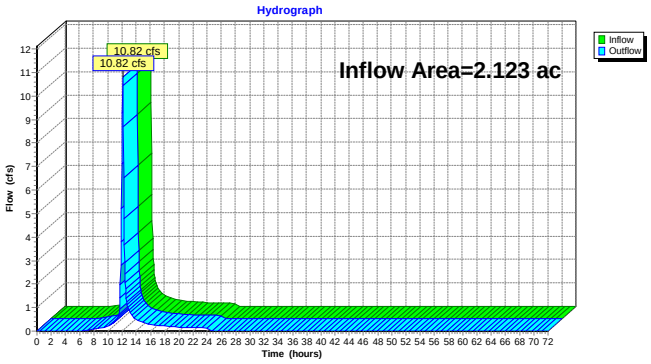
Summary for Reach 6R: WEST ADJ PROPERTY

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 2.123 ac, 21.95% Impervious, Inflow Depth = 4.03" for 100YR-24HR event
Inflow = 10.82 cfs @ 12.07 hrs, Volume= 0.712 af
Outflow = 10.82 cfs @ 12.07 hrs, Volume= 0.712 af, Atten= 0%, Lag= 0.0 min
Routed to Reach 12R : Total

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach 6R: WEST ADJ PROPERTY



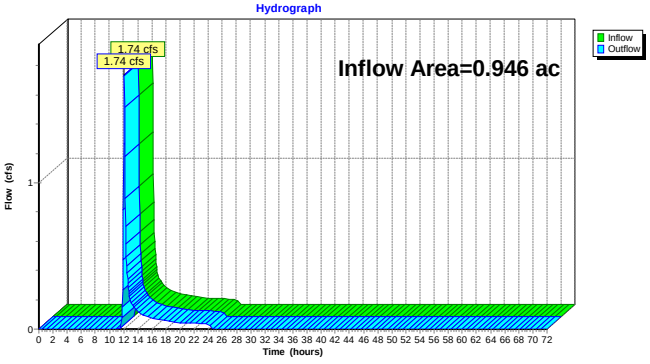
Summary for Reach 7R: SOUTH ADJ PROPERTY

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.946 ac, 11.10% Impervious, Inflow Depth = 1.56" for 100YR-24HR event
Inflow = 1.74 cfs @ 12.09 hrs, Volume= 0.123 af
Outflow = 1.74 cfs @ 12.09 hrs, Volume= 0.123 af, Atten= 0%, Lag= 0.0 min
Routed to Reach 12R : Total

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach 7R: SOUTH ADJ PROPERTY



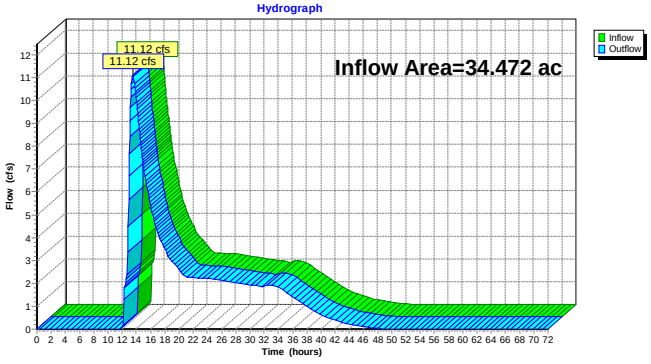
Summary for Reach 8R: SOUTH ON PROPERTY

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 34.472 ac, 66.66% Impervious, Inflow Depth = 2.32" for 100YR-24HR event
Inflow = 11.12 cfs @ 13.50 hrs, Volume= 6.671 af
Outflow = 11.12 cfs @ 13.50 hrs, Volume= 6.671 af, Atten= 0%, Lag= 0.0 min
Routed to Reach 12R : Total

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach 8R: SOUTH ON PROPERTY



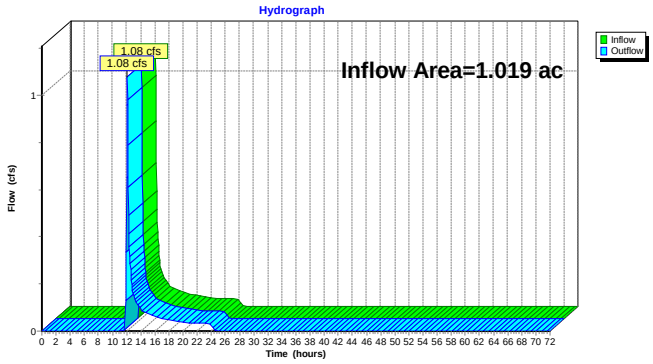
Summary for Reach 9R: NORTH ADJ PROPERTY

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 1.019 ac, 0.00% Impervious, Inflow Depth = 1.04" for 100YR-24HR event
Inflow = 1.08 cfs @ 12.10 hrs, Volume= 0.088 af
Outflow = 1.08 cfs @ 12.10 hrs, Volume= 0.088 af, Atten= 0%, Lag= 0.0 min
Routed to Reach 12R : Total

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach 9R: NORTH ADJ PROPERTY



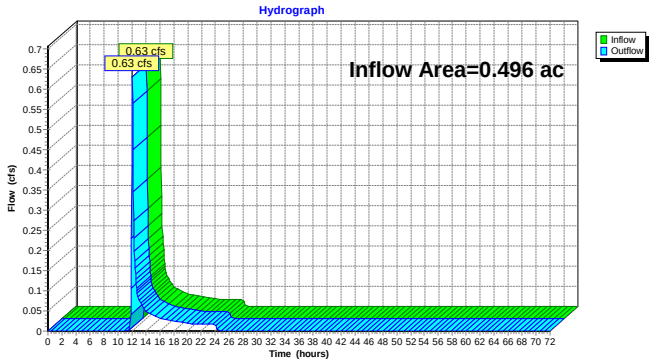
Summary for Reach 10R: EAST ADJ PROPERTY

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.496 ac, 5.04% Impervious, Inflow Depth = 1.18" for 100YR-24HR event
Inflow = 0.63 cfs @ 12.10 hrs, Volume= 0.049 af
Outflow = 0.63 cfs @ 12.10 hrs, Volume= 0.049 af, Atten= 0%, Lag= 0.0 min
Routed to Reach 12R : Total

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach 10R: EAST ADJ PROPERTY



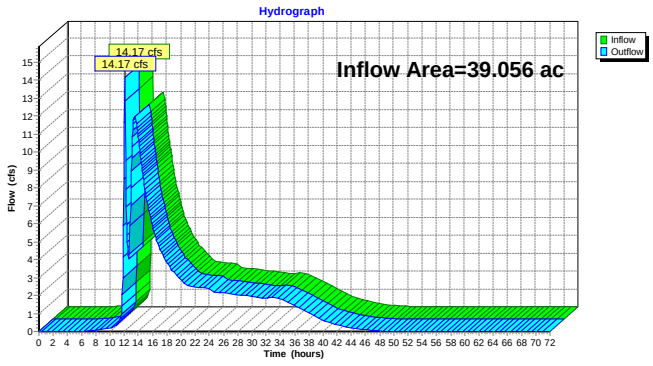
Summary for Reach 12R: Total

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 39.056 ac, 60.36% Impervious, Inflow Depth = 2.35" for 100YR-24HR event
Inflow = 14.17 cfs @ 12.07 hrs, Volume= 7.643 af
Outflow = 14.17 cfs @ 12.07 hrs, Volume= 7.643 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach 12R: Total



Summary for Pond 11P: DETENTION BASIN

Inflow Area = 34.472 ac, 66.66% Impervious, Inflow Depth = 4.67" for 100YR-24HR event
Inflow = 140.24 cfs @ 12.21 hrs, Volume= 13.409 af
Outflow = 12.12 cfs @ 13.50 hrs, Volume= 11.486 af, Atten= 91%, Lag= 77.1 min
Discarded = 0.99 cfs @ 13.50 hrs, Volume= 4.815 af
Primary = 2.37 cfs @ 13.50 hrs, Volume= 4.643 af
Routed to Reach 8R : SOUTH ON PROPERTY
Secondary = 8.76 cfs @ 13.50 hrs, Volume= 2.028 af
Routed to Reach 8R : SOUTH ON PROPERTY

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 883.79' @ 13.50 hrs Surf.Area= 82,541 sf Storage= 374,477 cf

Plug-Flow detention time= 991.4 min calculated for 11.478 af (86% of inflow)
Center-of-Mass det. time= 927.1 min (1,733.3 - 806.2)

Volume	Invert	Avail.Storage	Storage Description
#1	879.00'	442,663 cf	**Detention Basin (Prismatic)** Listed below (Recalc)
#2	882.00'	23,806 cf	**Forebay Cygnet (Prismatic)** Listed below (Recalc) -Impervious
#3	882.00'	29,657 cf	**Forebay Swan (Prismatic)** Listed below (Recalc) -Impervious
#4	883.00'	5,273 cf	**Forebay North (Prismatic)** Listed below (Recalc)
		501,399 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
879.00	63,780	0	0
880.00	67,009	65,395	65,395
881.00	70,294	68,652	134,046
881.20	70,954	14,125	148,171
882.00	73,635	57,836	206,006
883.00	77,033	75,334	281,340
883.50	79,398	39,108	320,448
884.00	80,488	39,972	360,420
885.00	83,999	82,244	442,663

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
882.00	6,156	0	0
883.00	7,311	6,734	6,734
884.00	8,522	7,917	14,650
885.00	9,790	9,156	23,806

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
882.00	7,747	0	0
883.00	9,141	8,444	8,444
884.00	10,592	9,867	18,311
885.00	12,100	11,346	29,657

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
883.00	2,080	0	0
884.00	2,622	2,351	2,351
885.00	3,222	2,922	5,273

Device	Routing	Invert	Outlet Devices
#1	Primary	881.20'	**12.0" Round CMP_Round 12"** L= 177.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 881.20' / 879.68' S= 0.0086 '/' Cc= 0.900 n= 0.025 Corrugated metal, Flow Area= 0.79 sf
#2	Discarded	879.00'	**0.520 in/hr Exfiltration over Horizontal area**
#3	Secondary	883.50'	**20.0' long + 3.0 '/' SideZ x 18.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Discarded OutFlow Max=0.99 cfs @ 13.50 hrs HW=883.79' (Free Discharge)
└**2=Exfiltration** (Exfiltration Controls 0.99 cfs)

Primary OutFlow Max=2.37 cfs @ 13.50 hrs HW=883.79' (Free Discharge)
└**1=CMP_Round 12"** (Barrel Controls 2.37 cfs @ 3.01 fps)

Secondary OutFlow Max=8.73 cfs @ 13.50 hrs HW=883.79' (Free Discharge)
└**3=Broad-Crested Rectangular Weir** (Weir Controls 8.73 cfs @ 1.44 fps)

Pond 11P: DETENTION BASIN

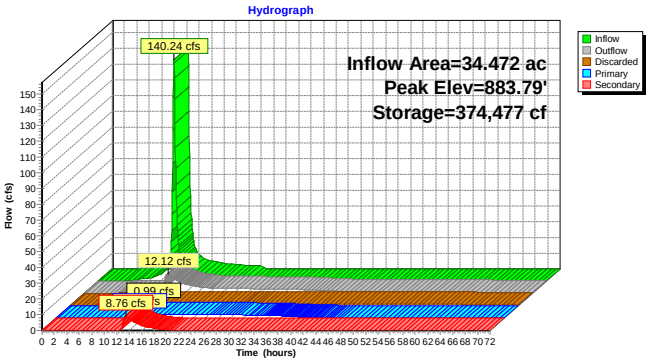


Exhibit 8 – FEMA Firm Map

National Flood Hazard Layer FIRMette

FEMA

85°29'17"W 42°17'51"N



85°28'39"W 42°17'25"N

0 250 500 1,000 1,500 2,000 Feet

1:6,000

Basemap Imagery Source: USGS National Map 2023

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 / 17.5 Cross Sections with 1% Annual Chance / Water Surface Elevation
- Coastal Transect
- Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

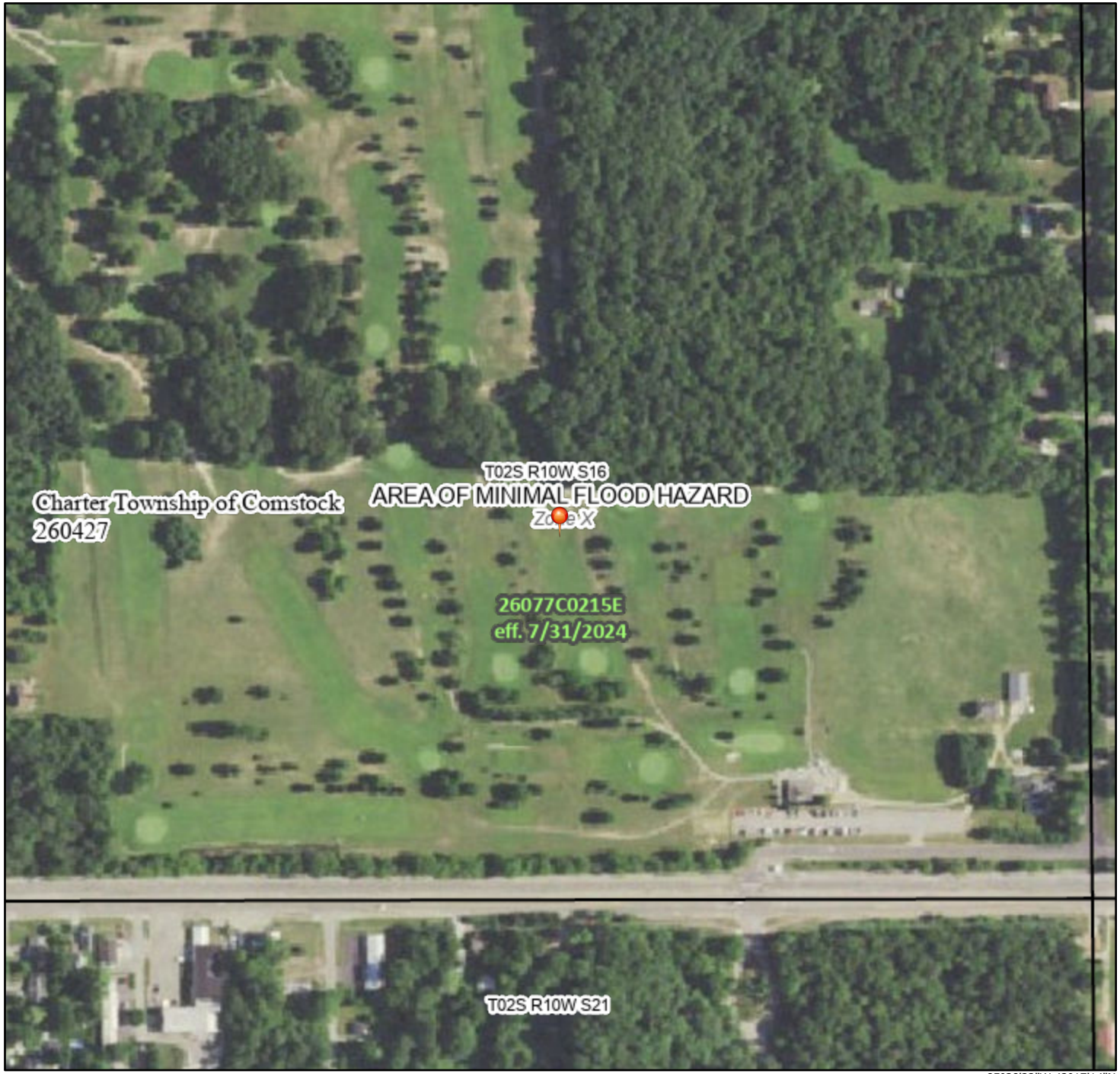
The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 3/25/2026 at 6:49 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

National Flood Hazard Layer FIRMette

FEMA

85°28'59"W 42°17'41"N



0 250 500 1,000 1,500 2,000 Feet

1:6,000

85°28'22"W 42°17'14"N

Basemap Imagery Source: USGS National Map 2023

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 Cross Sections with 1% Annual Chance
- 17.5 Water Surface Elevation
- Coastal Transect
- Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 3/25/2026 at 6:11 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

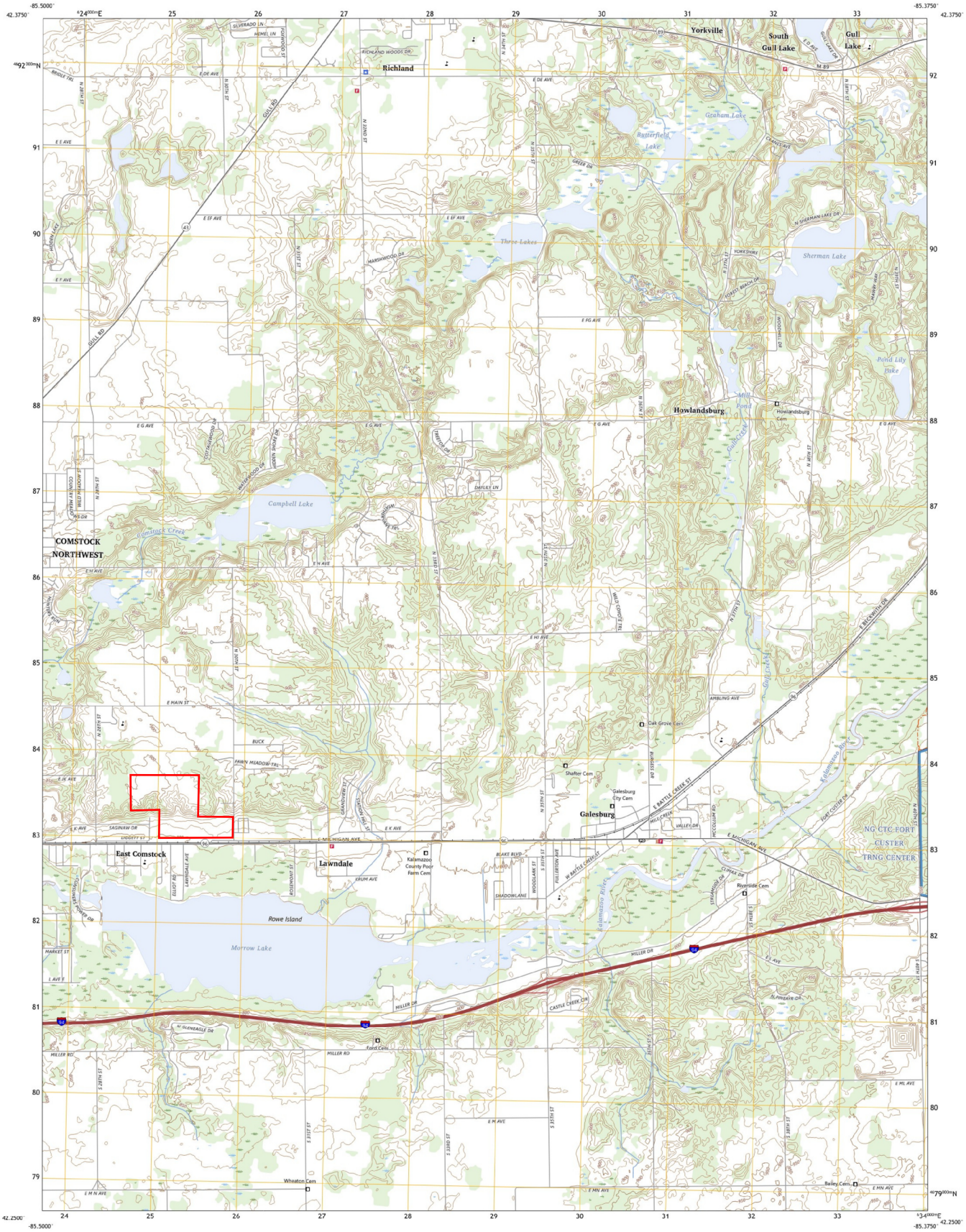
This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

Exhibit 9 – USGS Map

U.S. DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY

The National Map
US Topo

GALESBURG QUADRANGLE
MICHIGAN - KALAMAZOO COUNTY
7.5-MINUTE SERIES



Produced by the United States Geological Survey
North American Datum of 1983 (NAD83)
World Geodetic System of 1984 (WGS84). Projection and 1 000-meter grid:Universal Transverse Mercator, Zone 16T
This map is not a legal document. Boundaries may be generalized for this map scale. Private lands within government reservations may not be shown. Obtain permission before entering private lands.

Imagery.....NAIP, July 2020 - July 2020
Roads.....U.S. Census Bureau, 2016
Names.....GNIS, 1980 - 2023
Hydrography.....National Hycrography Dataset, 2006 - 2022
Contours.....National Elevation Dataset, 2018
Boundaries.....Multiple sources; see metadata file 2020 - 2022
Public Land Survey System.....BLM, 2018
Wetlands.....FWS National Wetlands Inventory Not Available

UTM GRID AND 2023 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

SCALE 1:24 000

CONTOUR INTERVAL 10 FEET
NORTH AMERICAN VERTICAL DATUM OF 1988

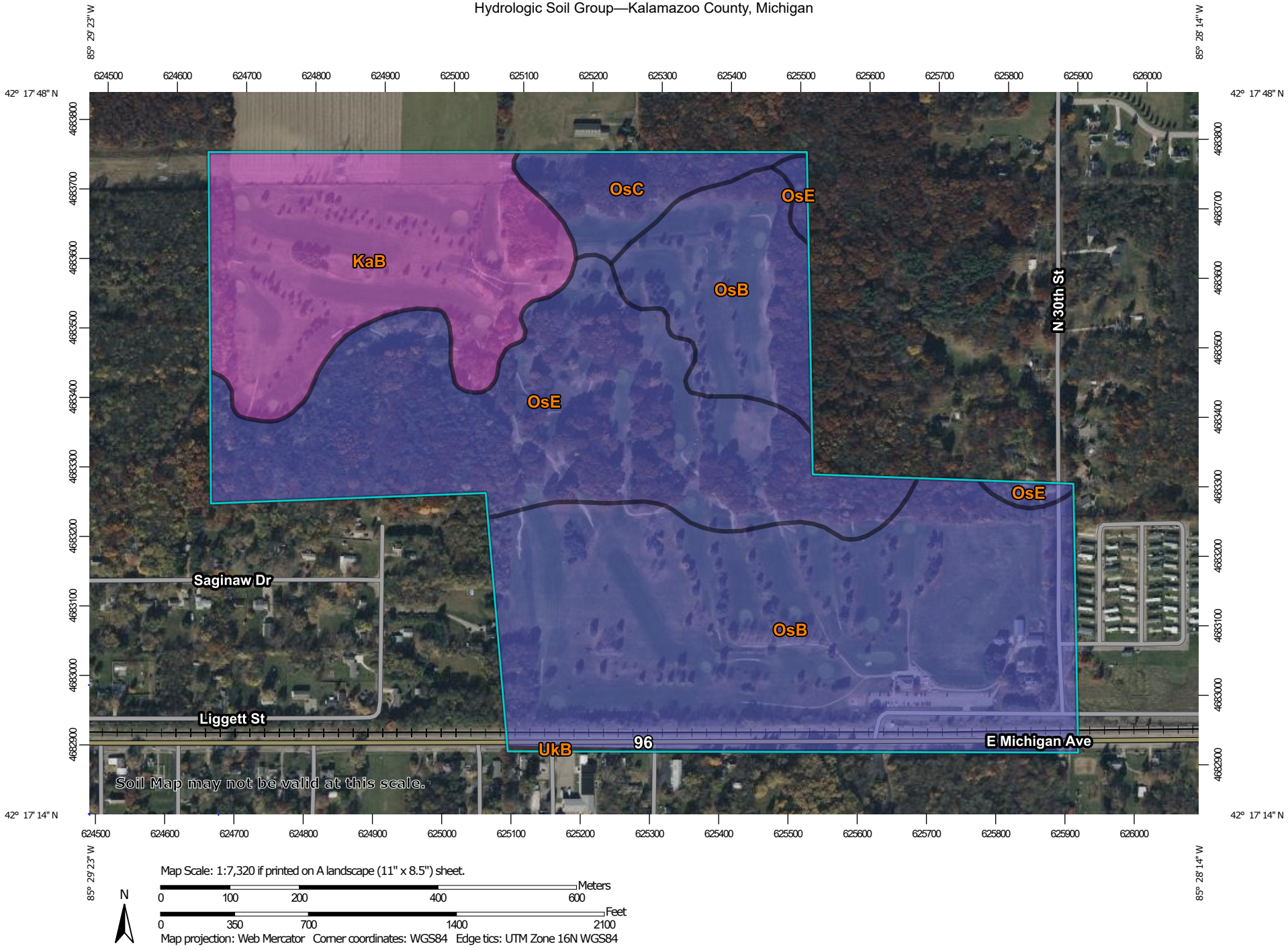
This map was produced to conform with the National Geospatial Program US Topo Product Standard.

ADJOINING QUADRANGLES
1 Kalamazoo NE
2 Delton
3 Banfield
4 Kalamazoo
5 Augusta
6 Portage
7 Adams Park
8 Climax

ROAD CLASSIFICATION
Expressway
Secondary Hwy
Ramp
Local Connector
Local Road
4WD
Interstate Route
US Route
State Route

GALESBURG, MI
2023

Exhibit 10 – NRCS Soil Report


85° 29' 23" W
85° 28' 14" W
42° 17' 48" N
42° 17' 14" N
624500
624600
624700
624800
624900
625000
625100
625200
625300
625400
625500
625600
625700
625800
625900
626000
4683800
4683700
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4683500
4683400
4683300
4683200
4683100
4683000
4682900
KaB
OsC
OsE
OsB
OsE
OsE
OsB
UkB
N 30th St
Saginaw Dr
Liggett St
96
E Michigan Ave
Soil Map may not be valid at this scale.
Map Scale: 1:7,320 if printed on A landscape (11" x 8.5") sheet.
N
0 100 200 400 600 Meters
0 350 700 1400 2100 Feet
Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 16N WGS84

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

Soil Rating Polygons

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Lines

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Points

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Water Features

- Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background

- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:15,800.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Kalamazoo County, Michigan
Survey Area Data: Version 20, Sep 4, 2025

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Oct 4, 2022—Nov 7, 2022

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
KaB	Kalamazoo loam, 2 to 6 percent slopes	C	36.4	19.6%
OsB	Oshtemo sandy loam, 0 to 6 percent slopes	A	88.7	47.8%
OsC	Oshtemo sandy loam, 6 to 12 percent slopes	A	7.9	4.3%
OsE	Oshtemo sandy loam, 18 to 35 percent slopes	A	52.2	28.2%
UkB	Urban land-Kalamazoo complex, 0 to 6 percent slopes	D	0.2	0.1%
Totals for Area of Interest			**185.5**	**100.0%**

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

EXHIBIT E(A): EMERGENCY RESPONSE GUIDE

Copenhagen Infrastructure Partners



JF2 DC LINK
Battery Energy Storage System at Swan & Cygnet BESS Facility

This guide has been developed to assist the local emergency responders with important safety and emergency response information concerning the JF2 DC LINK BESS Installation.

This document and supporting layout plans should be consulted prior to any fire service personnel entering the site.

Emergency Response Guide

[Date]

Rev. 0

Approved by:

Copenhagen Infrastructure Partners

Date

Document No. [Plan ID]

DRAFT

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- Deflagration/Explosion Potential 7
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DRAFT

Record of Revisions

Change #	Date of Change	Substance of Change	Entered By
Revision 0	[TBD]	Initial Issue	Jensen Hughes

This Emergency Response Guide (ERG) is prepared in accordance with the requirements of the Charter Township of Comstock Ordinance 564 (Adopted December 15, 2025) and is consistent with the Clean and Renewable Energy and Energy Waste Reduction Act, MCL 460.1001 et seq., as amended by PA 233 of 2023.

This ERG serves as both a Fire Response Plan and an Emergency Response Plan and has been developed in coordination with local First Responders. At least once every three years, a review of this ERG shall be conducted and documented with the Site Owner/Operator, the First Responders and county emergency managers. The plan shall also be reviewed and amended whenever there is a change in facility design, construction, operation, or maintenance that affects emergency response planning. If outside resources are changed or modified, the document shall be reviewed and updated to reflect the changes that may affect this ERG.

The following items are provided here only to document compliance with specific Charter Township of Comstock Ordinance 564 requirements that are not explicitly addressed within this Emergency Response Guide (ERG).

- *CIP and Jensen Hughes (JH) personnel had an in-person meeting with Chief Beauchamp to discuss this project on November 20, 2025 at Station 9-3, and have participated in a conference call with Chief Beauchamp, Charter Township of Comstock Superintendent, Scott Hess, (and others) on April 7, 2026 to discuss this project and this ERG's compliance with Ordinance 564.*
- *Based on preliminary observations, Comstock Fire and Rescue appears to possess the fire and emergency response capacity to handle an emergency event at the proposed BESS facility. JH personnel will meet with Comstock Fire and Rescue personnel in the near term, at which time a more formal evaluation of overall capabilities can occur. If it is determined that there are training needs or equipment needs, JH will offer the assistance required to ensure there are no deficiencies.*
- *This ERG is a draft document that will not be finalized unless/until the site becomes operational. Upon review of this draft document, Comstock Fire and Rescue and the County Emergency Manager can determine if it aligns with their current practices and can provide any information they find relevant for incorporation into the document.*

DRAFT

Section 1 – General Information

This Emergency Response Guide addresses the emergency scenarios most reasonably foreseeable for a utility-scale battery energy storage system (BESS), including but not limited to thermal runaway, fire, hazardous material release, and unauthorized access. While this plan cannot anticipate every conceivable emergency, the response protocols and coordination procedures outlined herein are designed to be adaptable to unanticipated events when used in conjunction with the first responder organizations' existing established Standard Operating Procedures/Guidelines.

1. FACILITY NAME – **Swan BESS and Cygnet BESS**
2. TYPE OF BATTERY SYSTEM – **JF2 DC LINK 5.1 Enclosures**
3. LOCATION OF FACILITY:

   65 North 30th Street, Galesburg, MI (Approx. 400' east of E. Michigan Avenue)
   (Entrance Drive @ 42°17'19.89"N, 85°28'28.73"W)

4. OWNER/OPERATOR

   Site Owner

   Copenhagen Infrastructure Partners (CIP)

   Operator

   [TBD]

   Battery Energy Storage System Manufacturer:

   LG Energy Solution

5. EMERGENCY CONTACT NUMBERS:

Emergency Contact Number	Main	Alternate
CIP Emergency Contact	[XXX-XXX-XXXX]	[XXX-XXX-XXXX]
Operator Emergency Contact	[XXX-XXX-XXXX]	[XXX-XXX-XXXX]
BESS Subject Matter Expert (SME) 24/7 Emergency Support	[XXX-XXX-XXXX]	[XXX-XXX-XXXX]
Community Notification Contact	[XXX-XXX-XXXX]	[XXX-XXX-XXXX]

DRAFT

6. FACILITY DESCRIPTION:

The Swan BESS and Cygnet BESS facility is situated on a 142.2 acre site with a single access on the north side of North 30th Street, approximately 400' east of its intersection with East Michigan Avenue. There are no other site access points, but each BESS yard has its own access gates and circulation drives.

The facility is comprised of two BESS yards (totaling ≈18.6 acres) which are separated by their respective substations. Cygnet BESS (≈9.0 acres) is situated on the west side and Swan BESS (≈9.6 acres) is situated on the east side. This Pre-Incident Planning / Emergency Response Guide document addresses both facilities.

The two substations total ≈1.4 acres each and are separated from each other by 100 feet. The substations are equipped with an oil-filled 34.5kV/138kV transformer, circuit breakers and other related equipment. The Swan substation also includes an unmanned 588 ft^2 control building. The substation and BESS yards are enclosed with a security fence with noise walls provided where they face adjoining properties to the east, north and west. The yards and access drives consist of stone paving. A fire water tank is situated southeast of the Cygnet BESS yard and a second is situated southwest of the Swan BESS yard. A 3+ acre stormwater management area is provided between the BESS yards, south of the two substations. An operations and maintenance (O&M) area is provided for each BESS yard. Each includes an unmanned 945 ft^2 building.

At full build-out, the Cygnet and Swan BESS yards will consist of 240 JF2 DC LINK 5.1 BESS enclosures. These enclosures consist of three M-LINK cabinets and a control panel (E-Panel). Each M-LINK cabinet contains two racks which each hold 14 battery packs. Each battery pack contains 120 battery cells. The battery chemistry is lithium iron phosphate technology. One Power Conversion System (PCS) enclosure is dedicated to every four BESS enclosures for a total of 60 units.

The site is a former golf course with farmfield adjacent to the north. East Michagan Avenue borders the property to the south. A residential district is adjacent to the east (with a wooded buffer), consisting of single family homes and a manufactured housing community. A residential district of single family homes is also adjacent to the west. Aerial high voltage transmission lines run along the eastern portion of the north site boundary. The Jaguar 138kV transmission substation is situated approximately 550 feet north of the northwestern property corner.

Refer to Section 2 for site location and yard equipment layouts.

Additional information on the equipment located on-site is provided in the following sections.

[NOTE: Highlighted items to be provided prior to implementation of Guide.]

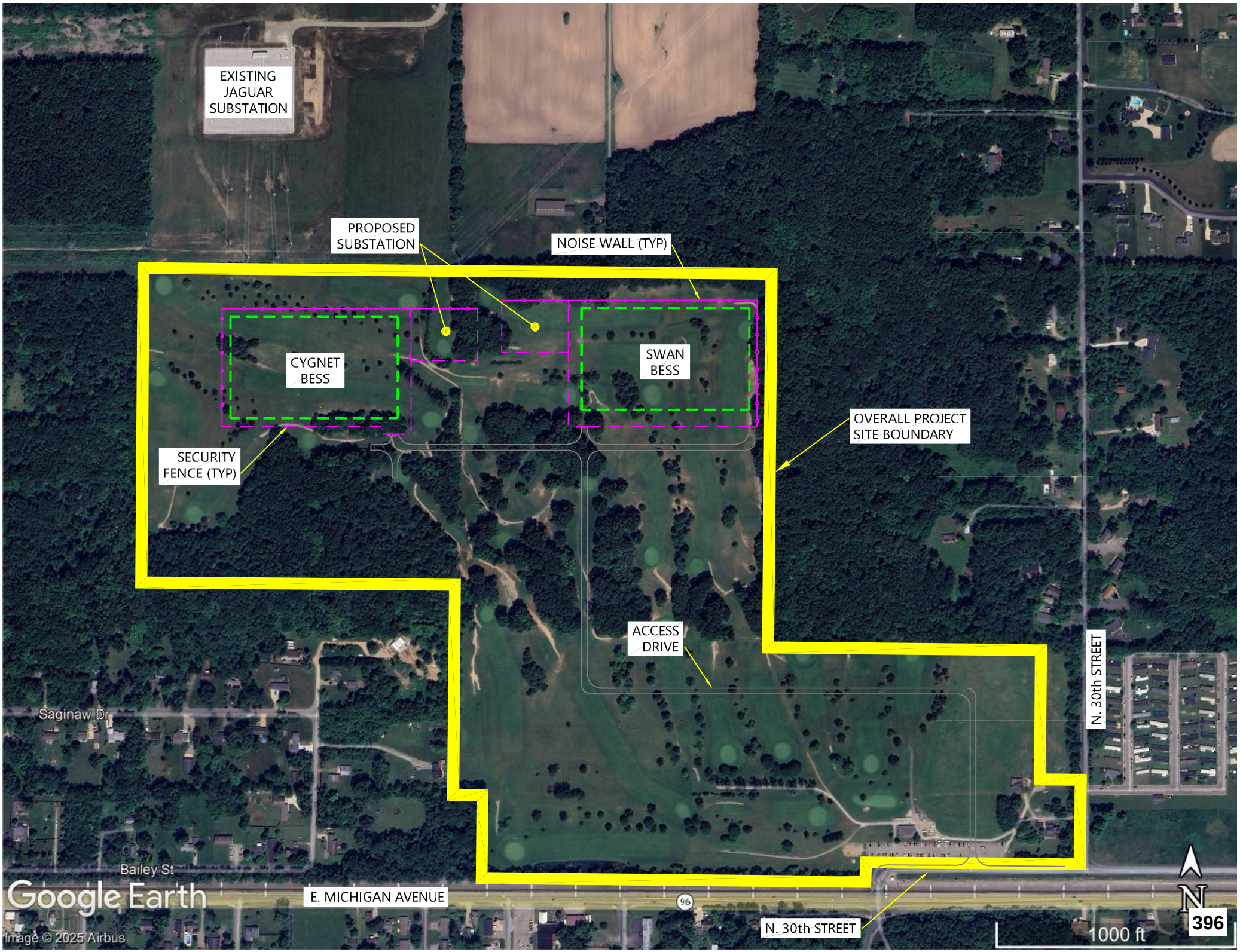
DRAFT

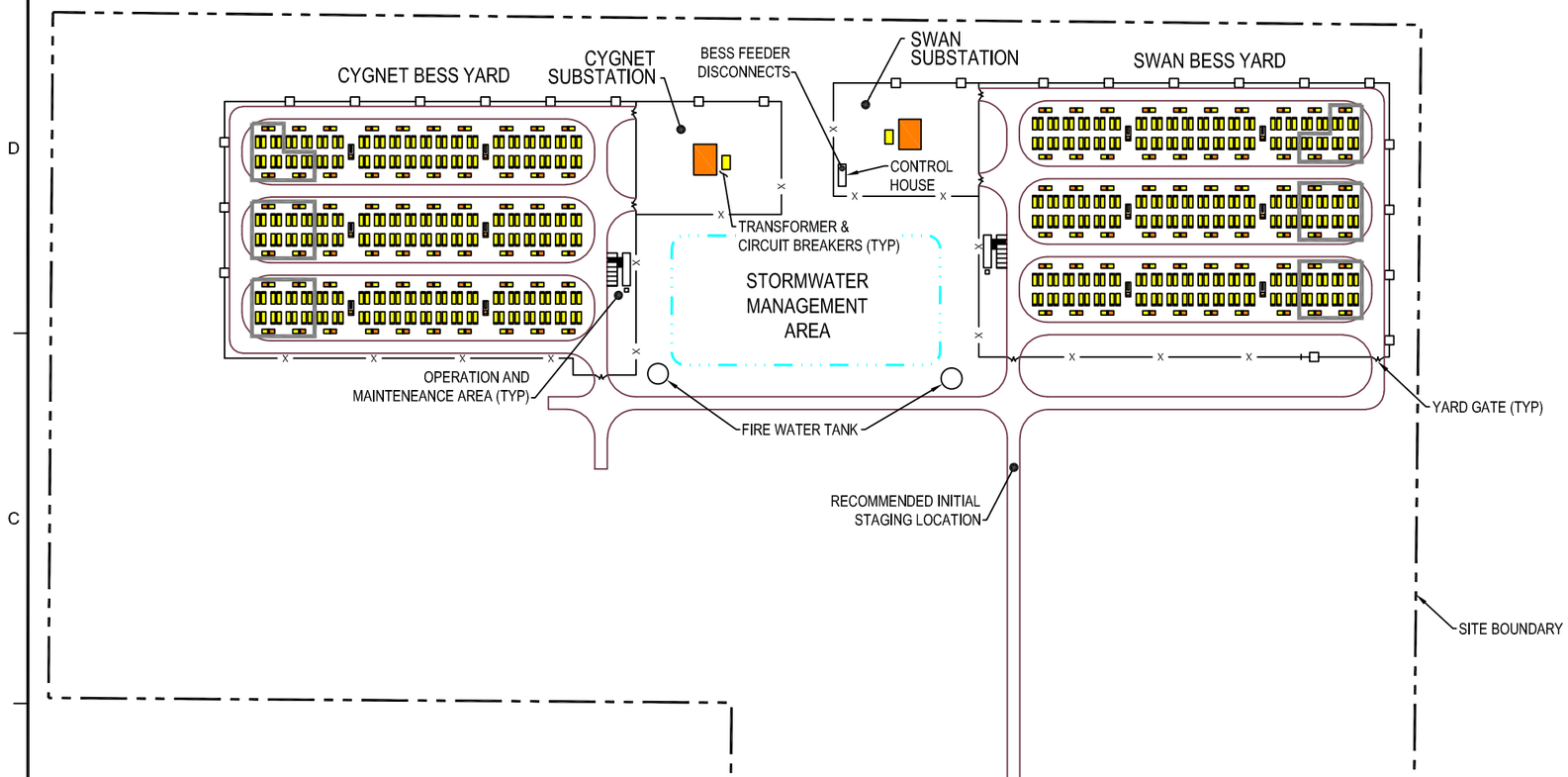
Section 2 – Site Plans and Layout Drawings

This section contains the following information:

- ***Aerial View***
- ***Overall Site Plan and Equipment Arrangement Plan***

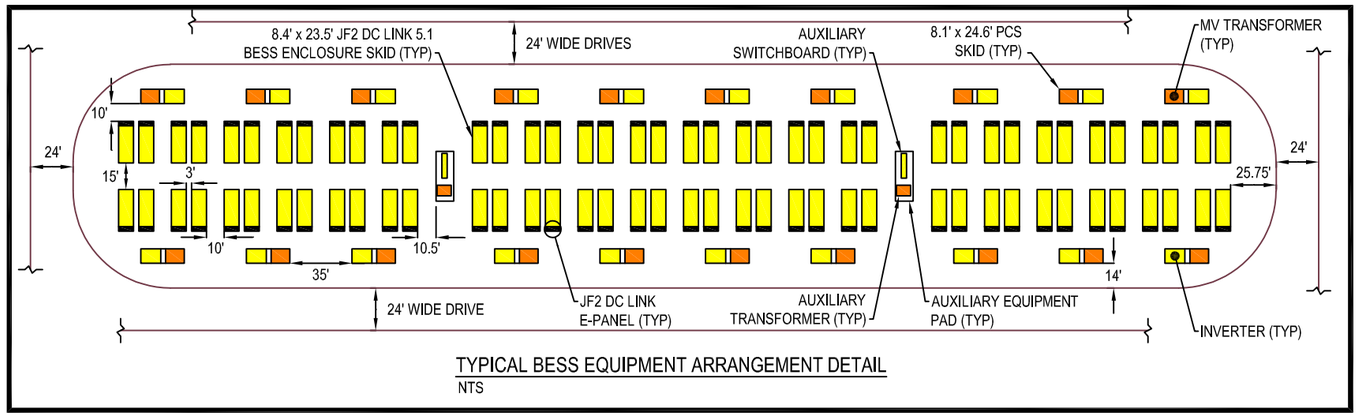
DRAFT


EXISTING JAGUAR SUBSTATION
PROPOSED SUBSTATION
NOISE WALL (TYP)
CYGNET BESS
SWAN BESS
OVERALL PROJECT SITE BOUNDARY
SECURITY FENCE (TYP)
ACCESS DRIVE
N. 30th STREET
Saginaw Dr
Bailey St
E. MICHIGAN AVENUE
96
N. 30th STREET
Google Earth
Image © 2025 Airbus
1000 ft
N
396

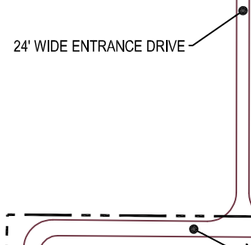


LEGEND

- MINERAL OIL HAZARD
- ELECTRICAL HAZARD
- LIMITS OF FUTURE AUGMENTATION
- SECURITY FENCE
- NOISE WALL
- PROPERTY LINE
- SWM FACILITY LIMITS



TYPICAL BESS EQUIPMENT ARRANGEMENT DETAIL
NTS



E. MICHIGAN AVENUE

N. 30th STREET

JENSEN HUGHES
10 Wacker Drive
Suite 1300
Chicago, IL 60606
O: 312-869-8500
www.jensenhughes.com

NO.	REVISION	DATE

NORTH ARROW

NORTH

SEAL

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PROJECT

SWAN BESS & CYGNET BESS FACILITY

ADDRESS
7600 EAST MAIN STREET
KALAMAZOO, MI 49048

PROJECT NO 1MDT25005

DATE APRIL 2026

DESIGN	DRAWN BY	CHECKED BY
N/A	BMC	AJW

SCALE
NOT TO SCALE

TITLE
OVERALL SITE PLAN AND EQUIPMENT ARRANGEMENT PLAN

NUMBER

SHEET 1 of 1

Section 3 –Battery System Precautions / Hazards

NO ACCESS SHOULD BE MADE INTO A BATTERY ENCLOSURE OR SURROUNDING AREA WITHOUT CIP AUTHORIZATION AND VERIFICATION THAT CONDITIONS ARE SAFE FOR ACCESS.

- ***Lithium-Ion Battery Energy Storage System (BESS)***

Energized lithium-ion batteries (lithium iron phosphate cell chemistry) are located within the JF2 BESS enclosures. Batteries present an electrical, thermal, and corrosive hazard, and are not de-energized when the unit is disconnected from the generating station or power grid. The BESS enclosures are constantly monitored and are designed to shut down automatically when there is a fault or if they are operating outside normal parameters. They can also be shut down remotely by the BESS 24/7 emergency support, so firefighters are not responsible for activating a manual "kill switch" on a unit during a potentially dangerous event. However, after shutdown, it is extremely unlikely that the system will be fully de-energized during an event and should be assumed to contain hazardous energy at all times. No access should be made into the BESS enclosure.

- ***Lithium-Ion Batteries - Thermal Runaway***

Thermal runaway is the uncontrolled build-up of heat within a lithium-ion (Li-Ion) battery. Battery damage, exposure to heat, electrical malfunction or defects can cause a breakdown in the separator barrier between the cathode and anode, causing uninhibited energy transfer through the electrolyte. This causes heat generation which reduces electrolyte resistance, allowing the energy transfer rate to further increase, creating a self-sustaining reaction. Thermal runaway results in a condition that requires copious amounts of water to extinguish. The approach at this facility, however, will be to allow the fire to self-terminate. Even after appearing to be extinguished, batteries may still be undergoing thermal runaway and reignite, so continued monitoring is required. Smoke from thermal runaway is extremely toxic and should be avoided. Hydrogen off-gassing will also occur (see "Deflagration/Explosion Potential").

- ***Potential Toxic Gas Emission***

When Li-Ion batteries experience a thermal runaway failure, they can rupture and produce a toxic gas mixture that can include hydrogen fluoride and carbon monoxide. The likelihood of a toxic gas mixture being produced is actually greater if the batteries do not catch fire. Exercise caution and always wear SCBA when operating near a battery enclosure that has experienced a failure.

- ***Deflagration/Explosion Potential***

Hydrogen and other flammable gases are released from Li-Ion batteries during thermal runaway. These gases may build up within the BESS enclosure. Without proper ventilation, this creates an explosive atmosphere. Introduction of oxygen into the container while an explosive atmosphere is present can lead to a deflagration or explosion.

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The M-LINK battery enclosures have built in vents/dampers to remove flammable gases and smoke. However, it should always be assumed that an explosive mixture could be present until proven otherwise.

- ***BESS Enclosures – Liquid Cooling System***

The batteries within each enclosure are cooled using a liquid heat exchanger system that utilizes a 50% ethylene glycol / 50% water mixture. Ethylene glycol is a combustible liquid that, if released from the cooling system, could exacerbate and/or spread any fire conditions. Additionally, if the liquid is released from the system and comes into contact with energized equipment, additional arcing or thermal runaway events could occur. The cooling system also contains R513A refrigerant. Leaked refrigerant does not pose fire spread or arcing hazards.

- ***Electrical Hazard***

Most electrical components are contained within the BESS and PCS enclosures and transformers. However, some connections and circuits may not be protected and could expose firefighters to an electrical hazard.

CONSIDER all equipment ENERGIZED until CONFIRMED DE-ENERGIZED, GROUNDED and safe by QUALIFIED CIP personnel.

The batteries in a BESS are NEVER FULLY DISCHARGED. Even when a BESS is shut down, the batteries still contain stored energy corresponding to the state of charge at the time it was shut down. Consult with CIP personnel before applying water on BESS equipment.

Use of Firefighting Water on Energized Electrical Equipment Could Be Hazardous to Firefighters. Exercise caution when putting handlines in service.

DO NOT USE metal ladders or other metal firefighting tools (pike poles, axes, halligans, etc.) around high voltage equipment as they can be CONDUCTIVE.

- ***Oil-Filled Transformers***

The BESS yard includes oil-filled auxiliary transformers containing XXX gallons of insulating oil. The PCS enclosures include MV transformers containing XXX gallons of insulating oil each. This presents a significant fire load at the facility. Once de-energized, fire in a transformer container may be considered an enclosed container fire. The process of de-energizing the transformer must be completed in its entirety before commencing fireground operations. In order to de-energize, power must be isolated on both the high side and the low side of the transformer. Isolate station DC power used in monitoring the unit.

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- ***Adjacent Exposures / Hazards***

The primary exposure concerns for a BESS enclosure fire are the adjacent enclosures and other equipment within the BESS yard itself. Beyond this, the nearest vulnerable equipment to the battery enclosures in each BESS yard is in its adjacent, dedicated substation. For both the Cygnet BESS and Swan BESS, the nearest substation equipment is approximately 170’ away.

The equipment arrangement in the BESS yards consists of groups of four JF2 DC LINK 5.1 enclosure. A back-to-back separation of 3’ and a side-to-side separation of 10’ is provided between the enclosures within their groups. The front-to-front separation within and between groups of enclosures is 10’. The end-to-end separation between groups of enclosures is 15’.

The separation between the PCS enclosures and the battery enclosures is 10’. The auxiliary equipment pads within the BESS yards are separated from the battery enclosures by 10.5’. These pads support oil-filled transformers and switchboard devices.

The distance from the nearest battery enclosures to the operation and maintenance buildings in each yard is ≈80’. The distance from the nearest battery enclosures to the Cygnet water tank is ≈155’. The distance from the nearest battery enclosures to the Swan water tank is ≈190’.

The nearest offsite exposures are homes. The nearest structure to a battery enclosure is more than 400’ to the north.

Refer to Section 2 for site location and yard equipment layouts.

DRAFT

Section 4 – Fire Response Guidelines and Precautions

NOTE: This Emergency Response Guide addresses the emergency scenarios most reasonably foreseeable for a utility-scale battery energy storage system, including but not limited to thermal runaway, fire, hazardous material release, and unauthorized access. While this plan cannot anticipate every conceivable emergency, the response protocols and coordination procedures outlined herein are designed to be adaptable to unanticipated events.

NOTE: If a potential security issue is encountered (e.g., damaged/vandalized security fencing/gate, a person or persons engaging in illegal, harmful or terroristic behavior), etc., law enforcement shall be contacted immediately (i.e., Call 911). No action against bad actors shall be taken by the fire department.

Section 4.1 – Lithium-Ion BESS Specific Guidelines and Precautions

ONLY PROPERLY EQUIPPED INDIVIDUALS TRAINED IN LI-ION BATTERY FIRES SHOULD ENGAGE IN A BESS FIRE EVENT.

Lithium-ion battery fires are extremely difficult to extinguish due to the self-sustaining reaction and large quantity of energy. Additionally, Li-Ion battery failures can produce flammable and/or toxic gases and can be extremely volatile and unpredictable. Due to the nature of their failure and inherent energy, response to a Li-Ion battery event should be **DEFENSIVE** in nature. No manual suppression should be used on a burning battery enclosure. The approach is to allow the fire self-terminate.

The preferred response to a battery enclosure on fire is to contain and protect exposures. That is to say, suppression efforts should be focused on ensuring that other units do not fail. A fire condition in a BESS enclosure can actually be beneficial, as the fire consumes many of the toxic gases that can be produced by a thermal runaway event.

The JF2 DC LINK 5.1 BESS is comprised of three M-LINK enclosures and an E-Panel. The M-LINK enclosures house the batteries. The E-Panel contains the FACP, battery system control, communications, dry-type transformers and other power components and electronics.

The E-Panel is attached to the M-LINK enclosures but is isolated. A fire in the E-Panel should remain isolated from the M-LINK battery enclosures.

A personnel standoff distance of 300 feet is advised. Some monitoring activities or protection of exposures may require personnel to operate within this “warm zone.” The minimum recommended standoff distance for such activities is 30 feet. Do not operate within the standoff distance, or downwind from the enclosure, without the use of SCBA, as toxic gases may be present in the gas plume.

Each M-LINK enclosure is equipped with two roof exhaust vents and two door intake dampers with an intake fan. The vents/dampers open automatically and intake fan operates upon detection of smoke or

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hydrogen and evacuates heat and toxic/flammable gases from the enclosure. Manual ventilation (opening the enclosure front door) should not be needed and is unadvised.

If the automatic ventilation fails and BESS data is available, monitor the temperature and flammable gas concentration within the enclosure. Manual gas monitoring can also be performed downwind and at a distance (such as at the fenceline) to determine if toxic gases are present and if evacuations or shelter in place orders are needed.

IN THE EVENT OF THE PRESENCE OF TXIC GASES, CALL THE COMMUNITY NOTIFICATION CONTACT IDENTIFIED IN SECTION 1 TO DISCUSS THE POSSIBILITY OF EVACUATION OR SHELTERING IN PLACE OF NEARBY RESIDENTS

In the event internal atmospheric conditions of the enclosure cannot be determined, no manual ventilation or access should be attempted.

The use of thermal imagers can be used to monitor the surface temperature of equipment adjacent to the failed unit. Coordinate with Operator and/or CIP/SME personnel to determine if water should be applied to the exposure units to prevent cascading failures. Any firefighting water applied to electrical equipment via handlines should be done with a minimum 30 degree fog pattern from a minimum of 30 feet away from the enclosure. Be aware of any standing water that may accumulate.

DO NOT OPEN AN ENCLOSURE UNTIL ELECTRICAL FAILURE EVENT IS VERIFIED BY QUALIFIED CIP/SME PERSONNEL TO BE COMPLETE AND THE ABOVE GUIDELINES HAVE BEEN CONSIDERED

If neither installed nor handheld gas monitoring of the enclosure is available, manual ventilation of the enclosure should NOT be performed.

Due to the volatile nature of Li-Ion batteries after failure, it is possible for the batteries to reignite, even after the event appears to be concluded. Batteries can continue to hold electricity (called “stranded energy”). Internal damage to the battery may result in a continued reaction even after the initial event concludes. Additionally, any mechanical agitation to the battery could result in a stopped reaction restarting.

Never assume that a battery enclosure is safe after suppression.

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Section 4.2 – Fire Response Guidelines

NOTE: These guidelines are meant to assist first responders in safely responding to a fire or thermal runaway incident involving a BESS Enclosure. These guidelines are not meant to supersede existing Standard Operating Procedures/Guidelines established by the first responders' organization.

1. When responding to a fire involving an JF2 DC LINK System Enclosure, **DO NOT** cut any perimeter gate locks, approach the enclosure or associated equipment, or force entry into the enclosure. **WAIT** outside the perimeter fence or at a safe distance (at least 300 feet) until CIP/SME personnel arrive on scene to provide assistance. If CIP/SME personnel are not present, **CALL** the 24/7 Emergency Contact number listed in Section 1 of this document or request that the Local 911 Center Fire Communications call CIP Emergency Number listed in Section 1].
2. Once CIP/SME personnel arrive(s), make contact and establish a continuous point of contact (POC) for the incident and establish a unified command with CIP POC. For your safety, while you are on the premises, qualified CIP/SME personnel **MUST** be present and **REMAIN** with the incident commander. The CIP/SME has access to the site's Energy Storage Management System (ESMS). Each BESS enclosure communicates with the ESMS for real-time monitoring of thermal, electrical, and environmental conditions. If in an abnormal condition or an alarm state, the ESMS automatically initiates shutdown of the affected unit and transmits system status and alarms to a 24/7 remote operations control center.
3. Firefighter **ACCOUNTABILITY** within the facility is the responsibility of the Fire Department. **USE** SCBA when entering smoke environment. The combustion gases given off may be toxic and/or corrosive.
4. CIP/SME will ensure that required equipment and circuits are **DE-ENERGIZED**. Fire Department personnel are not responsible for the shut down of BESS equipment. Shutdown is accommodated remotely and often automatically. The BESS SME 24/7 contact can initiate remote shutdown, with no one onsite.
   IN THE EVENT REMOTE SHUT DOWN FUNCTIONS ARE INOPERABLE, THE SME/OPERATOR CAN PERFORM A MANUAL SHUTDOWN AT THE FEEDER DISCONNECTS WITHIN THE SUBSTATION CONTROL HOUSE.
5. The BESS ventilation cannot be activated remotely. If not already active, coordinate with CIP/SME to consider manually activating the door intake dampers and roof exhaust vents via the electrical control panel. However, this is not recommended if the internal atmosphere is not known and extreme caution should be exercised if employing this option.
6. If available (and conditions warrant), utilize gas meters downwind from the failed unit to determine if significant quantities of toxic gases (such as Carbon Monoxide or Hydrogen Fluoride) are present. When performing gas samples, maintain as much distance as possible and never approach any of the enclosure doors head-on. Sampling at the fenceline will provide a good metric for the amount of gases escaping to the public. Based on gas sampling and wind direction, consideration should be given to shelter-in-place or evacuation orders for surrounding exposures. Call the Community Notification Contact listed in Section 1.

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7. If fire condition is present, monitor surface temperature of exposures using a thermal imaging camera, if available. Discuss whether water-based suppression should be used on the burning equipment. If there are no immediate exposures and no immediate danger to the public, letting the enclosure burn may be the best and safest approach. If the fire presents an immediate hazard to exposures or the public, connection to the water tank(s) and bringing handlines into the yard should be considered.
8. If water-based suppression is to be utilized to protect exposures, CIP/SME personnel will determine when equipment is electrically **SAFE** to fight a fire (especially in applying water on or near electrical equipment). **CAUTION -** adjacent electrical equipment not involved in the fire may still be energized.
9. Handlines should only be used on energized or potentially energized equipment in extreme situations. Only with proper training and approval by CIP/SME should firefighters consider using water on electrical equipment. Equipment and application factors affecting the safe use of water on potentially energized electrical components:

    - Proper nozzle and proper nozzle pressure
    - Proper patterns used (at least 30 degrees - never a straight or solid stream)
    - Proper distance from the component (at least 30 ft)

    Other factors that affect safety are:

    - Impact of overspray on energized electrical components
    - Water runoff or pooling that may become energized
    - Impact of water runoff and pool on other components in the area
    - Weather conditions; wind, rain and humidity

    Follow your fire department's SOPs and consult CIP/SME prior to using water on Class "B", Class "C" or Class "D" fires.

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Section 5 – Fire/Explosion Protection Systems

- ***Fire Alarm and Detection System(s)***

  Each M-LINK enclosure is provided with an automatic smoke detection system. One smoke detector and one hydrogen detector are located within each battery compartment. One smoke detector is located within the E-Panel. The detectors communicate to the fire alarm control panel (FACP) located in the E-Panel electrical enclosure. The FACP is monitored by the BESS Energy Storage Management System (ESMS) and remotely by CIP/SME.

  Activation of either detector within the M-LINK enclosure will initiate an alarm condition, activate horn & strobe notification, and shut down the HVAC system within the M-LINK enclosure.

  Activation of the E-Panel detector will initiate an alarm condition and activate horn & strobe notification.

- ***Explosion/Deflagration Prevention***

  Each M-LINK enclosure uses a combination of hydrogen detection and ventilation to prevent explosions/deflagrations within the enclosure.

  - ***Hydrogen Detection System***

    Each M-LINK battery enclosure is provided with a hydrogen detection system. One hydrogen detector is located with the smoke detector in the battery compartment and are monitored by the FACP. The hydrogen detectors will alarm at 0.4% hydrogen by volume.

  - ***Flammable Gas Ventilation System***

    The M-LINK battery enclosure is outfitted with a flammable gas ventilation system. Two roof exhaust vents are located on the enclosure roof and the intake dampers are provided on the front door. An intake fan is provided for the door openings. These vents/dampers may be capable of being operated remotely.

  - ***Explosion/Deflagration System Operation***
    - Activation of the smoke detector or the hydrogen detector within an M-LINK enclosure will initiate the system operation.
    - Once the alarm is received, FACP in the E-Panel controls the opening of the ventilation openings and intake fan.

- ***Water Supply***

  - ***Fire Water Tanks***

    See Section 2 for location of the tanks. The tanks are located outside the fence, within 100' of the primary gate to each BESS yard. There are no alternative water sources identified.

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Section 6 – Site Photos

[***These will be actual photos of installed equipment at the facility***]

Photo 1

JF2 DC Link 5.1 BESS Enclosure

The Cygnet and Swan BESS yards each have 240 battery enclosures installed in groups of four. Each contains 6 racks with 14 battery modules/rack. These batteries can never be fully discharged or de-energized.
See Section 4.1 for information regarding Thermal Runaway.
DO NOT attempt fire suppression until all power sources have been **DE-ENERGIZED** and **GROUNDED**.

Photo 2

JF2 DC Link BESS Enclosure Internal View

This is a front view of the enclosure with the panels removed.

This enclosure is an **ELECTROCUTION HAZARD** if not **DE-ENERGIZED** and **GROUNDED**.

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Photo 3

JF2 DC Link BESS Enclosure E-Panel

This is the panel located at the end of each BESS enclosure. It contains the FACP, battery system control, communications, dry-type transformers and other power components and electronics.

This enclosure is an **ELECTROCUTION HAZARD** if not **DE-ENERGIZED** and **GROUNDED**.

Photo 4

JF2 DC Link BESS Enclosure E-Panel

This is the panel located at the end of each BESS enclosure. It contains the FACP, battery system control, communications, dry-type transformers and other power components and electronics.

This enclosure is an **ELECTROCUTION HAZARD** if not **DE-ENERGIZED** and **GROUNDED**.

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Photo 5

Power Conversion System (PCS) Enclosure

The Cygnet and Swan BESS yards each have 60 PCS enclosures. The PCS is an inverter equipped with an MV transformer. The transformer contains XXX gallons of mineral oil (combustible liquid). They are set 35' apart and are in close proximity to other BESS yard equipment.

This enclosure is an **ELECTROCUTION HAZARD. DO NOT** attempt fire suppression until all power sources have been **DE-ENERGIZED** and **GROUNDED**. If oil ignites, follow your department procedures for a Class "B" fire.

Photo 6

Oil-Filled Auxiliary Transformer

The Cygnet and Swan BESS yards each have six auxiliary equipment pads. On each pad is an oil-filled transformer. The transformers contain XXX gallons of mineral oil (combustible liquid). They are in close proximity to other BESS equipment.

DO NOT attempt fire suppression until all power sources have been **DE-ENERGIZED** and **GROUNDED**. Follow your department procedures for a Class "B" fire.

Photo 7

Fire Water Supply Tank Connection

The fire water tank is located west of the BESS yard along the solar array access roadway.
The water supply connection is [TBD].

Photo 8

[Equipment TBD]

[Write-up]

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Section 7 –Safety Data Sheets (SDS)

SDS for Materials within the facility:

- **Lithium-Ion Batteries**
- **Mineral Oil (Auxiliary Transformers)**
- **Mineral Oil (PCS MV Transformers)**
- **Liquid Coolant**
- **Refrigerant**

[These documents will be provided upon finalization of the ERG]

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Lithium-Ion Battery

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Mineral Oil (Auxiliary Transformers)

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Mineral Oil (PCS MV Transformers)

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Liquid Coolant

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Refrigerant

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EXHIBIT E(B): HAZARD MITIGATION ANALYSIS

REPORT

CIP - BATTERY ENERGY STORAGE SYSTEM AT SWAN AND CYGNET SITE

Hazard Mitigation Analysis

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Project #: 1MDT25005-RPT-001
Revision #: Rev. 2
Date: April 8, 2026

JENSEN HUGHES

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Revision Record Summary

Revision	*Revision Summary*	*Date*
Rev. 0	Draft for Client Review	May 16, 2025
Rev. 1	Final Report Issued	June 30, 2025
Rev. 2	Revised Site Layout	April 08, 2026

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Acronyms and Abbreviations

Acronyms & Abbreviations	Full Name
AHJ	Authority Having Jurisdiction
BESS	Battery Energy Storage System
BMS	Battery Management System
ESMS	Energy Storage Management System
ESS	Energy Storage System
FACP	Fire Alarm Control Panel
HMA	Hazard Mitigation Analysis
HVAC	Heating, Ventilating, and Air Conditioning
LFL	Lower Flammability Limit
LSFT	Large-Scale Fire Test
PCS	Power Conversion System
PLC	Programmable Logic Controller
Wh	Watt-hours (unit of energy)
kWh	Kilowatt-hour (unit of energy)
MWh	Megawatt-hour (unit of energy)
MW	Megawatt (unit of power)

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Executive Summary

Jensen Hughes has completed a site-level Hazard Mitigation Analysis (HMA) for the two (2) 200 MW / 800 MWh Battery Energy Storage System (BESS) installations at the Energy Storage LLC and Cygnet Energy Storage LLC sites (Swan/Cygnet) on behalf of Copenhagen Infrastructure Partners (CiP). The Swan/Cygnet BESS project is located in Comstock Charter Township, Michigan, and utilizes the LG Energy Solution (LGES) JF2 DC LINK 5.1 BESS (JF2 BESS).

The HMA was conducted in accordance with Chapter 4 §4.4 of the 2023 edition of NFPA 855 [1] as adopted by reference by the State of Michigan through the Charter Township of Comstock Ordinance No. 558 [2]. It should be noted that Comstock Charter Township, Michigan is primarily governed by the National Fire Protection Association (NFPA 1) Uniform Fire Code, and Annexes and Index. NFPA 1, Chapter 52 Energy Systems, adopts the 2023 edition of NFPA 855 as minimum standards for fire safety regulations in the area.

This report presents as a site-level HMA. The Swan/Cygnet BESS installation and its associated components were analyzed based on project-specific information including site plans and product-related documentation provided by CiP. A separate product-level HMA for the JF2 BESS has been conducted by Jensen Hughes and is referenced in this report [19]. A complete HMA review requires both the site-level HMA and the product-level HMA.

Based on the evaluation of site-specific hazards, potential consequences, and existing safeguards, the HMA resulted in a set of safety recommendations, summarized in Section 4.1 of this report, to address site-specific considerations and support safe installation and operation the Swan/Cygnet BESS project.

This report was based solely upon and limited to the project information provided by CiP at the time of preparation as identified in Section 5.0 of this report. Any subsequent changes to the project design or layout may impact the conclusions of this report and should be evaluated accordingly.

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1.0 Introduction

This report provides a site-level HMA for the two (2) 200 MW / 800 MWh BESS installations for the Swan/Cygnet project in Comstock Charter Township, Michigan. The BESS installation utilizes the JF2 DC LINK 5.1 BESS (JF2 BESS).

The HMA was conducted in accordance with Chapter 4 §4.4 of the 2023 Edition of NFPA 855 [1]. The HMA evaluates the consequences of defined BESS failure modes, as per 2023 NFPA 855 Section 4.4.2 and identifies existing safeguards that either prevent or mitigate the consequences. Where existing safeguards do not adequately prevent or mitigate consequences, recommendations were made.

This report references the product-level HMA [19], and thus a complete description of the BESS product, its safety systems, related testing data, and evaluation of consequences of product-level failure modes, safeguards, and recommendations are not provided here. This report presents the analysis and recommendations pertaining to the site, which are not part of the product-level HMA.

The main sections of the report and a description of the content are provided in Table 1-1.

Table 1-1: Report Organization.

Section	Description
1.0 – Introduction	Presents the scope and outline of the report.
2.0 – Site and BESS Description	Provides an overview of the facility site and the BESS. Describes site-level components of the system and identifies applicable certifications and safety features.
3.0 – Hazard Mitigation Analysis	Evaluates the required failure modes per 2023 NFPA 855 Section 4.4.2, using a consequence-based approach, identifies the existing site-level safeguards against these failure modes, and provides recommendations for additional site-level safeguards based on the current design.
4.0 – Conclusions	Summarizes the HMA findings, presents site-level recommendations, and documents HMA approval considerations.
5.0 – References	Lists the references used in developing and completing the analysis.

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2.0 Site and BESS Description

2.1 GENERAL PROJECT INFORMATION

CiP is developing two (2) 200 MW / 800 MWh BESS installations for the Swan/Cygnet BESS project in Comstock CharterTownship, Michigan. The project site is located on the north side of N. 30th Street in Comstock Charter Township, as shown on the site plans. The site entrance is approximately 400 feet east of its intersection with E. Michigan Avenue. The address registered to the site is 65 N. 30th Street, Galesburg, Michigan 49053. The geographical coordinates for the site entrance are 42°17'19.89"N and 85°28'28.73"W.

The BESS installations utilizes LGES JF2 DC LINK 5.1 BESS (JF2 BESS) containerized enclosures, Model LINK-FDF2JR13 and LINK-FDF2LL13, each with a nominal energy capacity of 5.112 MWh. Each JF2 BESS container consists of three (3) battery enclosures (M-LINKs) and one (1) panel interface cabinet (E-PANEL). Each M-LINK contains two (2) battery racks connected in parallel in a 6.8 feet wide x 8.4 feet deep x 9 feet high enclosure. Each rack contains fourteen (14) battery modules wired in series and one (1) Battery Protection Unit (BPU) located at the bottom of the rack. Each battery module contains (120) cells arranged in a 30S4P configuration (4 parallel sets of 30 cells in series). The battery modules use 159 Ah Lithium Iron Phosphate (LFP) pouch cells. This configuration results in a total nominal energy capacity of 61.13 kWh per module, 855 kWh per rack, 1.7 MWh per M-LINK, and 5.112 MWh per BESS container.

The JF2 BESS models used for the Swan/Cygnet BESS project are identical in configuration; the only distinction is the E-PANEL location relative to the access doors, with the "TYPE A (LINK-FDF2JR13)" using a right-hand E-PANEL and the "TYPE C (LINK-FDF2LL13)" using a left-hand E-PANEL when viewed from the access side.

There are (392) BESS containers planned for the project at the Beginning of Life (BOL), with (88) additional BESS containers planned to be installed in future expansion projects. This results in a total of (480) BESS containers at End-of-Life (EOL).

Additionally, the project utilizes EPC Power M System, Model +M10, as the Power Conversion System (PCS) or inverter system to manage energy flow between the BESS containers and the electrical grid. There are (98) PCS skids planned for the project at BOL, with (22) additional PCS skids planned to be installed in future expansion projects. This results in a total of (120) PCS skids at EOL.

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General project information is provided Table 2-1.

Table 2-1: Project Information.

Item	Description
Project Name	Swan/Cygnet BESS
Project Owner / Developer	Swan/Cygnet Energy Storage, LLC
Site Address, City, and State **Township** **Geographical Coordinates**	65 N. 30th Street, Galesburg, Michigan 49053 Comstock Charter Township 42°17'19.89"N and 85°28'28.73"W
BESS Product	LG Energy Solution (LGES) JF2 DC LINK 5.1, Model LINK-FDF2JR13 and LINK-FDF2LL13
Battery Cell Chemistry / Form Factor	Lithium Iron Phosphate (LFP) Pouch Cells
PCS Product	EPC Power M System, Model +M10
Design Basis System Power	2 x 800 MWh (200 MW × 4 hours) at Point of Interconnection (POI)
BESS Product Count	BOL: 2 x 196 (5.112 MWh) = 392 containers EOL: 2 x 240 (5.112 MWh) = 480 containers
PCS Product Count	BOL: 2 x 49 Skids = 98 skids EOL: 2 x 60 Skids = 120 skids (Each skid supports 4 × 5.112 MWh containers)
Design Basis System Capacity	BOL: (196 × 5.112) = 1,001.952 MWh EOL: (240 × 5.112) = 1,226.88 MWh
BESS Function	Grid-scale energy storage
System Configuration	Outdoor non-walk-in style enclosures/containers

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2.2 SITE OVERVIEW AND NEARBY EXPOSURES

2.2.1 Location and Nearby Exposures

The Swan/Cygnet BESS project site is shown as outlined in Figure 2-1 [22]. The overall property, shared with the Hickory Ridge Golf Course and Driving Range, is approximately 142.2 acres and features a single primary access point located on the north side of N. 30th Street. The project site includes two (2) BESS yards which together occupy approximately 18.6 acres. The Swan BESS yard is approximately 9.6 acres, and the Cygnet BESS yard is approximately 9.0 acres.

In addition to the two (2) BESS yards, the project site also includes several laydown yards, two (2) electrical site substations (to be provided by others) which together occupy approximately 1.4 acres, operation and maintenance (O&M) areas, and a 3+ acre stormwater management area (pond). At full build-out, the substations will be equipped with main power transformers. The substations and BESS yards are primarily enclosed by 6-foot chain-link fencing with a barbed wire top guard. The portions of the yards that face east, north and west are provided with a 13-foot wooden plank sound wall. The BESS yards and access drives consist of stone paving.

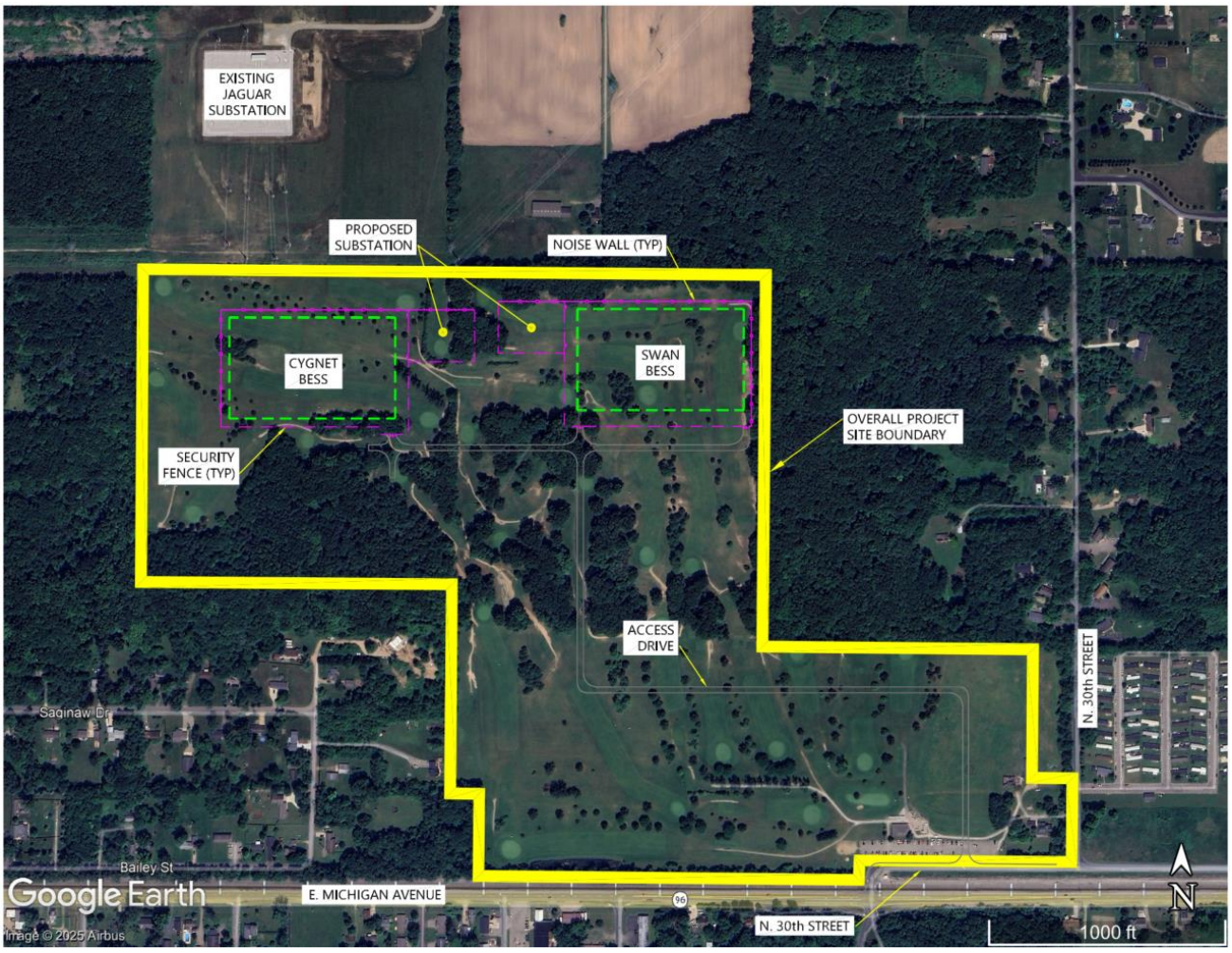

Figure 2-1: Google Earth View of Swan/Cygnet BESS Site.

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As shown in Figure 2-2 [23], the site is a currently a golf course with farm fields adjacent to the north. East Michagan Avenue borders the property to the south. A residential district is adjacent to the east (with a wooded buffer), consisting of single-family homes and a manufactured housing community. A residential district of single-family homes is also adjacent to the west. Aerial high voltage transmission lines run along the eastern portion of the north site boundary.

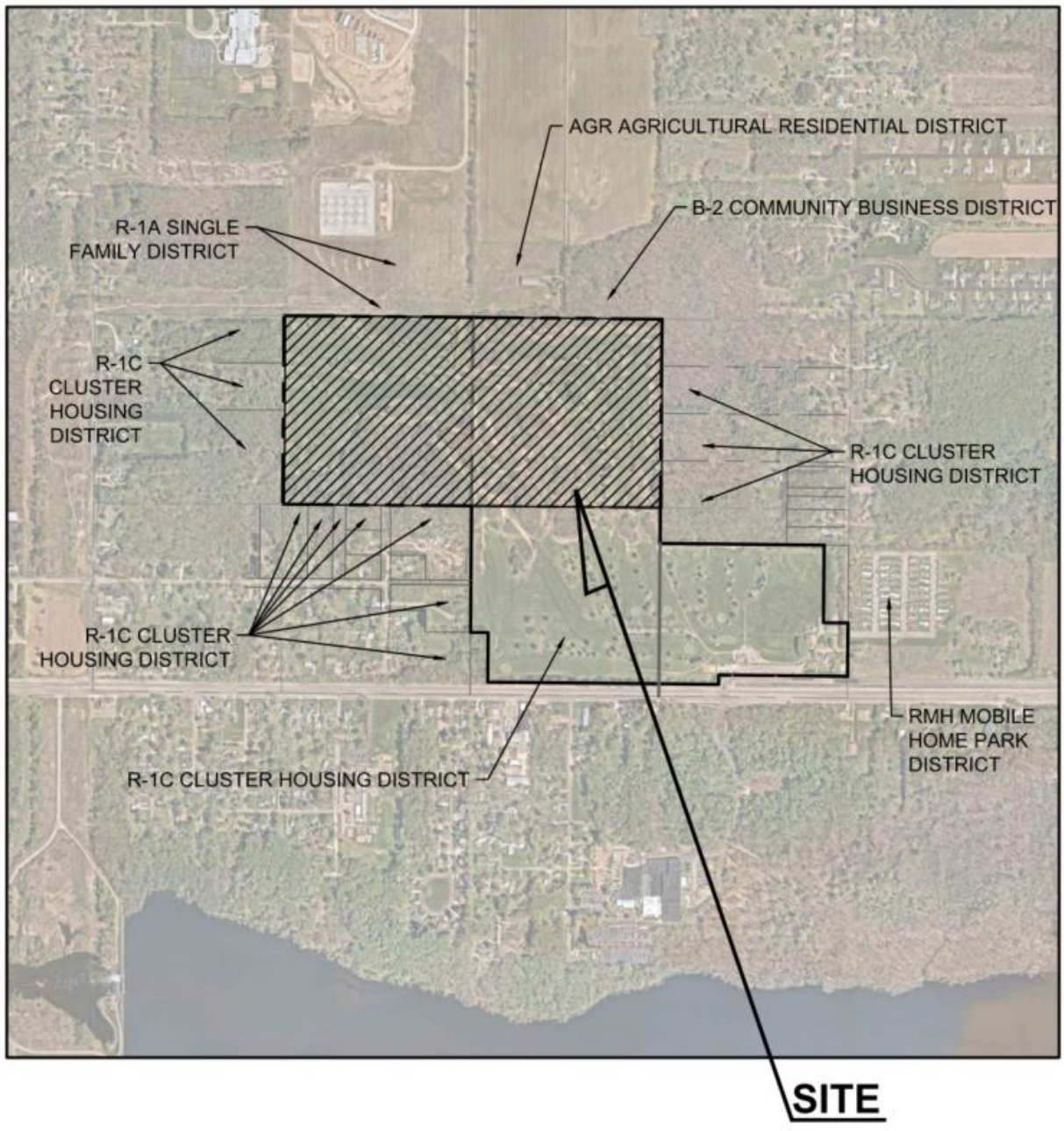

Figure 2-2: Vicinity Map of Swan/Cygnet BESS Site.

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Figure 2-3 [23] shows the overall site plan for the Swan/Cygnet BESS project.

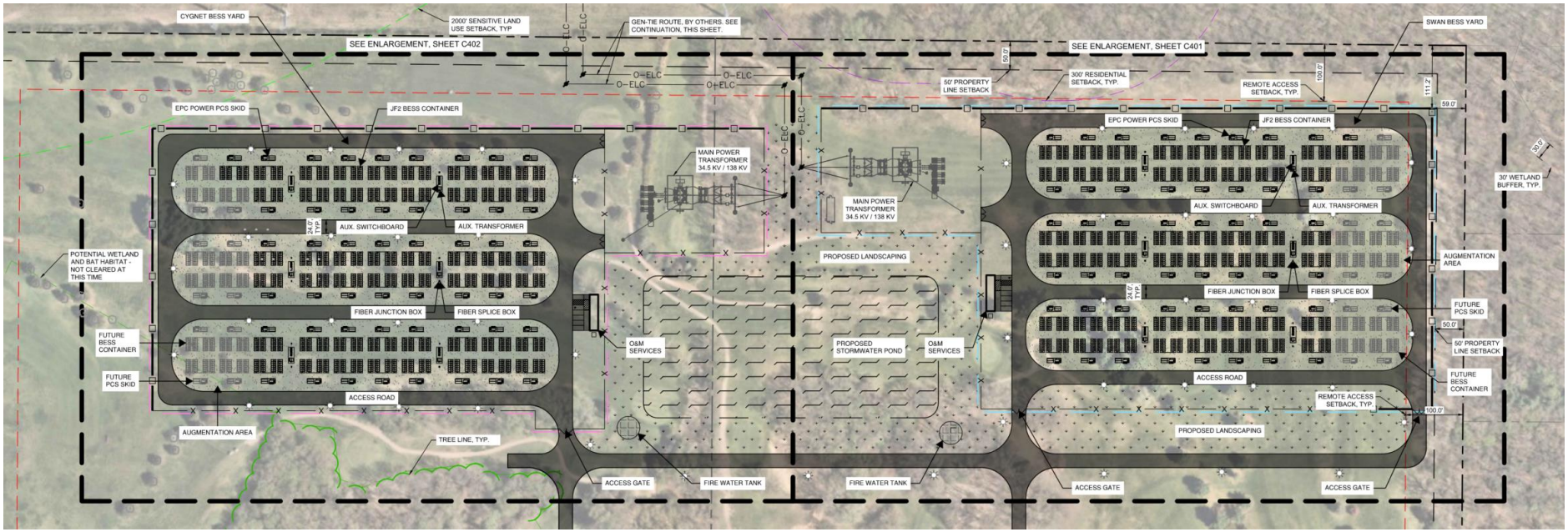

Figure 2-3: Overall Plan of Swan/Cygnet Site BESS.

The BESS yards include designated BESS installation pads and associated equipment, including BESS containers, PCS skids, and auxiliary electrical equipment, as depicted on the site plan. A "pad" refers to a defined BESS equipment area within the BESS yard, consisting of BESS containers, PCS skids and auxiliary equipment, and bounded by service roads and/or site fencing/sound wall.

A perimeter security fence and sound wall enclose each of the BESS yards as shown in Figure 2-3 [23]. Portions of the sound wall are off set between 9.4 feet and 10 feet from the internal perimeter roads.Around and between each BESS pad is a 24-foot-wide internal perimeter road, which provides circulation throughout the BESS yards and leads to access gate(s) approximately 30-foot-wide exiting onto a site access drive. The project site provides egress routes via the internal perimeter roads and the site access drive, leading to N. 30th Street.

The electrical site substations (to be provided by others) are proposed to be approximately 100 feet apart from each other in between the BESS yards. O&M services for each BESS yard are situated between the internal perimeter road and the perimeter security fence north of the access gates. A fire water tank is situated southeast of the Cygnet BESS yard and a second is situated southwest of the Swan BESS yard.

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2.2.2 BESS Installation Layout and Clearances

Figure 2-4 [23] shows a close-up layout of the Cygnet BESS yard.

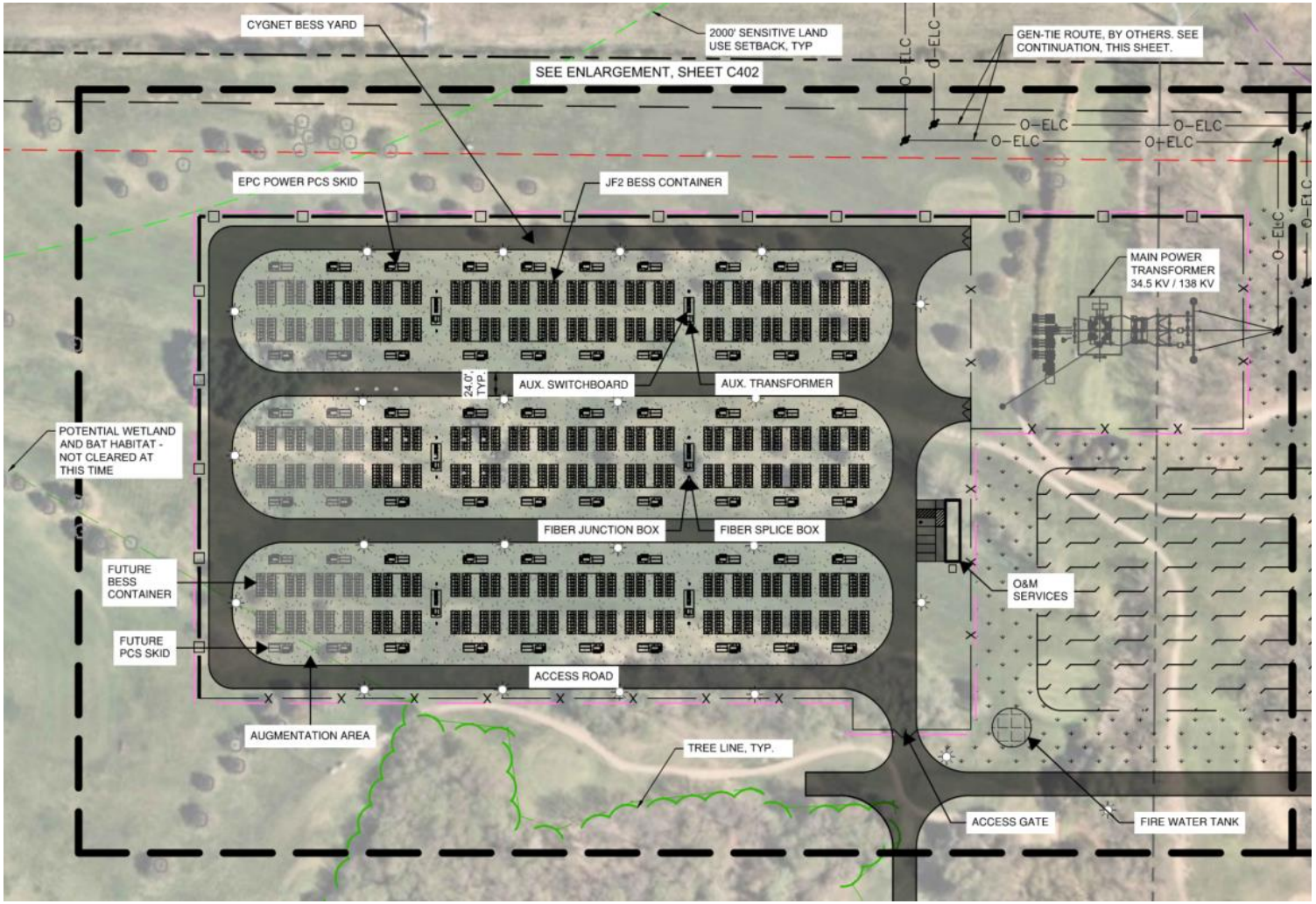

Figure 2-4: Close-up Layout of the Cygnet BESS Yard.

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As shown in Figure 2-4 [23], the Cygnet BESS yard is split between three (3) BESS installation pads.

Starting from north to south, the first pad includes (68) JF2 BESS containers, (17) PCS skids, (2) auxiliary transformers, (2) auxiliary switchboards, (1) fiber junction box, and (3) fiber splice boxes. There is space for an additional (12) BESS containers and (3) PCS skids planned for future expansion projects.

The second pad includes (64) JF2 BESS containers, (16) PCS skids, (2) auxiliary transformers, (2) auxiliary switchboards, (2) fiber junction boxes, and (4) fiber splice boxes. There is space for an additional (16) BESS containers and (4) PCS skids planned for future expansion projects.

The third pad includes (64) JF2 BESS containers, (16) PCS skids, (2) auxiliary transformers, (2) auxiliary switchboards, and (4) fiber splice boxes. There is space for an additional (16) BESS containers and (4) PCS skids planned for future expansion projects.

In total, there are (196) BESS containers planned at BOL, consisting of (98) containers of TYPE A and (98) containers of TYPE C, along with (49) PCS skids. In addition, (44) BESS containers, (22) "TYPE A (LINK-FDF2JR13)" and (22) "TYPE C (LINK-FDF2LL13)", along with (11) PCS skids are planned for future expansion projects, resulting in a total of (240) BESS containers and (60) PCS skids at EOL. All future BESS containers and PCS skids are shown in half-tone line type.

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Figure 2-5 [23] shows a close-up layout of the Swan BESS yard.

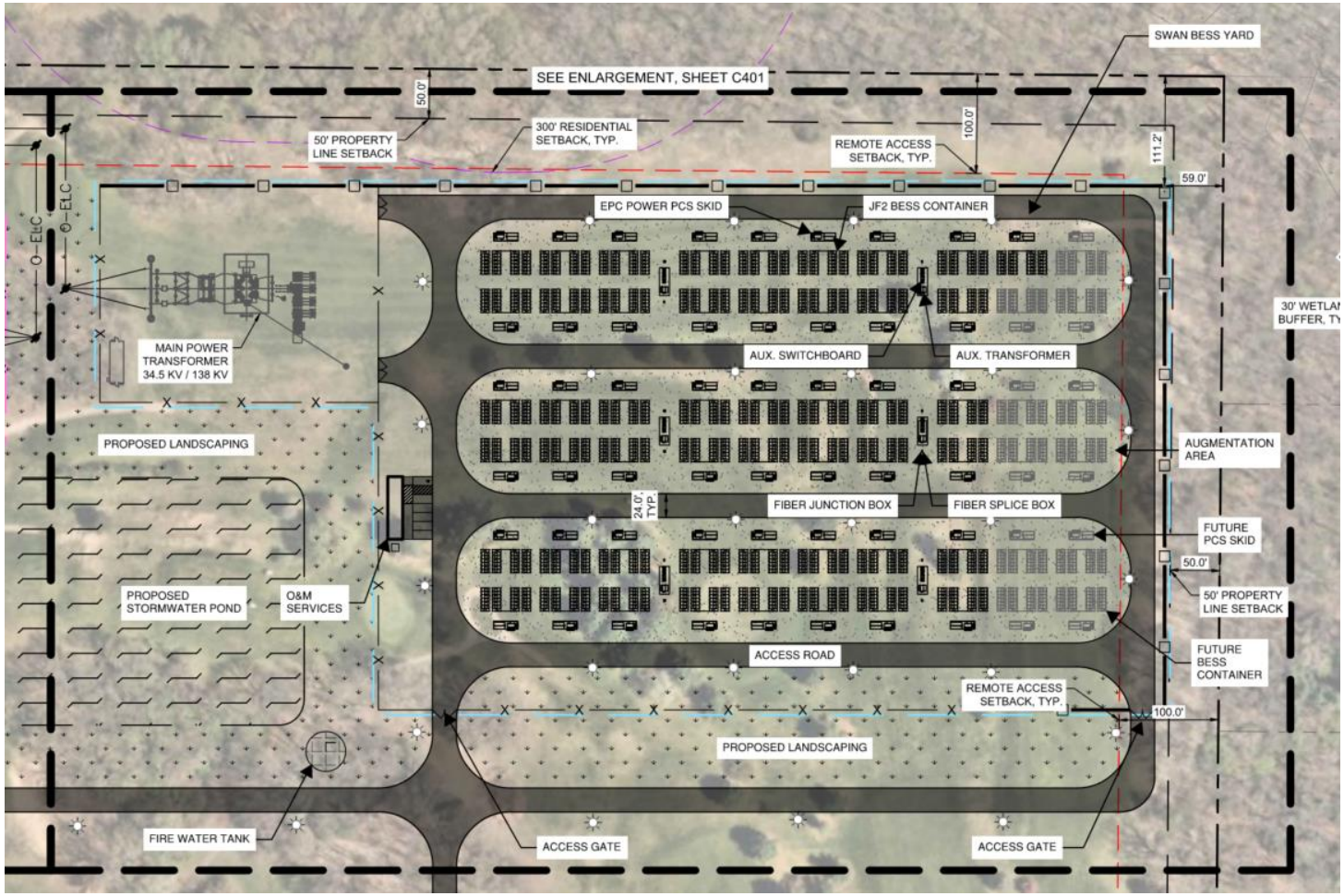

Figure 2-5: Close-up Layout of the Swan BESS Yard.

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As shown in Figure 2-5 [23], the Swan BESS yard is split between three (3) BESS installation pads.

Starting from north to south, the first pad includes (68) JF2 BESS containers, (17) PCS skids, (2) auxiliary transformers, (2) auxiliary switchboards, (4) fiber junction boxes, and (1) fiber splice box. There is space for an additional (12) BESS containers and (3) PCS skids planned for future expansion projects.

The second pad includes (64) JF2 BESS containers, (16) PCS skids, (2) auxiliary transformers, (2) auxiliary switchboards, (4) fiber junction boxes, and (2) fiber splice boxes. There is space for an additional (16) BESS containers and (4) PCS skids planned for future expansion projects.

The third pad includes (64) JF2 BESS containers, (16) PCS skids, (2) auxiliary transformers, (2) auxiliary switchboards, (3) fiber junction boxes, and (1) fiber splice box. There is space for an additional (16) BESS containers and (4) PCS skids planned for future expansion projects.

In total, there are (196) BESS containers planned at BOL, consisting of (98) containers of TYPE A and (98) containers of TYPE C, along with (49) PCS skids. In addition, (44) BESS containers, (22) "TYPE A (LINK-FDF2JR13)" and (22) "TYPE C (LINK-FDF2LL13)", along with (11) PCS skids are planned for future expansion projects, resulting in a total of (240) BESS containers and (60) PCS skids at EOL. All future BESS containers and PCS skids are shown in half-tone line type.

The nearest BESS container to a property line is in the southeast corner of the Swan BESS yard. It is located approximately 115 feet away. A minimum 100-foot property setback is provided on all sides of the BESS yards, as shown on the site plans.

The nearest on-site structures are the operation and maintenance (O&M) buildings, which are typically unoccupied and located approximately 80 feet from the nearest BESS containers. Beyond this, the unmanned substation control buildings are the next closest on-site structures. For both BESS yards the nearest substation equipment is approximately 170’ away. The distance from the nearest BESS container to the Cygnet fire water tank is approximately 155 feet and to the Swan fire water tank is approximately 190 feet.

The nearest off-site structures are residences which are more than 400 feet north of the nearest BESS container.

This site is classified as a "remote location" per 2023 NFPA 855 §9.3.2(1). This means that all BESS containers are located more than 100 feet away from buildings, lot lines that can be built upon, public ways, stored combustible materials, hazardous materials, high-piled stock, and other exposure hazards not associated with electrical grid infrastructure. For sites meeting the definition of a remote location, toxic gases released during a BESS failure event are not expected to present a significant off-site exposure hazard.

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Clearances between BESS containers, PCS skids, and auxiliary equipment for both BESS yards are shown in Figure 2-6 [23]. BESS containers are arranged in clusters of two (2) adjacent containers, with each group of four (4) containers connected to a dedicated PCS skid. Within each cluster, BESS containers are spaced 3 feet rear-to-rear. Clear aisle space of 10 feet, north-to-south, is provided between adjacent container clusters, separating BESS containers front-to-front. Clear aisle space of 15 feet, east-to-west, is provided between adjacent container groups, separating BESS containers non-E-PANEL side-to-non-E-PANEL side. Each group of BESS containers is separated from its corresponding PCS skid by 10 feet as measured from the E-PANEL side of the BESS container to the PCS skid. BESS containers are separated from the nearest auxiliary equipment pads by 10'-6". Thes pads support critical auxiliary systems, including transformers, Uninterruptible Power Supply (UPS) units, and protection panels.

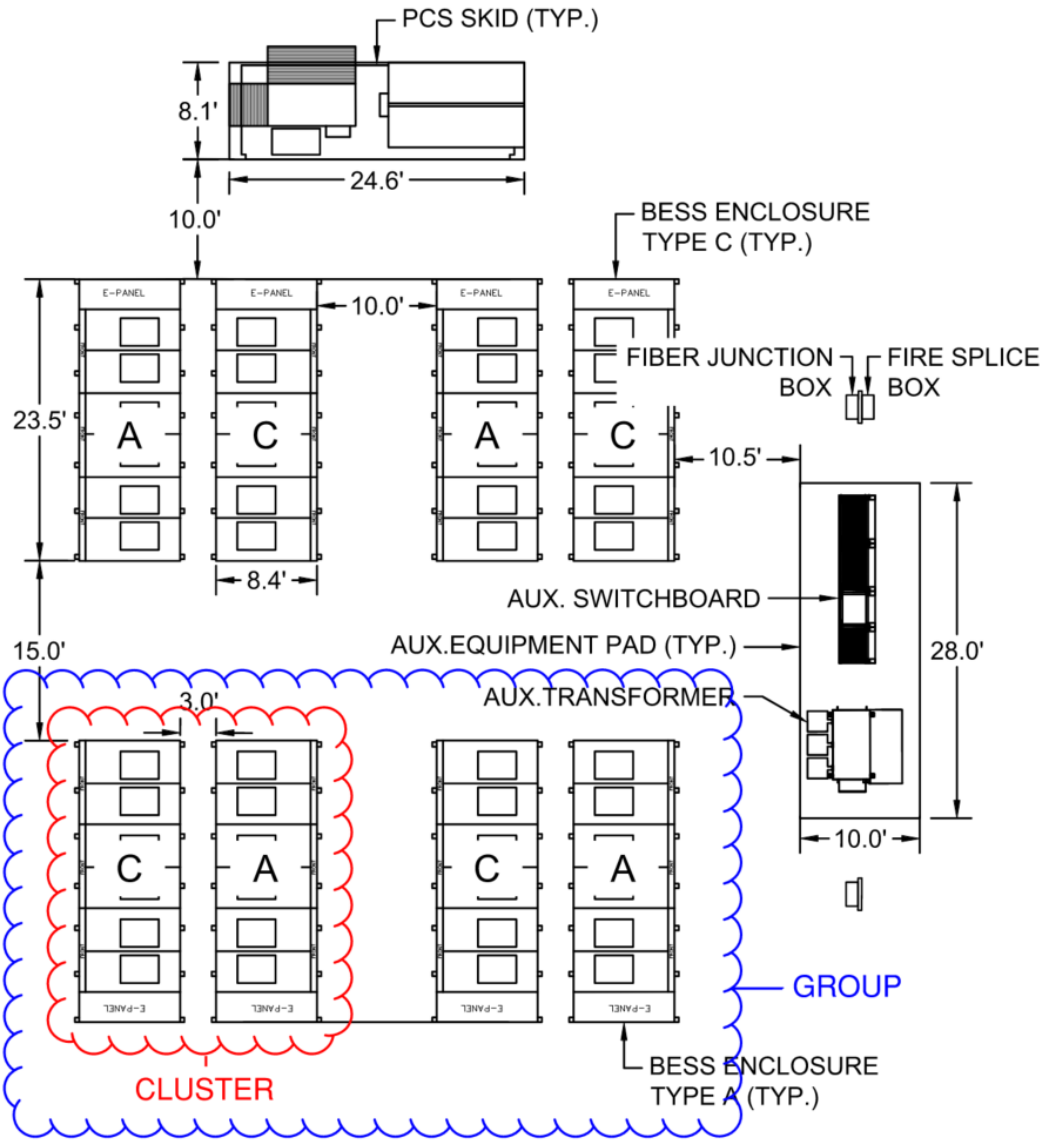

Figure 2-6: Equipment Layout and Spacing of Swan/Cygnet BESS.

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Figure 2-7 [10] shows the LGES-recommended minimum installation clearances around and between JF2 BESS containers. Key features of the layout include:

- 10-foot front-to-front clearance between BESS containers.
- 3-foot rear-to-rear clearance between opposing BESS containers.
- 3-foot side-to-side clearance between adjacent BESS containers.
- 10-foot clearance from the front of BESS containers to fences, walls, or barriers.
- 5-foot clearance from the sides of the BESS enclosures to fences, walls, or barriers.
- 5-foot clearance between adjacent E-PANELs.

The current installation layout and spacing meets or exceeds these manufacturer recommended clearances. Both the final construction site plans for this site and the as-built installation should be reviewed to ensure it complies with the recommendations listed above prior to commissioning.

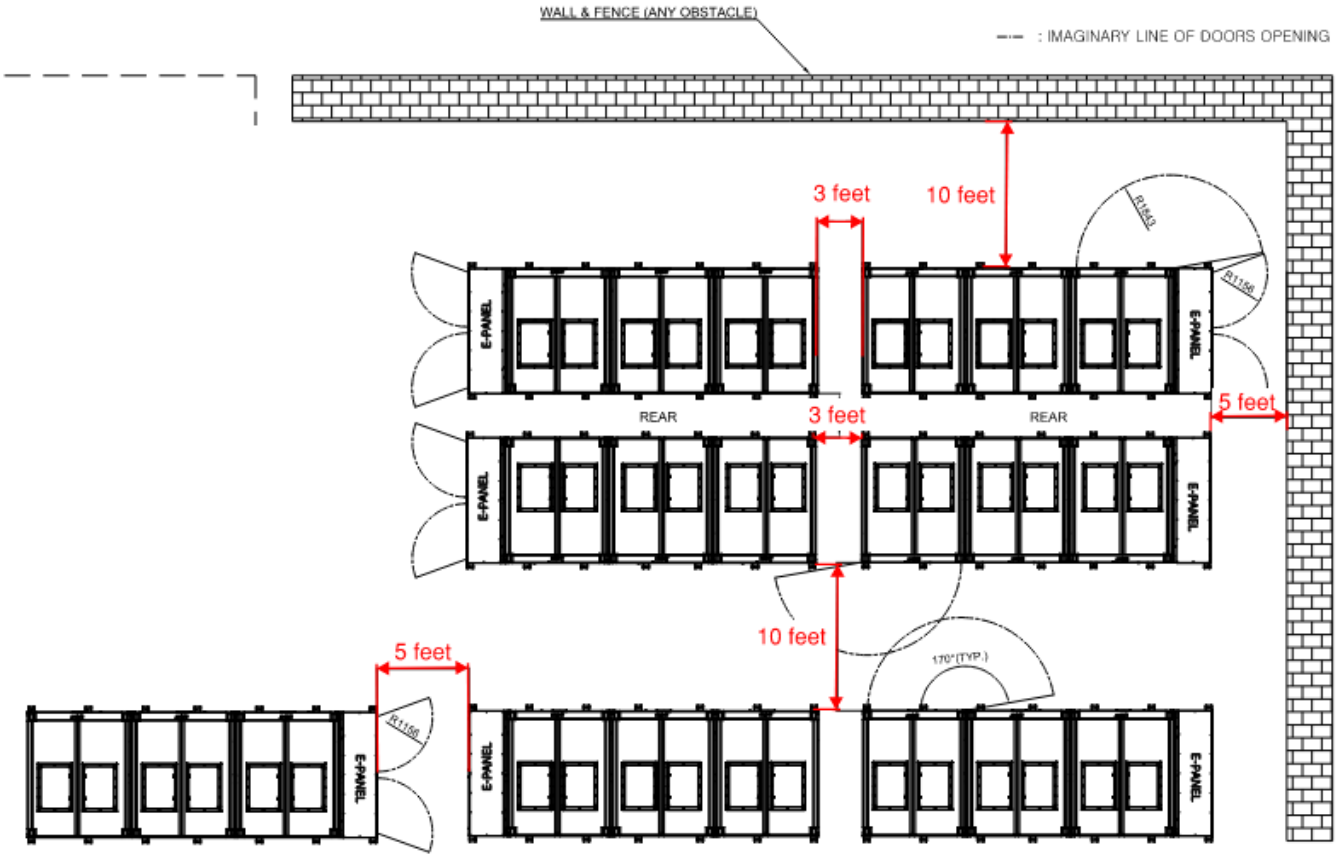

Figure 2-7: Manufacturer-Recommended BESS Equipment Layout and Spacing.

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2.2.3 Fire Department Access and Support

Fire department access roads are planned for the Swan/Cygnet BESS site. These roads must comply with the spatial criteria set forth in 2024 NFPA 1 §18.2, as follows:

- A minimum unobstructed width of not less than 20 feet, exclusive of shoulders. (§18.2.3.5.1.1)
- A minimum unobstructed vertical clearance of not less than 13 feet 6 inches. (§18.2.3.5.1.2)
- Dead-end access roads exceeding 150 feet in length shall be provided with an approved turnaround area suitable for fire apparatus operations. (§18.2.3.5.4)

As detailed in Section 2.2.1 of this report, the BESS yard layout includes a 24-foot-wide perimeter access road that runs around and between each BESS pad. Portions of the perimeter security fence and sound wall are off set at least 9.4 feet from the internal perimeter roads. This access road is designed to meet the minimum spatial criteria outlined above, and based on the current layout, it appears to align with fire department access requirements. Final compliance should be confirmed during detailed design to verify vertical clearance, all-weather surfacing, and the absence of dead-end segments exceeding 150 feet.

The Swan/Cygnet BESS project site is located approximately 5.0 miles, or a 9-minute drive, from the Eastwood Fire Station, located at 2703 East Main Street, Kalamazoo, Michigan 49048. Emergency responders will access the site via the designated access drive and interior perimeter roads.

The progression of thermal runaway may lead to fire. In the event of a fire involving the BESS, no automatic or manual suppression will be used. The approach used for this site is to allow the fire to self-terminate. The fire will burn out naturally under supervision, with cooling applied if necessary to protect surrounding exposures. To support this approach, a fire water tank will be provided outside each of the two BESS yards within 100 feet of the primary gate.

CiP has an Emergency Response Guide (ERG) [21], prepared by Jensen Hughes, which includes an outline of both the fire response and emergency response plans. The ERG, developed in coordination with local fire responders, contains a brief description of the BESS installation, including its hazards, safety features; the site plan and signage; a description of the detection and communication systems; a brief outline of the emergency response plan (ERP); a list of contacts in case of an emergency; and Safety Data Sheets (SDS) for the BESS and associated auxiliary equipment, including fluids. The contacts listed are the CiP Emergency Contact, the Operator Emergency Contact, the BESS Subject Matter Expert (SME), and the Community Notification Contact. The CiP Emergency Contact is the primary contact for notification in the event of an emergency, and BESS Subject Matter Expert (SME) assist with remote isolation of power to the site in the event of an emergency

For first responder emergency response, the general strategy for the local fire department handling a fire event at the site is to establish a safe perimeter to monitor the fire and let it self-terminate. The minimum recommended stand-off distance for such activities is 30 feet. A personnel stand-off distance of 300 feet is advised. During a fire, deflagration of flammable gases may occur. It should be noted that the JF2 BESS container is equipped with an explosion prevention system utilizing the combustible concentration reduction (CCR) method and designed in accordance with NFPA 69 [14].

A CiP site representative or BESS Subject Matter Expert (SME) will coordinate electrical isolation of the affected BESS container or grouping, inform the local fire department(s) of any known hazards, and provide Safety Data Sheets (SDS). A CiP site representative will direct the local fire department and deploy a site cleanup crew

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once the site is free of electrical hazards. At no point will a BESS container be occupied by personnel/first responders, as these containers are non-walk-in style enclosures. The standard emergency response guideline for first responders is to wear appropriate Personal Protective Equipment (PPE) , follow fire department's Standard Operating Procedures (SOP) and secure the perimeter, but not to approach or use water on any BESS container or open any BESS container doors. Only with proper training and approval by CiP should firefighters consider using water on electrical equipment.

2.3 BESS INSTALLATION DESCRIPTION

2.3.1 BESS Enclosure

The LGES JF2 DC LINK 5.1 BESS (JF2 BESS) container consists of three (3) battery enclosures (M-LINKs) and one (1) panel interface cabinet (E-PANEL). Each M-LINK contains two (2) battery racks connected in parallel in a 6.8 feet wide x 8.4 feet deep x 9 feet high enclosure. Each rack contains fourteen (14) battery modules wired in series and one (1) Battery Protection Unit (BPU) located at the bottom of the rack. Each battery module contains (120) cells arranged in a 30S4P configuration (4 parallel sets of 30 cells in series). The battery modules use 159 Ah Lithium Iron Phosphate (LFP) pouch cells. This configuration results in a total nominal energy capacity of 61.13 kWh per module, 855 kWh per rack, 1.7 MWh per M-LINK, and 5.112 MWh per BESS container.

Each M-LINK is provided with an explosion prevention system via combustible concentration reduction (CCR) method in NFPA 69 [1]. This CCR system is designed to exhaust combustible gas that is produced during a failure, maintaining the overall environment of the M-LINK below 25% of the LFL in accordance with NFPA 69 performance criteria. The CCR system includes two (2) door intake fans and two (2) roof exhaust vents that allow automated ventilation upon gas or smoke detection within the M-LINK [14].

Each M-LINK may be equipped with an optional open sprinkler head located at the top, near the rear center of the M-LINK, supplied via a dry pipe connection with water provided from outside with a fire department connection (FDC) located on-site; however, this feature will not be utilized at the Swan/Cygnet site, consistent with the exception in 2023 NFPA 855 §9.5.2.5 for outdoor installations in remote locations and subject to approval by the AHJ.

The E-PANEL serves as an interface for power and communication between the M-LINKs and PCS. It contains a disconnect means for the AC/DC distribution board, a Fire Alarm Control Panel (FACP) with a backup battery, distinct horns & strobes for gas and smoke detection in the M-LINKs.

A multi-level Battery Management System (BMS) is provided in each JF2 BESS container to monitor battery operation, track system components, and detect abnormal operating conditions. The architecture includes Pack BMS (PBMS) and Rack BMS (RBMS). RBMS collects data from all PBMS within its rack. In abnormal conditions, the RBMS issues the command to isolate the battery racks and disconnect the BESS.

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Figure 2-8 [15] shows a rendering of the BESS container. Detailed descriptions of the BESS components and its safety systems are provided in the product-level HMA [19].

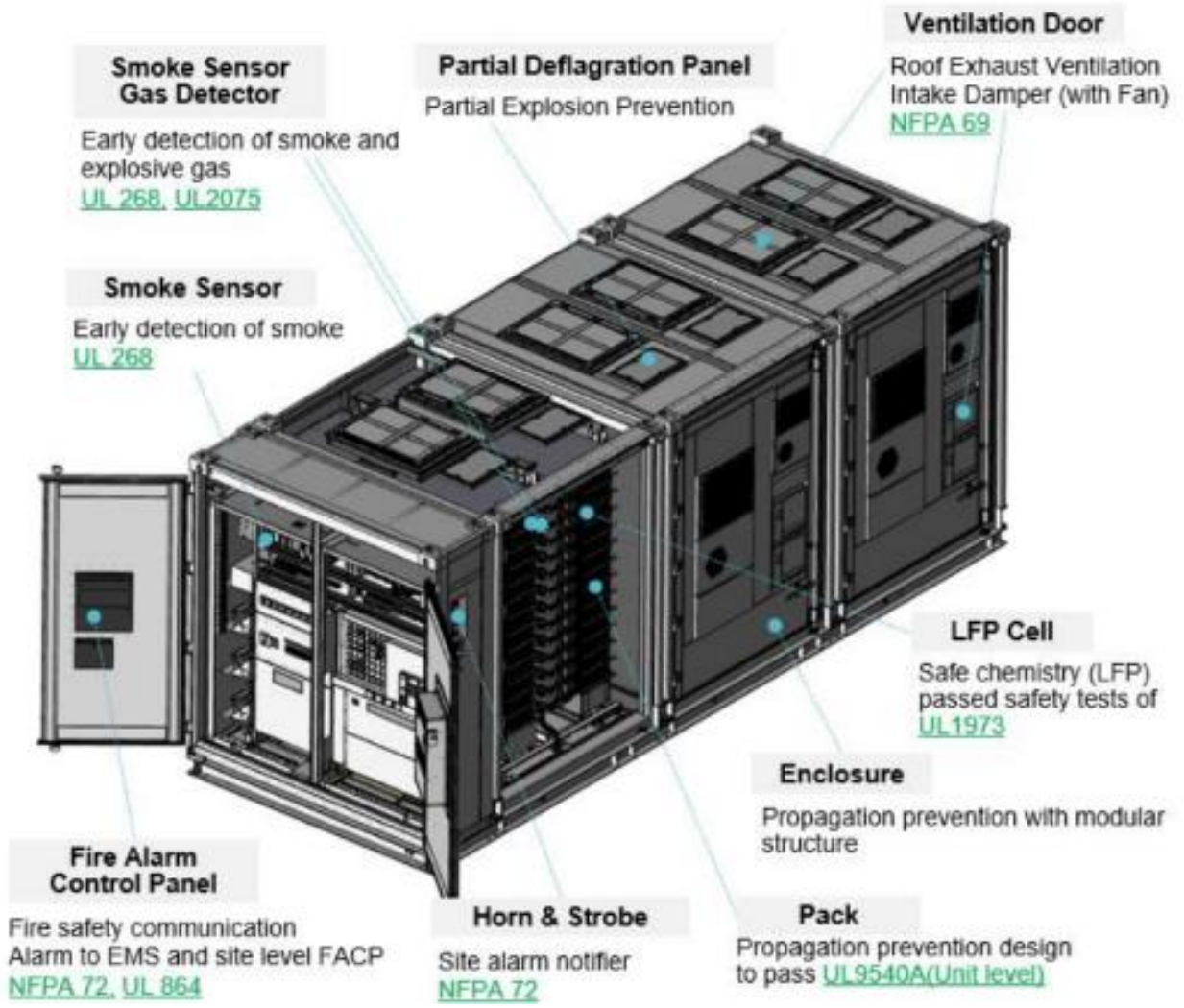

Figure 2-8: Rendering of the LGES JF2 DC 5.1 LINK BESS Product.

Each M-LINK is equipped with integrated smoke and gas detectors, which are continuously monitored by the site's Energy Storage Management System (ESMS). The Rack-level Battery Management System (RBMS) communicates with the ESMS via Modbus TCP/IP, allowing for real-time monitoring of thermal, electrical, and environmental conditions. If an abnormal condition or alarm state is detected within a BESS container, the ESMS automatically initiates shutdown of the affected unit. In addition, the ESMS transmits system status and alarms to a 24/7 remote operations control center, which qualifies as a proprietary supervising station. The ESMS is also capable of communicating with the inverters via Modbus to manage system-level operation, including lineup-level control (e.g., determining which components are discharging to the grid or load).

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Table 2-2 summarizes key information on the BESS container used for the Swan/Cygnet BESS.

Table 2-2: Power Conversion System Information

Parameter	Description
Product	LG Energy Solution (LGES) JF2 DC LINK 5.1
Function	Containerized lithium-ion BESS consisting of three (3) M-LINK battery enclosures and one (1) E-PANEL interface cabinet. Each M-LINK contains two (2) battery racks connected in parallel, with fourteen (14) battery modules per rack. The container stores electrical energy and delivers DC power to the PCS for conversion and export to the grid.
Electrical Ratings	5.112 MWh nominal energy capacity per BESS container (1.7 MWh per M-LINK; 855 kWh per rack)
Support of Safe Operation	Integrated BMS, hydrogen gas detection, smoke detection, combustible concentration reduction (CCR) ventilation system, HVAC thermal management system, and communication with the site ESMS/PLC.
UL Listing	UL 9540 [5] (Certification [13])
Emergency Function	Upon detection of abnormal conditions (e.g., smoke, gas detection, or BMS fault), alarms are transmitted to the site ESMS/PLC and supervising station, and the affected battery racks or containers can be electrically isolated or shut down.
Known Hazards During Normal Operations	Electrical shock

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2.3.2 Energy Storage Management System (ESMS)/Programmable Logic Controller (PLC)

Table 2-3 summarizes key information on the site ESMS/PLC used for the Swan/Cygnet site.

Table 2-3: Energy Storage Management System (ESMS)/Programmable Logic Controller (PLC) Information

Parameter	Description
Product	TBD
Function	Executes all control functions for the project site, executes site-level protection mechanisms, provides third-party supervisory, control, and data acquisition (SCADA) interfaces, and performs local data storage.
Emergency Function	Real-time monitoring of overcurrent, overvoltage, temperature, Fire Alarm Control Panel (FACP) trouble, faults, etc. Transmitting signals and alarms to supervising station. Shutdown of any BESS container if an abnormal condition is detected.
Certifications[2]	TBD
Known Hazards During Normal Operations	Electrical shock

[2] Certifications for the listed standards were not provided to Jensen Hughes for review, as an ESMS/PLC model is not currently selected.

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2.3.3 Power Conversion System (PCS)

Table 2-4 summarizes key information on the Power Conversion System (PCS) (or inverter) used for the Swan/Cygnet BESS.

Table 2-4: Power Conversion System (PCS) / Inverter Information

Parameter	*Description*
Product	EPC Power M System, Model +M10
Function	Contains inverters that convert DC and AC power between the battery and grid sides, respectively. Low-voltage generated by the inverters is transformed by a medium-voltage transformer to a higher-voltage level and fed into the power grid.
UL Listing	UL 1741[3]
Additional Listings and Compliance	TBD
Support of Safe Operation	Medium-voltage AC switchgear (configurable) AC and DC circuit breakers or disconnects AC and DC fuses and overvoltage protection Ground-fault detection via isolation monitoring device NEMA 3R outdoor-rated enclosure Air-cooled thermal management system
Emergency Function	Insulation monitoring device alarms or trips the system when a ground-fault or insulation fault is detected. DC switch-disconnect can be manually or electronically activated to disconnect the DC line from the inverter. Current interrupt devices, breakers, fuses, or other passive surge-arresting elements that open the circuit in the case of failure.
Known Hazards During Normal Operations	Electrical shock

[3] Certifications for the listed standards were not provided to Jensen Hughes for review.

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2.3.4 Signage and Warning Labels

Approved signage to alert site personnel, emergency responders, and the public of hazards associated with the ESS are required by 2023 NFPA 855 §4.7.4 to be placed in approved locations near entrance gates to BESS areas and on doors of BESS containers. The signs and warning labels alert to the presence of a BESS, electric shock hazards, fire and explosion hazards, and provide warnings against trespassing and other hazard information for anyone who may approach the BESS site.

The signage on entrance gates to BESS areas and doors of BESS containers should comply with 2023 NFPA 855 §4.7.4.2, which requires compliance with ANSI Z535 [9], and the following information, on the sign/label:

1. "Energy Storage System" with the symbol of a lightning bolt in a triangle.
2. The identification of the type of technology associated with the BESS (i.e. lithium-ion batteries).
3. Special hazards associated as identified in 2023 NFPA 855 Chapter 9, as applicable:
    a. Fire hazards (i.e. fire due to thermal runaway or other abnormal conditions).
    b. Explosion hazards (i.e. flammable gases and potential for deflagration under abnormal conditions).
    c. Chemical hazards (i.e. hazardous vapors, gases, or particulates during abnormal conditions).
    d. Electrical hazards (i.e. electrical shock, arc flash, and exposure to energized components).
    e. Stranded or stored energy hazards (i.e. presence of stored electrical energy within the system, including damaged or partially discharged batteries).
    f. Physical Hazards (i.e. potential for burns, overpressurization, or exposure to hot or moving components under abnormal conditions).
4. Type of suppression system installed in the area of the BESS (none if not installed).
5. Emergency contact information.

In addition, 2023 NFPA 855 §4.7.4.3 requires installing a permanent plaque or directory, denoting the location of the disconnecting means for all BESS on or in the premises. This plaque or directory should be located at each service equipment location and at the location(s) of the system disconnect(s) for all BESS capable of being interconnected.

Preliminary signage layouts are available for the Swan/Cygnet BESS site [23]. It is recommended to develop an overall signage plan for the site that shows the locations of standard signage on entrance gates, perimeter fences, and any BESS container doors.

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2.3.4.1 Entrance Gate Signage

Figure 2-9 [23] shows the signage as it should be mounted on entrance gates in accordance with 2023 NFPA 855 §4.7.4.2. The proposed signage meets all requirements of the code.

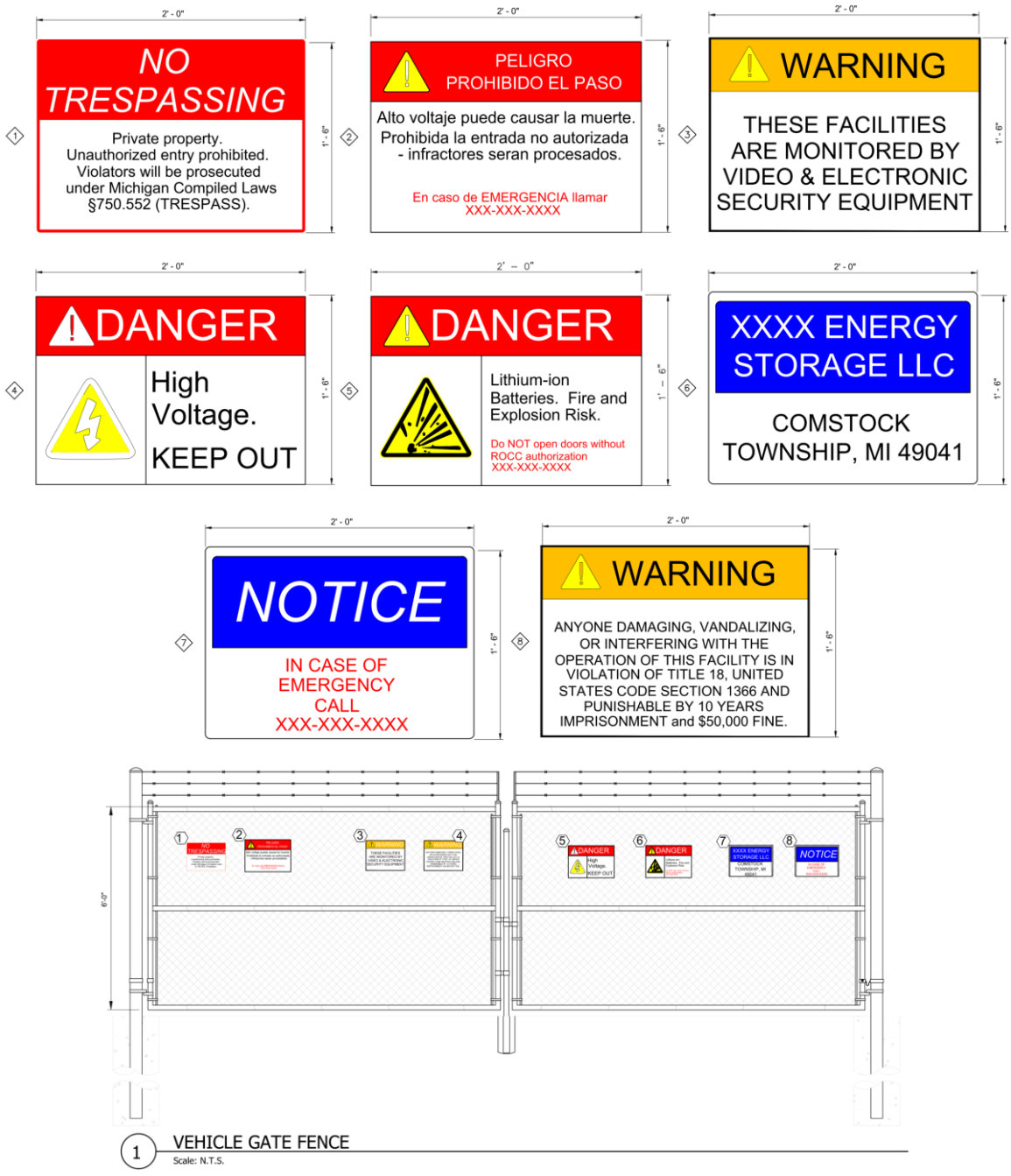

Figure 2-9: Signage Details and Layout on Entrance Gates.

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2.3.4.2 Perimeter Fence Signage

Figure 2-10 [23] shows the signage as it is proposed to be mounted on the perimeter fence sections, although not explicitly addressed by 2023 NFPA 855.

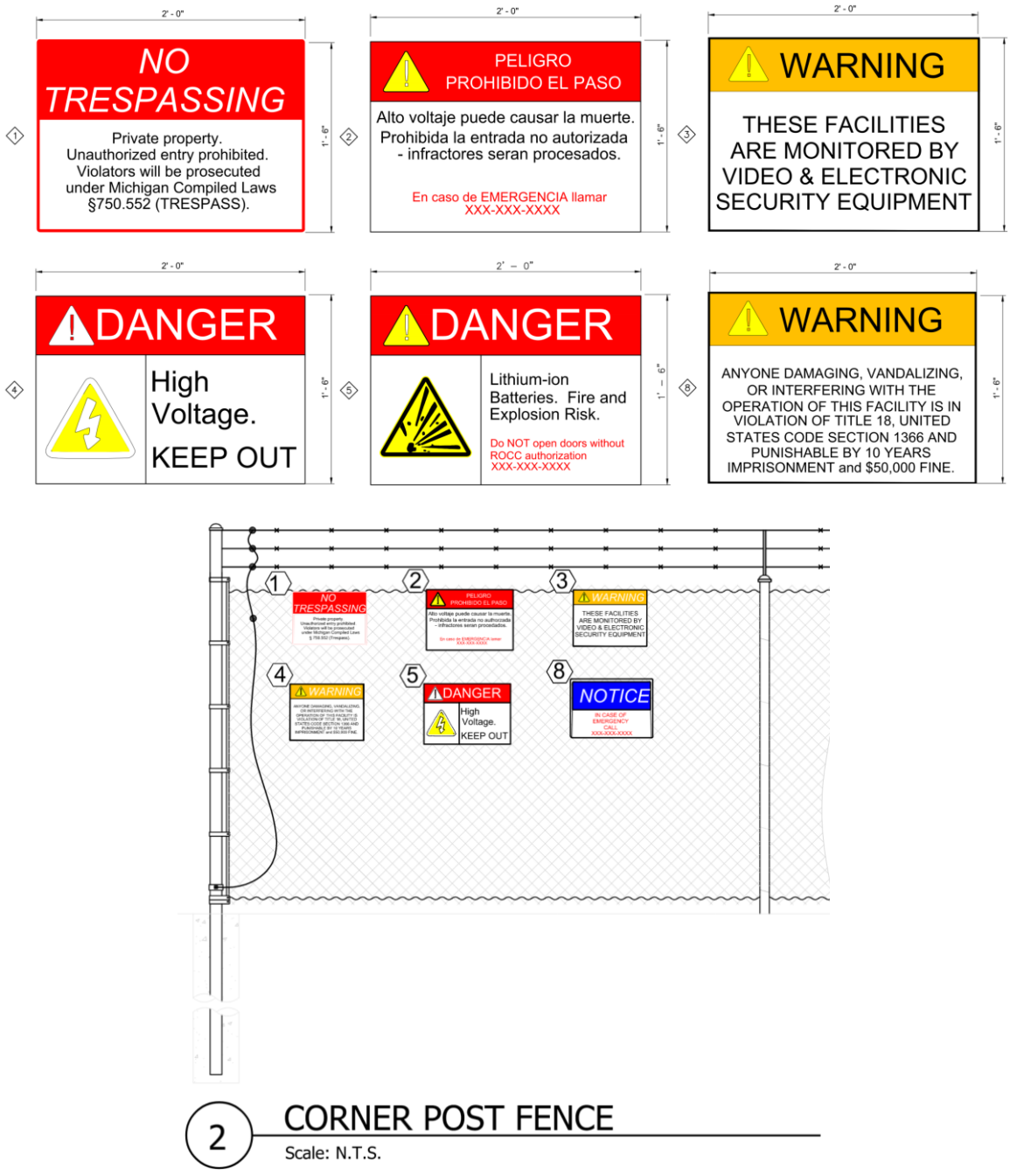

Figure 2-10: Signage Details and Layout on Perimeter Fences.

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2.3.4.3 Container Signage

Figure 2-11 [23] shows the signage proposed to be provided on the doors of BESS containers in accordance with 2023 NFPA 855 §4.7.4.2. The proposed signage does not meet all requirements of the code. It is recommended to develop the signage layout on the BESS container doors.



Figure 2-11: Signage Details on BESS Container/Enclosure Doors.

2.3.4.4 Disconnection Means Signage

Figure 2-12 [23] shows the proposed disconnecting means signage, including the required permanent plaques and directories indicating the location of all BESS disconnecting means on the premises, as required by 2023 NFPA 855 §4.7.4.3. The proposed signage does not meet all requirements of the code. It is recommended to develop the signage layout on the BESS container doors.

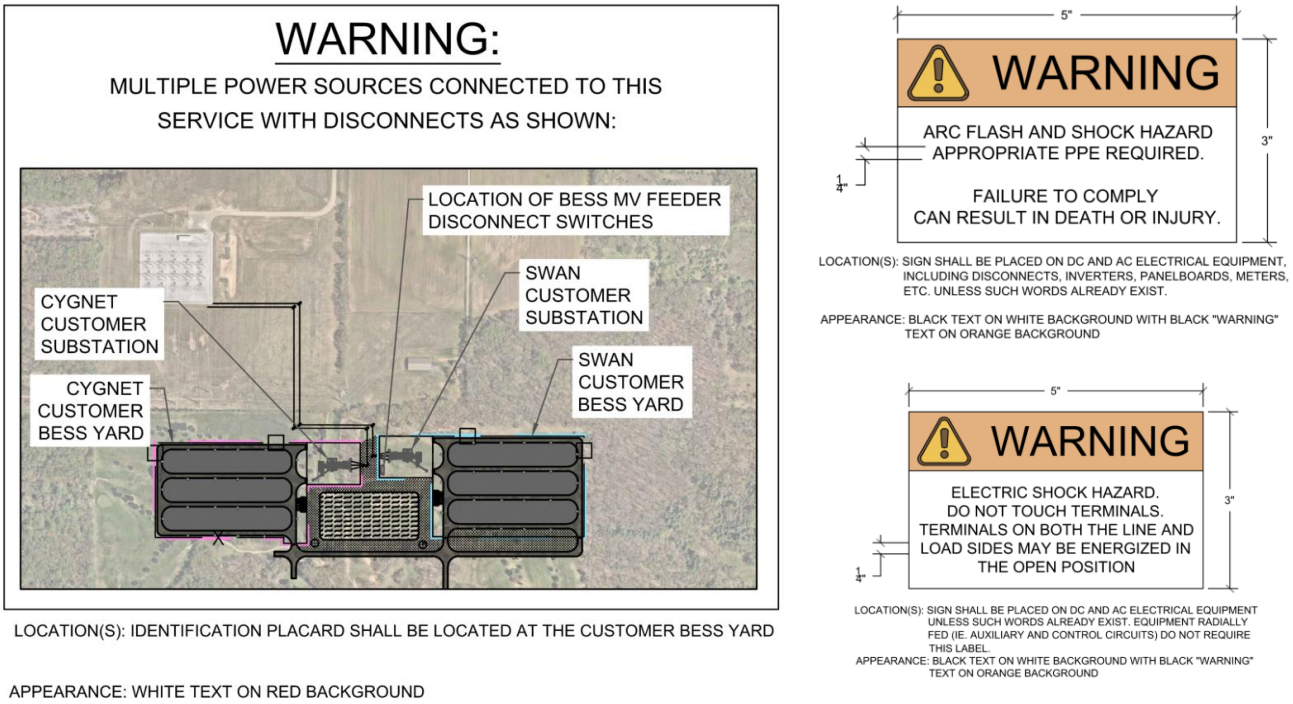

Figure 2-12: Signage Details and Layout for Disconnecting Means.

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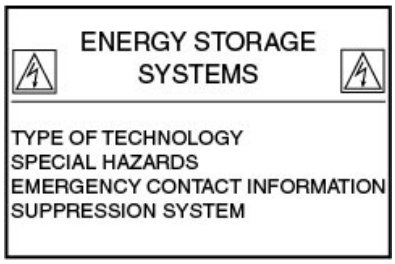
2.3.4.5 Missing Required Signage

It is recommended to add the overall signage plan for the site and to develop the required container door signage layout and disconnecting means signage in accordance with the previously referenced sections of 2023 NFPA 855 per the following example:



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3.0 Hazard Mitigation Analysis

This section details the HMA that was performed for the BESS installation at the Swan/Cygnet site. The following sub-sections provide an overview of the applicable codes and standards for this site and the analysis of the failure modes that are prescribed by those codes and standards.

3.1 CODES AND STANDARDS

Table 3-1 provides an overview of the primary codes and standards used for this evaluation and their relationship to other referenced codes, standards, and requirements. Specifically, failure modes for BESS installations identified in the 2023 NFPA 855 were considered in the analysis. Fire protection requirements per the 2023 NFPA 855 were used to inform the evaluation of the BESS installation.

Table 3-1: Applicable Codes and Standards

Code or Standard	*Commentary/Compliance*
NFPA 1 – Fire Code (2024)	NFPA 1 Chapter 52 requires BESS to be in accordance with NFPA 855
NFPA 855 – Standard for the Installation of Stationary Energy Storage Systems (2023)	NFPA 855 §4.4 lists the requirements for the HMA
UL 9540 – Standard for Safety, Energy Storage Systems and Equipment (2020)	NFPA 855 §4.6.1[4] requires that BESS shall be listed in accordance with UL 9540. **The JF2 BESS is UL 9540-listed (Certification [13])** UL 9540 requires power conversion equipment that is part of a BESS installation to be listed to *UL 1741 - Inverters, Converters, Controllers and Interconnection System Equipment for Use With Distributed Energy Resources, or equivalent.*

3.2 FAILURE MODES ANALYSIS

This section addresses the failure modes identified in NFPA 855 §4.4.2 applicable to an Energy Storage System (ESS) that uses lithium-ion batteries, which are in general agreement with industry best practices.

2023 NFPA 855 §4.4.2.1 requires an evaluation of the following failure modes:

(1) A thermal runaway or mechanical failure condition in a single ESS unit, addressed in Section 3.2.1.

(2) Failure of an energy storage management system or protection system that is not covered by the product listing failure modes and effects analysis (FMEA), addressed in Section 3.2.2.

(3) Failure of a required protection system, including, but not limited to, ventilation (HVAC), exhaust ventilation, smoke detection, fire suppression, or gas detection, addressed in Section 3.2.2.

[4] A report documenting conditions of acceptability and any features or functions not evaluated by UL 9540 listing shall be provided to AHJ.

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Only single failure modes were considered for each scenario as required by 2023 NFPA 855 §4.4.2.2.

While not explicitly required by 2023 NFPA 855 as one of the failure modes, failure of emergency response is also evaluated and addressed in Section 3.2.4.

The HMA includes a written description of the failure mode, the site-specific safeguards in place to prevent or mitigate the failure mode, and the consequences of the failure mode. Where existing safeguards do not adequately prevent or mitigate consequences, recommendations were made. This written evaluation is analogous to a generic bowtie evaluation. It should be noted that this is a consequence-based analysis, meaning that the likelihood of the event is not considered.

3.2.1 Thermal Runaway Condition in a Single BESS Unit

3.2.1.1 Description

Thermal runaway is the condition in which an electrochemical battery cell increases its temperature through self-heating in an uncontrollable fashion and progresses when the cell's heat generation is at a higher rate than it can dissipate. This leads to the release of flammable gas and can result in a fire or explosion.

Section 4.1 of the BESS product-level HMA [19] provides a detailed discussion of thermal runaway mechanisms, potential ignition scenarios, and pathways for thermal runaway propagation. Section 2.6 of the BESS product-level fire code review [20] provides a summary of the UL 9540A [6] thermal runaway propagation testing for BESS at the cell, module, and unit levels. The unit-level test met all UL 9540A performance criteria and did not show thermal runway propagation outside the initiating unit.

At the site level, the hazard assessment considers the consequences of a container fire under abnormal or worst-case conditions. Unchecked thermal runaway within a BESS container may lead to the BESS container burning or result in a deflagration. A fire involving the BESS container can release toxic gases into the environment. A generic toxic plume release analysis is available for the BESS product [11]; however, a site-specific analysis is not available.

3.2.1.2 Safeguards

Safeguards are put in place to help prevent batteries from entering thermal runaway, cope with the byproducts of thermal runaway, and slow and limit the propagation of thermal runaway to other cells within a module and/or a rack. The product-level safeguards are listed in Section 4.1.1 of the BESS product-level HMA [19].

At the site-level, the PCS includes current interrupt devices, breakers, fuses, and other passive surge-arresting elements, which open the circuit in the case of failure. If potentially hazardous temperatures or other hazardous conditions are detected, the BESS components or containers will be electrically isolated by operators monitoring the signals transmitted to the BESS SME.

For the Swan/Cygnet BESS site, each BESS container is separated from the other BESS containers by at least 3 feet of spacing between the rear walls. Separation between containers helps to prevent container-to-container fire spread. Each grouping of up to two (2) BESS containers has at least 15-foot aisles from other container groups and at least 10-foot aisles from PCS skids, providing separation in the event multiple containers become involved in a fire. Around and between the BESS pads is a 24-foot-wide road, providing additional separation in the event multiple containers become involved in a fire.

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3.2.1.3 Consequences

The consequences of a thermal runaway event occurring in the BESS container are discussed in the product-level HMA [19]. To summarize, failure of the safety systems to mitigate a thermal runaway event could cause a large-scale fire or explosion. In the event of a large-scale fire, multiple BESS containers may become involved, although the separation distance between containers and the results of UL 9540A and large-scale fire testing make this a lower likelihood scenario.

The Swan/Cygnet BESS site is considered remote; a large fire is not expected to impact critical infrastructure, and the site is typically unoccupied. A large fire may produce significant smoke, which can pose health effects to surrounding populations. In the incident literature, smoke plumes from BESS fires have not been observed to pose greater health risks than those from conventional fires, although this remains an ongoing research topic.

Spacing between BESS containers can reduce the risk of fire spread between containers. The separation distance between BESS containers at the Swan/Cygnet site is at least 3 feet. There are no prescriptive size and separation code requirements applicable to the Swan/Cygnet BESS site, as it is classified as a outdoor installation in remote locations per 2023 NFPA 855, and the consequence of a fire involving multiple BESS containers has a low risk to life safety, as the site is normally unoccupied. For property protection, spacing recommendations based on the large-scale fire test (LSFT) of the BESS product should be used to inform site separation strategies and justify site-specific risk mitigation.

It is recommended to maintain minimum clearances around the BESS container consistent with those evaluated during the LSFT for the BESS product conducted in accordance with Large Scale Fire Test procedure in CSA TS-800:24 in line with Clause 9.7 – Large Scale Fire Test Procedure of CSA 800 [7]. The LSFT results for the JF2 BESS container demonstrated that a minimum separation distance of 3 feet between adjacent containers (rear-to-rear and side-to-side) effectively prevented container-to-container fire propagation, with only minor surface scorching observed on the adjacent target containers. In addition, minimum clearances of 5 feet between the E-PANEL side and adjacent walls and 10 feet between the front of the container and adjacent walls prevented fire spread or structural ignition and limited thermal exposure to nearby structures [12].

Industry incident investigations have shown that strong winds can influence flame behavior and contribute to fire spread between closely spaced BESS containers. In a one large-scale BESS incident involving a different BESS product than the one used for the project [18], a container fire spread from one unit to an adjacent unit, with the investigation determining that the spread mechanism was driven by wind-blown flames and hot gas entering vents or openings on the adjacent container rather than conductive heat transfer between the containers. The event highlighted how wind direction and flame impingement can affect external fire behavior. It should be noted that BESS containers have normally closed dampers on all air inlets/outlets, along with an explosion protection system described in Section 2.3.1 . This design, as demonstrated in the LSFT, reduces the likelihood of flame ingress and fire propagation between adjacent containers.

The ERG applicable to the Swan/Cygnet BESS site (prepared by Jensen Hughes) [21] does not prescribe active firefighting, and first responders have a responsibility to set a perimeter and let any event self-terminate. CiP on-site personnel will provide guidance on the status of electrical hazards and will perform cleanup operations. The ERG is thus developed, addressing recommendation (1) from the product-level HMA [19] . Thermal management through firefighting will not be performed for the Swan/Cygnet BESS site. However, part of the recommendation remains applicable, as coordination and training of the local fire department(s) are necessary to ensure the safety of first responders.

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Toxic gases released during a fire vent at the BESS are typically not an issue for remote sites like the Swan/Cygnet BESS site, which are separated by at least 100 feet from buildings, lot lines, or public ways. The site is not typically manned and is surrounded by a fence (typically 60 feet away from any BESS container) to keep out trespassers, and is at least 100 feet away from the closest building.

3.2.1.4 Recommendations

See Section 4.1.3 of the BESS product-level HMA [19] for product-level recommendations to mitigate the thermal runaway hazard. In addition to the product-level HMA recommendations,

1. Coordination with the local fire department(s) should be performed to ensure first responders are familiar with the specific hazards and proper response procedures to a fire event at the BESS installation.

As noted in the prior section, recommendation (1) is partially addressed by the outline ERP along with the fire department orientation presentation.

3.2.2 Failure of the Battery (Energy) Storage Management System

3.2.2.1 Description

The Energy Storage Management System (ESMS) is defined in 2023 NFPA 855 §3.3.8 as "*a system that monitors, controls, and optimizes the performance and safety of an energy storage system*". This system can control or send signals to one or more individual management systems, such as battery management systems (BMS), fire alarm control units (FACU), building automation systems (BAS), and possibly other site systems. Generally, these signals cause the BMS, FACU, and BAS to operate controls, such as battery charging disconnect, fire control protocols, and ventilation shutdown or activation.

This definition implies that the ESMS covers the following:

+ The container-level ESMS (i.e. container-level BMS) within the BESS containers.
+ The PCS/inverter system external to the BESS containers.
+ The site-level ESMS external to the BESS containers.

This section addresses potential failures of the PCS and the site-level ESMS based on overall function expectations. A discussion of potential failures of the container-level ESMS or BMS can be found in the BESS product-level HMA [19].

Each PCS unit is connected to up to four (4) BESS containers and converts the low-voltage DC power from the BESS to high-voltage AC power that can feed the power grid. The PCS may fail to detect ground fault, insulation degradation, wiring faults, abnormal current or voltage conditions, internal temperature increases, communication failures with the ESMS, or internal component malfunctions. This can result in an inability to shut down, report adverse conditions, properly monitor, balance, and protect the BESS, resulting in failure of other components in the BESS.

The site-level ESMS controls or sends signals to one or more individual container-level ESMS or BMS and transmits signals and alarms to the BESS SME and can trigger BESS container(s) shutdown if an abnormal condition is detected. 2023 NFPA 855 §9.2.3.2 requires the ESMS to isolate or disconnect electrical connections to the BESS or affected components of the BESS or otherwise place it in a safe condition if

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potentially hazardous temperatures or other hazardous conditions, such as short circuits, overvoltage, or undervoltage, are detected. The site-level ESMS may fail to report abnormal conditions to the supervising station, resulting in a delayed or prolonged response from the supervising station to notify the local fire department. Failure to shut down the BESS under abnormal conditions can result in further damage to BESS components.

3.2.2.2 Safeguards

Safeguards against failure of the PCS include:

- The insulation monitoring device alarms or trips the system when a ground or insulation fault is detected.
- The DC switch-disconnector can be manually or electronically activated to disconnect the DC line from the inverter.
- Current interrupt devices, breakers, fuses, or other passive surge-arresting elements that may open the circuit in the case of failure.

The site ESMS/PLC is assumed to be listed and tested to operate in conditions exceeding its voltage and current ratings. A specific model for the ESMS/PLC is not yet been selected.

3.2.2.3 Consequences

Failure to shut down the system given potentially hazardous temperatures or other conditions, such as short circuits or voltage surges, may result in damage to the battery cells. This damage could ultimately lead to a thermal runaway event. The consequences of a thermal runaway event are described in Section 4.1.2 and the product-level HMA [19].

3.2.2.4 Recommendations

In the event of a PCS or ESMS failure, the worst-case consequence is a thermal runaway. Therefore, the same recommendations as provided in Section 4.1.3 of the BESS product-level HMA [19] apply. In addition to the product-level HMA recommendations:

2. Test all manual and automatic system functions, alarms, and interlocks should be tested during site/system commissioning.
3. Periodic inspection, testing, and maintenance should be performed on all equipment and instrumentation tied to the PCS in accordance with manufacturer recommendations and industry standard practices.

3.2.3 Failure of a Required Protection System, including, but not limited to, Ventilation (HVAC), Exhaust Ventilation, Smoke Detection, Fire Detection, Fire Suppression, or Gas Detection

Fire protection systems provided within the BESS containers are evaluated under the product-level the BESS product-level HMA [19] . For an evaluation of the potential failures of protection systems within the BESS containers, see Section 4.3 to Section 4.6 of the BESS product-level HMA [19].

The site does not have any external protection systems beyond what is already provided internally within the BESS container. Accordingly, evaluation of protection system failures is addressed by the product-level HMA referenced above.

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3.2.4 Failure of Firefighting Response

3.2.4.1 Description

Manual firefighting response by the local fire department will be a "defensive approach" and is outlined in a site-specific ERG (prepared by Jensen Hughes) [21] developed in coordination with local first responders. Site-specific fire department orientation should be initiated during the permitting stage, and site-specific training should be conducted prior to commissioning.

Activation of the smoke or gas detection systems in a BESS container will send an alarm signal to the supervising station, which will notify the appropriate responding local fire department. On-site, the fire department handling the fire event should establish a safe perimeter to monitor the fire and allow it to burn out. The BESS Subject Matter Expert (SME) should isolate the affected BESS container or grouping, inform the local fire department of any known hazards, and provide Safety Data Sheets. A site representative will direct the local fire department and deploy a site cleanup crew once the site is free of electrical hazards. At no point will a BESS container be occupied by personnel/first responders, as these containers are non-walk-in style enclosures. The standard emergency response guideline for first responders is to wear appropriate Personal Protective Equipment (PPE), follow fire department's Standard Operating Procedures (SOP) and secure the perimeter, but not to approach or use water on any BESS container or open any BESS container doors. Only with proper training and approval by CiP should firefighters consider using water on electrical equipment.

3.2.4.2 Safeguards

The ERG (prepared by Jensen Hughes) [21] calls for safety training of site personnel annually, when the plan is instated, and when the plan changes. In addition, a review of the ERG shall be conducted and documented with the Site Owner/Operator, the First Responders, and county emergency managers at least every three (3) years. The ERG shall also be reviewed and amended whenever there is a change in facility design, construction, operation, or maintenance that affects emergency response planning. If outside resources are changed or modified, the document shall be reviewed and updated to reflect the changes that may affect the ERG.

3.2.4.3 Consequences

Lack of adequate emergency action and response planning, training, and/or site familiarity may result in harm to site personnel and emergency responders.

3.2.4.4 Recommendations

4. The ERG should be finalized with the appropriate local fire department(s). Site familiarization and training sessions should be conducted annually and when site changes occur to ensure first responders understand the emergency response procedures, including maintaining a safe perimeter, monitoring fire events without approaching or using water on any BESS container, and not opening any BESS container doors.
5. A site-specific signage plan should be developed detailing the design and placement of all signage installed on the site, in compliance with 2023 NFPA 855 §4.7.4.2 and §4.7.4.3. The signage plans should also be updated to include the required disconnecting means signage, in compliance with 2023 NFPA 855 §4.7.4.3. Refer to Section 2.3.4 for required signage details and examples.

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4.0 Conclusions

A site-level HMA was performed for the BESS installation at the Swan/Cygnet BESS site. The HMA evaluated the failure modes provided in 2023 NFPA 855 §4.4.2 using a consequence-based analysis, which determined how well the existing safeguards would prevent or mitigate the consequences of the failure modes. The likelihood of occurrence of the failure modes was not assessed, and only single failure modes were considered. Where existing safeguards do not adequately prevent or mitigate the consequences of the failure modes, recommendations were made.

4.1 RECOMMENDATIONS

The HMA resulted in the recommendations presented in Table 4-1.

Table 4-1: Site-Level HMA Recommendations

No.	Category	Description
1	Fire Department Coordination	Coordination with the local fire department(s) should be performed to ensure first responders are familiar with the specific hazards and proper response procedures to a fire event at the BESS installation.
2	PCS and ESMS Selection/Verification	Selection of PCS and ESMS with third-party certifications (e.g., UL 1741) and protective features required by 2023 NFPA 855 should be performed. Functionality should be confirmed during final design and commissioning.
3	Testing During Commissioning	Test all manual and automatic system functions, alarms, and interlocks should be tested during site/system commissioning.
4	Periodic Inspection, Testing, and Maintenance of PCS	Periodic inspection, testing, and maintenance should be performed on all equipment and instrumentation tied to the PCS in accordance with manufacturer recommendations and industry standard practices.
5	Emergency Response Plan Coordination	The ERG should be finalized with the appropriate local fire department(s). Site familiarization and training sessions should be conducted annually and when site changes occur to ensure first responders understand the emergency response procedures, including maintaining a safe perimeter, monitoring fire events without approaching or using water on any BESS container, and not opening any BESS container doors.
6	Develop Compliant Signage Layout Plans	A site-specific signage plan should be developed detailing the design and placement of all signage installed on the site, in compliance with 2023 NFPA 855 §4.7.4.2 and §4.7.4.3. The signage plans should also be updated to include the required disconnecting means signage, in compliance with 2023 NFPA 855 §4.7.4.3. Refer to Section 2.3.4 for required signage details and examples.

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4.2 HMA APPROVAL

The local AHJ may approve the HMA as documentation of the safety of the BESS installation provided that the conditions stated in 2023 NFPA 855 §4.4.3 are demonstrated. These conditions are summarized in Table 4-1.

Table 4-1: Approval of HMA

Conditions Demonstrated	*(Y/N)*	*Comment*
1. Fires will be contained within unoccupied BESS rooms for the minimum duration of the fire resistance rating specified in 2023 NFPA 855 §9.6.4, which states that r*ooms or spaces containing BESS shall be separated from other areas of the building by fire barriers with a minimum 2-hour fire resistance rating and horizontal assemblies with a minimum 2-hour fire resistance rating, constructed in accordance with the local building code.* [2023 NFPA 855 §4.4.3(1)].	Y	The Swan/Cygnet BESS meets the intent of this requirement. The BESS containers are non-walk-in, non-occupiable enclosures installed outdoors, not within unoccupied BESS rooms or indoor areas. However, it should be noted that the BESS has several mitigation measures in place that may reduce the likelihood of fire spreading to an adjacent container. As demonstrated in the LSFT of the BESS, fire was contained to a single container and did not propagate to adjacent containers when spaced at 3 feet. Although this requirement applies to unoccupied BESS rooms rather than outdoor installations, the Swan/Cygnet BESS still meets the intent of the requirement by limiting the risk of a fire event to a single BESS container. The site's spacing strategy, which provides a minimum of 3 feet of separation between containers, is consistent with and supported by the LSFT results, which demonstrated no fire propagation between containers at this distance.

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Conditions Demonstrated	(Y/N)	Comment
2. Fires and products of combustion will not prevent occupants from evacuating to a safe location [2023 NFPA 855 §4.4.3(2)].	Y	The Swan/Cygnet BESS meets the intent of this requirement. The BESS containers are non-walk-in, non-occupiable enclosures installed outdoors on a regularly unmanned, remotely located site, not within occupied work centers or indoor areas. However, it should be noted that the BESS container is provided with numerous internal sensors monitored by the BMS that can detect abnormal conditions in the container, along with smoke and gas detection. These detection systems can activate the horn/strobe installed on the exterior of the BESS container to provide local notification to promptly inform anyone who may be performing work on or in the vicinity of the container. Additionally, the remote outdoor location helps mitigate the impact of fire and combustion products on the ability of those working on or in the vicinity of the container to evacuate. Therefore, the Swan/Cygnet BESS meets the intent of the requirement via the internal sensors + BMS, detection and alarm systems, and the site's outdoor remote location.
3. Deflagration hazards will be addressed by an explosion control or other system [2023 NFPA 855 §4.4.3(3)].	Y	The Swan/Cygnet BESS meets this requirement. Deflagration hazards are addressed by an explosion prevention system in the JF2 BESS containers utilizing the combustible concentration reduction (CCR) method, designed in accordance with NFPA 69 [14]. The system is designed to control gases released during fire or other abnormal conditions and prevent accumulation.

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This report was based solely upon and limited to the available information and documentation provided by CiP. Information and documentation not provided by CiP is not considered as part of this analysis. This report is not intended to verify or guarantee that the final installation complies with the applicable codes and standards and the recommendations of the HMA.

If you have any questions about this report, please do not hesitate to contact us.

Sincerely,

Jensen Hughes, Inc.

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The following references were used in the development of this report:

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[13]. LGES JF2 DC LINK: *F2D4-5.1US-CC15_DC LINK UL9540_V2.0.*

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[22]. Google Earth, *imagery date 2026 April 1: Jensen Hughes markups*.

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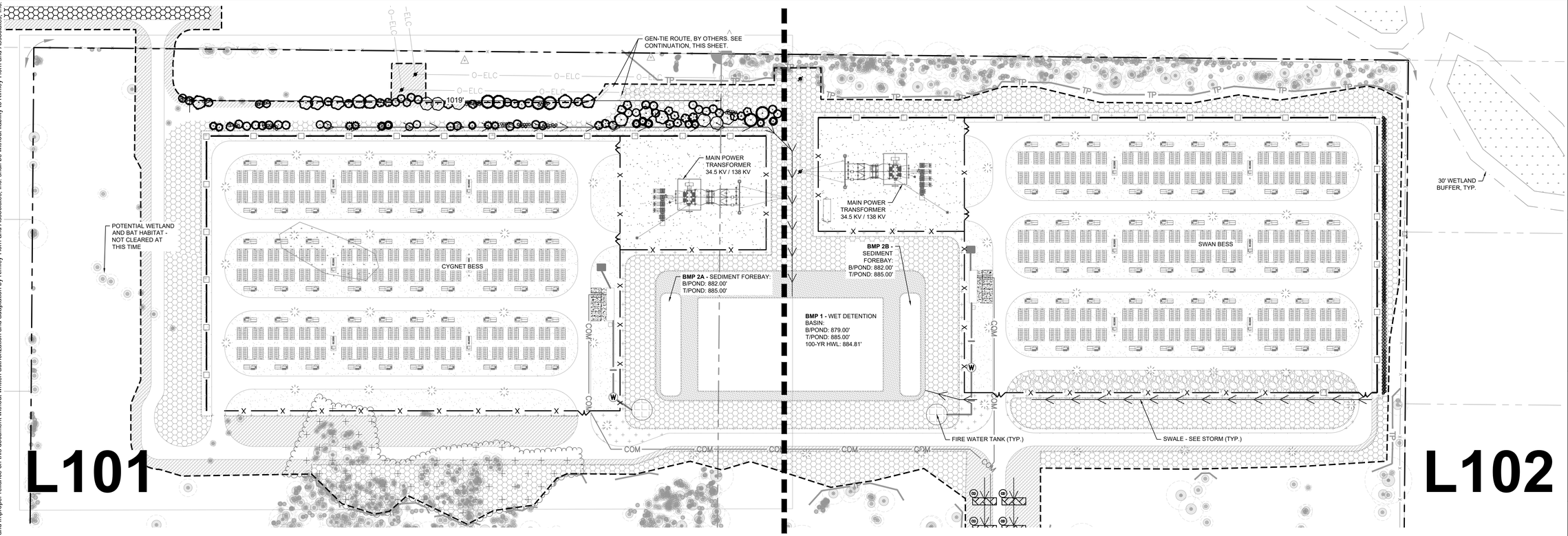
EXHIBIT F: GROUNDCOVER AND VEGETATION ESTABLISHMENT AND MANAGEMENT PLAN



LANDSCAPE SUMMARY

NORTH GREENSPACE PLANTINGS FOR WEST PROPERTY:

REQUIRED GREENSPACE CANOPY TREES:	31 TREES = 1,019 L.F. / 100 L.F. * 3
PROVIDED GREENSPACE CANOPY TREES:	31 TREES = 23 PROPOSED + 8 EXISTING
REQUIRED GREENSPACE UNDERSTORY TREES:	62 TREES = 1,019 L.F. / 100 L.F. * 6
PROVIDED GREENSPACE UNDERSTORY TREES:	62 TREES
REQUIRED GREENSPACE CONIFEROUS TREES:	21 TREES = 1,019 L.F. / 100 L.F. * 2
PROVIDED GREENSPACE CONIFEROUS TREES:	21 TREES = 19 PROPOSED + 2 EXISTING
REQUIRED GREENSPACE SHRUBS:	92 SHRUBS = 1,019 L.F. / 100 L.F. * 9
PROVIDED GREENSPACE SHRUBS:	94 SHRUBS

NORTH GREENSPACE PLANTINGS FOR EAST PROPERTY:
- DENSE EXISTING VEGETATION, NO PROPOSED PLANTINGS.

EAST GREENSPACE PLANTINGS:
- A NATURAL COMPACT PLANTING AREA OF NARROW UPRIGHT EVERGREENS PLANTED AT 4.5' FEET ON CENTER PLANTED AT 45 DEGREE ALTERNATE SPACING. EVERGREEN SHRUB SCREENING PROPOSED DUE TO SITE CONSTRAINTS.
-

SOUTH GREENSPACE SCREENING:
- NO SCREENING PROVIDED DUE TO EXISTING TREES.

WEST GREENSPACE SCREENING:
- NO SCREENING PROVIDED DUE TO EXISTING TREES

LANDSCAPE LEGEND

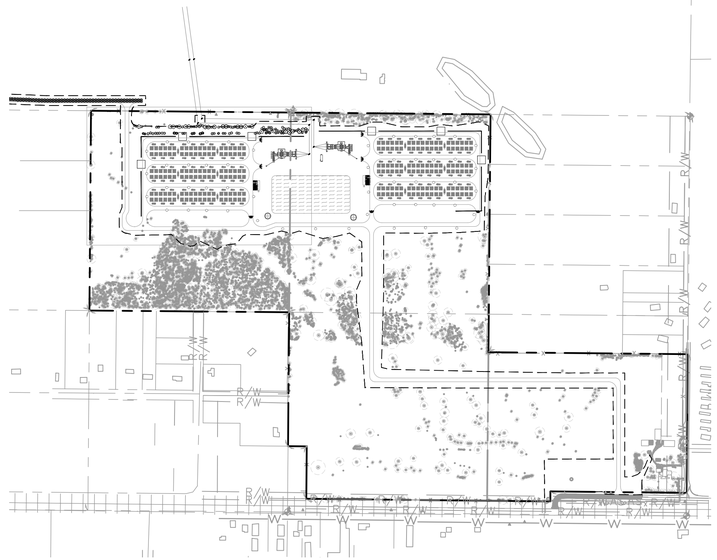
- APPROXIMATE LIMITS OF SEEDING, SEED ALL DISTURBED AREAS (TYP.)
- SEED / SOD EDGE (TYP.)
- MDOT CLASS A MIX (TYP.)
- BASIC SHORTGRASS PRAIRIE SEED MIX (TYP.)
- MESIC TALLGRASS PRAIRIE SEED MIX (TYP.)
- STORMWATER BASIN SEED MIX (TYP.)
- ROCK MULCH (TYP.)

NORTH

GRAPHIC SCALE IN FEET
0 50 100 200

SEEDING KEYNOTES

A	MDOT CLASS A MIX (TYP.)
SP	BASIC SHORTGRASS PRAIRIE SEED MIX (TYP.)
TP	MESIC TALLGRASS PRAIRIE SEED MIX (TYP.)
SB	STORMWATER BASIN SEED MIX (TYP.)



VICINITY MAP

NORTH

GRAPHIC SCALE IN FEET
0 250 500 1000

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KHA PROJECT 161262002
DATE 06/08/2026
SCALE AS SHOWN
DESIGNED BY CPK
DRAWN BY ATK
CHECKED BY CALW

GROUNDCOVER AND VEGETATION ESTABLISHMENT AND MANAGEMENT PLAN

SWAN BESS AND CYGNET BESS
PREPARED FOR
SWAN ENERGY STORAGE LLC AND CYGNET ENERGY STORGAGE LLC
COMSTOCK TOWNSHIP MI

SHEET NUMBER
L100

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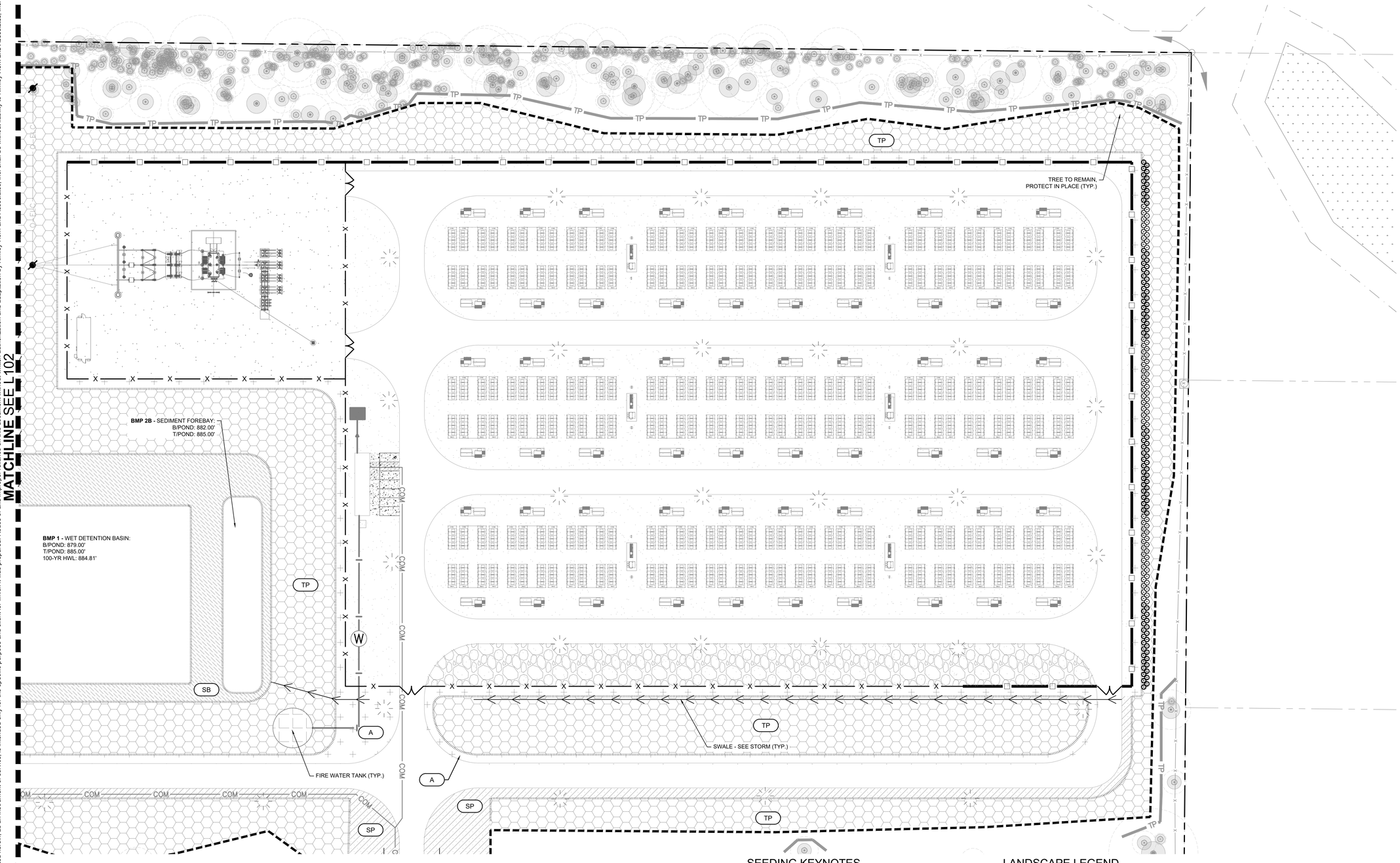

SEEDING KEYNOTES

A	MDOT CLASS A MIX (TYP.)
SP	BASIC SHORTGRASS PRAIRIE SEED MIX (TYP.)
TP	MESIC TALLGRASS PRAIRIE SEED MIX (TYP.)
SB	STORMWATER BASIN SEED MIX (TYP.)

LANDSCAPE LEGEND

- APPROXIMATE LIMITS OF SEEDING, SEED ALL DISTURBED AREAS (TYP.)
- SEED / SOD EDGE (TYP.)
- MDOT CLASS A MIX (TYP.)
- BASIC SHORTGRASS PRAIRIE SEED MIX (TYP.)
- MESIC TALLGRASS PRAIRIE SEED MIX (TYP.)
- STORMWATER BASIN SEED MIX (TYP.)
- ROCK MULCH (TYP.)

NORTH

GRAPHIC SCALE IN FEET
0 25 50 100

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GROUNDCOVER AND VEGETATION ESTABLISHMENT ENLARGEMENT PLAN

SWAN BESS AND CYGNET BESS
PREPARED FOR
SWAN ENERGY STORAGE LLC AND CYGNET ENERGY STORGAGE LLC
COMSTOCK TOWNSHIP
MI

KHA PROJECT	16126Z002
DATE	06/08/2026
SCALE	AS SHOWN
DESIGNED BY	CFK
DRAWN BY	ATK
CHECKED BY	CALW

SHEET NUMBER
L101

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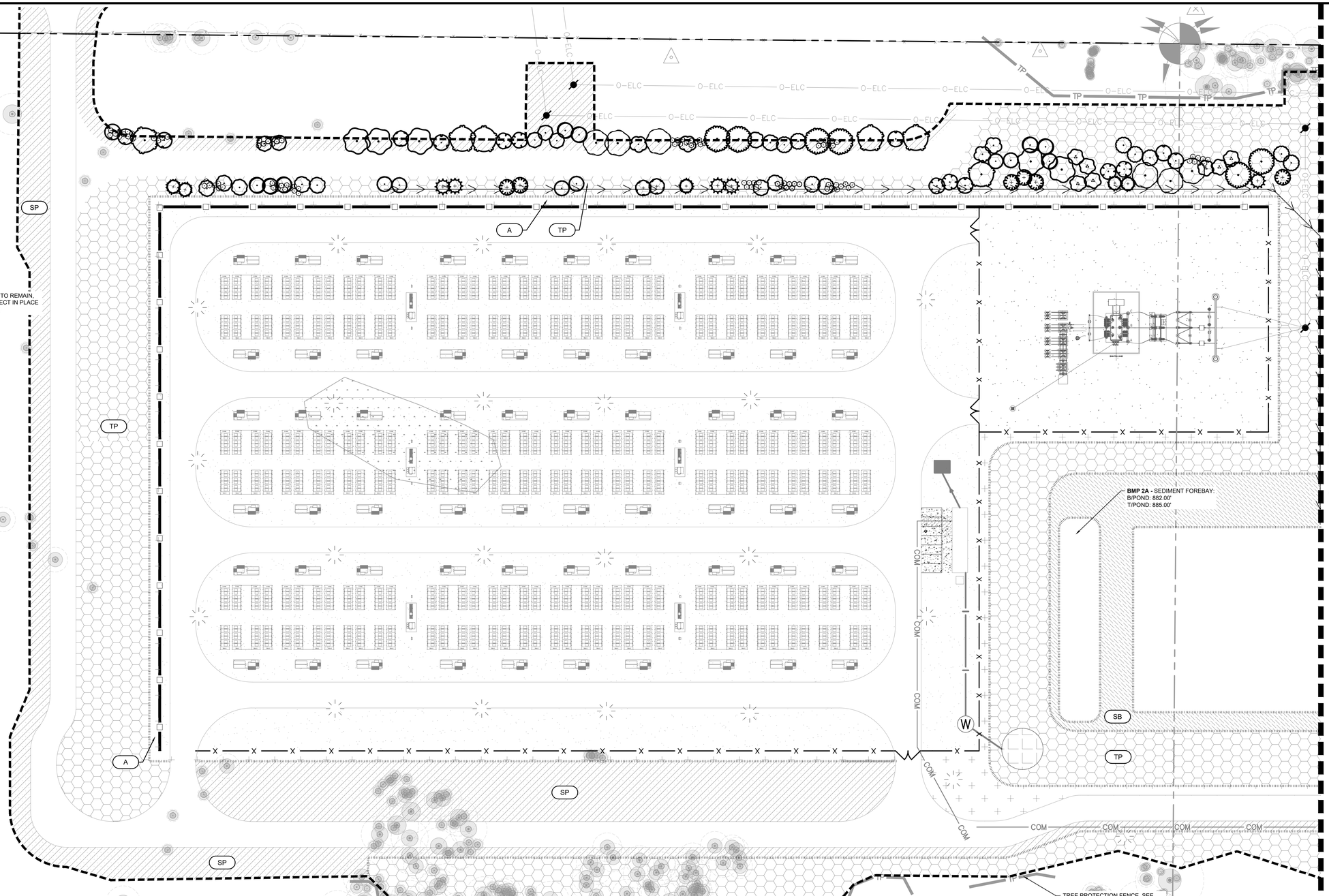

MATCHLINE SEE L101

SEEDING KEYNOTES

A	MDOT CLASS A MIX (TYP.)
SP	BASIC SHORTGRASS PRAIRIE SEED MIX (TYP.)
TP	MESIC TALLGRASS PRAIRIE SEED MIX (TYP.)
SB	STORMWATER BASIN SEED MIX (TYP.)

LANDSCAPE LEGEND

- APPROXIMATE LIMITS OF SEEDING, SEED ALL DISTURBED AREAS (TYP.)
- SEED / SOD EDGE (TYP.)
- MDOT CLASS A MIX (TYP.)
- BASIC SHORTGRASS PRAIRIE SEED MIX (TYP.)
- MESIC TALLGRASS PRAIRIE SEED MIX (TYP.)
- STORMWATER BASIN SEED MIX (TYP.)
- ROCK MULCH (TYP.)

NORTH

GRAPHIC SCALE IN FEET
0 25 50 100

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KHA PROJECT 161262002
DATE 06/08/2026
SCALE AS SHOWN
DESIGNED BY CPK
DRAWN BY ATK
CHECKED BY CALW

GROUNDCOVER AND VEGETATION ESTABLISHMENT ENLARGEMENT PLAN

SWAN BESS AND CYGNET BESS

PREPARED FOR
SWAN ENERGY STORAGE LLC AND
CYGNET ENERGY STORGAGE LLC

COMSTOCK TOWNSHIP MI

SHEET NUMBER
L102

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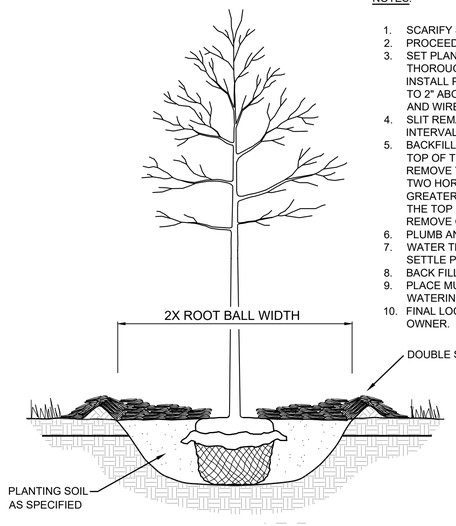
PLANT SCHEDULE

SYMBOL	CODE	QTY	COMMON NAME	BOTANICAL NAME	CAL	HT
CONIFEROUS TREE						
	ERC	5	EASTERN REDCEDAR	JUNIPERUS VIRGINIANA	B & B	5` HT.
	RDP	3	RED PINE	PINUS RESINOSA	B & B	5` HT.
	WHC	6	WHITE CEDAR	THUJA OCCIDENTALIS	B & B	5` HT.
	WHP	5	WHITE PINE	PINUS STROBUS	B & B	5` HT.
ORNAMENTAL TREE						
	ABS	4	AUTUMN BRILLIANCE APPLE SERVICEBERRY	AMELANCHIER X GRANDIFLORA 'AUTUMN BRILLIANCE'	B & B	1.5" CAL.
	AHB	8	AMERICAN HORNBEAM	CARPINUS CAROLINIANA	B & B	1.5" CAL.
	AMP	9	AMERICAN PLUM	PRUNUS AMERICANA	B & B	1.5" CAL.
	ERB	8	EASTERN REDBUD	CERCIS CANADENSIS	B & B	1.5" CAL.
	PPW	6	PAWPAW	ASIMINA TRILOBA	B & B	1.5" CAL.
	PRC	6	PRAIRIE ROSE CRABAPPLE	MALUS IOENSIS 'PRAIRIE ROSE'	B & B	1.5" CAL.
	PTB	9	PRAIRIE TORCH® BUCKEYE	AESCULUS X 'BERGESON'	B & B	1.5" CAL.
	RVB	7	RIVER BIRCH MULTI-TRUNK	BETULA NIGRA	B & B	6` HT.
	YWB	5	YELLOW BIRCH	BETULA ALLEGHANIENSIS	B & B	1.5" CAL.
OVERSTORY TREE						
	GMM	6	GREEN MOUNTAIN SUGAR MAPLE	ACER SACCHARUM `GREEN MOUNTAIN`	B & B	2" CAL.
	RDL	5	REDMOND AMERICAN LINDEN	TILIA AMERICANA `REDMOND`	B & B	2.5" CAL.
	RDO	6	RED OAK	QUERCUS RUBRA	B & B	2" CAL.
	SBH	6	SHAGBARK HICKORY	CARYA OVATA	B & B	2" CAL.

SYMBOL	CODE	QTY	COMMON NAME	BOTANICAL NAME	CONT	SPACING
DECIDUOUS SHRUBS						
	BTB	19	BUTTONBUSH	CEPHALANTHUS OCCIDENTALIS	BARE ROOT	5` O.C.
	GDW	20	GRAY DOGWOOD	CORNUS RACEMOSA	#5 CONT.	5` O.C.
	NBV	15	NANNYBERRY	VIBURNUM LENTAGO	BARE ROOT	5` O.C.
	ROD	24	RED-OSIER DOGWOOD	CORNUS SERICEA	#5 CONT.	5` O.C.
	SUM	16	SMOOTH SUMAC	RHUS GLABRA	BARE ROOT	5` O.C.
EVERGREEN SHRUBS						
	BFS	43	BOULEVARD FALSE-CYPRESS	CHAMAECYPARIS PISIFERA 'BOULEVARD'	#5 CONT.	4.5' O.C.
	RGA	54	RHEINGOLD ARBORVITAE	THUJA OCCIDENTALIS 'RHEINGOLD'	#5 CONT.	4.5' O.C.
	SPJ	42	SPARTAN JUNIPER	JUNIPERUS CHINENSIS 'SPARTAN'	#5 CONT.	4.5' O.C.
	TCA	28	TECHNY ARBORVITAE	THUJA OCCIDENTALIS 'TECHNY'	#5 CONT.	4.5' O.C.

NOTE:
QUANTITIES ON PLAN SUPERSEDE LIST QUANTITIES IN THE EVENT OF A DISCREPANCY.

ABBREVIATIONS:
B&B = BALLED AND BURLAPPED CAL. = CALIPER HT. = HEIGHT MIN. = MINIMUM
O.C. = ON CENTER SP. = SPECIES QTY. = QUANTITY



NOTES:

1. SCARIFY SIDES AND BOTTOM OF HOLE.
2. PROCEED WITH CORRECTIVE PRUNING.
3. SET PLANT ON UNDISTURBED NATIVE SOIL OR THOROUGHLY COMPACTED PLANTING SOIL. INSTALL PLANT SO THE ROOT FLARE IS AT OR UP TO 2" ABOVE THE FINISHED GRADE WITH BURLAP AND WIRE BASKET, (IF USED), INTACT.
4. SLIT REMAINING TREATED BURLAP AT 6" INTERVALS.
5. BACKFILL TO WITHIN APPROXIMATELY 12" OF THE TOP OF THE ROOTBALL, THEN WATER PLANT. REMOVE THE TOP 1/3 OF THE BASKET OR THE TOP TWO HORIZONTAL RINGS WHICHEVER IS GREATER. REMOVE ALL BURLAP AND NAILS FROM THE TOP 1/3 OF THE BALL. REMOVE ALL TWINE. REMOVE OR CORRECT STEM GIRDLING ROOTS.
6. PLUMB AND BACKFILL WITH PLANTING SOIL.
7. WATER THOROUGHLY WITHIN 2 HOURS TO SETTLE PLANTS AND FILL VOIDS.
8. BACK FILL VOIDS AND WATER SECOND TIME.
9. PLACE MULCH WITHIN 48 HOURS OF THE SECOND WATERING UNLESS SOIL MOISTURE IS EXCESSIVE.
10. FINAL LOCATION OF TREE TO BE APPROVED BY OWNER.

1 TREE PLANTING DETAIL

SCALE: N.T.S. L200

NOTES:

1. SCARIFY SIDES AND BOTTOM OF HOLE.
2. PROCEED WITH CORRECTIVE PRUNING OF TOP AND ROOT.
3. REMOVE CONTAINER AND SCORE OUTSIDE OF SOIL MASS TO REDIRECT AND PREVENT CIRCLING FIBROUS ROOTS. REMOVE OR CORRECT STEM GIRDLING ROOTS.
4. PLUMB AND BACKFILL WITH PLANTING SOIL.
5. WATER THOROUGHLY WITHIN 2 HOURS TO SETTLE PLANTS AND FILL VOIDS.
6. BACK FILL VOIDS AND WATER SECOND TIME.
7. PLACE MULCH WITHIN 48 HOURS OF THE SECOND WATERING UNLESS SOIL MOISTURE IS EXCESSIVE.
8. MIX IN 3-4" OF ORGANIC COMPOST.

2 SHRUB / PERENNIAL PLANTING DETAIL

SCALE: N.T.S. L200

LANDSCAPE NOTES

PLANTING

1. CONTACT COMMON GROUND ALLIANCE AT 811 OR CALL811.COM TO VERIFY LOCATIONS OF ALL UNDERGROUND UTILITIES PRIOR TO INSTALLATION OF ANY PLANTS OR LANDSCAPE MATERIAL.
2. ACTUAL LOCATION OF PLANT MATERIAL IS SUBJECT TO FIELD AND SITE CONDITIONS.
3. NO PLANTING WILL BE INSTALLED UNTIL ALL GRADING AND CONSTRUCTION HAS BEEN COMPLETED IN THE IMMEDIATE AREA.
4. ALL SUBSTITUTIONS MUST BE APPROVED BY THE LANDSCAPE ARCHITECT PRIOR TO SUBMISSION OF ANY BID AND/OR QUOTE BY THE LANDSCAPE CONTRACTOR.
5. PROVIDE TWO YEAR GUARANTEE OF ALL PLANT MATERIALS. THE GUARANTEE BEGINS ON THE DATE OF THE LANDSCAPE ARCHITECT'S OR OWNER'S WRITTEN ACCEPTANCE OF THE INITIAL PLANTING. REPLACEMENT PLANT MATERIAL SHALL HAVE A ONE YEAR GUARANTEE COMMENCING UPON PLANTING.
6. ALL PLANTS TO BE SPECIMEN GRADE, MICHIGAN-GROWN AND/OR HARDY. SPECIMEN GRADE SHALL ADHERE TO, BUT IS NOT LIMITED BY, THE FOLLOWING STANDARDS:
   ALL PLANTS SHALL BE FREE FROM DISEASE, PESTS, WOUNDS, SCARS, ETC.
   ALL PLANTS SHALL BE FREE FROM NOTICEABLE GAPS, HOLES, OR DEFORMITIES.
   ALL PLANTS SHALL BE FREE FROM BROKEN OR DEAD BRANCHES.
   ALL PLANTS SHALL HAVE HEAVY, HEALTHY BRANCHING AND LEAFING.
   CONIFEROUS TREES SHALL HAVE AN ESTABLISHED MAIN LEADER AND A HEIGHT TO WIDTH RATIO OF NO LESS THAN 5:3.
7. PLANTS TO MEET AMERICAN STANDARD FOR NURSERY STOCK (ANSI Z60.1-2014 OR MOST CURRENT VERSION) REQUIREMENTS FOR SIZE AND TYPE SPECIFIED.
8. PLANTS TO BE INSTALLED AS PER ANSI STANDARD PLANTING PRACTICES.
9. INSTALL PLANTS BY PLANT INSTALLATION PERIOD INFORMATION IN THE LATEST STANDARD PLANTING DETAILS FROM MDOT. PLANTINGS BEFORE OR AFTER THESE DATES ARE DONE AT RISK.
10. PLANTS SHALL BE IMMEDIATELY PLANTED UPON ARRIVAL AT SITE. PROPERLY HEEL-IN MATERIALS IF NECESSARY; TEMPORARY ONLY.
11. PRIOR TO PLANTING, FIELD VERIFY THAT THE ROOT COLLAR/ROOT FLARE IS LOCATED AT THE TOP OF THE BALLED & BURLAP TREE. IF THIS IS NOT THE CASE, SOIL SHALL BE REMOVED DOWN TO THE ROOT COLLAR/ROOT FLARE. WHEN THE BALLED & BURLAP TREE IS PLANTED, THE ROOT COLLAR/ROOT FLARE SHALL BE EVEN OR SLIGHTLY ABOVE FINISHED GRADE.
12. OPEN TOP OF BURLAP ON BB MATERIALS; REMOVE POT ON POTTED PLANTS; SPLIT AND BREAK APART PEAT POTS.
13. PRUNE PLANTS AS NECESSARY - PER STANDARD NURSERY PRACTICE AND TO CORRECT POOR BRANCHING OF EXISTING AND PROPOSED TREES.
14. WRAP ALL SMOOTH-BARKED TREES - FASTEN TOP AND BOTTOM. REMOVE BY APRIL 1ST.
15. STAKING OF TREES AS REQUIRED; REPOSITION, PLUMB AND STAKE IF NOT PLUMB AFTER ONE YEAR.

SOIL

16. TOPSOIL SHALL BE LOCAL FERTILE AGRICULTURAL SOIL FREE OF SUBSOILS, ROCKS LARGER THAN ONE INCH, CLAYS, PLANTS, WEEDS, ROOTS AND OTHER IMPURITIES. PH VALUE TO BE BETWEEN 5.4 AND 7.0. REMOVE DEBRIS AND WEEDS FROM SUBSOIL. MINIMUM 4" DEPTH TOPSOIL FOR ALL LAWN GRASS AREAS AND 12" DEPTH TOPSOIL FOR TREES, SHRUBS AND PERENNIALS. LIGHTLY COMPACT TOPSOIL AFTER PLACEMENT AND PROHIBIT CONSTRUCTION TRAFFIC FROM AREAS WITH TOPSOIL.
17. THE NEED FOR SOIL AMENDMENTS SHALL BE DETERMINED UPON SITE SOIL CONDITIONS PRIOR TO PLANTING. LANDSCAPE CONTRACTOR SHALL NOTIFY LANDSCAPE ARCHITECT FOR THE NEED OF ANY SOIL AMENDMENTS.

MULCH

18. MULCH TO BE AT ALL TREE, SHRUB, PERENNIAL, AND MAINTENANCE AREAS. TREE AND SHRUB PLANTING BEDS SHALL HAVE 4" DEPTH OF DOUBLE SHREDDED HARDWOOD MULCH. DOUBLE SHREDDED HARDWOOD MULCH TO BE USED AROUND ALL PLANTS WITHIN TURF AREAS. PERENNIAL AND ORNAMENTAL GRASS BEDS SHALL HAVE 2" DEPTH DOUBLE SHREDDED HARDWOOD MULCH. MULCH TO BE FREE OF DELETERIOUS MATERIAL AND NATURAL IN COLOR (DYE-FREE), OR APPROVED EQUAL. APPLY PRE-EMERGENT HERBICIDE PRIOR TO MULCH PLACEMENT PER MANUFACTURER RECOMMENDATIONS, USE PREEN OR PRE-APPROVED EQUAL. ROCK MULCH TO BE ON COMMERCIAL GRADE FILTER FABRIC, BY TYPAR, OR APPROVED EQUAL WITH NO EXPOSURE. MULCH AND FABRIC TO BE APPROVED BY OWNER PRIOR TO INSTALLATION. MULCH TO MATCH EXISTING CONDITIONS (WHERE APPLICABLE).

SEED/SOD

19. ALL DISTURBED AREAS TO BE SEEDED, UNLESS OTHERWISE NOTED. ALL TOPSOIL AREAS TO BE RAKED TO REMOVE DEBRIS AND ENSURE DRAINAGE. SLOPES OF 3:1 OR GREATER SHALL BE STAKED. SEED AS SPECIFIED, PER MDOT SPECIFICATIONS AND SUPPLIER/MANUFACTURER RECOMMENDATIONS. IF NOT INDICATED ON LANDSCAPE PLAN, SEE EROSION CONTROL PLAN.

ESTABLISHMENT

20. PROVIDE NECESSARY WATERING OF PLANT MATERIALS UNTIL THE PLANT IS FULLY ESTABLISHED OR IRRIGATION SYSTEM IS OPERATIONAL. OWNER WILL NOT PROVIDE WATER FOR CONTRACTOR.
21. REPAIR, REPLACE, OR PROVIDE SOD/SEED AS REQUIRED FOR ANY ROADWAY BOULEVARD AREAS ADJACENT TO THE SITE DISTURBED DURING CONSTRUCTION.

WARRANTY

22. REPAIR ALL DAMAGE TO PROPERTY FROM PLANTING OPERATIONS AT NO COST TO OWNER.
23. MAINTAIN TREES, SHRUBS, SEED AND OTHER PLANTS UNTIL PROJECT COMPLETION, BUT IN NO CASE, LESS THAN FOLLOWING PERIOD; 1 YEAR AFTER PROJECT COMPLETION. MAINTAIN TREES, SHRUBS, SEED AND OTHER PLANTS BY PRUNING, CULTIVATING, AND WEEDING AS REQUIRED FOR HEALTHY GROWTH. RESTORE PLANTING SAUCERS. TIGHTEN AND REPAIR STAKE AND GUY SUPPORTS AND RESET TREES AND SHRUBS TO PROPER GRADES OR VERTICAL POSITION AS REQUIRED. RESTORE OR REPLACE DAMAGED WRAPPINGS. SPRAY AS REQUIRED TO KEEP TREES AND SHRUBS FREE OF INSECTS AND DISEASE. REPLENISH MULCH TO THE REQUIRED DEPTH. MAINTAIN LAWNS FOR 60 DAYS AFTER INSTALLING SOD INCLUDING MOWING WHEN SOD RECITES 4" IN HEIGHT. WEED PLANTING BEDS AND MULCH SAUCERS AT MINIMUM ONCE A MONTH DURING THE GROWING SEASON. PROVIDE A MONTHLY REPORT TO THE OWNER ON WEEDING AND OTHER MAINTENANCE RESPONSIBILITIES.

No.	DATE	BY
1	06/08/2026	BPG

ENTITLEMENT SET
REVISIONS

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LANDSCAPE DETAILS

SWAN BESS AND CYGNET BESS
PREPARED FOR
SWAN ENERGY STORAGE LLC AND CYGNET ENERGY STORGAGE LLC
COMSTOCK TOWNSHIP
MI

ISSUED FOR PERMIT - NOT FOR CONSTRUCTION

MISS DIG 811

SHEET NUMBER
L200

MDOT CLASS A SEED MIX

SEED	MINIMUM PURITY	MINIMUM GERMINATION	MIXTURE
CREEPING RED FESCUE	98.5%	85%	40%
KENTUCKY BLUE GRASS	98.5%	75%	30%
PERENNIAL RYEGRASS	99.5%	85%	30%

Native Connections
3815 N Westnedge Ave, Kalamazoo, MI 49004
(P) 269.459.6900
info@nativeconnections.net
www.nativeconnections.net

Basic Mesic Tallgrass Prairie Mix

This is the base version of our Mesic Tallgrass Prairie Mix. The lower diversity and seed density still provide more than adequate coverage to establish a simple tallgrass prairie in dry to mesic soils.

Total Seeding Rate: 31.28 lbs per acre
3.88 lbs grasses • 2.41 lbs forbs • 25 lbs nurse crop
39.42 native seeds per sq ft • up to 8 ft

Call, email or visit our website for pricing.

Grasses		PLS Oz/acre	Seeds/sq ft
Andropogon gerardii	Big Bluestem	10.00	2.30
Elymus canadensis	Canada Wild Rye	16.00	1.91
Panicum virgatum	Switchgrass	8.00	2.57
Schizachyrium scoparium	Little Bluestem	20.00	6.89
Sorghastrum nutans	Indian Grass	8.00	2.20
	Total Grasses	**62.00**	**15.87**

Forbs		PLS Oz/acre	Seeds/sq ft
Asclepias syriaca	Common Milkweed	2.00	0.18
Asclepias tuberosa	Butterfly Milkweed	2.00	0.20
Baptisia lactea (B. leucantha, B. alba)	White Wild Indigo	1.00	0.04
Chamaecrista fasciculata	Partridge Pea	8.00	0.50
Echinacea purpurea	Purple Coneflower	6.00	0.91
Heliopsis helianthoides	False sunflower	4.00	0.58
Liatris spicata	Marsh Blazingstar	1.50	0.38
Monarda fistulosa	Wild Bergamot	2.00	3.21
Penstemon digitalis	Foxglove Beardtongue	1.50	4.48
Ratibida pinnata	Yellow Coneflower	2.50	1.72
Rudbeckia hirta	Black-eyed Susan	4.00	8.45
Silphium integrifolium	Rosinweed	0.25	0.01
Solidago rigida	Stiff Goldenrod	1.00	0.94
Symphyotrichum novae-angliae	New England Aster	1.00	1.52
Zizia aurea	Golden Alexander	1.75	0.44
	Total Forbs	**38.50**	**23.56**

Temporary Grass Cover		Oz/acre	Seeds/sq ft
Lolium multiflorum	Annual Ryegrass	80.00	24.79
Avena sativa	Seed Oats	320.00	7.35
	Total Temp Grasses	**400.00**	**32.14**

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Stormwater Mix

This mix is designed to withstand the low water quality and highly variable condtions associated with stormwater features. Most of the species are salt tolerant and most species will do well in mesic to wet hydrology with others filling in the wettest and driest ends of the spectrum. The high native seed count and heavy annual nurse crop in this mix ensure full and aggressive establishment.

Total Seeding Rate: 35.98 lbs per acre
3.13 lbs grasses • 2.85 lbs forbs • 30 lbs nurse crop
113.11 native seeds per sq ft

Call, email or visit our website for pricing.

Grasses, Sedges & Rushes		PLS Oz/acre	Seeds/sq ft
Andropogon gerardii	Big Bluestem	3.00	0.69
Carex vulpinoidea	Fox Sedge	2.00	4.59
Eleocharis palustris	Great Spike Rush	0.40	0.47
Elymus canadensis	Canada Wild Rye	12.00	1.430
Elymus virginicus	Virginia Wild Rye	12.00	1.16
Glyceria striata	Fowl Manna Grass	1.20	4.410
Juncus effusus	Soft Rush	0.40	9.18
Juncus tenuis	Path Rush	0.40	9.18
Panicum virgatum	Switchgrass	4.00	1.29
Schizachyrium scoparium	Little Bluestem	8.00	2.750
Scirpus cyperinus	Wool Grass	0.40	15.610
Scirpus validus (S. tabernaemontanii)	Soft-stem Bulrush	1.00	0.85
Sorghastrum nutans	Indian Grass	4.00	0.83
Spartina pectinata	Prairie Cordgrass	2.00	0.300
	Total Grasses	**50.80**	**52.74**

Forbs		PLS Oz/acre	Seeds/sq ft
Allium cernuum	Nodding Wild Onion	2.00	0.35
Asclepias incarnata	Swamp Milkweed	2.40	0.26
Asclepias tuberosa	Butterfly Milkweed	2.40	0.24
Bidens cernua	Nodding Bur Marigold	0.80	0.39
Doellingeria umbellata	Flat-topped Aster	0.40	0.62
Echinacea purpurea	Purple Coneflower	8.00	1.21
Eutrochium purpureum	Sweet Joe Pye Weed	1.20	1.16
Helenium autumnale	Sneezeweed	0.80	2.39
Heliopsis helianthoides	False sunflower	4.00	0.58
Lobelia siphilitica	Great Blue Lobelia	0.40	4.59
Mimulus ringens	Monkey Flower	0.40	21.12
Monarda fistulosa	Wild Bergamot	0.80	1.29
Penstemon digitalis	Foxglove Beardtongue	1.20	3.58
Physostegia virginiana	Obedient Plant	0.40	0.10
Polygonum pensylvanicum (Persicaria p.)	Pennsylvania Smartweed	4.00	1.19
Pycnanthemum virginianum	Mountain mint	0.40	2.02
Ratibida pinnata	Yellow Coneflower	1.60	1.10
Rudbeckia hirta	Black-eyed Susan	6.00	12.67
Senna hebecarpa	Wild Senna	4.00	0.13
Solidago riddellii	Riddell's Goldenrod	0.40	0.85
Symphyotrichum novae-angliae	New England Aster	0.40	0.61
Verbena hastata	Blue Vervain	1.60	3.42
Zizia aurea	Golden Alexander	2.00	0.51
	Total Forbs	**45.60**	**60.38**

Temporary Grass Cover		Oz/acre	Seeds/sq ft
Lolium multiflorum	Annual Ryegrass	112.00	34.71
Avena sativa	Seed Oats	368.00	8.45
	Total Temp Grasses	**480.00**	**43.16**

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Basic Shortgrass Prairie Mix

This is the economy version of our Dry Shortgrass Prairie Mix. Though the diversity and seed density are greatly reduced, this is a great starter prairie where a low stature on dry soils is needed or desired.

Total Seeding Rate: 31.25 lbs per acre
4 lbs grasses • 2.25 lbs forbs • 25 lbs nurse crop
43 native seeds per sq ft

Call, email or visit our website for pricing.

Grasses		PLS Oz/acre	Seeds/sq ft
Bouteloua curtipendula	Side-oats Grama	22.00	3.03
Carex brevior	Plains Oval Sedge	1.00	0.67
Elymus canadensis	Canada Wild Rye	8.50	1.01
Koeleria cristata	June Grass	0.25	1.15
Schizachyrium scoparium	Little Bluestem	32.00	11.02
Sporobolus heterolepis	Prairie Dropseed	0.25	0.09
	Total Grasses	**64.00**	**16.97**

Forbs		PLS Oz/acre	Seeds/sq ft
Asclepias tuberosa	Butterfly Milkweed	0.50	0.05
Aster azureus (A. oolentangiensis)	Arrow-leaved Aster	0.50	0.92
Cassia fasciculata (Chamaecrista f.)	Partridge Pea	8.00	0.50
Coreopsis lanceolata	Lance-leaf Coreopsis	7.00	3.21
Dalea purpurea (Petalostemum p.)	Purple Prairie Clover	4.00	1.65
Echinacea purpurea	Purple Coneflower	7.00	1.06
Monarda fistulosa	Wild Bergamot	0.50	0.80
Penstemon digitalis	Foxglove Beardtongue	0.50	1.49
Potentilla arguta (Drymocallis a.)	Prairie Cinquefoil	0.50	2.64
Ratibida pinnata	Yellow Coneflower	0.70	0.48
Rudbeckia hirta	Black-eyed Susan	5.25	11.09
Solidago nemoralis	Old-field Goldenrod	0.25	1.72
Solidago rigida	Stiff Goldenrod	0.70	0.66
Verbena stricta	Hoary Vervain	0.60	0.39
	Total Forbs	**36.00**	**26.66**

Temporary Grass Cover		Oz/acre	Seeds/sq ft
Lolium multiflorum	Annual Ryegrass	80.00	24.79
Avena sativa	Seed Oats	320.00	7.35
	Total Temp Grasses	**400.00**	**32.14**

PERFORMANCE STANDARDS

SATISFACTORY GROUNDCOVER DEVELOPMENT ASSOCIATED WITH NATURALIZED VEGETATION SHOULD BE EVALUATED AT EACH MONITORING PERIOD AND BASED ON THE FOLLOWING CRITERIA.

UPON COMPLETION OF PROJECT CONSTRUCTION:

ALL DISTURBED AREAS OR AREAS IDENTIFIED AS BARE SOILS MEASURING ONE SQUARE METER WITH NO VEGETATION SHOULD RECEIVE EITHER TEMPORARY COVER CROP OR PERMANENT SEED APPLICATION. NO AREAS OF BARE SOILS SHOULD REMAIN AFTER SUBSTANTIAL COMPLETION OF THE PROJECT.

THREE MONTHS AFTER SEEDING:

WITHIN THREE MONTHS OF SEED APPLICATION, OR THREE MONTHS AFTER THE START OF THE GROWING SEASON FOLLOWING DORMANT SEEDING, APPROXIMATELY 60 PERCENT OF THE SEEDED AREA (EXCLUDING PAVING OR OTHER HARDSCAPE AREAS), AS MEASURED BY AERIAL COVER, SHOULD BE VEGETATED OR OTHERWISE STABILIZED AGAINST EROSION. TEMPORARY COVER CROP MAY BE INCLUDED IN STABILIZATION AND SEEDED AREA PERCENTAGE. SUPPLEMENTAL USE OF STRAW MULCH OR BLANKET SHOULD NOT BE INCLUDED IN THE SEEDED AREA PERCENTAGE, UNLESS NEW GROWTH GERMINATION IS IDENTIFIED WITHIN THE STRAW OR BLANKETED AREAS. ANY AREAS OF IDENTIFIED BARE SOILS MEASURING ONE SQUARE METER OR MORE WITH NO VEGETATION SHOULD BE RE-SEEDED.

AFTER THE FIRST YEAR:

BY THE END OF THE FIRST FULL GROWING SEASON, ALL SEEDED AREAS SHOULD HAVE 80 PERCENT MINIMUM VEGETATION (EXCLUDING PAVING OR OTHER HARDSCAPE AREAS), AS MEASURED BY AERIAL COVER. TEMPORARY COVER CROP MAY BE INCLUDED IN SEEDED AREA PERCENTAGES. ANY AREAS OF IDENTIFIED BARE SOILS MEASURING ONE SQUARE METER OR MORE WITH NO VEGETATION SHOULD BE RE-SEEDED.

AFTER THE SECOND YEAR:

BY THE END OF THE SECOND GROWING SEASON, ALL SEEDED AREAS SHOULD HAVE A MINIMUM OF 90 PERCENT VEGETATION GROUND COVER, OF WHICH 50 PERCENT SHOULD BE NATIVE AND NATURALIZED SPECIES IDENTIFIED IN FINAL SEED MIX (EXCLUDING PAVING OR OTHER HARDSCAPE AREAS). NATIVE AND NATURALIZED SPECIES PERCENTAGE SHOULD NOT INCLUDE TEMPORARY COVER CROP, EROSION CONTROL MEASURES, OR UNDESIRABLE AND INVASIVE PLANT SPECIES. ANY AREAS OF IDENTIFIED BARE SOILS MEASURING ONE SQUARE METER OR MORE WITH NO VEGETATION SHOULD BE RE-SEEDED.

AFTER THE THIRD YEAR, AND SUBSEQUENT YEARS:

BY THE END OF THE THIRD GROWING SEASON, ALL SEEDED AREAS SHOULD HAVE A MINIMUM OF 75 PERCENT GROUND COVER BY NATIVE AND NATURALIZED SPECIES IDENTIFIED IN FINAL SEED MIX (EXCLUDING PAVING OR OTHER HARDSCAPE AREAS). THIS SHOULD NOT INCLUDE TEMPORARY COVER CROP, EROSION CONTROL MEASURES, OR UNDESIRABLE AND INVASIVE PLANT SPECIES. NO AREAS IDENTIFIED AS BARE SOILS OF ONE SQUARE METER OR LARGER SHOULD BE PRESENT WITHIN SEEDED AREAS. ANY AREAS OF IDENTIFIED BARE SOILS MEASURING ONE SQUARE METER OR MORE WITH NO VEGETATION SHOULD BE RE-SEEDED.

IF PERFORMANCE STANDARDS ARE NOT MET AT EACH OBSERVATION PERIOD, THE LANDSCAPE CONTRACTOR SHOULD NOTIFY THE OWNER AND PROPOSE CORRECTIVE ACTION IN ORDER TO MEET THE PERFORMANCE STANDARD BY THE NEXT OBSERVATION PERIOD. CORRECTIVE ACTION MAY INCLUDE OVERSEEDING, ESPECIALLY AREAS IDENTIFIED WITH BARE SOILS, ADDITIONAL EROSION CONTROL MEASURES, OR HERBICIDE TREATMENTS.

GROUNDCOVER MAINTENANCE AND MONITORING

A THREE-YEAR STEWARDSHIP PROGRAM IS NECESSARY TO ENSURE PROPER ESTABLISHMENT AND HEALTH OF GROUND COVER, TO CONTROL INVASIVE SPECIES, AND TO PREVENT OVERGROWTH AND SHADING OF EQUIPMENT. AFTER THE THIRD GROWING SEASON, THE PROGRAM IS TO BE REDUCED TO A MINIMUM OF ONE VISIT PER YEAR, DEPENDENT UPON SITE CONDITIONS AND REQUIRED STRATEGIES TO MAINTAIN GOOD HEALTH OF THE SITE SUCH AS DETHATCHING, ADDITIONAL MOWING, OR HERBICIDE TREATMENTS. ALL ASSESSMENTS MADE DURING MONITORING VISITS SHOULD IDENTIFY ANY PRESENCE OF INVASIVE SPECIES AS DEFINED BY THE MINNESOTA BOARD OF WATER AND SOIL RESOURCES, INCLUDING ADDITIONAL SPECIES OF INVASIVE OR WEEDY VEGETATION AS DEFINED BY THE MINNESOTA DEPARTMENT OF NATURAL RESOURCES, UNIVERSITY OF MINNESOTA, AND THE U.S. DEPARTMENT OF AGRICULTURE. ASSESSMENTS SHOULD INCLUDE PLANNED ACTION TO MANAGE AND REMOVE IDENTIFIED WEEDY SPECIES.

FIRST YEAR:

THE EARLIEST POSSIBLE SEED APPLICATION MAY OCCUR IN THE SPRING OF THE FIRST YEAR. NO MAINTENANCE ACTIONS ARE REQUIRED TO BE PERFORMED DURING THE FIRST SEASON OF APPLICATION. IF SEED APPLICATION TAKES PLACE IN SUMMER OR FALL OF THE FIRST YEAR, MAINTENANCE AND MONITORING SHOULD START THE FOLLOWING SEASON.

SITE VISITS ARE RECOMMENDED TO BE PERFORMED ONE TO THREE TIMES THROUGHOUT THE SUMMER AND AN ADDITIONAL ONE TO THREE TIMES THROUGHOUT THE FALL, WITH MONITORING AND EVALUATION OF VEGETATION HEIGHT AND PRESENCE OF INVASIVE SPECIES OCCURRING AT EACH VISIT. IF WEEDY SPECIES ARE IDENTIFIED DURING AN OBSERVATION, MEASURES TO CONTROL INVASIVE WOODY AND HERBACEOUS FLORA THROUGH PHYSICAL REMOVAL OR SPOT HERBICIDE TREATMENTS ARE REQUIRED. MOWING SHOULD BE CONDUCTED DURING THE FIRST YEAR IN AREAS OF THE SITE IDENTIFIED TO HAVE VEGETATION OVER 18 INCHES IN HEIGHT. AREAS WITH GROUNDCOVER HEIGHT UNDER 18 INCHES MAY REMAIN UNTIL THE NEXT SCHEDULED MONITORING VISIT. NEWLY SEEDED AREAS SHOULD BE CUT BACK TO 9 INCHES IN HEIGHT, IF POSSIBLE, AS THE LOWER MOWING HEIGHT HELPS TO REDUCE OPPORTUNISTIC WEEDY SPECIES.

SECOND YEAR:

SITE VISITS ARE RECOMMENDED TO BE PERFORMED ONE TO THREE TIMES THROUGHOUT THE SPRING, SUMMER, AND FALL, WITH MONITORING AND EVALUATION OF VEGETATION HEIGHT AND PRESENCE OF INVASIVE SPECIES OCCURRING AT EACH VISIT. DURING THE FIRST VISIT OF THE YEAR, MOWING SHOULD OCCUR TO CUT BACK ANY VEGETATION TO A HEIGHT OF 9 INCHES AND REMOVE DEAD STALKS AND SEED HEADS FROM THE PREVIOUS GROWING SEASON. IF WEEDY SPECIES ARE IDENTIFIED DURING AN OBSERVATION, MEASURES TO CONTROL INVASIVE WOODY AND HERBACEOUS FLORA THROUGH PHYSICAL REMOVAL OR SPOT HERBICIDE TREATMENTS ARE REQUIRED.

MOWING SHOULD BE CONDUCTED AT EACH ADDITIONAL VISIT IN AREAS OF THE SITE IDENTIFIED TO HAVE VEGETATION OVER 24 INCHES IN HEIGHT. AREAS WITH GROUNDCOVER HEIGHT UNDER 24 INCHES MAY REMAIN UNTIL THE NEXT SCHEDULED MONITORING VISIT. VEGETATIVE AREAS SHOULD BE CUT BACK TO 12 INCHES IN HEIGHT.

THIRD YEAR:

SITE VISITS ARE RECOMMENDED TO BE PERFORMED ONE-TO-TWO TIMES DURING THE EARLY SPRING, SUMMER, AND FALL WITH MONITORING AND EVALUATION OF VEGETATION HEIGHT AND PRESENCE OF INVASIVE SPECIES OCCURRING AT EACH VISIT. DURING THE FIRST VISIT OF THE YEAR, MOWING SHOULD OCCUR TO CUT BACK ANY VEGETATION TO A HEIGHT BETWEEN 9 AND 12 INCHES TO REMOVE DEAD STALKS AND SEED HEADS FROM THE PREVIOUS GROWING SEASON. IF WEEDY SPECIES ARE IDENTIFIED DURING AN OBSERVATION, MEASURES TO CONTROL INVASIVE WOODY AND HERBACEOUS FLORA THROUGH PHYSICAL REMOVAL OR SPOT HERBICIDE TREATMENTS ARE REQUIRED.

MOWING SHOULD BE CONDUCTED IN AREAS OF THE SITE IDENTIFIED TO HAVE VEGETATION OVER 36 INCHES IN HEIGHT. AREAS WITH GROUNDCOVER HEIGHT UNDER 36 INCHES MAY REMAIN UNTIL THE NEXT SCHEDULED MONITORING VISIT. VEGETATIVE AREAS SHOULD BE CUT BACK TO 12 INCHES IN HEIGHT.

FOLLOWING THE THIRD YEAR:

SITE VISITS ARE RECOMMENDED TO BE PERFORMED AT LEAST ONCE A YEAR, DURING THE EARLY SPRING, WITH MONITORING AND EVALUATION OF VEGETATION HEIGHT AND PRESENCE OF INVASIVE SPECIES OCCURRING DURING THE VISIT. DURING THE SPRING, MOWING SHOULD OCCUR TO CUT BACK ANY VEGETATION TO A HEIGHT BETWEEN 9 AND 12 INCHES TO REMOVE DEAD STALKS AND SEED HEADS FROM THE PREVIOUS GROWING SEASON. IF WEEDY SPECIES ARE IDENTIFIED DURING AN OBSERVATION, MEASURES TO CONTROL INVASIVE WOODY AND HERBACEOUS FLORA THROUGH PHYSICAL REMOVAL OR SPOT HERBICIDE TREATMENTS ARE REQUIRED.

FOR THE REMAINDER OF THE YEAR, MOWING MAY ONLY BE NECESSARY IN AREAS THAT ARE IDENTIFIED TO HAVE INVASIVE OR WEEDY VEGETATION. VEGETATIVE AREAS SHOULD BE CUT BACK TO 12 INCHES IN HEIGHT.

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1	ENTITLEMENT SET	06/09/2026	BPG

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3000 TOWN CENTER, SUITE 2600
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(312) 726 9445

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CIP
Copenhagen Infrastructure Partners

KHA PROJECT 161262002
DATE 06/08/2026
SCALE AS SHOWN
DESIGNED BY CFK
DRAWN BY ATK
CHECKED BY CALW

ISSUED FOR PERMIT - NOT FOR CONSTRUCTION

SWAN BESS AND CYGNET BESS
PREPARED FOR
SWAN ENERGY STORAGE LLC AND CYGNET ENERGY STORGAGE LLC
COMSTOCK TOWNSHIP MI

LANDSCAPE DETAILS

SHEET NUMBER
L201

MISS DIG 811

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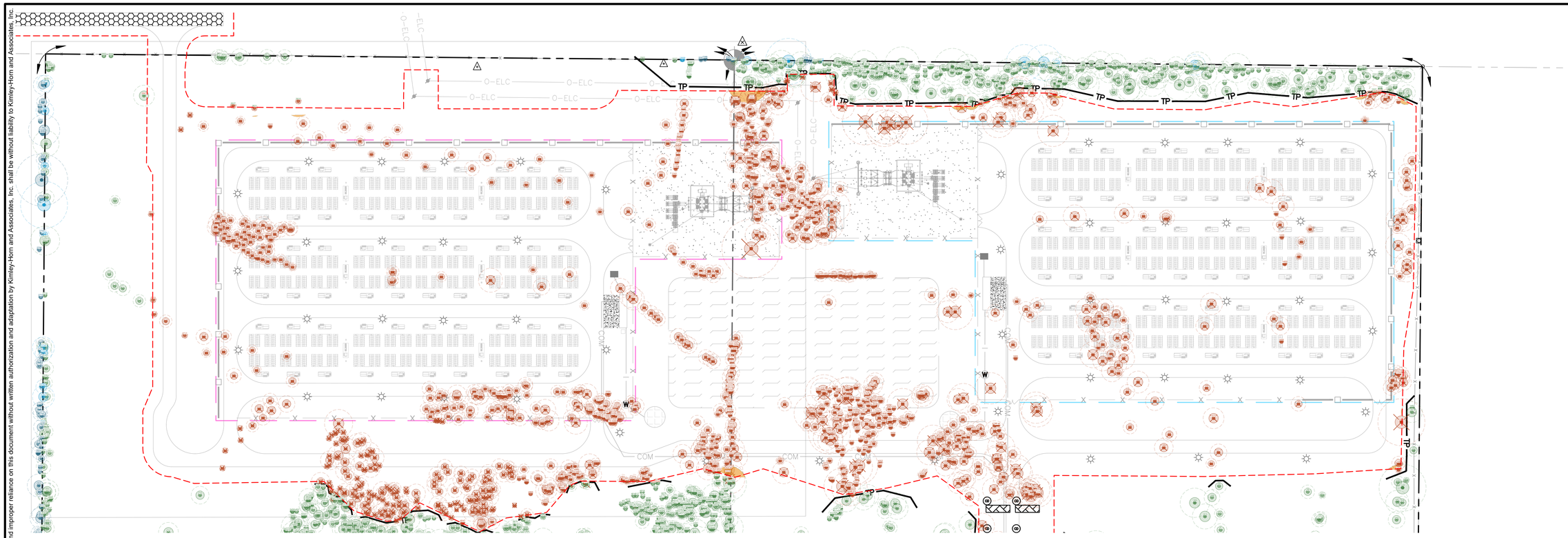
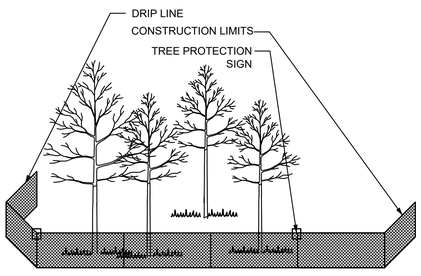
EXHIBIT G: TREE PRESERVATION PLAN





FURNISH AND INSTALL TEMPORARY FENCE AT THE TREE'S DRIPLINE OR CONSTRUCTION LIMITS AS SPECIFIED, PRIOR TO ANY CONSTRUCTION. WHEN POSSIBLE PLACE FENCE 25 FEET BEYOND THE DRIP LINE. PLACE PROTECTION SIGNS ALONG FENCE AT 20' INTERVALS.

1 TEMPORARY TREE PROTECTION FENCE PLACEMENT

SCALE: N.T.S. TP201

TREE PROTECTION NOTES

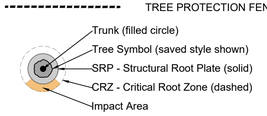
1. PRUNING WILL BE DONE BY PROFESSIONALS DURING APPROPRIATE PRUNING SEASON.
2. NO STORAGE OF MATERIALS, OPERATION OF MACHINERY, OR DEVELOPMENT OF ANY SORT WILL OCCUR WITHIN THE FENCE-LINE WITHOUT APPROVAL IN WRITING FROM THE TOWNSHIP.
3. SITE GRADING TO BE DONE ONLY AFTER PROTECTIVE MEASURES HAVE BEEN TAKEN, TOWNSHIP HAS APPROVED FENCING LOCATIONS, AND ALL CONTRACTORS HAVE BEEN BREIFED ON TREE PRESERVATION TECHNIQUES.
4. EXISTING TREES TO REMAIN OR REMOVED TO BE CLEARLY IDENTIFIED, WITHIN DISTURBANCE LIMITS AND 10' OUTSIDE OF THE DISTURBANCE LIMITS.
5. TREE PRESERVATION TO BE APPROVED BY OWNER AND PER LOCAL GOVERNMENTAL AUTHORITY.

TREE MITIGATION DATA

TOTAL TREES ONSITE:	7,047 TREES
TOTAL TREES REMOVED:	1,521 TREES
TOTAL TREES SAVED:	5,526 TREES

LEGEND

- PROPERTY LINE
- LIMITS OF CONSTRUCTION
- TREE PROTECTION FENCE

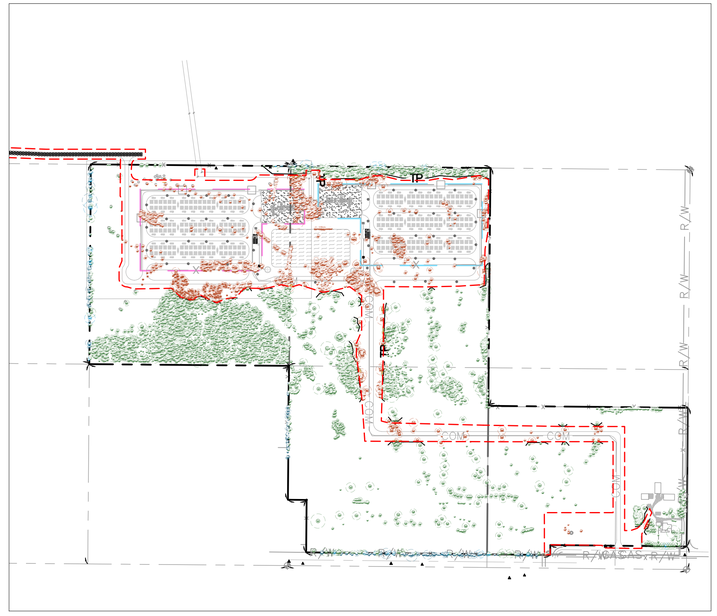


TREE TYPES:

- SITE SAVED
- BOUNDARY SAVED
- CO-OWNED SAVED
- REMOVED (Uses Removal X Symbol color)

KEYNOTE LEGEND

- (A) EXISTING TREE TO BE SAVED (TYP.)
- (B) EXISTING TREE TO BE REMOVED (TYP.)
- (C) LIMITS OF CONSTRUCTION (TYP.)
- (D) TREE PROTECTION FENCE (SEE DETAIL) (TYP.)



MISS DIG 811

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1	ENTITLEMENT SET	06/08/2026	BPG

Kimley»Horn of Michigan, Inc.

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3000 TOWN CENTER, SUITE 2600
SOUTHFIELD, MI 48075
(312) 726 9445

CIP Copenhagen Infrastructure Partners

STATE OF MICHIGAN BRIAN GAMMON ENGINEER NO. 6201312904 LICENSED PROFESSIONAL ENGINEER

Brian Gammon

KHA PROJECT 161262002
DATE 06/08/2026
SCALE ########
DESIGNED BY JLL
DRAWN BY EAS
CHECKED BY BPG

OVERALL TREE PRESERVATION PLAN

SWAN BESS AND CYGNET BESS

PREPARED FOR
SWAN ENERGY STORAGE LLC AND CYGNET ENERGY STORGAGE LLC
COMSTOCK TOWNSHIP MI

SHEET NUMBER
TP201

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S89°27'33"E 1317.95'

S89°27'33"E 2635.90'

S89°27'33"W 1569.29'

LEGEND

- PROPERTY LINE
- LIMITS OF CONSTRUCTION
- TREE PROTECTION FENCE

Trunk (filled circle)
Tree Symbol (saved style shown)
SRP - Structural Root Plate (solid)
CRZ - Critical Root Zone (dashed)
Impact Area

TREE TYPES:

- **SITE SAVED**
- **BOUNDARY SAVED**
- **CO-OWNED SAVED**
- **REMOVED** (Uses Removal X Symbol color)

KEYNOTE LEGEND

- (A) EXISTING TREE TO BE SAVED (TYP.)
- (B) EXISTING TREE TO BE REMOVED (TYP.)
- (C) LIMITS OF CONSTRUCTION (TYP.)
- (D) TREE PROTECTION FENCE (SEE DETAIL) (TYP.)

GRAPHIC SCALE IN FEET
0 25 50 100

NORTH

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STATE OF MICHIGAN
BRIAN JAMMON
ENGINEER
NO. 6201312904
PROFESSIONAL ENGINEER

Brian Jammon

KHA PROJECT	161262002
DATE	06/08/2026
SCALE	AS SHOWN
DESIGNED BY	CFK
DRAWN BY	CFK
CHECKED BY	BPG

TREE PRESERVATION ENLARGEMENT

SWAN BESS AND CYGNET BESS
PREPARED FOR
SWAN ENERGY STORAGE LLC AND CYGNET ENERGY STORGAGE LLC
COMSTOCK TOWNSHIP
MI

SHEET NUMBER
TP202

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S89°29'25"E 1319.17'

N00°26'29"E 1318.44'

N00°29'11"E 1317.96'

LEGEND

- PROPERTY LINE
- LIMITS OF CONSTRUCTION
- TREE PROTECTION FENCE

Trunk (filled circle)
Tree Symbol (saved style shown)
SRP - Structural Root Plate (solid)
CRZ - Critical Root Zone (dashed)
Impact Area

TREE TYPES:

- **SITE SAVED**
- **BOUNDARY SAVED**
- **CO-OWNED SAVED**
- **REMOVED** (Uses Removal X Symbol color)

KEYNOTE LEGEND

- (A) EXISTING TREE TO BE SAVED (TYP.)
- (B) EXISTING TREE TO BE REMOVED (TYP.)
- (C) LIMITS OF CONSTRUCTION (TYP.)
- (D) TREE PROTECTION FENCE (SEE DETAIL) (TYP.)

GRAPHIC SCALE IN FEET
0 25 50 100

NORTH

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STATE OF MICHIGAN
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NO.
6201312404
PROFESSIONAL ENGINEER

Brian Gammon

KHA PROJECT	161262002
DATE	06/08/2026
SCALE	AS SHOWN
DESIGNED BY	CFK
DRAWN BY	CFK
CHECKED BY	BPG

TREE PRESERVATION ENLARGEMENT

SWAN BESS AND CYGNET BESS
PREPARED FOR
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COMSTOCK TOWNSHIP
MI

SHEET NUMBER
TP203

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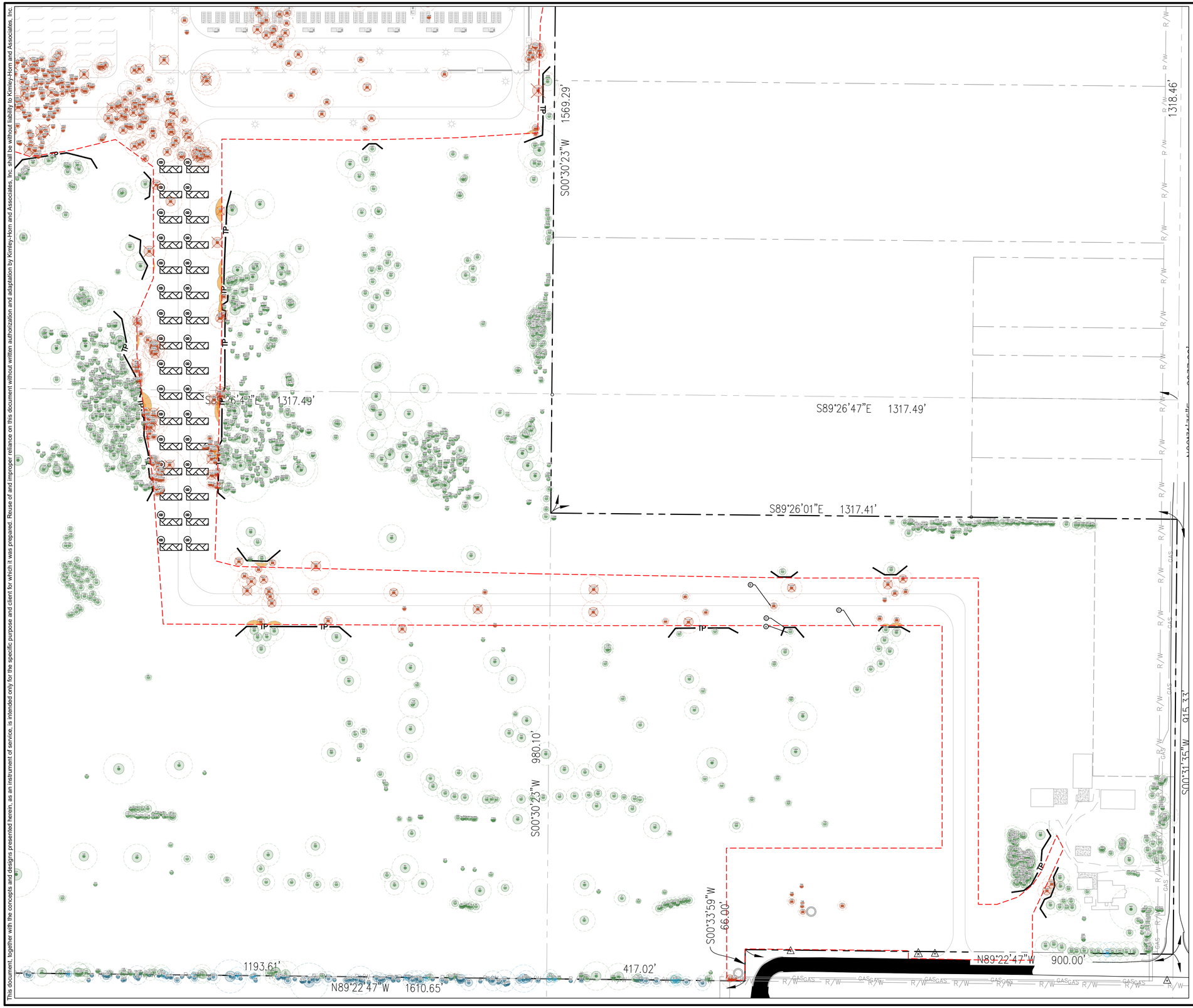

LEGEND

- PROPERTY LINE
- LIMITS OF CONSTRUCTION
- TREE PROTECTION FENCE

Trunk (filled circle)
Tree Symbol (saved style shown)
SRP - Structural Root Plate (solid)
CRZ - Critical Root Zone (dashed)
Impact Area

TREE TYPES:

- **SITE SAVED**
- **BOUNDARY SAVED**
- **CO-OWNED SAVED**
- **REMOVED** (Uses Removal X Symbol color)

KEYNOTE LEGEND

- (A) EXISTING TREE TO BE SAVED (TYP.)
- (B) EXISTING TREE TO BE REMOVED (TYP.)
- (C) LIMITS OF CONSTRUCTION (TYP.)
- (D) TREE PROTECTION FENCE (SEE DETAIL) (TYP.)

GRAPHIC SCALE IN FEET
0 25 50 100

NORTH

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ENGINEER
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PROFESSIONAL ENGINEER

Brian Gammon

KHA PROJECT 161282002
DATE 06/08/2026
SCALE AS SHOWN
DESIGNED BY CFK
DRAWN BY CFK
CHECKED BY BPG

TREE PRESERVATION ENLARGEMENT

SWAN BESS AND CYGNET BESS
PREPARED FOR
SWAN ENERGY STORAGE LLC AND CYGNET ENERGY STORGAGE LLC
COMSTOCK TOWNSHIP MI

SHEET NUMBER
TP204

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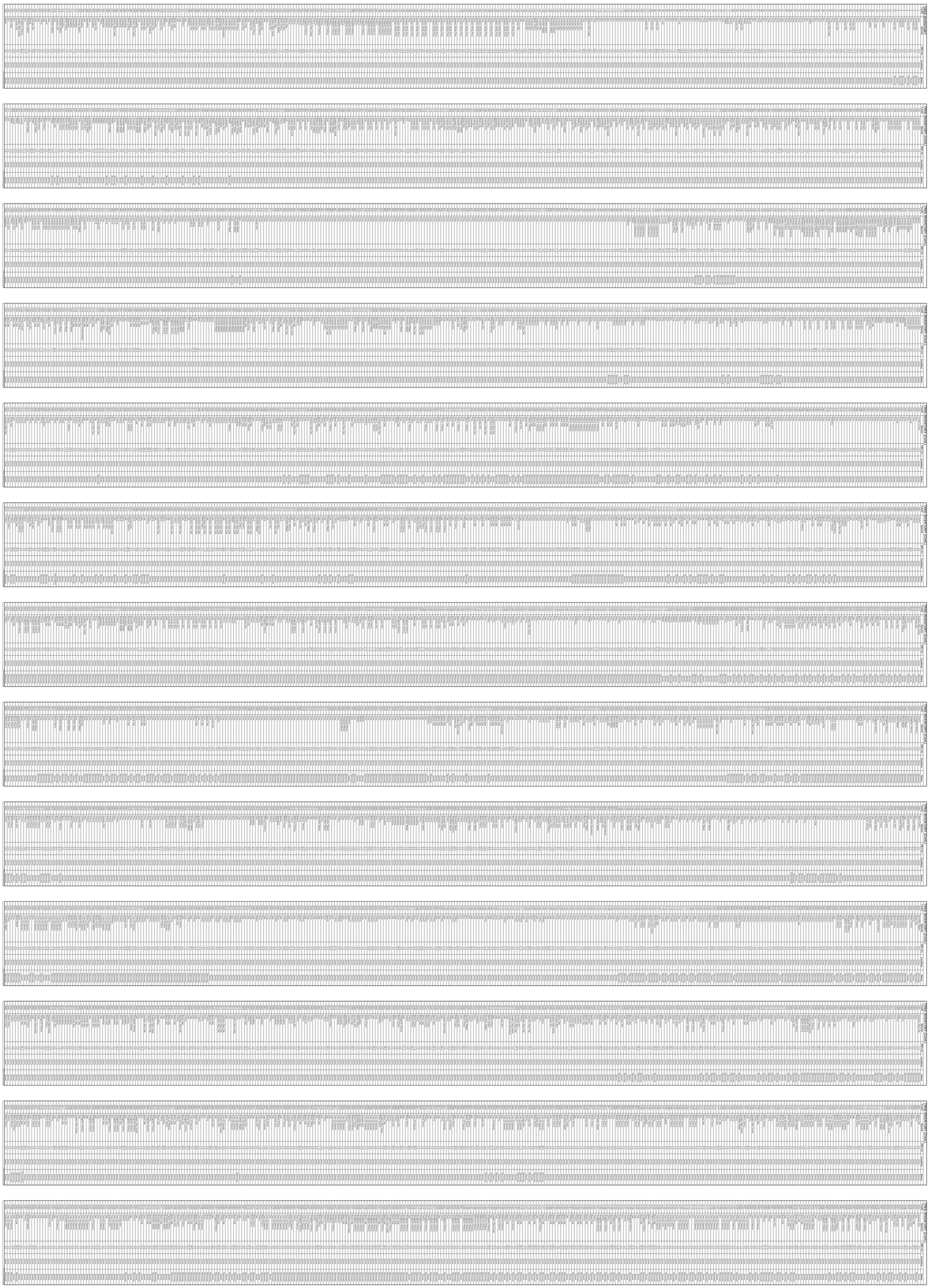

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TP205

SWAN BESS AND CYGNET BESS

PREPARED FOR
SWAN ENERGY STORAGE LLC AND
CYGNET ENERGY STORGAGE LLC
COMSTOCK
TOWNSHIP MI

TREE INVENTORY

KHA PROJECT	161262002
DATE	06/08/2026
SCALE	########
DESIGNED BY	JLL
DRAWN BY	EAS
CHECKED BY	BPG

Brian Gannon

STATE OF MICHIGAN · BRIAN GANNON · LICENSED PROFESSIONAL ENGINEER · NO. 6201-73043

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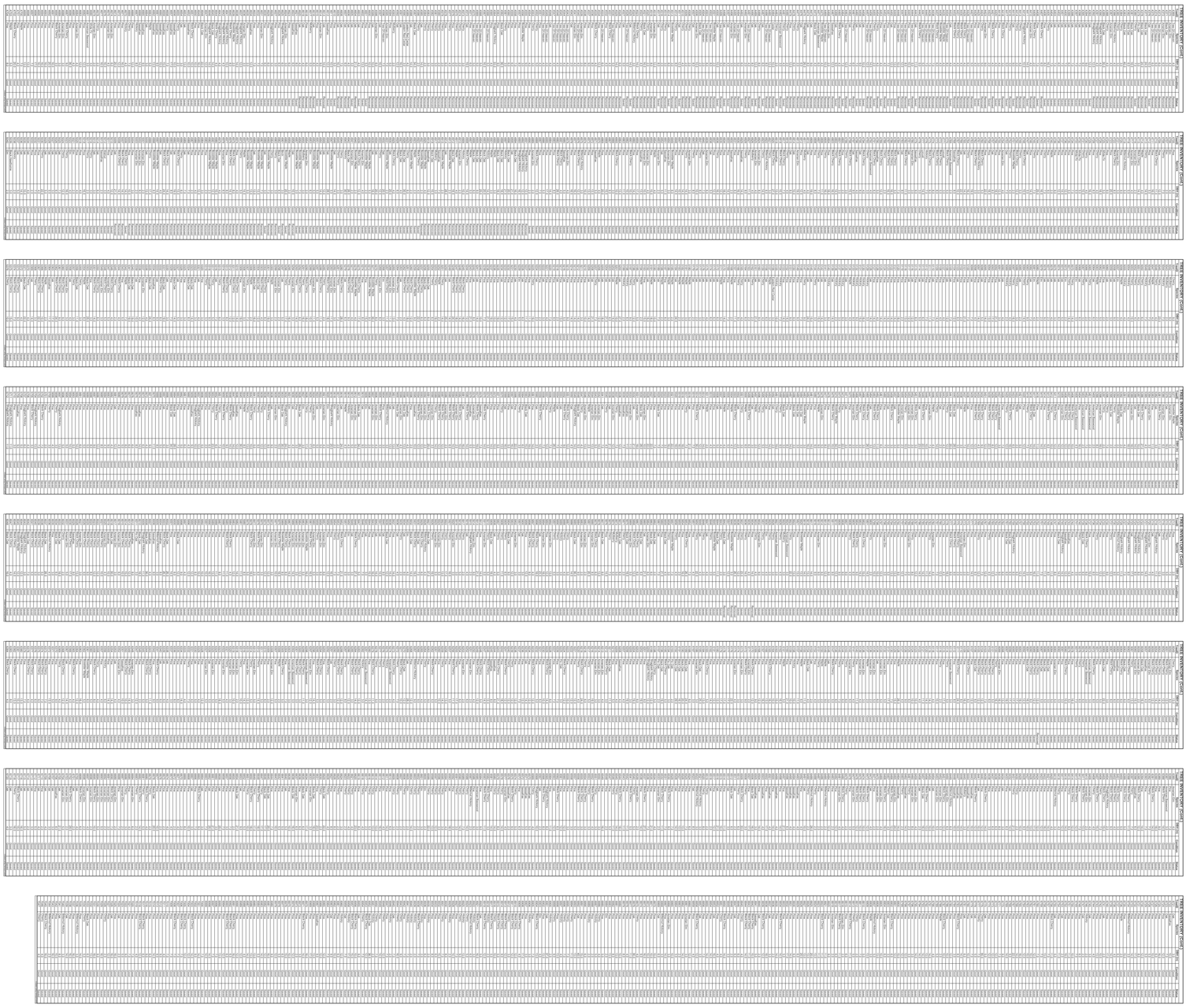

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TP206

SWAN BESS AND CYGNET BESS

PREPARED FOR
SWAN ENERGY STORAGE LLC AND
CYGNET ENERGY STORGAGE LLC
COMSTOCK
TOWNSHIP MI

TREE INVENTORY

KHA PROJECT	161262002
DATE	06/08/2026
SCALE	########
DESIGNED BY	JLL
DRAWN BY	EAS
CHECKED BY	BPG

Brian Gannon

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EXHIBIT H: PHOTOMETRIC PLAN

\\TCWfiler01\Projects01\MW_TCW\Data\TCW_LDEV\Copenhagen Infrastructure Partners\Swan BESS_MI\2 Design\CAD\PlanSheets\PP100-PHOTOMETRICS PLAN.dwg June 08, 2026 - 12:49pm

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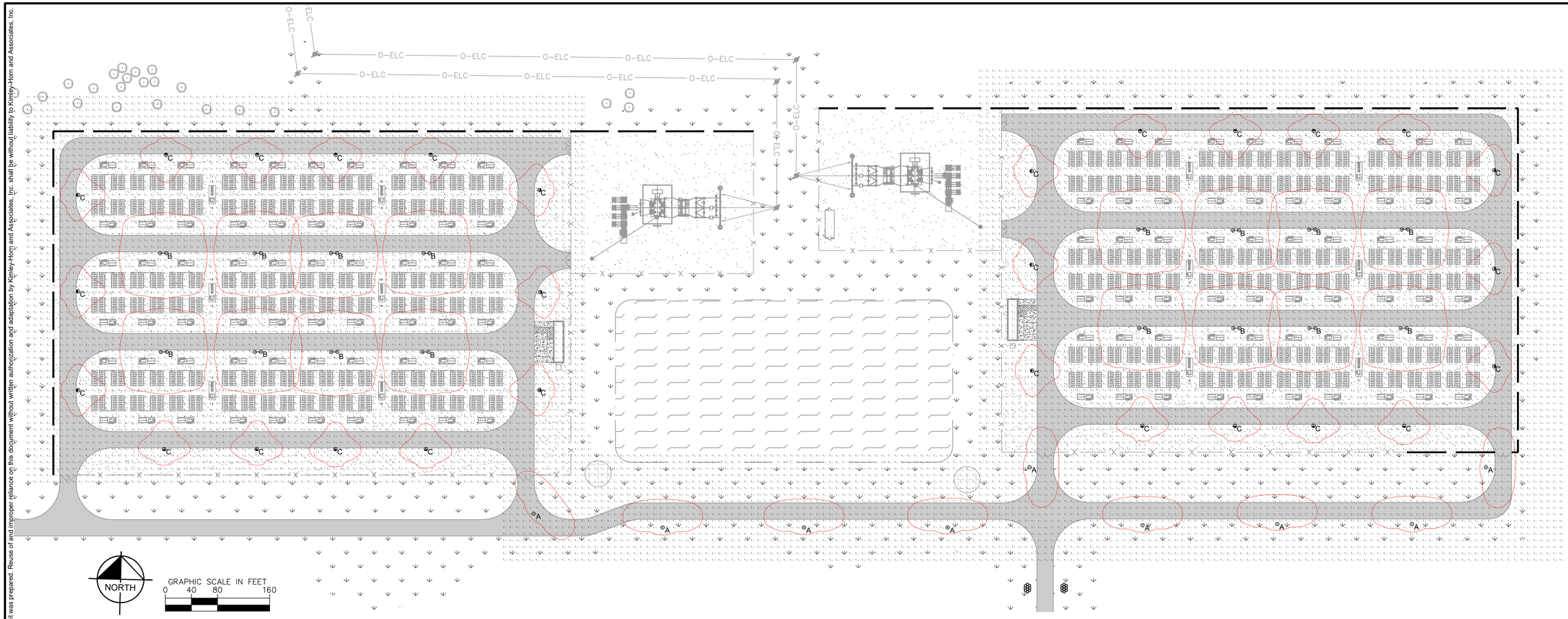
O-ELC
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EXHIBIT I: TRUCK CIRCULATION PLAN

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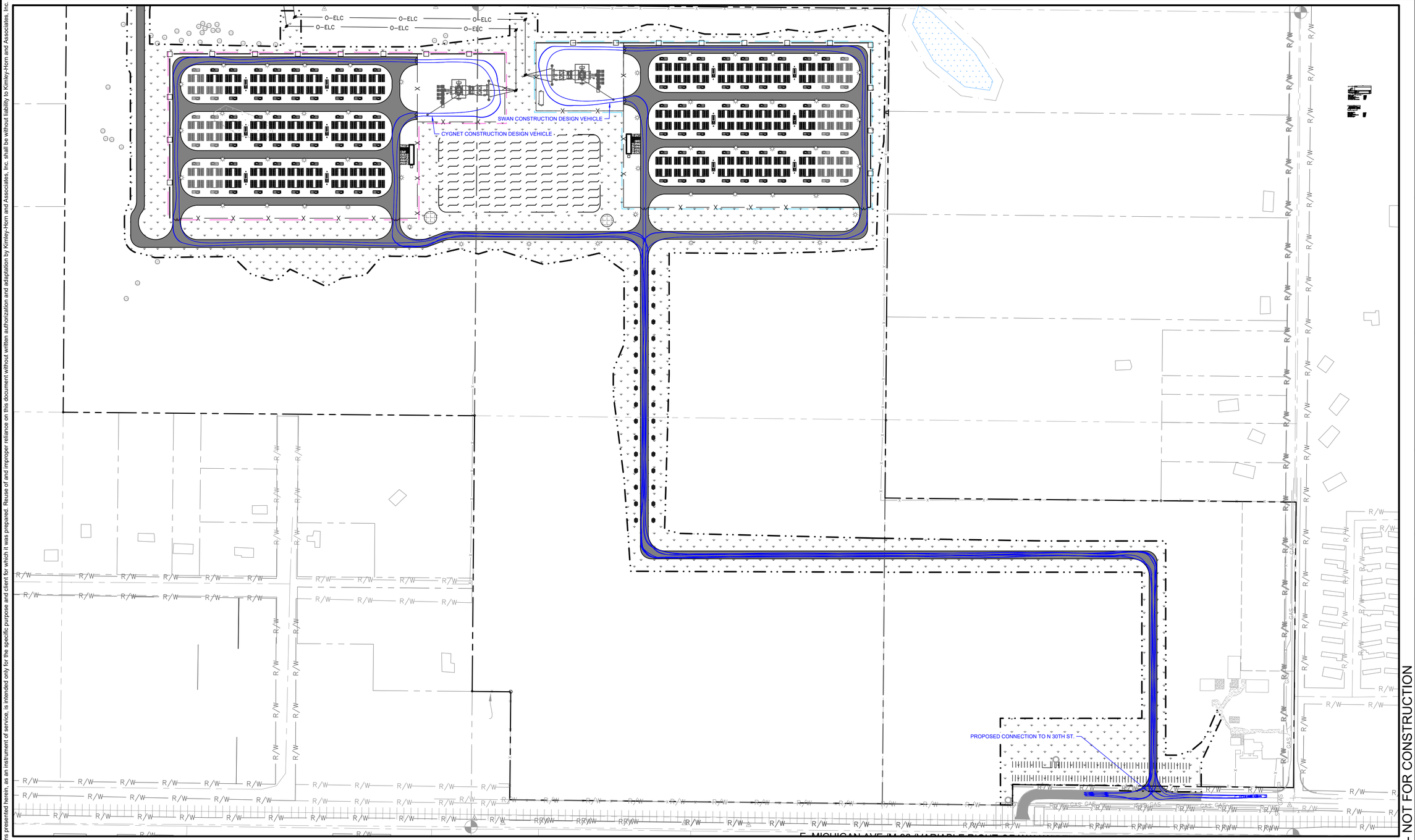
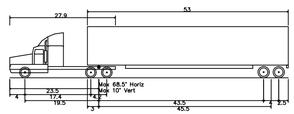


CONSTRUCTION DESIGN VEHICLE



WB-67 – Interstate Semi-Trailer	
Overall Length	73.501ft
Overall Width	8.500ft
Overall Body Height	13.500ft
Min Body Ground Clearance	1.334ft
Max Track Width	8.500ft
Lock-to-lock time	6.00s
Max Steering Angle (Virtual)	28.40°

THE VEHICLE MANEUVERING IDENTIFIED ON THIS PLAN WAS PREPARED USING VEHICLE TRACKING SOFTWARE AND DOES NOT NECESSARILY REPRESENT ACTUAL CONDITIONS NOR DOES IT ACCOUNT FOR EXTERNAL FACTORS. THIS ANALYSIS SHOULD NOT BE USED AS THE SOLE BASIS FOR THE CLIENT'S DECISION MAKING

NORTH

GRAPHIC SCALE IN FEET
0 75 150 300

MISS DIG 811

ISSUED FOR PERMIT - NOT FOR CONSTRUCTION

No.	REVISIONS	DATE	BY
1	ENTITLEMENT SET	06/08/2026	BPG

Kimley»Horn of Michigan, Inc.

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3000 TOWN CENTER, SUITE 2600
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CIP
Copenhagen Infrastructure Partners

STATE OF MICHIGAN
BRIAN DAMON GAMMON
ENGINEER
6201312904
PROFESSIONAL ENGINEER

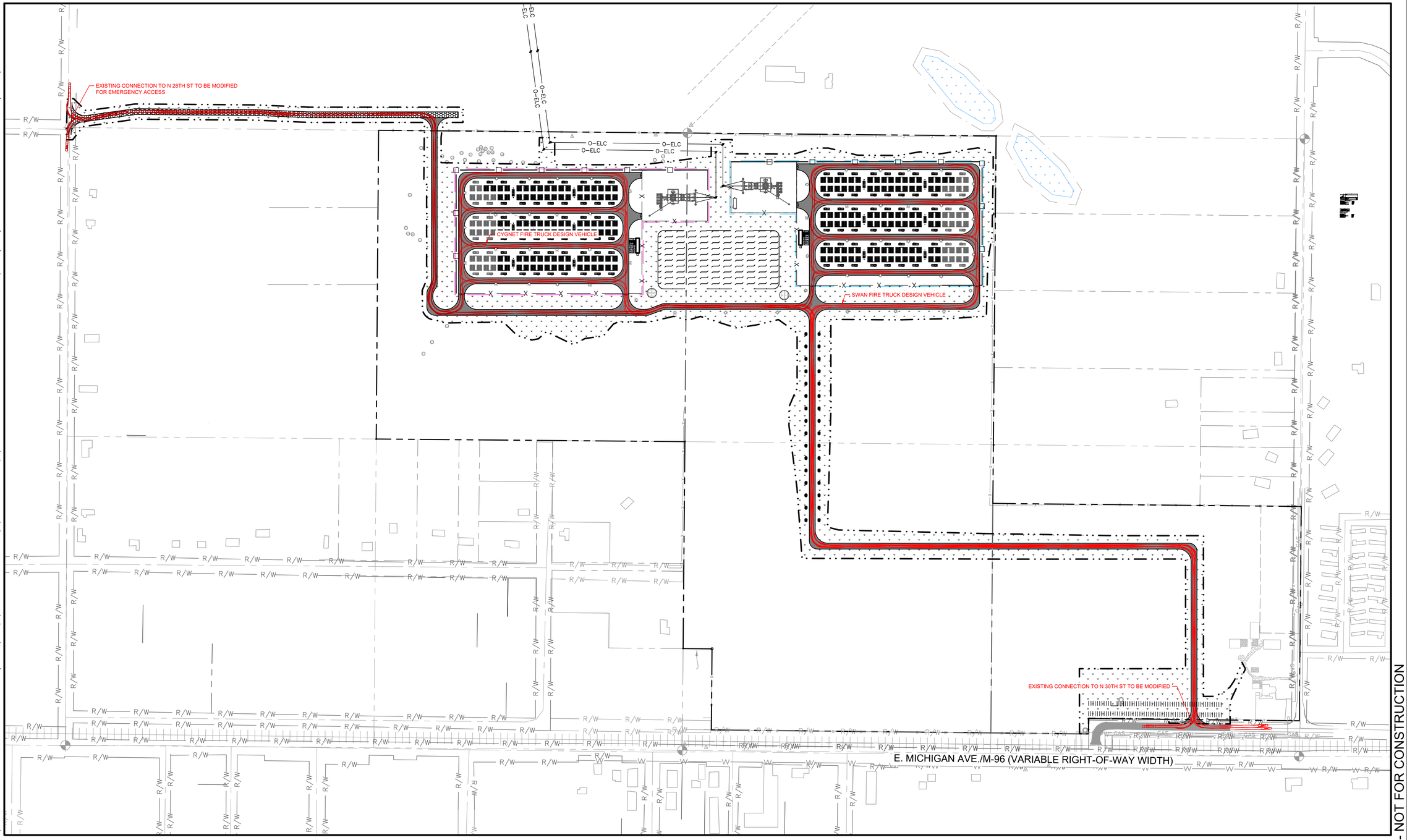
Brian Gammon

KHA PROJECT	161262002
DATE	06/08/2026
SCALE	AS SHOWN
DESIGNED BY	JLL
DRAWN BY	EAS
CHECKED BY	BPG

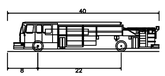
CONSTRUCTION VEHICLE CIRCULATION PLAN

SWAN BESS AND CYGNET BESS
PREPARED FOR
SWAN ENERGY STORAGE LLC AND CYGNET ENERGY STORGAGE LLC
COMSTOCK TOWNSHIP
MI

SHEET NUMBER
C410



FIRE TRUCK DESIGN VEHICLE



Pumper Fire Truck	
Overall Length	40.000ft
Overall Width	8.167ft
Overall Body Height	7.745ft
Min Body Ground Clearance	0.656ft
Track Width	8.167ft
Lock-to-lock time	5.00s
Max Wheel Angle	45.00°

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NORTH

GRAPHIC SCALE IN FEET
0 100 200 400

MISS DIG 811

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No.	REVISIONS	DATE	BY
1	ENTITLEMENT SET	06/08/2026	BPG

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STATE OF MICHIGAN BRIAN GAMMON ENGINEER NO. 6201312904 LICENSED PROFESSIONAL ENGINEER

Brian Gammon

KHA PROJECT 161262002
DATE 06/08/2026
SCALE AS SHOWN
DESIGNED BY JLL
DRAWN BY EAS
CHECKED BY BPG

EMERGENCY VEHICLE CIRCULATION PLAN

SWAN BESS AND CYGNET BESS
PREPARED FOR
SWAN ENERGY STORAGE LLC AND CYGNET ENERGY STORGAGE LLC
COMSTOCK TOWNSHIP MI

SHEET NUMBER
C411

K:\TCW_LDEV\Copenhagen Infrastructure Partners\Swan BESS_MI\2 Design\CAD\PlanSheets\C4-CIRCULATION PLAN.dwg June 08, 2026 - 12:27pm
This document, together with the concepts and designs presented herein, as an instrument of service, is intended only for the specific purpose and client for which it was prepared. Reuse of and improper reliance on this document without written authorization and adaptation by Kimley-Horn and Associates, Inc. shall be without liability to Kimley-Horn and Associates, Inc.

EXHIBIT J: NOISE STUDY

Kimley»Horn
of Michigan, Inc.

March 30, 2026

Simone Marletti
Swan Energy Storage LLC & Cygnet Energy Storage LLC
c/o Copenhagen Infrastructure Service Co.

Subject: ***Swan BESS and Cygnet BESS – Noise Study***
Comstock Township, Kalamazoo County, Michigan

Executive Summary

The purpose of this technical memorandum is to summarize the evaluated sound levels associated with the operational equipment to be located at the proposed Swan Battery Energy Storage System (BESS) and Cygnet BESS site located in Comstock Township, Kalamazoo County, MI. The proposed Swan BESS and Cygnet BESS project site is located approximately 1.5 miles southeast of Comstock Northwest, approximately 2.5 miles east of Eastwood, approximately 2.5 miles west of Galesburg, and approximately 5 miles east of downtown Kalamazoo. The site is generally located south of East Main Street, east of North 28th Street, north of East Michigan Avenue/MI-96, and west of North 30th Street. Additionally, Amtrak (ATK) railroad tracks are located directly south of the site, and the Kalamazoo/Battle Creek International Airport is located approximately 4.5 miles southwest of the site. It is to be noted that an existing substation is also located directly north of the site. The Swan BESS and Cygnet BESS site will be located on recreational land (i.e. golf course) with residences surrounding the site. The location of the proposed Swan BESS and Cygnet BESS site is shown in **Figure 1**.

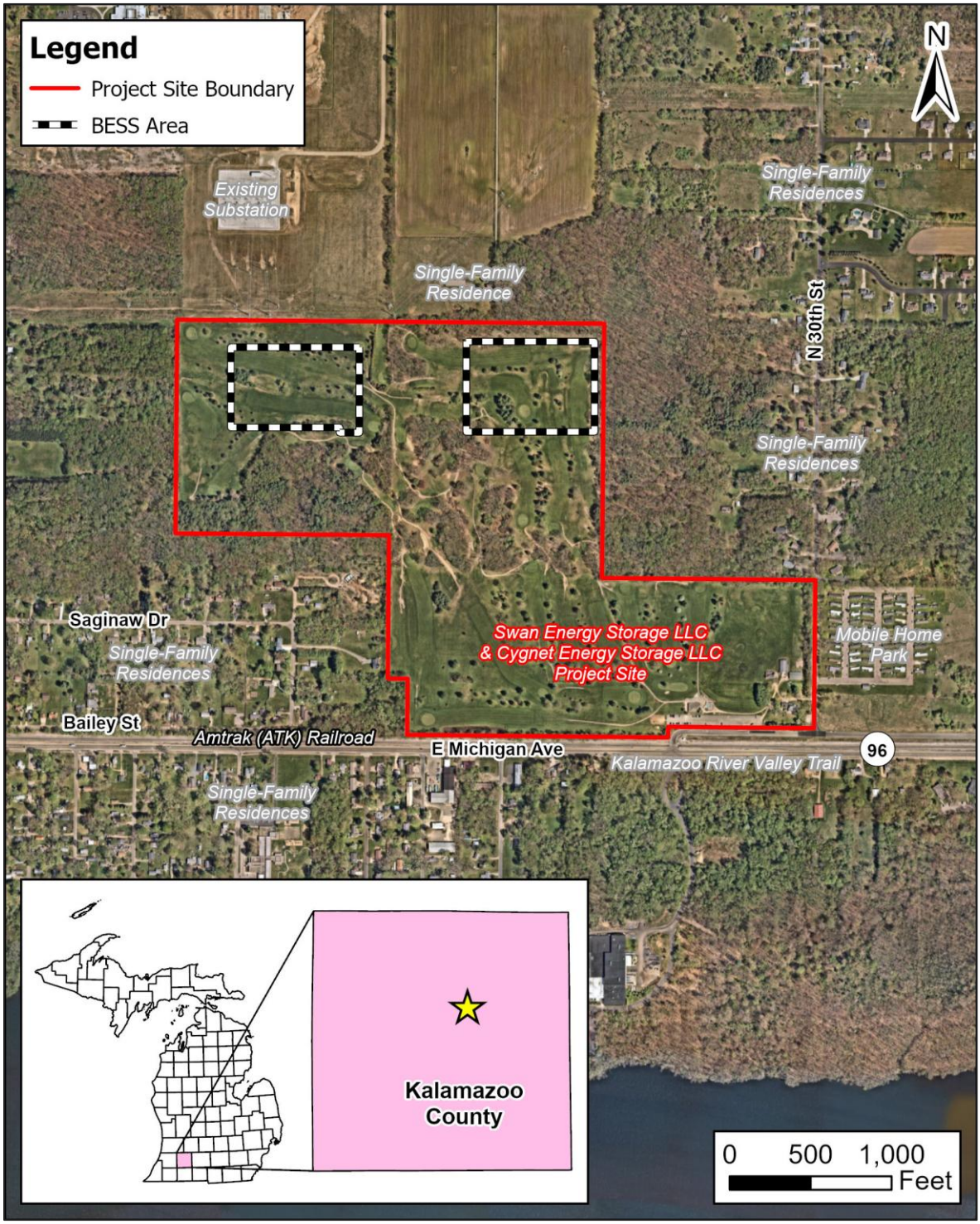
Analysis Findings

- *The Swan BESS and Cygnet BESS site will be located on recreational land with residences surrounding the site, railroad tracks to the south, an airport to the southwest, and an existing substation to the north. The Township of Comstock BESS Ordinance establishes an allowable sound level of 55 dB(A) as measured at the property line of an adjacent non-participating property. Unmitigated maximum equivalent operational noise levels at the project boundary were estimated to be near or below approximately 63 dB(A) during peak operations; therefore, mitigation is recommended at this time.*

Project Description

The proposed Swan BESS and Cygnet BESS site will be constructed on nearly 34 acres of approximately 143 acres of recreational land in Comstock Township, MI. The proposed site will contain one hundred twenty (120) inverters in the BESS areas in the northern portion of the site with sixty (60) inverters in each BESS area and four hundred eighty (480) battery storage cabinets in the BESS areas with two hundred forty (240) battery storage cabinets in each BESS area. Additionally, two (2) transformers will be located between the BESS areas.

Figure 1: Site Location and Vicinity



Characteristics of Noise

Noise is generally defined as unwanted sound. It is emitted from many natural and man-made sources. Sound pressure levels are usually measured and expressed in decibels (dB). The decibel scale is logarithmic and expresses the ratio of the sound pressure unit being measured to a standard reference level. Most sounds occurring in the environment do not consist of a single frequency, but rather a broad band of differing frequencies. The intensities of each frequency add together to generate sound. Because the human ear does not respond to all frequencies equally, the method commonly used to quantify environmental noise consists of evaluating all of the frequencies of a sound according to a weighting system. It has been found that the A-weighted decibel [dB(A)] filter on a sound level meter, which includes circuits to differentially measure selected audible frequencies, best approximates the frequency response of the human ear.

The degree of disturbance from exposure to unwanted sound – noise – depends upon three factors:

1. The amount, nature, and duration of the intruding noise
2. The relationship between the intruding noise and the existing sound environment; and
3. The situation in which the disturbing noise is heard

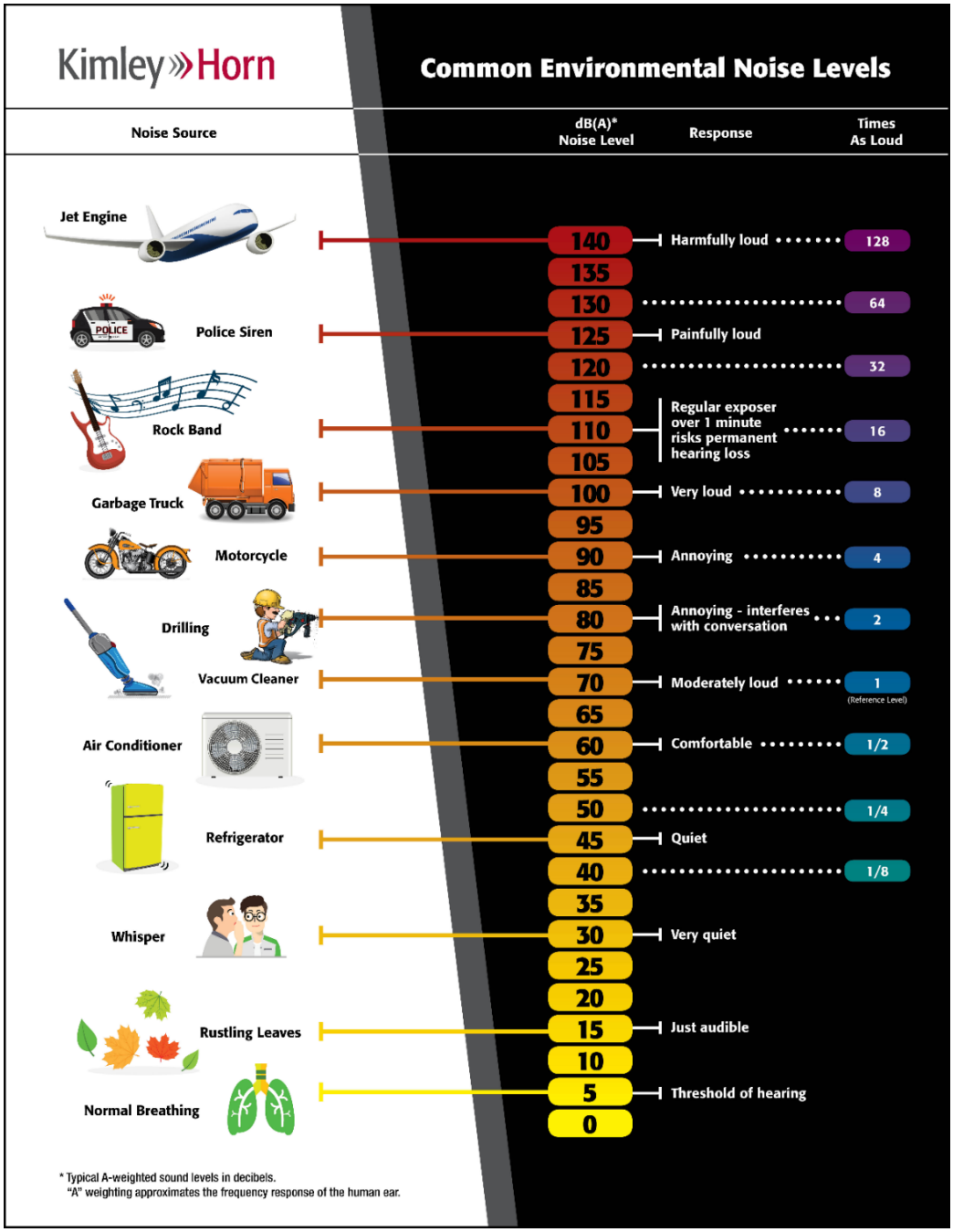
In considering the first of these factors, it is important to note that individuals have varying sensitivity to noise. Loud noises bother some people more than other people, and some individuals become increasingly upset if an unwanted noise persists. The time patterns and durations of noise(s) also affect perception as to whether or not it is offensive. For example, noises that occur during nighttime (sleeping) hours are typically considered to be more offensive than the same noises in the daytime.

With regard to the second factor, individuals tend to judge the annoyance of an unwanted noise in terms of its relationship to noise from other sources (background noise). A car horn blowing at night when background noise levels are low would generally be more objectionable than one blowing in the afternoon when background noise levels are typically higher. The response to noise stimulus is analogous to the response to turning on an interior light. During the daytime an illuminated bulb simply adds to the ambient light, but when eyes are conditioned to the dark of night, a suddenly illuminated bulb can be temporarily blinding.

The third factor – situational noise – is related to the interference of noise with activities of individuals. In a 60 dB(A) environment such as is commonly found in a large business office, normal conversation would be possible, while sleep might be difficult. Loud noises may easily interrupt activities that require a quiet setting for greater mental concentration or rest; however, the same loud noises may not interrupt activities requiring less mental focus or tranquility.

As shown in **Figure 2**, most individuals are exposed to fairly high noise levels from many sources on a regular basis. To perceive sounds of greatly varying pressure levels, human hearing has a non-linear sensitivity to sound pressure exposure. Doubling the sound pressure results in a three decibel change in the noise level; however, variations of three decibels [3 dB(A)] or less are commonly considered “barely perceptible” to normal human hearing. A five decibel [5 dB(A)] change is more readily noticeable. A ten-fold increase in the sound pressure level correlates to a 10 decibel [10 dB(A)] noise level increase; however, it is judged by most people as only sounding “twice as loud”.

Figure 2: Common Noise Levels



Over time, individuals tend to accept the noises that intrude into their lives on a regular basis. However, exposure to prolonged and/or extremely loud noise(s) can prevent use of exterior and interior spaces and has been theorized to pose health risks.

Noise Regulations

The proposed Swan BESS and Cygnet BESS site is located in Comstock Township, MI. Article 4, Section 4.61(C)(7) of the Township of Comstock BESS Ordinance states that "The [energy storage] system may not generate a maximum sound in excess of 55 average hourly decibels measured at the property line of an adjacent nonparticipating property."

Noise Analysis

Operational sound levels from the proposed Swan BESS and Cygnet BESS site were evaluated using SoundPLAN. This program computes predicted sound levels at noise-sensitive areas through a series of adjustments to reference sound levels. SoundPLAN also accounts for topography, groundcover type, and intervening structures. Sound levels generated from inverters, transformers, and battery storage cabinets are anticipated to be the main sources of sound from the proposed BESS site.

It should be noted that noise from surrounding roadways was not modeled in this analysis, although East Main Street, North 28th Street, East Michigan Avenue/MI-96, North 30th Street, and other nearby roadways are anticipated to contribute to the ambient noise environment throughout the entire day. According to the Federal Railroad Administration (FRA) Rail Crossing Inventory, the ATK railroad tracks located south of the project site are anticipated to have approximately six (6) train pass-by events during daytime hours and approximately two (2) train pass-by events during nighttime hours. However, noise from train pass-by was not modeled in this analysis. Additionally, noise from the Kalamazoo/Battle Creek International Airport is anticipated to contribute to the ambient noise environment but was also not modeled in this analysis.

Inverters

Inverter equipment can generate steady, unvarying sound that may create issues when located near noise-sensitive areas. According to the current site layout, one hundred twenty (120) inverters will be located in the BESS areas in the northern portion of the site with sixty (60) inverters in each BESS area. Based on noise emission information provided for the EPC Power M10 Inverter, a reference sound pressure level of 75 dB(A) at 1 meter (i.e., 3 feet) for each inverter was used. The sound from the simultaneous operation of the inverter equipment was calculated at the closest adjacent non-participating property boundary using SoundPLAN.

Transformers

Transformers can also generate steady, unvarying sound that may create issues when located near noise-sensitive areas. It was assumed that two (2) transformers would be located between the BESS areas. Based on emission levels for typical transformer equipment, a reference sound level of 75 dB(A) at 1 meter was used for each transformer. The sound from the operation of the transformers was calculated at the closest adjacent non-participating property boundary using SoundPLAN.

Sound generated by the transformers is not anticipated to significantly contribute to the existing environmental sound levels surrounding the site. Also, sound generated by the transformers is

expected to be mitigated by providing sufficient offsets between the transformers and surrounding noise-sensitive land uses.

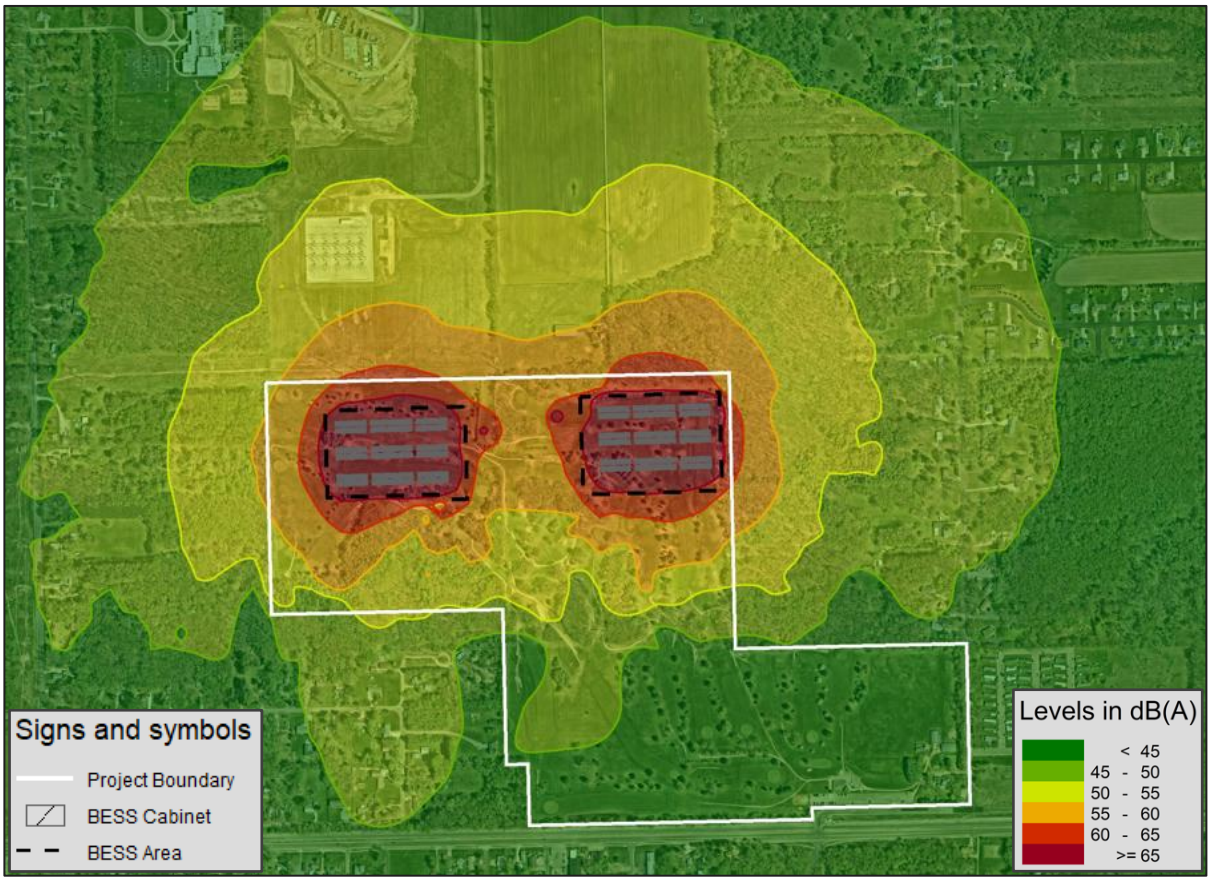
Battery Storage Cabinets

Battery storage cabinets can also generate steady, unvarying sound that may create issues when located near noise-sensitive areas. According to the current site layout, four hundred eighty (480) battery storage cabinets will be located in the BESS areas in the northern portion of the site with two hundred forty (240) battery storage cabinets in each BESS area. The battery storage cabinets in the BESS area will contain up to three (3) chillers and four (4) HVAC units. Based on noise emission information provided for the LG JF2 DC Link 5.1, a reference sound pressure level of 70 dB(A) at 1 meter for each chiller was used and a reference sound pressure level of 71 dB(A) at 1 meter for each HVAC unit was used. The sound from the simultaneous operation of the battery storage cabinet chillers and HVAC units was calculated at the closest adjacent non-participating property boundary using SoundPLAN. It was assumed that the chillers and HVAC units are located facing the aisles between cabinets.

Results

The SoundPLAN-predicted maximum equivalent operational sound levels at the closest property line of an adjacent non-participating property are anticipated to be near or below approximately 63 dB(A) which exceeds the established noise level limit of 55 dB(A); therefore, mitigation is recommended. The anticipated operational noise contours are shown in **Figure 3**.

Figure 3: Anticipated Operational Noise Contours



Noise Abatement Measures

Passive noise abatement measures are effective because they absorb sound energy, extend the source-to-receptor sound transmission path, or both. Sound absorption is a function of abatement medium (e.g. earth berms absorb more sound energy than noise walls of the same height because earth berms are more massive). The source-to-receptor path is extended by placement of an obstacle, such as an earth berm or concrete wall, that sufficiently blocks the transmission of sound waves that travel from the source to the receptor.

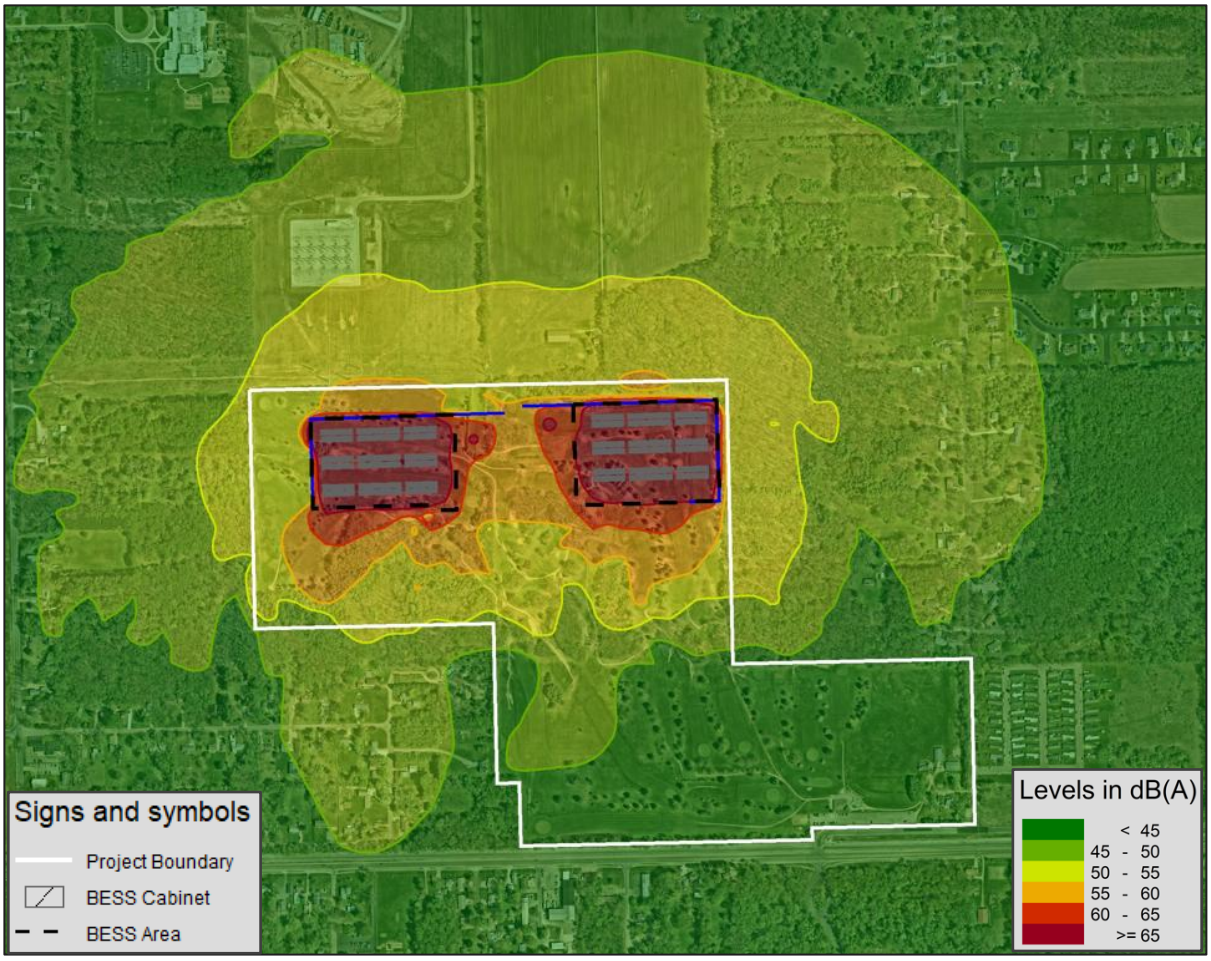
Sound barriers are primarily constructed as earth berms or solid-mass walls adjacent to sources of noise that are in proximity to noise-sensitive land use(s). To be effective, a sound barrier must be long enough and tall enough to shield potentially impacted areas. Generally, the noise barrier length must be eight times the distance from the barrier to the receptor. For example, if a receptor is 200 feet from the noise source, an effective barrier would be approximately 1,600 feet long – with the noise-sensitive land use in the horizontal center.

Since on-site operational noise levels are predicted to exceed the maximum noise level established in the Township of Comstock BESS Ordinance at the closest property line of adjacent non-participating

properties, noise abatement was analyzed to reduce noise levels from the anticipated operations to be near or below 55 dB(A).

Sound walls, along the BESS areas, were determined to reduce the anticipated on-site operational noise by up to approximately 9 dB(A) at the closest property line of adjacent non-participating properties of the proposed Swan BESS and Cygnet BESS site, which is anticipated to reduce on-site operational noise levels to be near or below the established noise level limit of 55 dB(A). The proposed wall would be 14 feet in height and approximately 3,370 feet in length. The anticipated operational noise contours with the analyzed sound wall are shown in **Figure 4.**

Figure 4: Anticipated Operational Noise Contours with Noise Wall



In lieu of a sound wall, other methods of mitigation may include increasing the distance between the equipment and noise sensitive receptors, utilizing quieter equipment/enclosures/sound-dampening materials, or constructing an earthen berm.

Conclusions

The proposed BESS project site is generally located south of East Main Street, east of North 28th Street, north of East Michigan Avenue/MI-96, and west of North 30th Street. Additionally, ATK railroad tracks are located directly south of the site, and the Kalamazoo/Battle Creek International Airport is located approximately 4.5 miles southwest of the site. It is to be noted that an existing substation is also located directly north of the site. The Swan BESS and Cygnet BESS site will be located on recreational land (i.e. golf course) with residences surrounding the site.

After modeling and analyzing the anticipated worst-case operational scenarios at the proposed Swan BESS and Cygnet BESS site, it was determined that on-site operational noise levels are anticipated to exceed the noise level limit established in the Township of Comstock BESS Ordinance. As a result, a 14-foot sound wall, along BESS areas in the northern portion of the site, is recommended for implementation. Other methods of mitigation that may be considered for implementation include increasing the distance between the equipment and noise sensitive receptors, utilizing quieter equipment/enclosures/sound-dampening materials, or constructing an earthen berm.

EXHIBIT K: DECOMMISSIONING PLAN

DECOMMISSIONING PLAN

SWAN BESS

CYGNET BESS

COMSTOCK CHARTER TOWNSHIP

KALAMAZOO COUNTY, MI

PREPARED FOR:

SWAN ENERGY STORAGE, LLC
CYGNET ENERGY STORAGE, LLC
COPENHAGEN INFRASTRUCTURE SERVICE CO.
200 Wacker Drive
Suite 1600
Chicago, IL 60606

PREPARED BY:

KIMLEY-HORN OF MICHIGAN, INC.
3000 Town Center, Suite 2600,
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Prepared on: June 8, 2026

Kimley»Horn
of Michigan, Inc.

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1. INTRODUCTION

1.1 PURPOSE

This decommissioning plan is provided by Swan Energy Storage LLC and Cygnet Energy Storage LLC. (or the "Project Company") and will detail the projected decommissioning demands associated with the proposed Swan BESS and Cygnet BESS projects.

The purpose of this decommissioning plan is to provide procedures and an opinion of probable construction cost for partial or full closure and removal of the Battery Energy Storage System (BESS) facility. Comstock Township requires a decommissioning plan to supplement plans submitted as part of a Special Use Permit (SUP) package. This decommissioning plan details provisions for facility deconstruction and a site restoration and shall ensure that the site will be restored to a useful, nonhazardous, meadow-like condition. This decommissioning plan shall take effect upon facility abandonment, discontinuation of operation, or expiration of the use permit as defined by Comstock Township.

1.2 SITE LOCATION

Swan Energy Storage LLC and Cygnet Energy Storage LLC are proposing to develop a BESS facilities, each with a nameplate capacity of approximately 200 MW / 800 MWh in Comstock Township, Kalamazoo County, Michigan. The project site is located at 65 M 30th Street, in Comstock Township, Kalamazoo County, Michigan and within tax parcel identification number 07-16-455-051 and 07-16-330-011 and is zoned R-1C Cluster Housing District.

Swan Energy Storage, LLC and Cygnet Energy Storage, LLC. will design and permit the project with the authorities having jurisdiction, including Comstock Township, Kalamazoo County, and EGLE. Upon permit issuance, Owner/Operator will manage the construction, operation, and decommissioning of the project.

1.3 ANTICIPATED SERVICE LIFE

Unless the system is purchased by Comstock Township or other entity, the facility shall be decommissioned in accordance with this Decommissioning Plan ("Plan"), restoring to meadow-like state upon expiration or termination of the Power Purchase Agreement. Swan BESS and Cygnet BESS have an anticipated project life of 20 years, with the option to re-evaluate for continuation or decommissioning at the end of this 20-year period.

Decommissioning responsibilities shall include:

- Removal of aboveground and below ground cables, equipment, structures, fences, and foundations to a depth of four (4) feet by the end of the decommissioning period
- Restoration of the surface grade and soil after removal of equipment
- Revegetation of restored soil areas with native seed mixes, excluding any invasive species
- Management of materials and waste, projected costs, and a decommissioning fund agreement overview
- The time frame for the completion of site restoration work
- All other requirements of the Comstock Township Planning Commission

This decommissioning plan shall take effect upon any of the following conditions:

- The land lease (including the exercise of any extension options) ends and will either not be renewed or a new lease will not be entered into for the Project.
- The system does not produce power for sale for a consecutive 12-month period, except in the instance of a force majeure event in which the Project is being repaired and/or restored.
- The system is damaged and will not be repaired or replaced.
- System abandonment, discontinuation of operation, or as required by the Comstock Township Planning Commission.

1.4 DECOMISSIONING RISK OVER PROJECT LIFECYCLE

The probability of an event that would lead to abandonment or long-term interruption is extremely low during the first 15 to 20 years of the Project life. Accordingly, the risk of decommissioning the Project is extremely low during this time frame. The reasons why the risk to decommission the Project is extremely low in the early phases of the Project include, but are not limited to:

- Project owners have sophisticated financing structures that allow the lender or tax equity partner to step in and rectify the event that may lead to abandonment.

- Most critical BESS components have original equipment manufacturer (OEM) warranties with terms exceeding five years that include labor and parts. A warranty is an agreement or guarantee outlined by a manufacturer to a customer that defines performance requirements for a product or service. Warranties give customers a form of insurance if the purchased product or service does not adhere to quality standards. These warranties assure the Project owner, financing parties, and other stakeholders, that equipment will perform as expected which minimizes the risk of a decommissioning event. Average warranty lengths for critical BESS components range from 10 to 15 years, with some warranties on BESS units extending to 20 or 25+ years.

- BESS projects consist of many networked components designed to store and release electrical energy. The failure of any single component will not result in a substantial reduction of energy generation that could lead to a decommissioning event.

- BESS projects are required to maintain replacement value property damage insurance coverage and business interruption insurance coverage. Business interruption insurance covers the loss of income that a business suffers after a disaster or equipment failure.

- The replacement costs of BESS components will typically decline over time, and accordingly, costs to replace failed or damaged equipment after lapsed OEM warranties will not create large financial hurdles for the Project.

- In the early stages of the Project, the resale value of the equipment is significantly higher than the decommissioning costs, resulting in a net positive (revenue).

Per BESS Ordinance No. 564, Article 4 Section 4.61C 19.d, the Project will provide a surety bond or cash deposit for site decommissioning and stabilization.

Battery Energy Storage Systems (BESS) are an increasingly popular form of grid stability and backup power around the world and are an essential energy option for the future of the planet. BESS also offers the additional benefit of being easier to build, operate, and decommission with minimal environmental risks. Recent rises in popularity and use can be linked to lower installation and operation costs and it is expected that this pattern will continue, further reducing the risk of a decommissioning event.

1.5 DECOMMISSIONING RISKS OVER TIME

As previously noted, the probability of a decommissioning event that would lead to abandonment or long-term financial interruption is extremely low during the first 15 to 20 years of the Project life and accordingly, the financial risk to decommission the Project is also extremely low. A risk analysis approach is presented here for informational purposes only and has not been considered in the decommissioning cost estimates present in this Plan.

It is important to note that there are two aspects to consider when evaluating the risk for decommissioning the Project:

1. The risk of the need to decommission the Project as a whole (Project termination risk).
2. The risk of failing to recuperate the cost of the decommissioning activities (decommissioning funding).

The primary concern for the Comstock Township Zoning Board of Appeals is the ability to recuperate the cost of decommissioning and restoration of the land to pre-Project conditions. The presence of a Power Purchase Agreement (PPA) in the first 20 years of the Project makes the likelihood of decommissioning very low during that time. The graph below summarizes the estimated decommissioning risk of cost recovery for the Project. The graph utilizes a “one percent” risk as the lowest risk; however, the financial value of the Project or equipment in the early years would far exceed the cost of the decommissioning and restoration activities and therefore, the graph is conservative.



The factors taken into consideration in estimating the risk include, but were not limited to:

- Years 1-5 – Minimal Project termination or financial risk due to presence of PPA with guarantee to purchase power, resale of value components, component warranties, value of facility.
- Years 5-10 – Similar consideration of previous period, except minimal increased financial risk due to the decrease in resale value of used components and rise in technological improvements of new equipment in market.
- Years 10-15 – Similar consideration of previous period, with slightly increased risk as warranties start to expire. Value of equipment is still substantial but decreasing.
- Years 15-20 – Similar consideration of previous period, warranties continue to expire; value of equipment diminishes with age and technological improvements in market.

Years 20-25 – PPA expires, Project termination and funding risks increase, value of equipment diminishes, and technological improvements in market.

2. PROJECT COMPONENTS

2.1 SITE WORK PREPARATION

Prior to construction, appropriate construction best management practices shall be installed. This includes, but is not limited to, construction entrance and soil stabilization, perimeter control, and other security and erosion and sediment control measures. The stockpile area shall be delineated upon the implementation of silt fence or approved equal.

2.2 PROPOSED SITE IMPROVEMENTS

The existing site is 144.28 acres and has historically operated as a golf course and agricultural land. The BESS development area for the proposed BESS facility is approximately 39.22 acres. The existing contour elevations within the project area range from 803'-906'. Slopes are generally lower to the north and south, averaging around 0-10%. In the central portion of the site, a range of 5-20% is present within the wooded areas.

The proposed site conditions include gravel access road, yard rock, substation area, battery storage system equipment, and grass lined stormwater control pond. These developments will be located within the existing golf course. The entrance of the gravel road will use the existing driveway from the golf course off N 30th St. The proposed access drive will run through the existing golf course, and any existing trees within construction limits will be removed. An additional secondary entrance for emergency vehicles will run through the northern part of the site, off E Main St. Additional tree removal along the north eastern edge of the parcel as well as in the central portion of the parcel, as well as clearing and grubbing of the golf course is proposed. Re-grading will occur within the BESS yards, substation area, and access road.

2.3 BESS/ELECTRICAL EQUIPMENT

Initially on site there will be 196 battery enclosures and 49 skids installed for each project. Augmentation is planned for year 5 and 11 with an addition of 20 battery enclosures and 5 skids in year 5 and 24 battery enclosures and 6 skids in year 11 for each project. Electrical equipment shall be installed and shall maintain

clearances as required by Comstock Township, National Electric Code ("NEC"), and National Fire Protection Association ("NFPA"). To connect the battery containers to the on-site substation 9,500 linear feet of medium voltage wiring and 3,886 linear feet of low voltage wiring for Swan Energy Storage, LLC are proposed, and 10,332 linear feet of medium voltage wiring and 3,886 linear feet of low voltage wiring for Cygnet Energy Storage LLC are proposed.

2.4 STORMWATER MANAGEMENT

Post-development stormwater runoff will be captured and conveyed to a proposed stormwater pond on-site. The storm water basin will be located next to the BESS facility to capture, detain/retain, and treat runoff as well as protect the site from flooding during the project lifespan. The basin will be decommissioned with the rest of the project in addition to the site equipment. The stormwater basin will be backfilled with soil similar to existing soils in the project site.

2.5 SITE ACCESS

The project will feature internal roadways and perimeter fencing. All access roads on the site will comply with Township and County regulations for emergency response and equipment manufacturer specifications for delivery and maintenance. During the project's lifespan, the roadways and fencing will be consistently maintained. After decommissioning, the access roads may be kept to ensure continued access to the property area

3. PROJECT DECOMMISSIONING AND RECYCLING

3.1 DECOMMISSIONING OBJECTIVES

The decommissioning plan adheres to the standards of the Battery Energy Storage System (BESS) industry and standard lease and easement agreement terms. The decommissioning process will ensure the safe execution of the following tasks:

1. Remove and clean every battery storage unit or energy storage device, transformer, balance of plant (BOP) equipment, and substation equipment constructed on the property.

2. Remove and clean all structural foundations of the battery storage facility on the property. All holes or cavities created during removal will be backfilled with the excavated soil. Foundations will be removed to a depth of four feet.

3. Remove and clean all buried cables, including power, grounding, fiber-optic, and communication cables installed on the property. Any holes or cavities created during removal will be backfilled with the excavated soil. Cables buried deeper than four feet will remain.

4. Remove all overhead power or communication lines constructed on the property. Disconnection from the utility power grid.

5. Remove all stormwater basins established on the property. All holes or cavities created during removal will be backfilled with the excavated soil.

6. Remove all fences, gates, and onsite access roads established on the property. All holes or voids created during removal will be backfilled with the excavated soil.

7. Remove all underground utilities, including water service, irrigation service, sanitary sewer, storm sewer installed on the property. Any holes or cavities created during removal will be backfilled with the excavated soil. Utilities buried deeper than four feet will remain with proper abandonment.

The decommissioning project will be approached as a single, comprehensive effort, allowing for the most cost-effective demolition methods. Various means and methods may be employed for the dismantling process, though the specific means and methods will be determined by the contractor performing the work to ensure safe dismantling of the project.

This decommissioning plan is based on current best management practices and procedures. This Plan may be subject to revision based on new standards and emergent best management practices at the time of decommissioning. Permits will be obtained as required and notification will be given to necessary stakeholders prior to decommissioning.

The Project Company is responsible for this decommissioning, provided however that the Project Company may contract with a third-party to perform the decommissioning on its behalf. Nothing in this plan relieves any obligation that the real estate property owner may have to remove the Facility as outlined in Special Use Permit in the event the operator of the Facility does not fulfill this obligation.

3.2 TIMELINE

Once it is determined that the Project has reached the end of its usable life and decommissioning should begin, a detailed decommissioning report will be prepared. This report will coordinate the schedules and stages of decommissioning activities, record the equipment or materials removed, document the recipients of disposed or recycled materials, track changes in equipment custody, and provide a final site condition report. Preparation for decommissioning should commence before ceasing site operations, with all decommissioning activities expected to be completed within 12 months of the Project's closure.

Decommissioning of various stages can happen concurrently, but decommissioning the site will generally follow the order below.

1. BESS battery units, transformers and support equipment
2. Substation components and transmission line structures (if required)
3. Foundations
4. Underground Cables and Utilities
5. Stormwater BMPs
6. Perimeter fencing
7. Site access and internal roadways

3.3 DECOMMISSIONING TASKS

Upon determining that the Project has reached the end of its life and decommissioning can commence, the Project will be disconnected from its point of interconnection (POI) at the substation located north of the Project site. Prior to shutting down the facility, the Battery Energy Storage System (BESS) will be discharged to below 30% state of charge, or follow more stringent requirements set by the Department of Energy or Department of Transportation at the time of decommissioning. This ensures compliance with transportation guidelines for safely transferring the lithium-ion batteries for reuse or recycling. All equipment on-site, from the Project's substation to the BESS enclosures, will be isolated and grounded to minimize potential energy risks to personnel. The contractor responsible for decommissioning will provide

all necessary equipment and ensure compliance with lockout/tagout (LOTO) procedures to minimize risks. Proper personal protective equipment (PPE) will be required for all personnel at all times.

High-value assets will be removed early in the decommissioning schedule to reduce theft risk, improve cash flow, and separate recyclable materials for maximizing scrap recovery. High-value assets include precious alloys like copper, aluminum-brass tubes, stainless steel tubes, and other valuable metals used in plant systems. This category includes transformers, transformer coils, circuit breakers, electrical cables, batteries, and inverters. The removal methods will vary based on the asset's location and nature. Smaller transformers, equipment, and cables will likely be removed and shipped to scrap yards, while large transformers and inverters will require on-site disassembly before being sent to scrap yards.

Construction and Demolition (C&D) waste will be kept separate from scrap and concrete to prevent cross-contamination of waste or recycling streams. C&D demolition crews will use equipment like excavators with material handling attachments and skid steers to remove these materials. The materials will then be consolidated and loaded into bulk containers for disposal.

3.4 BESS BATTERY UNITS AND SUPPORT EQUIPMENT

The Project's Battery Energy Storage System (BESS) will be the first component to be removed from the site. All personnel working on the BESS equipment must be certified and trained in decommissioning procedures according to both manufacturer requirements and federal hazardous materials regulations. The batteries within the custom-built enclosures will be isolated down to the smallest individual component recommended by the manufacturer for on-site handling and then removed and packaged for reuse or recycling. Following the removal of battery modules, any internal equipment such as heating and cooling systems, fire suppression systems, and other components will be separated for recycling. The custom-built enclosures themselves will then be disassembled and separated for recycling. When decommissioning the electrical components, the grounding circuit will, whenever possible, be the last to be removed to ensure personnel safety. Foundations for the enclosures will remain in place until all other equipment has been disassembled and removed from the site. Specialized equipment needed for this task may include a crane, forklift, and specific equipment provided by the BESS manufacturer.

3.5 POWER CONVERSION SKIDS

All personnel decommissioning the power conversion equipment will be trained according to the manufacturer's requirements. Electrical cabling between battery enclosures and inverter or transformer components will be removed for recycling. Electronic equipment and transformers will be separated from power conversion equipment for resale or recycling. All on-site transformers will be drained of oil before being moved offsite. Cables connecting the power conversion systems to the Project substation will also be recycled. The grounding circuit will be the last to be removed whenever possible for safety. Foundations for the power conversion systems will remain until all other equipment is disassembled and removed. Specialized equipment may include a crane and tools from the power conversion system manufacturer.

3.6 AUXILIARY ELECTRICAL SYSTEMS

All personnel decommissioning the auxiliary electrical equipment will be trained according to the manufacturer's requirements. Auxiliary systems may include transformers, switchboards, panelboards, fire protection equipment, and heating and cooling systems. These components, connected to the BESS power

conversion system, will be removed and organized for recycling per manufacturer recommendations and relevant regulations. Additional handling requirements may be needed for certain equipment before recycling. The grounding circuit will be the last to be removed whenever possible for safety. Foundations will remain until all equipment is disassembled and removed. Specialized equipment, such as a crane and forklift, may be needed for this work.

3.7 ELECTRICAL CABLES AND CONDUITS

All direct buried electrical cables and conduits between equipment must be excavated and removed. The materials will be separated for recycling or C&D waste disposal. The BESS ground grid and underground electrical cables connecting to the Project substation will be removed for recycling up to the substation yard. Gravel terrain will be removed and disposed of off-site. All cavities created will be filled with soil similar to the original soil intended for agricultural development. Specialized equipment may include graders, skid steers, excavators, bulldozers, and dump trucks.

3.8 FOUNDATIONS

The remaining structures and foundations will be demolished up to four feet. Steel components will be separated, crushed, and recycled. Concrete will be crushed and disposed of. At the end of this task, there should be no in-ground components of the project besides site fencing (See section 3.10 for site perimeter fencing).

3.9 STORMWATER BASIN

All site stormwater basins on site will be backfilled and graded to match existing terrain. All voids created in completing this work will be filled with soil consistent to the existing conditions.

3.10 PERIMETER FENCING

Perimeter fencing will remain until all other assets of the project have been removed. The fencing will continue to provide site security and safety during the decommissioning process. Once the rest of the site has been cleared, fencing will be removed, and materials will be sent to recycling or waste.

3.11 SITE ACCESS AND DRIVES

Internal site roadways and drives will be removed and restored to, or closely with, the original site conditions and grades, to prepare the site to become a meadow field rather than revert to original use. All materials removed will be reused or recycled. All voids created during this process will be filled with soil consistent to the existing conditions. Site access roads may be preserved after the project with written approval from the owner.

3.12 RESTORATION OF SITE

The projects disturbed land will be restored to become a meadow field. This work will follow all removal as described in Section 3.3 above. Restoration will consist of re-grading to re-establish the pre-existing topography. In order to adequately restore the site to a meadow-like condition, documentation using pre-construction video and/or digital photography will be performed prior to construction activities. This information will be reviewed prior to preparation of decommissioning demolition documents and included in the submittal to the Comstock Township. Pre-construction documentation will also consist of detailed descriptions of existing vegetative and soil conditions as well as existing topography and drainage patterns.

At the time of decommissioning, the Project Company will restore the BESS Facility to a meadow-like condition. All waste and excess materials will be disposed of in accordance with municipal, provincial and federal regulations. Waste that can be recycled under municipal programs will be recycled accordingly. Provided, however, the Project Company shall not be required to replace any structures that were removed to build the BESS Facility.

The restoration will consist of de-compaction of the topsoil by disking or tilling and re-vegetation of the property. The Project Company will provide dust control during site restoration. At the end of the project, the area will be seeded and fertilized with native vegetation as needed to return the site to as close as practicable to initially agreed-upon condition. The future use of the land will be determined at the time of decommissioning. Deciding factors will be influenced by Comstock Township land use and comprehensive plans and regulations at such time in the future.

The developer will coordinate with the Comstock Township to monitor vegetation and drainage following restoration until permanent vegetation is established. Erosion and sediment control, re-seeding, soil stabilization, weed control and fertilization will be provided by the developer as needed until the site is stabilized and approved to be completed by the Comstock Township.

Upon completion of the site restoration, a final report of activities will be submitted to the Comstock Township documenting the process and results.

4. PROJECT DECOMMISSIONING COSTS

An engineer's opinion of probable construction was prepared as part of this decommissioning plan. Appendix A and Appendix B summarizes the probable costs associated with decommissioning.

Industry standard prices in 2026 for removal costs were determined using RSMeans cost data supplemented with other local data. Removal cost includes materials, contractor installation/demolition, mobilization and demobilization, overhead and profit, performance bonding, contingency, and engineering plans and permitting. Resale value of equipment of significant value were calculated with straight-line depreciation of the original material cost. The following assumptions were included in our estimate:

- All costs are shown in current 2026 dollars.
- Trucking costs are based on Q1, 2026 rates.
- Site mobilization for decommissioning is assumed to initiate from Kalamazoo, Michigan.
- Project quantities are based on the Swan BESS and Cygnet BESS Electrical Plans dated 03/27/2026.
- Waste disposal is assumed to be hauled to WM-Autumn Hills Landfill approximately 57 miles from the site.
- Recycled material is assumed to be hauled to Kent County Recycling and Education Center approximately 40 miles from the site.
- Cost fluctuations are expected based on market conditions prior to contract execution.
- Land value and/or sales are excluded from this estimate.

The net probable value of decommissioning was calculated as the removal value adjusted for inflation in Year 20. The expected removal value subtotal is **$4,869,000** for Swan Energy Storage LLC, and is **$4,846,000** for Cygnet Energy Storage LLC. Approximately **$1,095,000** is assumed for soft costs and contingencies for Swan Energy Storage, LLC, and **$1,090,000** is assumed for soft costs and contingencies for Cygnet Energy Storage, LLC., bringing the probable net present value of decommissioning including

contingencies to **$5,936,000** for Swan Energy Storage LLC, and is **$5,964,000** for Cygnet Energy Storage LLC**.** Assuming an inflation rate of 3.25% for 20 years, the probable value of decommissioning is estimated to be **$11,307,000** for Swan Energy Storage LLC, and is **$11,254,000** for Cygnet Energy Storage LLC**.**

Disclaimer

Kimley-Horn of Michigan, Inc. (“KHMI”) is not obligated to update these materials beyond the current date, even if the information becomes outdated or inaccurate.

The information, analysis, and opinions contained herein are based on publicly available sources, market research, financial or operational data. KHMI relies on provided information as current, accurate, and complete. KHMI has not conducted exhaustive research nor independently verified this information, and therefore does not guarantee its accuracy, completeness, or current status. The projections and conclusions presented are based on the mentioned information and reflect KHMI's opinions. They should not be interpreted as definitive forecasts or guaranteed outcomes, as actual conditions and pricing may vary significantly.

KHMI does not have control over factors such as material and equipment availability, labor availability, energy or commodity pricing, demand and usage, market conditions, technological advancements, weather, and other economic or political factors that could influence these estimates, analyses, and recommendations.

Appendix A: Swan BESS - Engineer's Opinion of Probable Construction Cost

Swan Energy Storage, LLC
Comstock Township, Kalamazoo County, MI
Decommissioning Estimate Pro Forma without Salvage for BESS Facility: 20 Year Removal

The Engineer has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Engineer at this time and represent only the Engineer's judgment as a design professional familiar with the construction industry. The Engineer cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs. LS = Lump Sum, HR = Hours, EA = Each, LF = Linear Feet, SF = Square Feet.

Item	Quantity	Unit	Unit Price	Total Price
Disassembly, Removal and Demolition (COST)				
Removal of BESS Batteries (Modules)	6,720	EA	$507.68	$3,411,610.27
BESS Battery Disassembly and Removal of BESS Containers and Pads	240	EA	$252.45	$60,588.03
Power Conversion System (PCS)	60	EA	$125.22	$7,513.20
Low Voltage Wiring	3,886	LF	$0.24	$941.06
Medium Voltage Wiring	9,500	LF	$0.44	$4,194.71
Wall (13' masonry stone)	22,672	SF	$5.00	$113,360.00
Fence (6' tall chain link)	1,576	LF	$5.05	$7,958.80
General Conditions	1	LS	$10,000.00	$10,000.00
Substation	1	EA	$183,405.36	$183,405.36
			Sub-Total	**$3,799,571.43**
Haul-Off and Disposal (COST)				
Aggregate Road Base	4,941	CY	$35.00	$172,935.00
Steel Piles	1,920	EA	$5.27	$10,118.40
BESS Equipment	1	LS	$749,867.71	$749,867.71
			Sub-Total	**$932,921.11**
Restoration Grade & Seed (COST)				
Topsoiling, Grading	147,465	SY	$0.47	$69,772.95
Seeding, Fertilizing, and Stabilization	147,465	SY	$0.45	$66,563.16
			Sub-Total	**$136,336.11**

SUBTOTAL (w/o Salvage)	**$4,868,828.65**
10% Contingency	$486,882.87
12.5% Soft Costs	$608,603.58
Total Present Cost (w/o Salvage)	$5,964,315.10
3.25% Inflation/year	$5,343,059.66
TOTAL COST (YR 20)	**$11,307,374.75**

1. Equipment removal costs include associated pad removal and conduit removal (or abandonment).
2. Costs based on RSmeans city cost index (cci, heavy construction 2026) for Kalamazoo, MI and locally provided data.
3. The engineer has no control over the cost of labor, materials, equipment, or over the contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to engineer at this time and represent only the engineer's judgment as a design professional familiar with the construction industry. The engineer cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.
4. The following assumptions were made in the analysis: 28 batteries per battery container.

Appendix B: Cygnet BESS - Engineer's Opinion of Probable Construction Cost

Cygnet Energy Storage, LLC
Comstock Township, Kalamazoo County MI
Decommissioning Estimate Pro Forma without Salvage for BESS Facility: 20 Year Removal

The Engineer has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Engineer at this time and represent only the Engineer's judgment as a design professional familiar with the construction industry. The Engineer cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs. LS = Lump Sum, HR = Hours, EA = Each, LF = Linear Feet, SF = Square Feet.

Item	Quantity	Unit	Unit Price	Total Price
Disassembly, Removal and Demolition (COST)				
Removal of BESS Batteries (Modules)	6,720	EA	$507.68	$3,411,610.27
BESS Battery Disassembly and Removal of BESS Containers and Pads	240	EA	$252.45	$60,588.03
Power Conversion System (PCS)	60	EA	$125.22	$7,513.20
Low Voltage Wiring	3,886	LF	$0.24	$941.06
Medium Voltage Wiring	10,332	LF	$0.44	$4,562.08
Wall (13' masonry stone)	20,397	SF	$5.00	$101,985.00
Fence (6' tall chain link)	1,769	LF	$5.05	$8,933.45
General Conditions	1	LS	$10,000.00	$10,000.00
Substation	1	EA	$183,405.36	$183,405.36
			Sub-Total	**$3,789,538.45**
Haul-Off and Disposal (COST)				
Aggregate Road Base	5,490	CY	$35.00	$192,150.00
Steel Piles	1,920	EA	$5.27	$10,118.40
BESS Equipment	1	LS	$749,867.71	$749,867.71
			Sub-Total	**$952,136.11**
Restoration Grade & Seed (COST)				
Topsoiling, Grading	112,860	SY	$0.47	$53,399.81
Seeding, Fertilizing, and Stabilization	112,860	SY	$0.45	$50,943.24
			Sub-Total	**$104,343.05**

SUBTOTAL (w/o Salvage)	**$4,846,017.61**
10% Contingency	$484,601.76
12.5% Soft Costs	$605,752.20
Total Present Cost (w/o Salvage)	$5,936,371.57
3.25% Inflation/year	$5,318,026.79
TOTAL COST (YR 20)	**$11,254,398.36**

1. Equipment removal costs include associated pad removal and conduit removal (or abandonment).
2. Costs based on RSmeans city cost index (cci, heavy construction 2026) for Kalamazoo, MI and locally provided data.
3. The engineer has no control over the cost of labor, materials, equipment, or over the contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to engineer at this time and represent only the engineer's judgment as a design professional familiar with the construction industry. The engineer cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.
4. The following assumptions were made in the analysis: 28 batteries per battery container.

EXHIBIT L: PROOF OF PROPERTY OWNERSHIP OR CONTROL

Transaction Identification Data, for which the Company assumes no liability as set forth in Commitment Condition 5.e.:
Issuing Agent: First American Title Insurance Company National Commercial Services
Issuing Office: 9255 Towne Center Drive, Suite 200, San Diego, CA 92121
(858)352-2073
Issuing Office's ALTA® Registry ID: z
Commitment Number: NCS-FA500MI27-NRG
Issuing Office File Number: NCS-FA500MI27-NRG
Property Address: Multiple APNs, , MI
Revision Number:

SCHEDULE A

1. Commitment Date: December 02, 2025 at 8:00 AM

2. Policy to be issued:
   a. ALTA® Standard Owner's Policy
   Proposed Insured: Prospective Purchaser
   Proposed Amount of Insurance: $TBD
   The estate or interest to be insured: Leasehold

3. The estate or interest in the Land at the Commitment Date is:

   Fee Simple

4. The Title is, at the Commitment Date, vested in:

   David K. Dart, survivor of his deceased wife, Debra L. Dart, whose Death Certificate is recorded in Instrument No. 2014-023022, Kalamazoo County Records.

5. The Land is described as follows:

   See Schedule C attached hereto and made a part hereof

This page is only a part of a 2021 ALTA Commitment for Title Insurance issued by First American Title Insurance Company. This Commitment is not valid without the Notice; the Commitment to Issue Policy; the Commitment Conditions; Schedule A; Schedule B, Part I—Requirements; and Schedule B, Part II—Exceptions; and a counter-signature by the Company or its issuing agent that may be in electronic form.

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Commitment No. NCS-FA500MI27-NRG

SCHEDULE B, PART I—Requirements

All of the following Requirements must be met:

1. The Proposed Insured must notify the Company in writing of the name of any party not referred to in this Commitment who will obtain an interest in the Land or who will make a loan on the Land. The Company may then make additional Requirements or Exceptions.

2. Pay the agreed amount for the estate or interest to be insured.

3. Pay the premiums, fees, and charges for the Policy to the Company.

4. Documents satisfactory to the Company that convey the Title or create the Mortgage to be insured, or both, must be properly authorized, executed, delivered, and recorded in the Public Records.

5. Receipt by the Company of an ALTA/NSPS Land Title Survey, certified to First American Title Insurance Company, and in form and content satisfactory to the Company. The Company reserves the right to make further requirements and/or exceptions upon review of this survey.

6. In connection with any lease and easement agreements ("Agreements") to be insured by the Company, fully executed copies of the underlying Agreements must be provided for review and prior to closing. A memorandum of the Agreement must be recorded in the Public Records. At closing the Company will also require a current, duly authorized estoppel executed by the grantor/landlord stating:
   (i) that the Agreement is in full force and effect,
   (ii) that there are no defaults or violations under the terms of the Agreement,
   (iii) that all lease payments due and owing the landlord have been paid current,
   (iv) that neither party to the Agreement has any Known claims against the other under the terms of the Agreement and
   (v) that there are no amendments or modifications to the Agreement other than as set forth in the estoppel, and
   (vi) a duly authorized consent by the grantor/landlord, which may be included in the estoppel described above, to the transaction creating the estate, interest or Mortgage to be insured by the policy, if such consent is required under the terms of the Agreement.

7. Authority documents for all parties executing documents including the following, which will be required for each entity of such kind comprising any tier of ownership of each party

   Corporation:
   1. Certificate of Incorporation from Secretary of State of state of formation.

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2. Certificate of Legal Existence and Good Standing from Secretary of State of state of formation.
3. Copies of Articles of Organization and Corporate By-Laws.
4. Clerk's certificate and Certificate of Incumbency to be provided with copy of Corporation Resolution authorizing officers' action.

Limited Liability Company:
1. Documents to be signed by member, manager, officer of other authorized agent of the LLC.
2. Certificate of Legal existence/Good Standing from the Secretary of State of state of formation, disclosing names of member(s) or manager(s) authorized to act on behalf of company, and naming person or entity authorized to act with respect to real estate.
3. Copy of the LLC's Articles of Organization and Operating Agreement.
4. Written approval by authorized member(s) or manager(s).
5. If any LLC member or manager is a corporation, see requirements for corporations above.

Limited Partnership:
1. Documents to be signed by general partner(s).
2. Copy of Limited Partnership Agreement and all amendments identifying the general partner(s).
3. Certificate of Good Standing from Secretary of State in state of formation.
4. If general partner is a corporation, see requirements for corporation above.

General Partnership:
1. Copy of general partnership agreement and all amendments.
2. Certificate by a general partner, certifying Partnership to be in full force and effect and identifying the partners of said Partnership.
3. If any partner is a corporation, see requirements for corporation (above).

Trust:
1. Copy of the Trust instrument to be provide to the Company for review.
2. Trustee's Certificate to be recorded indicating that the Trustee(s) are actually Trustee(s) under the instrument of trust, that the trust is in existence and has not been amended or revoked, and that the Trustee(s) have the authority to convey.

8. Pay unpaid taxes and assessments unless shown as paid.

9. All Taxes paid to and including 2024
2025 Summer Taxes PAID in the amount of $4,789.53
2025 Winter Taxes DUE in the amount of $2,419.74
Tax Item No. 07-16-330-011, as to Parcel 1
Property Address: Bailey St, Kalamazoo, MI 49048
If any amounts are shown as DUE, the total does not include collection fees, penalties or interest.

Special Assessment: None

10. All Taxes paid to and including 2024
2025 Summer Taxes PAID in the amount of $15,184.23

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2025 Winter Taxes DUE in the amount of $7,671.45
Tax Item No. 07-16-455-051, as to Parcel 2A and portion of Parcel 2B
Property Address: 91 North 30th St, Galesburg, MI 49053
If any amounts are shown as DUE, the total does not include collection fees, penalties or interest.

Special Assessment: None

11. All Taxes paid to and including 2024
2025 Summer Taxes PAID in the amount of $551.65
2025 Winter Taxes DUE in the amount of $278.62
Tax Item No. 07-16-480-050, as to remainder of Parcel 2B
Property Address: North 30th St, Kalamazoo, MI 49001
If any amounts are shown as DUE, the total does not include collection fees, penalties or interest.

Special Assessment: None

12. If the Land is connected to public/community water or sewer, furnish a copy of the current bill to First American Title Insurance Company showing that all charges have been paid to date or the Policy to be issued will include an exception on Schedule B for water and sewer charges which became a lien prior to the Date of Policy.

13. When the proposed insured is identified additional requirements and/or exceptions may be made.

14. Provide evidence of the purchase price and/or the amount of the mortgage to be insured.

15. Submit "Affidavit by Owner". Additional requirements may be made or exceptions taken for matters disclosed therein.

16. We find no outstanding voluntary liens of record affecting subject property. Disclosure should be made concerning the existence of any unrecorded lien or other indebtedness which could give rise to any possible security interest in the subject property.

17. The marital status of the vested owner described in item 4 of Schedule A is consistent with the marital status identified in the most current instrument vesting title in the land. First American Title Insurance Company does not represent that this is the current marital status of the vested owner. The current marital status of the vested owner should be provided to the Company prior to closing. Additional requirements may be imposed based upon any change in marital status since the recording of the current vesting deed

18. The Michigan Commercial Real Estate Broker Lien Act applies to a sale, lease, option, loan or other transfer of commercial real estate. The Company must be provided proof, in affidavit form from the Seller and Purchaser, satisfactory to the Company, (a) of payment in full of any broker's services which have been engaged with regard to the management, sale, purchase, lease, option or other

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conveyance or proposed conveyance of any interest in the subject commercial real estate, together with a lien waiver or estoppel letter from any party determined by such affidavit to have a right to file a broker's lien, and (b) that no notice of lien for any such services has been received. In the event that said affidavit(s) contain any qualification with respect to any such services, proof of payment in full for all such services, together with a lien waiver or estoppel letter from such identified Broker(s) must be obtained.

NOTE: Where the possibility of a right to file a broker's lien is determined and no lien waiver or estoppel letter provided to the Company, the following exception will be included in the policy to be issued pursuant to this Commitment.

Any broker's lien, or right to a broker's lien, imposed by law.

19. NOTE: The following endorsement(s) will be attached to the Leasehold Owners Policy, when issued, and made a part thereof: ALTA 13-06

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Commitment No. NCS-FA500MI27-NRG

SCHEDULE B, PART II—Exceptions

Some historical land records contain Discriminatory Covenants that are illegal and unenforceable by law. This Commitment and the Policy treat any Discriminatory Covenant in a document referenced in Schedule B as if each Discriminatory Covenant is redacted, repudiated, removed, and not republished or recirculated. Only the remaining provisions of the document will be excepted from coverage.

The Policy will not insure against loss or damage resulting from the terms and conditions of any lease or easement identified in Schedule A, and will include the following Exceptions unless cleared to the satisfaction of the Company:

1. Any defect, lien, encumbrance, adverse claim, or other matter that appears for the first time in the Public Records or is created, attaches, or is disclosed between the Commitment Date and the date on which all of the Schedule B, Part I—Requirements are met.

2. Any facts, rights, interests or claims that are not shown by the Public Records but that could be ascertained by an inspection of the Land or by making inquiry of persons in possession of the Land.

3. Easements, liens or encumbrances, or claims thereof, not shown by the Public Records.

4. Any encroachment, encumbrance, violation, variation, or adverse circumstance affecting the Title including discrepancies, conflicts in boundary lines, shortage in area, or any other facts that would be disclosed by an accurate and complete land survey of the Land, and that are not shown in the Public Records.

5. Taxes and assessments not due and payable at Commitment Date.

6. Any lien or right to a lien, imposed by law, as a result of services, labor, and/or materials used, or to be used, for improvement to the Land.

7. Water rights, claims or title to water, whether or not shown by the Public Records.

8. Any claim to (a) ownership of or rights to minerals and similar substances, including but not limited to ores, metals, coal, lignite, oil, gas, uranium, clay, rock, sand, and gravel located in, on, or under the Land or produced from the Land, whether such ownership or rights arise by lease, grant, exception, conveyance, reservation, or otherwise; and (b) any rights, privileges, immunities, rights of way, and easements associated therewith or appurtenant thereto, whether or not the interests or rights excepted in (a) or (b) appear in the Public Records or are shown in Schedule B.

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9. All Tax Map Numbers referred to in the title report and final policy are for informational purposes only and First American Title Insurance Company does not insure, nor limit the exceptions, to the tax map numbers indicated.

10. Covenants, conditions, terms and/or restrictions contained in a Warranty Deed recorded March 29, 1962 in/as Liber 788, Page 671, of Kalamazoo County Records.

11. Easement Deed by Court Order in Settlement of Landowner Action by and between David K Dart and Debra L Dart and Sprint Communications Company L.P., Qwest Communications Company, LLC, Level 3 Communications, LLC, and WilTel Communications, LLC created by instrument recorded September 17, 2013 in/as Instrument No. 2013-038710, of Kalamazoo County Records. (Affects Parcel 2A and 2B)

12. Interest of others in oil, gas and mineral rights, if any, whether or not recorded in the Public Records.

13. Interest, if any, of the United States, State of Michigan, or any political subdivision thereof, in the oil, gas and minerals in and under and that may be produced from the Land.

14. Rights of tenants under unrecorded leases.

15. To the extent a tract is bounded by a public road, rights of others in and to any portion of the property that lies within said road.

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SCHEDULE C

Land in the Township of Comstock, Kalamazoo County, MI, described as follows:

Parcel 1:

The Northeast Quarter of the Southwest Quarter of Section 16, Town 2 South, Range 10 West.

Parcel 2A:

The West half of the Southeast Quarter of Section 16, Town 2 South, Range 10 West, Except Beginning at the Intersection of the North and South Quarter line of said Section with the North Line of the right of way of the Michigan Central Railroad and running thence North 0 degrees 8 minutes West along said quarter line 347 feet, thence South 89 degrees 58 minutes East parallel to the North Line of said Right of Way 123.47 feet; thence South 0 degrees 8 minutes East parallel to said quarter line 347 feet to the North line of said Railroad Right of Way; thence North 89 degrees 58 minutes West along the North line of said Right of Way 123.47 feet to the Place of Beginning; Also Except the right of way of the Michigan Central Railroad as located over and across the first above described parcel of land.

Parcel 2B:

Part of the East 1/2 of the Southeast 1/4 of Section 16 of Town 2 South, Range 10 West, described as commencing at the Intersection of the East Line of said Section 16 with the North Line of the right of way of the Michigan Central Railroad; thence North on the East Section Line 980 feet; thence West parallel with the North Line of said right of way of the Michigan Central Railroad to the North and South 1/8 Line of said Southeast 1/4 of Section 16, thence South thereon 980 feet to the North Line of said Michigan Central Railroad right of way; thence East thereon to the Place of Beginning, Except the South 66 feet of the East 900 feet thereof.

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ALTA COMMITMENT FOR TITLE INSURANCE
issued by
FIRST AMERICAN TITLE INSURANCE COMPANY

NOTICE

IMPORTANT—READ CAREFULLY: THIS COMMITMENT IS AN OFFER TO ISSUE ONE OR MORE TITLE INSURANCE POLICIES. ALL CLAIMS OR REMEDIES SOUGHT AGAINST THE COMPANY INVOLVING THE CONTENT OF THIS COMMITMENT OR THE POLICY MUST BE BASED SOLELY IN CONTRACT.

THIS COMMITMENT IS NOT AN ABSTRACT OF TITLE, REPORT OF THE CONDITION OF TITLE, LEGAL OPINION, OPINION OF TITLE, OR OTHER REPRESENTATION OF THE STATUS OF TITLE. THE PROCEDURES USED BY THE COMPANY TO DETERMINE INSURABILITY OF THE TITLE, INCLUDING ANY SEARCH AND EXAMINATION, ARE PROPRIETARY TO THE COMPANY, WERE PERFORMED SOLELY FOR THE BENEFIT OF THE COMPANY, AND CREATE NO EXTRACONTRACTUAL LIABILITY TO ANY PERSON, INCLUDING A PROPOSED INSURED.

THE COMPANY'S OBLIGATION UNDER THIS COMMITMENT IS TO ISSUE A POLICY TO A PROPOSED INSURED IDENTIFIED IN SCHEDULE A IN ACCORDANCE WITH THE TERMS AND PROVISIONS OF THIS COMMITMENT. THE COMPANY HAS NO LIABILITY OR OBLIGATION INVOLVING THE CONTENT OF THIS COMMITMENT TO ANY OTHER PERSON.

COMMITMENT TO ISSUE POLICY

Subject to the Notice; Schedule B, Part I—Requirements; Schedule B, Part II—Exceptions; and the Commitment Conditions, First American Title Insurance Company, a Nebraska Corporation (the "Company"), commits to issue the Policy according to the terms and provisions of this Commitment. This Commitment is effective as of the Commitment Date shown in Schedule A for each Policy described in Schedule A, only when the Company has entered in Schedule A both the specified dollar amount as the Proposed Amount of Insurance and the name of the Proposed Insured.

If all of the Schedule B, Part I—Requirements have not been met within six months after the Commitment Date, this Commitment terminates and the Company's liability and obligation end.

FIRST AMERICAN TITLE INSURANCE COMPANY

Sally F. Tyler, President

Lisa W. Cornehl, Secretary

This page is only a part of a 2021 ALTA Commitment for Title Insurance issued by First American Title Insurance Company. This Commitment is not valid without the Notice; the Commitment to Issue Policy; the Commitment Conditions; Schedule A; Schedule B, Part I—Requirements; and Schedule B, Part II—Exceptions; and a counter-signature by the Company or its issuing agent that may be in electronic form.

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COMMITMENT CONDITIONS

1. DEFINITIONS

a. "Discriminatory Covenant": Any covenant, condition, restriction, or limitation that is unenforceable under applicable law because it illegally discriminates against a class of individuals based on personal characteristics such as race, color, religion, sex, sexual orientation, gender identity, familial status, disability, national origin, or other legally protected class.

b. "Knowledge" or "Known": Actual knowledge or actual notice, but not constructive notice imparted by the Public Records.

c. "Land": The land described in Item 5 of Schedule A and improvements located on that land that by State law constitute real property. The term "Land" does not include any property beyond that described in Schedule A, nor any right, title, interest, estate, or easement in any abutting street, road, avenue, alley, lane, right-of-way, body of water, or waterway, but does not modify or limit the extent that a right of access to and from the Land is to be insured by the Policy.

d. "Mortgage": A mortgage, deed of trust, trust deed, security deed, or other real property security instrument, including one evidenced by electronic means authorized by law.

e. "Policy": Each contract of title insurance, in a form adopted by the American Land Title Association, issued or to be issued by the Company pursuant to this Commitment.

f. "Proposed Amount of Insurance": Each dollar amount specified in Schedule A as the Proposed Amount of Insurance of each Policy to be issued pursuant to this Commitment.

g. "Proposed Insured": Each person identified in Schedule A as the Proposed Insured of each Policy to be issued pursuant to this Commitment.

h. "Public Records": The recording or filing system established under State statutes in effect at the Commitment Date under which a document must be recorded or filed to impart constructive notice of matters relating to the Title to a purchaser for value without Knowledge. The term "Public Records" does not include any other recording or filing system, including any pertaining to environmental remediation or protection, planning, permitting, zoning, licensing, building, health, public safety, or national security matters.

i. "State": The state or commonwealth of the United States within whose exterior boundaries the Land is located. The term "State" also includes the District of Columbia, the Commonwealth of Puerto Rico, the U.S. Virgin Islands, and Guam.

j. "Title": The estate or interest in the Land identified in Item 3 of Schedule A.

2. If all of the Schedule B, Part I—Requirements have not been met within the time period specified in the Commitment to Issue Policy, this Commitment terminates and the Company's liability and obligation end.

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3. The Company's liability and obligation is limited by and this Commitment is not valid without:
   a. the Notice;
   b. the Commitment to Issue Policy;
   c. the Commitment Conditions;
   d. Schedule A;
   e. Schedule B, Part I—Requirements;
   f. Schedule B, Part II—Exceptions; and
   g. a counter-signature by the Company or its issuing agent that may be in electronic form.

4. COMPANY'S RIGHT TO AMEND
The Company may amend this Commitment at any time. If the Company amends this Commitment to add a defect, lien, encumbrance, adverse claim, or other matter recorded in the Public Records prior to the Commitment Date, any liability of the Company is limited by Commitment Condition 5. The Company is not liable for any other amendment to this Commitment.

5. LIMITATIONS OF LIABILITY
   a. The Company's liability under Commitment Condition 4 is limited to the Proposed Insured's actual expense incurred in the interval between the Company's delivery to the Proposed Insured of the Commitment and the delivery of the amended Commitment, resulting from the Proposed Insured's good faith reliance to:
      i. comply with the Schedule B, Part I—Requirements;
      ii. eliminate, with the Company's written consent, any Schedule B, Part II—Exceptions; or
      iii. acquire the Title or create the Mortgage covered by this Commitment.
   b. The Company is not liable under Commitment Condition 5.a. if the Proposed Insured requested the amendment or had Knowledge of the matter and did not notify the Company about it in writing.
   c. The Company is only liable under Commitment Condition 4 if the Proposed Insured would not have incurred the expense had the Commitment included the added matter when the Commitment was first delivered to the Proposed Insured.
   d. The Company's liability does not exceed the lesser of the Proposed Insured's actual expense incurred in good faith and described in Commitment Condition 5.a. or the Proposed Amount of Insurance.
   e. The Company is not liable for the content of the Transaction Identification Data, if any.
   f. The Company is not obligated to issue the Policy referred to in this Commitment unless all of the Schedule B, Part I—Requirements have been met to the satisfaction of the Company.
   g. The Company's liability is further limited by the terms and provisions of the Policy to be issued to the Proposed Insured.

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6. LIABILITY OF THE COMPANY MUST BE BASED ON THIS COMMITMENT; CHOICE OF LAW AND CHOICE OF FORUM

a. Only a Proposed Insured identified in Schedule A, and no other person, may make a claim under this Commitment.

b. Any claim must be based in contract under the State law of the State where the Land is located and is restricted to the terms and provisions of this Commitment. Any litigation or other proceeding brought by the Proposed Insured against the Company must be filed only in a State or federal court having jurisdiction.

c. This Commitment, as last revised, is the exclusive and entire agreement between the parties with respect to the subject matter of this Commitment and supersedes all prior commitment negotiations, representations, and proposals of any kind, whether written or oral, express or implied, relating to the subject matter of this Commitment.

d. The deletion or modification of any Schedule B, Part II—Exception does not constitute an agreement or obligation to provide coverage beyond the terms and provisions of this Commitment or the Policy.

e. Any amendment or endorsement to this Commitment must be in writing and authenticated by a person authorized by the Company.

f. When the Policy is issued, all liability and obligation under this Commitment will end and the Company's only liability will be under the Policy.

7. IF THIS COMMITMENT IS ISSUED BY AN ISSUING AGENT

The issuing agent is the Company's agent only for the limited purpose of issuing title insurance commitments and policies. The issuing agent is not the Company's agent for closing, settlement, escrow, or any other purpose.

8. PRO-FORMA POLICY

The Company may provide, at the request of a Proposed Insured, a pro-forma policy illustrating the coverage that the Company may provide. A pro-forma policy neither reflects the status of Title at the time that the pro-forma policy is delivered to a Proposed Insured, nor is it a commitment to insure.

9. CLAIMS PROCEDURES

This Commitment incorporates by reference all Conditions for making a claim in the Policy to be issued to the Proposed Insured. Commitment Condition 9 does not modify the limitations of liability in Commitment Conditions 5 and 6.

10. CLASS ACTION

ALL CLAIMS AND DISPUTES ARISING OUT OF OR RELATING TO THIS COMMITMENT, INCLUDING ANY SERVICE OR OTHER MATTER IN CONNECTION WITH ISSUING THIS COMMITMENT, ANY BREACH OF A COMMITMENT PROVISION, OR ANY OTHER CLAIM OR DISPUTE ARISING OUT OF OR RELATING TO THE TRANSACTION GIVING RISE TO THIS COMMITMENT, MUST BE BROUGHT IN AN INDIVIDUAL CAPACITY. NO PARTY MAY SERVE AS PLAINTIFF, CLASS MEMBER, OR PARTICIPANT IN ANY CLASS OR REPRESENTATIVE PROCEEDING. ANY POLICY ISSUED PURSUANT TO THIS COMMITMENT WILL CONTAIN A CLASS ACTION CONDITION.

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EXHIBIT M: BESS SPECIFICATIONS

epcpower
excellence in power conversion



M System Installation Manual

Contacting EPC

When contacting EPC for support, please have the following information available:

- Unit Model Number
- Unit Serial Number
- Application information
- Background information of the problem

North America
+1.858.748.5590
cs.support@epcpower.com

13250 Gregg Street, Suite A-2
Poway, CA 92064

This is a preliminary release of the M Installation Manual; information and dimensions are subject to change.

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EPC Power Corporation
www.epcpower.com

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1 Introduction

This installation manual is intended to provide step-by-step instructions to install the M System successfully. This manual also provides information for installation planning and verification.

1.1 Applicability

M System models

- 50-103421

M Inverter models

- 50-200100

Please read all applicable sections during the engineering process and before you apply power to your system.

1.2 Revision History

Rev	Date	Change
0.0	June 2024	Preliminary draft
0.01	October 2024	2nd preliminary draft
1		

1.3 Related Documents and Manuals

Document number	Document Title	Revision
[70-100094]	M System Technical Manual	00
[70-100092]	M System O&M Manual	00
[70-100091]	M Isolation Transformer Guide	00

1.4 Additional Support

When requesting support for any issues, the following information is typically required:

- PC tool for the system control via laptop and associated files
- Electrical Site Drawing including ground system
- System Drawings

2 Safety

This section contains important information regarding the safe and proper use of equipment. System integrators & OEMs must provide a final set of service instructions / manual to their end customer as part of the final product. Trained and qualified personnel are required for installation and operation of this equipment. Failure to follow safety instructions can result in damage to equipment, injury, or death.

Busbars, fuses, disconnects, cooling system components, and similar may be hot if the unit has been operating recently. It is recommended to wait for the components to cool for a few hours (depending on the ambient temperature and operating point of the unit) before working on the device.

Warnings and Notes
This manual contains the following safety notices:

 DANGER	**DANGER** indicates a hazardous situation which, if not avoided, will result in death or serious injury.	**DANGER** indique une situation dangereuse qui, si elle n'est pas évitée, causera des blessures graves ou la mort.
 WARNING	**WARNING** indicates hazardous conditions that could damage equipment or cause personal injury or death.	**AVERTISSEMENT** indique des conditions dangereuses qui pourraient endommager l'équipement ou causer des blessures ou la mort de personnes
 CAUTION	**CAUTION** indicates a hazardous situation which, if not avoided, could result in equipment damage, minor or moderate injury.	**ATTENTION** indique une situation dangereuse qui, si elle n'est pas évitée, pourrait causer des dommages à l'équipement et des blessures mineures ou modérées au personnes
	**ESD** Electrostatic discharge warning, indicating that equipment can be damaged if proper ESD protections (e.g., wrist straps) are not used.	**ESD** Risques de décharges électrostatiques, ceci indique que l'équipement peut être endommagé si les protections ESD appropriées (par exemple bracelets antistatiques) ne sont pas utilisées.

2.1 Electrical Safety

 WARNING	**WARNING** Basic electrical precautions must be followed by all personnel when working on electrical systems. Equipment damage, injury, or death can occur as a result of failure to follow these instructions or installation by unqualified personnel.	**AVERTISSEMENT** Les précautions électriques de base doivent être respectées par toute personne travaillant sur les systèmes électriques. Des dommages matériels, blessures ou la mort peuvent être provoqués suite au non-respect de ces instructions ou l'installation par du personnel non qualifié.
 WARNING	**WARNING** High touch current. Earth connection is essential before connecting supply.	**AVERTISSEMENT** Courant de contact élevé. Raccordement à la terre indispensable avant le raccordement à l'alimentation.

Review the following steps before performing any installation or maintenance work:

1. Work must be performed by qualified personnel only.
2. Clearly identify work locations.
3. Ensure that all sources of power have been disconnected.
4. Inverters contain capacitors which require several minutes to discharge after removing power. Verify that system and component voltages are at or near 0 V by measuring with a voltmeter.
5. All electrical installations must comply with the electrical standards applicable on-site.

2.2 Stored Energy

 DANGER	**DANGER** Inverters contain capacitors which retain voltage even after the system has been de-energized. By design, these capacitors self-discharge to less than 5 V within 5 minutes or within the time stated on the inverter. System and component voltage should always be verified prior to working on equipment to ensure the discharge has been completed successfully.	**DANGER** Les onduleurs contiennent des condensateurs qui restent chargés après la coupure de toutes les sources d'alimentation. Ces condensateurs sont conçus pour se décharger à moins de 5 V en moins de 5 minutes. Assurez-vous de toujours mesurer les tensions du système et des composants pour s'assurer qu'elles ne soient plus dangereuses.

After powering down, and before working on the system:

1. Disconnect or turn off and lock out ***all sources of power*** (see Figure 1 for sample disconnect options):
    a. Main AC
    b. Main DC
    c. Lock out power sources of M System
    d. Auxiliary power (optional for properly trained personnel)
2. Ensure that power cannot be re-applied while working on the equipment by following proper lockout/tagout procedures for all power sources (e.g., the AC grid disconnect switch, battery bank disconnect switch, etc.).
3. Wait at least 5 minutes (or as indicated by the inverter labeling) after disconnecting power to the inverter to allow stored energy to discharge (e.g., charged capacitors within the inverter).
4. Use of voltage detector accepted and designed for detecting the absence of AC and DC voltages on high power installation.
5. Measure voltages and ensure that they are below ~5 V by using a 1,500-V rated DMM (Digital Multimeter). ***Measurements must be taken by a trained professional. The list below is suggested as a minimum set of measurements, however personnel performing maintenance are responsible for taking all proper and necessary measurements to ensure that all stored energy is removed prior to work and all sources are properly locked out to ensure safety.***
    a. Suggested AC side measurements
        i. With DMM in AC measurement mode, on the **incoming side of the AC fuses** (common AC of M System):
            1. from L1 phase to L2 phase
            2. from L2 phase to L3 phase
            3. from L3 phase to L1 phase
            4. from L1 phase to GND
            5. from L2 phase to GND
            6. from L3 phase to GND
            7. *Repeat all above measurements with the DMM in DC voltage measurement mode.*
        ii. With DMM in AC measurement mode, on the **inverter side of each AC switch** (if AC switch option is not present, inverter side of each AC fuse set):
            1. from L1 phase to L2 phase
            2. from L2 phase to L3 phase
            3. from L3 phase to L1 phase
            4. from L1 phase to GND
            5. from L2 phase to GND
            6. from L3 phase to GND
            7. *Repeat all above measurements with the DMM in DC voltage measurement mode.*
    b. Suggested DC side measurements

i. With DMM in DC measurement mode, on the **incoming side of the DC fuses**:
    1. from POS-NEG
    2. from POS-GND
    3. from NEG-GND
    4. *Repeat all the above measurements with the DMM in AC voltage measurement mode.*
ii. With DMM in DC measurement mode, on the **inverter side of the DC switch** (if DC switch option is not present, inverter side of the DC fuse):
    1. from POS-NEG
    2. from POS-GND
    3. from NEG-GND
    4. *Repeat all the above measurements with the DMM in AC voltage measurement mode.*

6. Install safety grounding as appropriate.

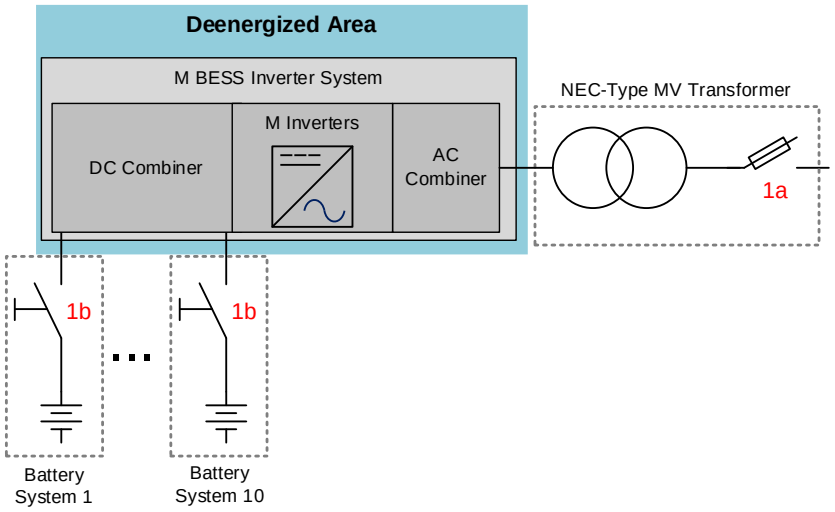

Figure 1. The disconnection and isolation of the AC connection (1a) and all DC connections (1b) of M BESS Inverter System: NEC-type transformer with openable MV-side fuses,

2.3 Grounding & Hipot

 WARNING	**WARNING** The inverter may or may not include a GFDI device. If not, this system must be used with an external GFDI device as required by local jurisdictions.	**AVERTISSEMENT** Cet onduleur n'est peut-être pas équipé d'un dispositif de détection de défaut à la terre interne. S'il n'est pas présent, cet onduleur doit être équipé d'un dispositif de détection de défaut à la terre externe en conformité avec les réglementations locales.
 CAUTION	**CAUTION** Only qualified personnel should perform this work. If you do not follow these instructions, electrical noise may be increased, resulting in operational errors, or communication interference.	**ATTENTION** Seul un personnel qualifié doit effectuer ce travail. Si vous ne suivez pas ces instructions, les perturbations électromagnétiques seront amplifiées, entraînant des défauts de fonctionnement et des interférences au niveau des communications.

Grounding

- The equipment grounding of the M System is the responsibility of the integrator or installer.
- When working with the M System, always install a protective ground from the M System chassis to the DC and AC power circuits with conductors of sufficient cross section. DC-side and AC-side power circuits are isolated from the enclosure.
- When servicing the M System, protective grounds may be used and they must be removed upon completion of work, prior to energizing the equipment.

Hipot

- A hipot test has been performed by EPC at the factory and is **NOT PERMITTED to be performed in the field by the user**.

2.4 Cleanliness / Debris

 CAUTION	**CAUTION** The M System has air vents. Debris should not be allowed to fall into the venting, including metallic chips from drilling, weld splatter, etc. as it may result in damage to the system. Covering the vents is good practice if there is a chance of debris falling. The covers MUST be removed prior to operation to provide adequate ventilation.	**ATTENTION** l'onduleur est pourvu de bouches d'aération. Il faut éviter d'y faire tomber des débris (les copeaux métalliques de forage, les projections de soudure, etc.) car ils provoqueraient des dommages à l'onduleur. Recouvrir les bouches est une bonne pratique s'il y a un risque de chute de débris. Les couvercles doivent être enlevés avant l'utilisation pour assurer une bonne ventilation.

2.5 Personnel

All the procedures described in this manual may be dangerous and may be performed by personnel certified by EPC Power Corp only. Some procedures are limited to EPC Power Corp personnel only and may not be attempted by anyone else. Please contact EPC for your training and certification needs.

3 Inspection and Receiving

3.1 Inspection

When picking up units at the EPC Power facility, ensure M System assemblies are well secured for transit.

On receipt of equipment, inspect equipment for:

- The part number indicated on the nameplate corresponds with the part number of your order.
- No damage occurred during transport.

In case of equipment damage, please submit an RMA (Return Merchandise Authorization) to EPC Power with appropriate pictures of the damaged equipment.

3.2 Specification Label

M System and individual M inverter specification labels include the main data including ratings, certification, type designation and serial number. A sample EPC Power specification label for a M10 System is shown in Figure 2.

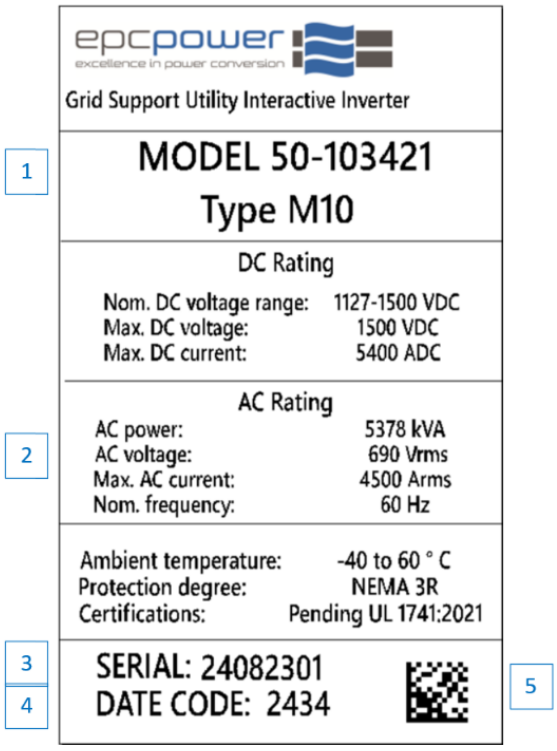

Figure 2. Sample M10 Nameplate

Rating plate information is detailed in Table 1 below.

Table 1. M System rating plate clarification.

No.	Name	Description
1	System Model	50-103421 = M System as BESS Inverter with 10 M Inverters 50-200100= M Inverter Unit
2	AC Voltage	Inverter Rated AC Voltage
3	Serial Number	The serial number in a format: *yymmddxxxx* yy = manufacturing year mm = manufacturing month dd = manufacturing day xxxx = total running number in SAP Serial: 24120322 means 22nd unit on Dec. 3rd, 2024
4	Date Code	The serial number in a format: *yyww* yy = manufacturing year ww = manufacturing week Code: 2451 means manufactured on week 51 in the year 2024
5	Data Matrix Code	Serial number in a data matrix code

3.3 Test Reports

EPC provides a certificate of conformance with every inverter and system that guarantees the M System and the M Inverters have passed all acceptance tests before leaving the factory. Figure 3 show example Certificate of Conformance (CoC) and data for reference only.



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excellence in power conversion

EPC Power Corp.
13250 Gregg Street
Suite A-2
Poway CA 92064
United States

Certificate of Conformance

Supplier Name: EPC Power Corp.
PO Number:
Material Quantity: 1.00
Issue Date: MM/DD/YYYY
Firmware:

Part Number: 50-100XXX
Part Description:
Serial Number: XXXXXXXX
Parameters:

Verification Tests Completed

1. Set mixing valve to 35 degrees C
2. Coolant System Air Leak Test
   a. Δpsig ≤ 0.150 psi at 65 psi for 10 minutes — Pass
3. Component Functional Test — Pass
4. Hi-Pot Test
   a. Leakage Current ≤ 0.003 A — Pass
   b. Voltage Value (held for 60 seconds): 3414 Volts — Pass
5. Low Voltage Checkout
   a. DIO — Pass
   b. Local/Remote Sense — Pass
   c. PWM — Pass
   d. CAN/Serial Communication — Pass
   e. Relay Drive — Pass
   f. Current Sense — Pass
   g. DC Bus Voltage Sense — Pass
6. High Voltage Test
   a. Software Fault at Upper Limit: 1300 Volts — Pass
   b. Hardware Fault at Upper Limit: 1350 Volts — Pass
   c. Accepted Capacitor Discharge Time: 3 minutes — Pass
7. Power Test (2 hr)
   a. Max Power: 500 kW — Pass
   b. Max Current: 602 A — Pass
   c. Max Voltage: 480 V_{AC} / 1000 V_{DC} — Pass
   d. Grid Protections — Pass
      i. Abnormal Frequency
         1. Trips above 62 Hz in 0.16 seconds
         2. Trips between 60.5 and 62 Hz in 300 seconds
         3. Does not trip between 58.5 and 60.5 Hz
         4. Trips between 57 and 58.5 Hz in 300 seconds
         5. Trips under 57 Hz in 0.16 seconds
      ii. Abnormal Voltage
         1. Trips at or above 120% nominal voltage in 0.16 seconds
         2. Trips between 110% and 120% nominal voltage in 13 seconds
         3. Does not trip between 88% and 110% nominal voltage
         4. Trips at or above 70% and below 88% nominal voltage in 21 seconds
         5. Trips at or above 50% and below 70% nominal voltage in 11 seconds
         6. Trips below 50% nominal voltage in 1.5 seconds
8. Fanboard Test
   a. TCP Communication Test — Pass
9. Firmware and Parameters uploaded to unit at end of test

The above supplied product is in accordance with all contractual Purchase Order requirements and engineering specifications.

Production Manager:_____ **Quality Manager:**_____

(858) 748-5590 http://www.epcpower.com EIN: 27-2568879 Duns #: 96-257-0003 Cage Code: 6L8W6 BBB: Accredited (A+) ISO 9001:2015

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Figure 3. Example CoC of an EPC Power Inverter.

3.4 Storage

An M System is shipped and stored without a package.

EPC Power recommends having humidity limitation included in the M System during shipping and storage especially when the duration between shipping and connection of auxiliary power is expected to be weeks instead of days.

- The standard method is packing the M System cabinets with desiccant which needs to be checked monthly until the internal humidity control system of M System is powered.
    - It is possible to have temporary external 48-V_{DC} power supply connection in cases when an internal auxiliary power supply option (+IAP or +IDP) is selected and the main power is not yet available.
        - Contact EPC Power for additional information.
- As an option available later, a PV roof option is provided. In it, the humidity control system is self-powered by the roof covered by PV (photovoltaic) modules and the controlled humidity prevents internal condensation over the storage period.

Alternatively, the M System can be stored inside in dry location when a humidity limitation via desiccant or the humidity control system is not necessary.

When the outdoor storage location does not have solar irradiation for several days, it is recommended to apply external auxiliary power to the M System so that it can regulate the internal humidity to prevent internal condensation.

When external auxiliary power is used, connect the inputs to suitable power supply as shown in section 4.4 or contact EPC Power for possible temporary solutions.

During the storage period, the M System must be stored in the following conditions.

1. A safe place free from risk of damage.
2. Protected against animals/rodents.
3. The surface must be flat and must be placed on non-corrosive supportive structure >10″ above the ground/soil.
    - The support of the frame must be the same as is required in the foundation (see section 4.1.2).

4 Installation and Wiring

4.1 Installation Preparations

EPC will provide 3D models in STEP format upon request. Dimensions are provided below. M System is an outdoor rated device, if installed inside building or closed container, please contact EPC Power or the project engineer.

4.1.1 Site Installation Requirement

M Systems must be installed on a level surface, detailed in section 4.1.2, adhering to the anchoring information, and relevant clearance and conduit entry requirements identified in sections 4.1.3 through 4.1.10. The M System is suitable for mounting on concrete or other non-combustible surfaces only and to be installed in a limited access electrical operating area. Only properly trained and certified personnel should be allowed to perform work on the M System and inverters.

4.1.2 Foundation

The inverter foundation must be non-combusting, flat, and level surface with adequate support to system frame. Requirements:

- Flatness: the surface shall not exceed 4 mm vertically over the 2 m horizontal distance within the M System footprint
- Levelness: the surface of the foundation in total shall not exceed a slope of 0.5% within the M System footprint
- The foundation must support the frame of M System as shown with two example cases in Figure 4.
    - The cable entry spaces are shown in detail in sections 4.1.7 and 4.1.9 and recommended to be considered as a keep out area shown in Figure 4.
        - In the non-pylon case of foundation shown in Figure 4b, it is recommended to consider the necessity of the foundation under the DC combiner marked by lighter gray.
    - See section 4.1.10 for the details of the mass distribution and CoG (Center of Gravity).
    - The weight per pylon is 850 kg [1875 lbs].
- Take local requirements such as possible wind load and seismic requirement into account on the installation and foundation construction.
- If the holes of the M System frame are used for anchoring, their locations need to be considered in pylon and foundation designs.
    - There are eight Ø28 mm (Ø1.1″) holes in the frame as marked in Figure 4.
    - Note. It is the customer's responsibility to provide robust anchoring of the M System as required by the seismic and wind conditions of the plant.

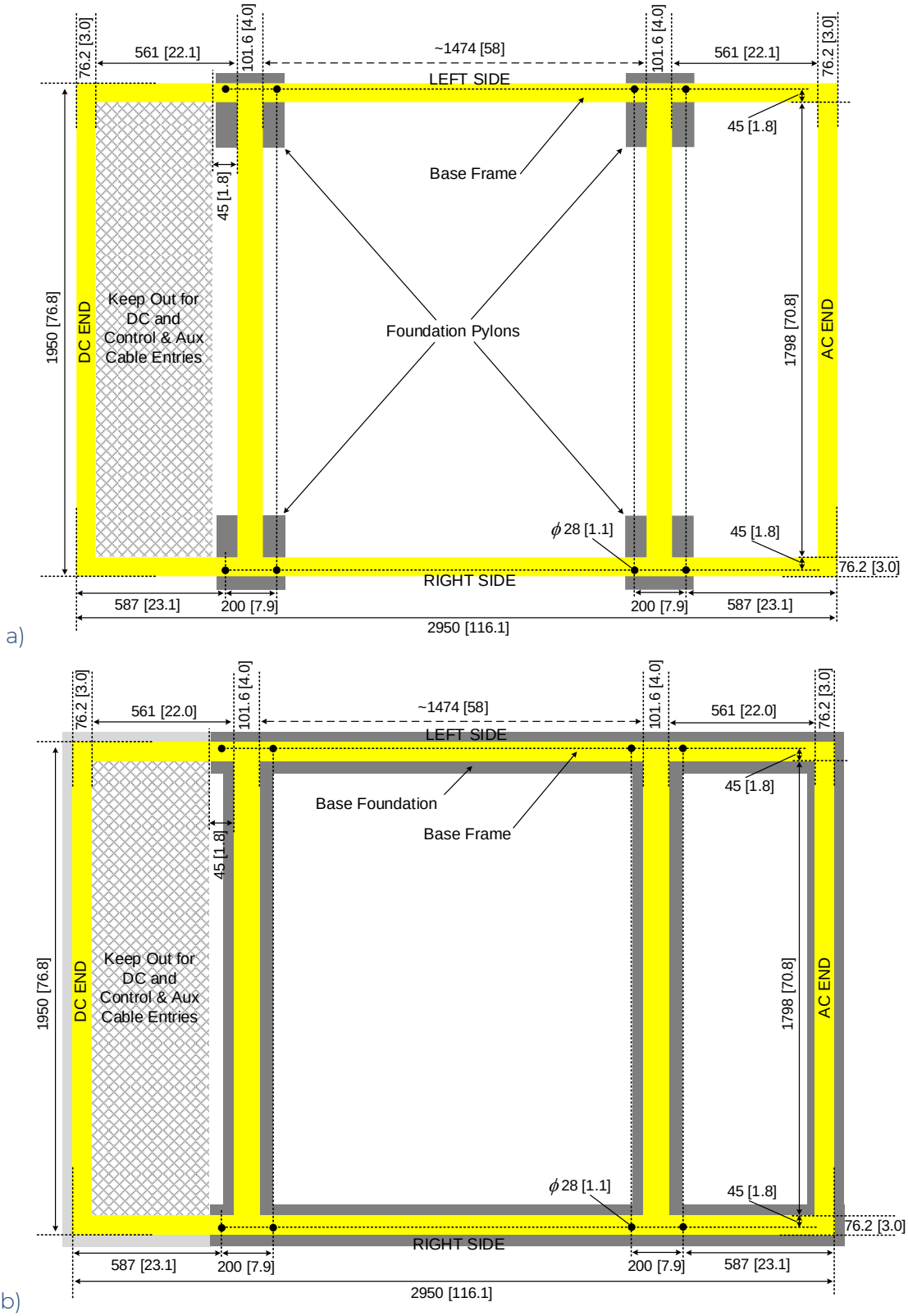


Figure 4. M System frame dimensions (units in mm [in]) and foundation examples: a) four foundation pylons in main weight points. b) base foundation under the frame

4.1.3 M System Dimensions

M System dimensions are shown in Figure 5 and naming convention in Figure 6.

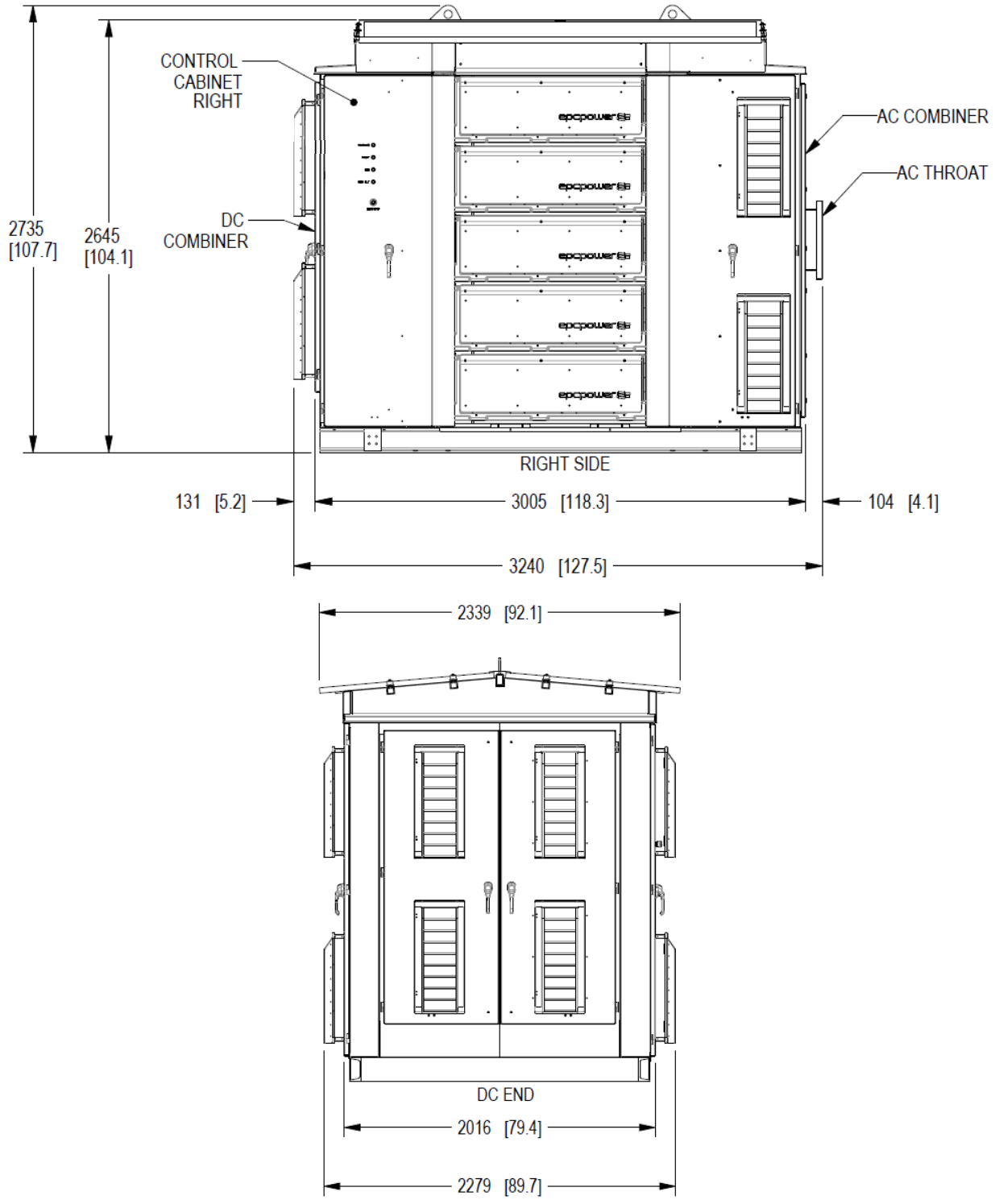


Figure 5. M System dimensions (units in mm [in]).

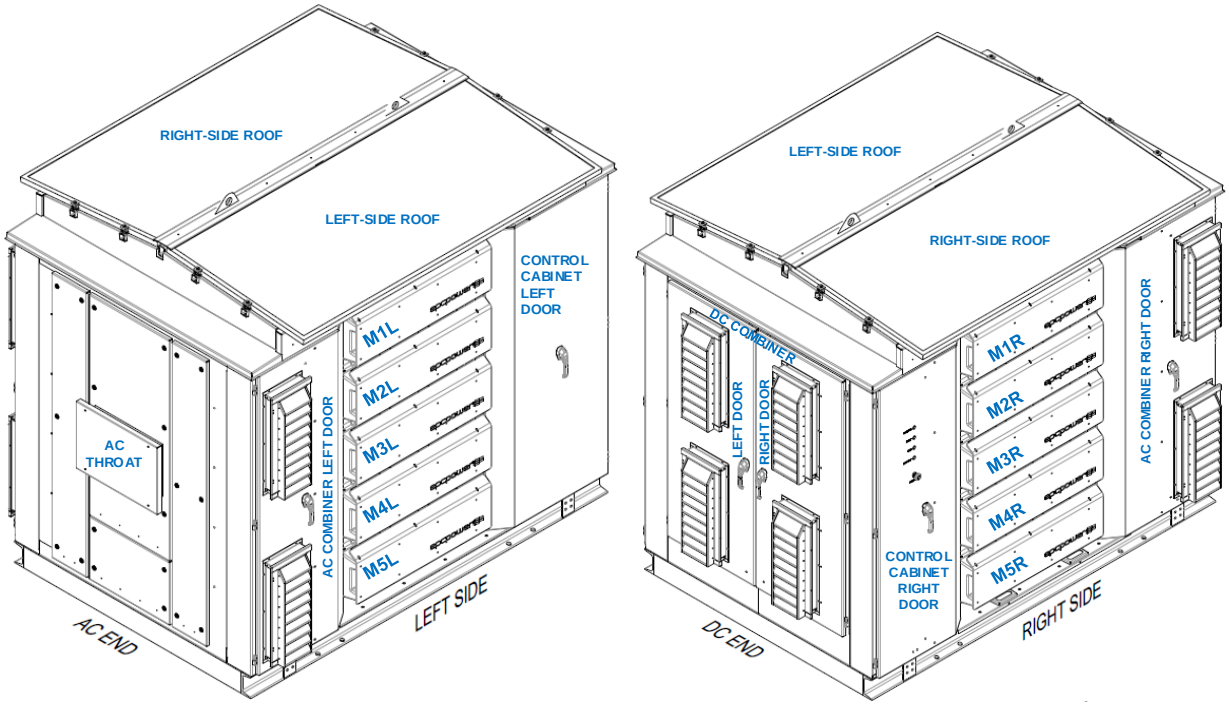


Figure 6. M System naming convention.

Note! The final dimensions, and e.g. locations of the combiner air intakes and exhausts are subject to change. However, general locations are as illustrated in this manual.

4.1.4 Ventilation Clearance

Each M Inverter has air intakes on their front. Therefore, the M Inverter air intakes are present on both sides of the M System. The exhaust air of the inverters is routed to the center and top of M System. Both combiner cabinets have their own ventilation, having air intakes on the DC end and on the right side of the AC combiner. DC combiner exhausts are also in the DC end whereas the air exhaust of the AC combiner is on the left side. As a result, the air intakes and the air exhausts as illustrated in Figure 7, Figure 8, Figure 9, and Figure 10. In all of them, intake air is marked with blue and outlet air with dark red. The ventilation clearances are shown as light-yellow areas.

The minimum ventilation clearances to be considered in the site/plant design are:

- Both sides and DC end must have a horizontal clearance of ≥2000 mm [80″].
- The AC end must have a horizontal clearance of ≥2000 mm [80″] on top of the MV transformer
- Vertically, the clearances reach up to ≥2000 mm [80″] above the M System over the whole ventilation clearance area.
- Walls, roofs, or other structures restricting the air flow are not allowed within the ventilation clearance area.

In the final installation, none of the air vents may be covered or obstructed.

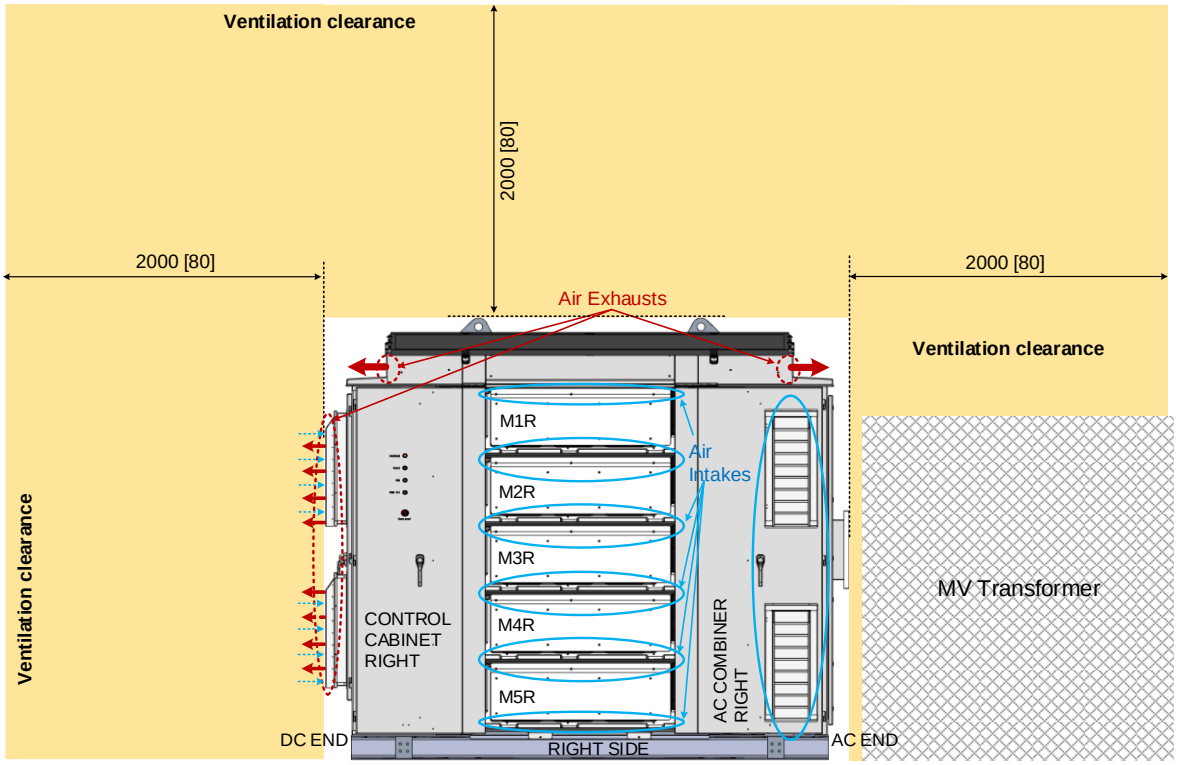


Figure 7. Air intakes (blue) and exhausts (dark red) with the ventilation clearances in the ends and top with right-side view (units in mm [in]).

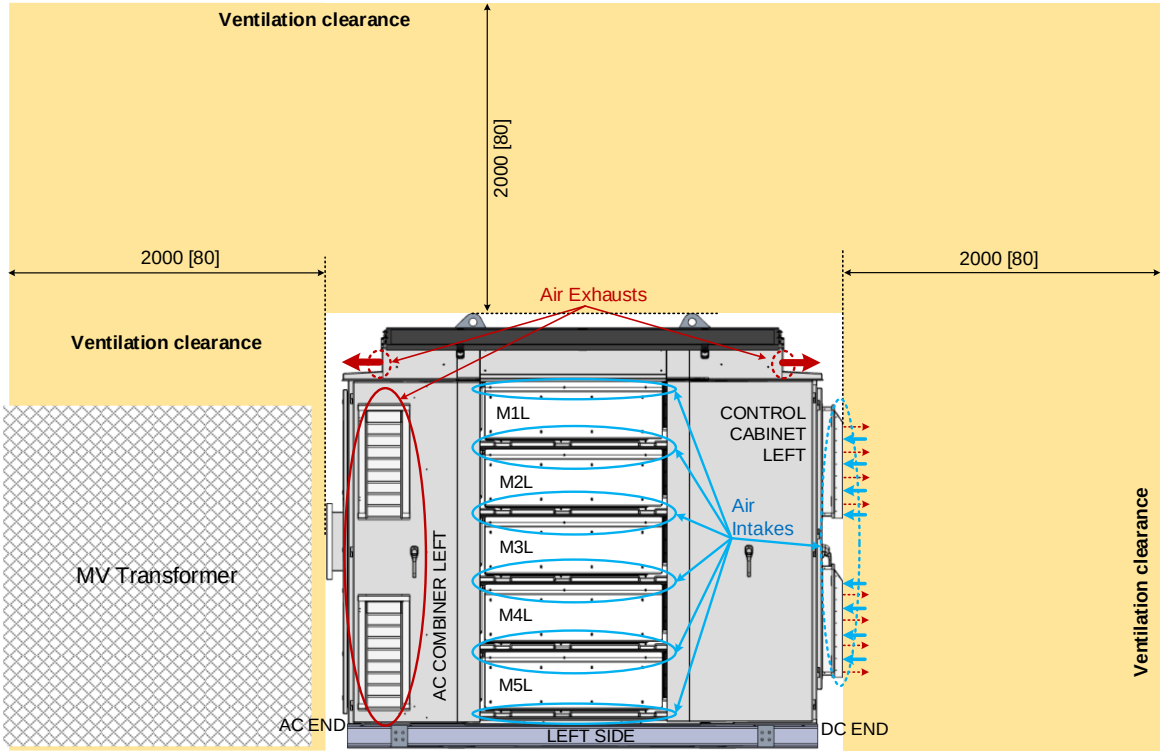


Figure 8. Air intakes (blue) and exhausts (dark red) with the ventilation clearances in the ends and top with left-side view (units in mm [in]).

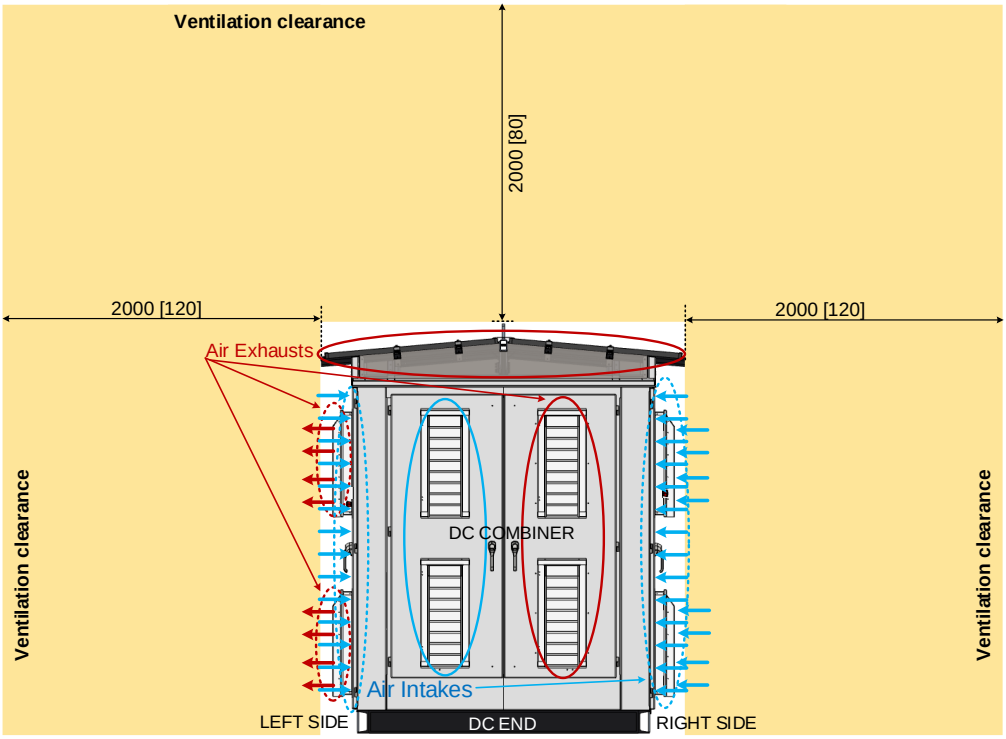


Figure 9. Air intakes (blue) and exhausts (dark red) in the DC with the ventilation clearances in the sides and top (units in mm [in]).

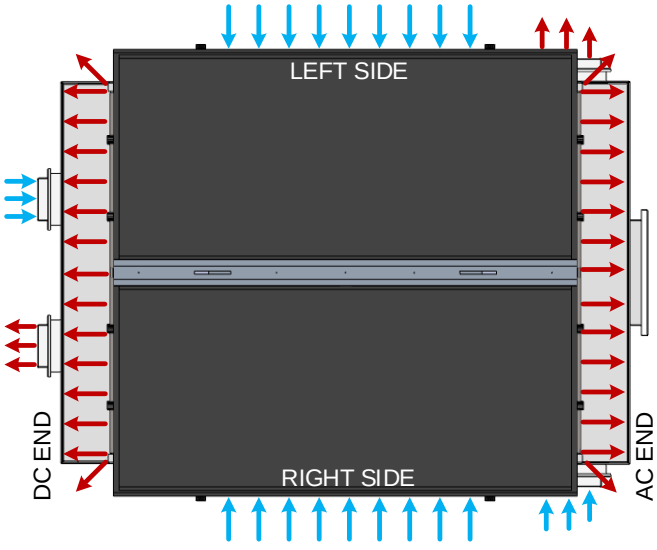


Figure 10. Top view about all air intake routes (blue arrows) and outlet routes (dark red arrows).

4.1.5 Maintenance Clearance

Clearance must also be considered for maintenance. At minimum the service clearances are as shown in Figure 11 and Figure 12:

- Both sides must have the clearance of ≥1000 mm [40″] for door openings and Inverter interchange and additional clearance of ≥1000 mm [40″] for the cabinet access and interchange work or as guided by local regulation for electrical work if that is wider.
- DC end must have a clearance of ≥1000 mm [40″] for door openings and additional clearance of ≥1000 mm [40″] or as guided by local regulation for electrical work if that is wider.
- On the side of the space between the AC end MV transformer, there must be ≥800 mm [32″] clearance to access the AC throat or as guided by local regulations.
- Vertically, the clearance reaches up to ≥1000 mm [40″] above the M System over the whole area.
    - Note that this vertical space is not adequate for lifting an M System, but only the requirement for service and maintenance.
- No obstacles are allowed within the service and maintenance area.
- EPC Power recommends the surface of the service and maintenance area to be flat and to have weatherproof basement soil and surface layer with concrete, blacktop, revetment, compact gravel, etc.



Figure 11. Service and Maintenance spacing (on gold) around the M System on the ground, DC end view (units in mm [in])

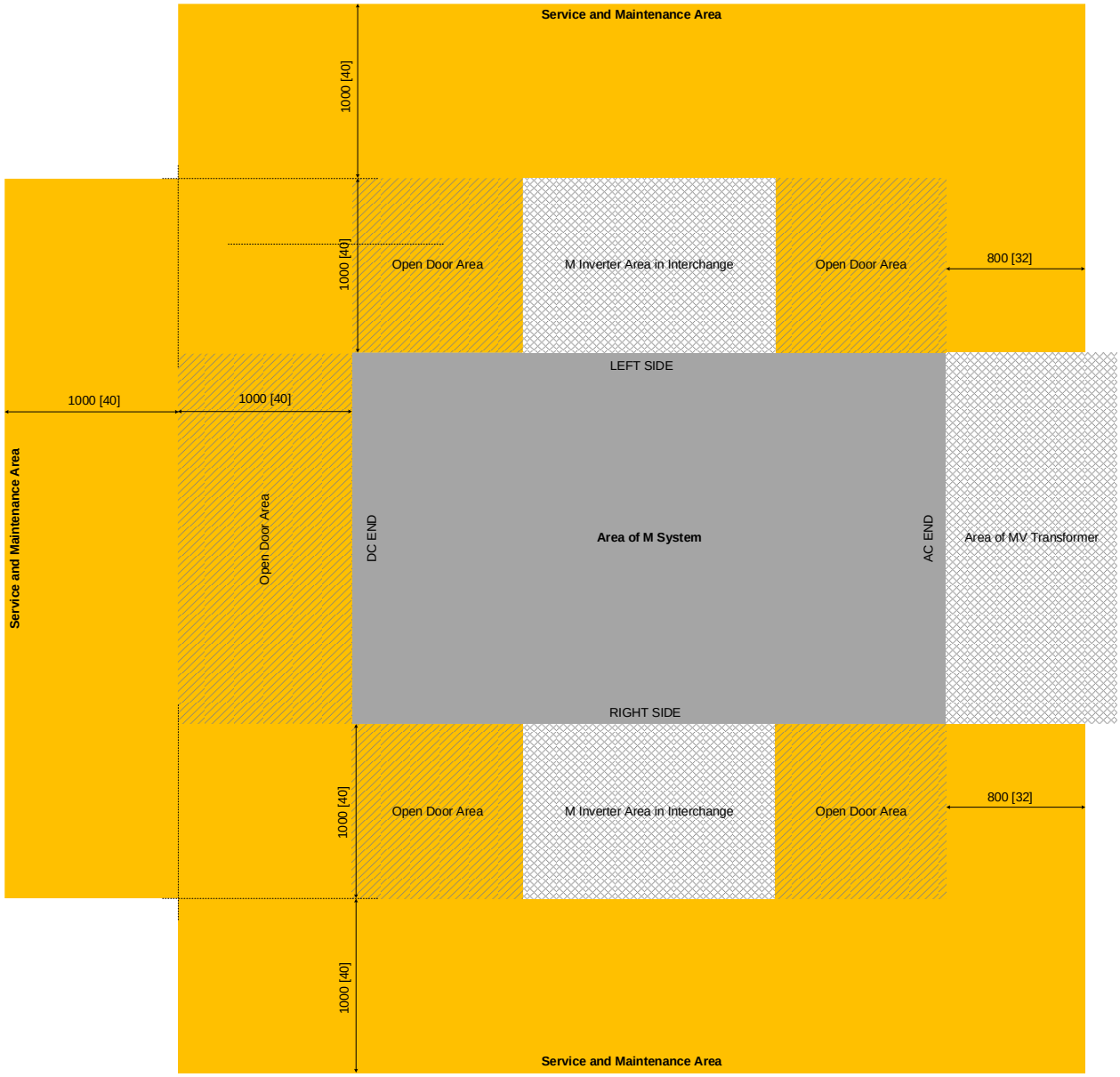


Figure 12. Service and Maintenance spacing (on gold) around the M System above the ground, top view (units in mm [in])

4.1.6 Clearances between Multiple M Systems

Follow the spacing shown in Figure 13 when locating M Systems next to each other:

- 4 m [13 ⅛′] between the right and left side of the adjacent M Systems
- 4 m [13 ⅛′] between the DC end of the M System and the MV transformer of the next M System

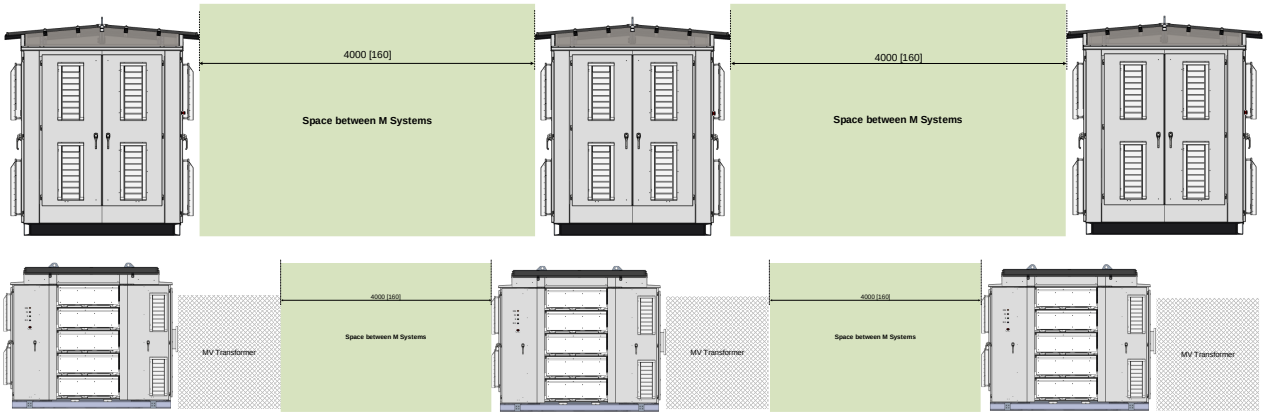


Figure 13. Clearances between M Systems sidewise and lengthwise (units in mm [in])

4.1.7 DC Cable Entry and Routing

There are two options for DC cable entry, both options are from the ground direction:

- The standard: conduit entry requiring customer modification of EPC provided gland plates.
- Option +DGP: cable gland plates

Both DC entry plates panels are located in the same combiner cabinet as shown in Figure 14.

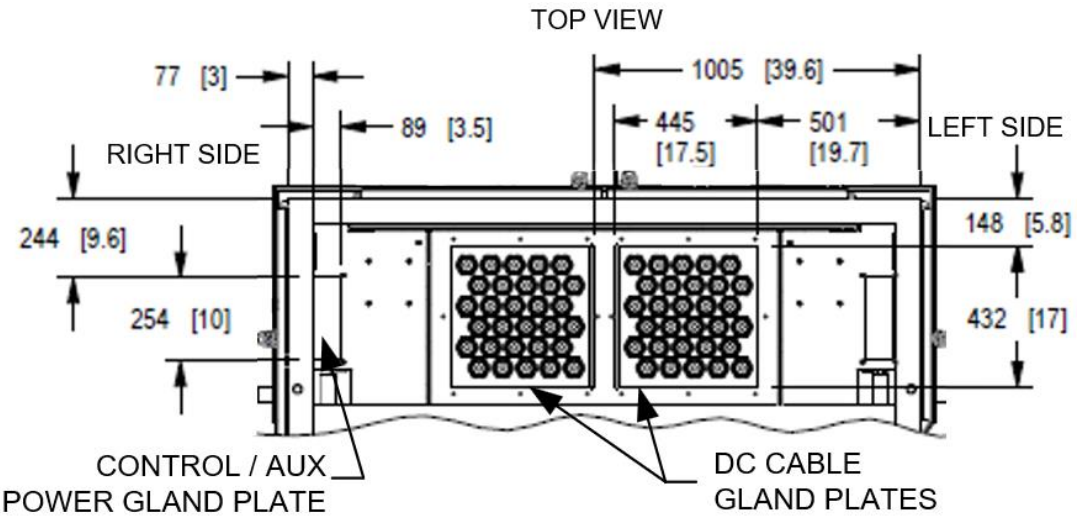


Figure 14. Location of the DC cable gland plates and Control & AUX power gland plate in M System DC Combiner base, top view (units in mm [in]).

Depending on the site construction, the entry type may affect the cable and conduit routing of the site, and it is recommended to be considered when the base of the M System is designed and constructed.

Due to the DC cabling space shown in Figure 15, it is essential to plan the DC cable entries and routing according to the ordered DC configuration.

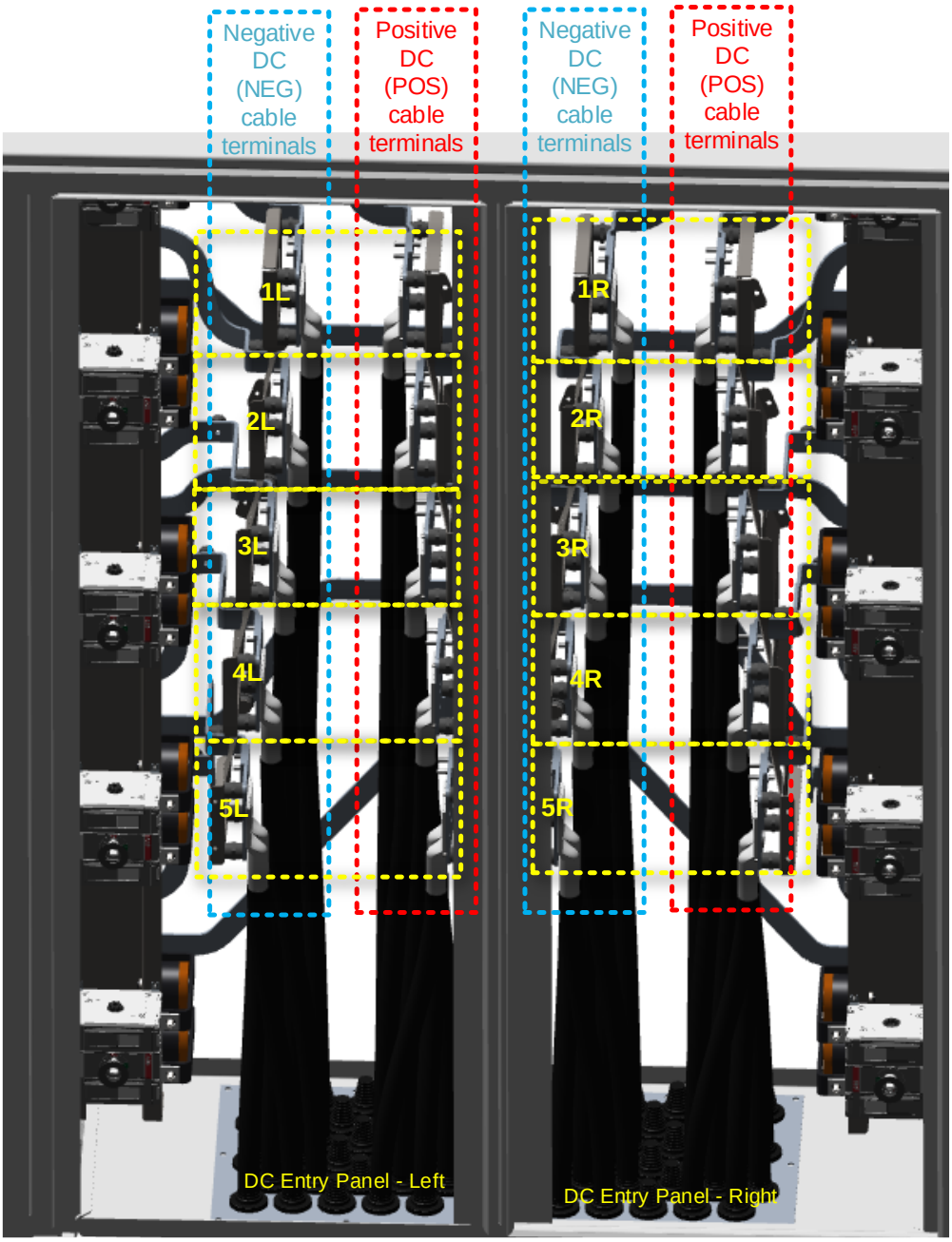


Figure 15. DC combiner end view of DC cabling section.

Some simplified examples of how DC sources and DC cable routing are linked to virtual inverters are shown in Figure 16. The exact configuration depends always on the case due to various points of optimization, and electrical drawings of the configuration ordered must be referred.

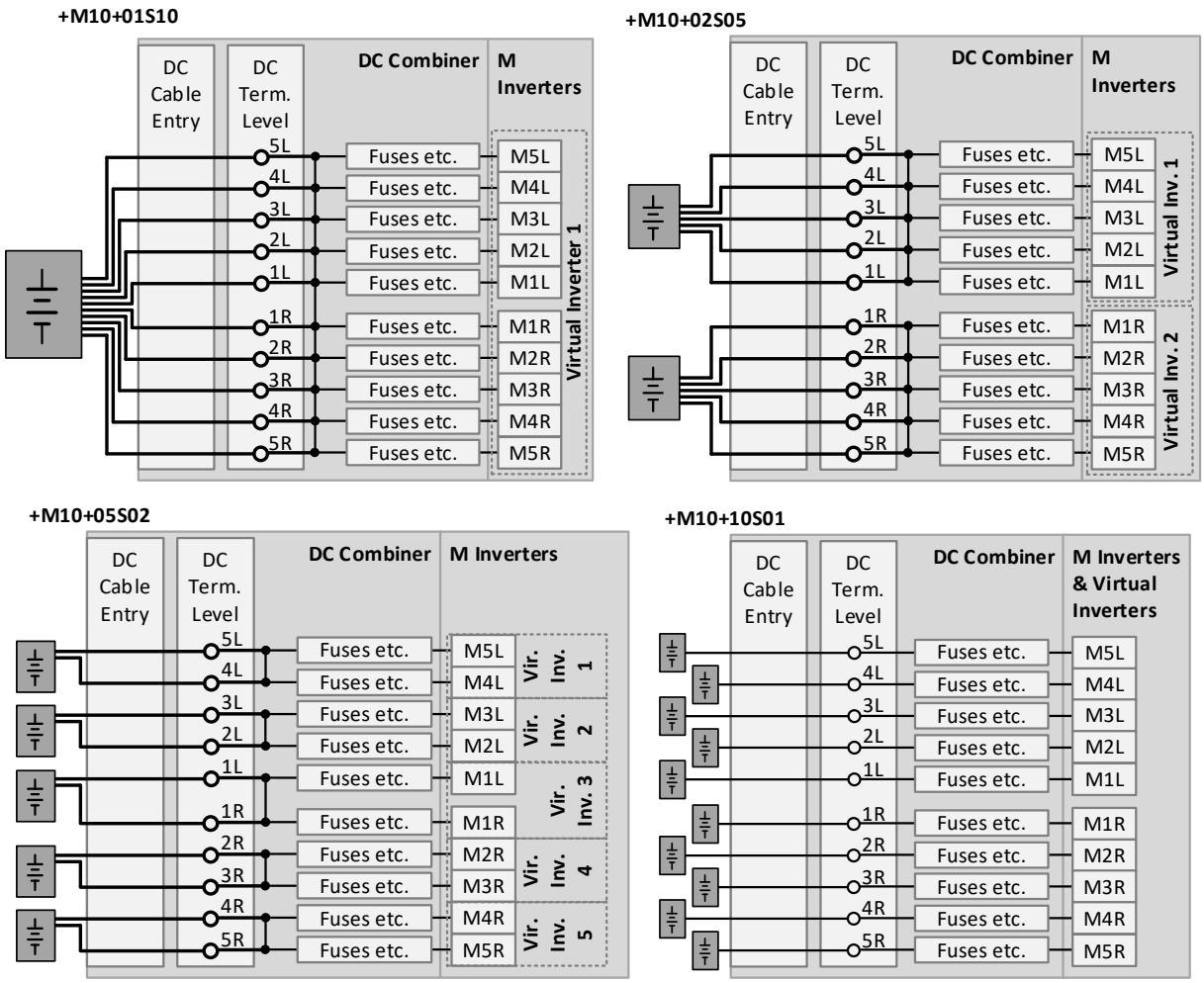


Figure 16. Examples of BESS DC configurations.

4.1.8 AC Throat Entry

The AC throat is in the AC combiner end of M System and has the AC terminal busbars as illustrated in Figure 17 with the recommended order of the AC phases L1, L2, and L3. The connection between the AC terminal busbars and MV transformer requires braids or busbars and cover ensuring the integrity of the enclosure of M System.

The AC busbar details are shown in Section 4.2.4.

EPC Power recommends the customer to use an option AC Throat Parts (option code +THR) to make sure that the connection is adequately rated in amperage and has proper ingress protection.

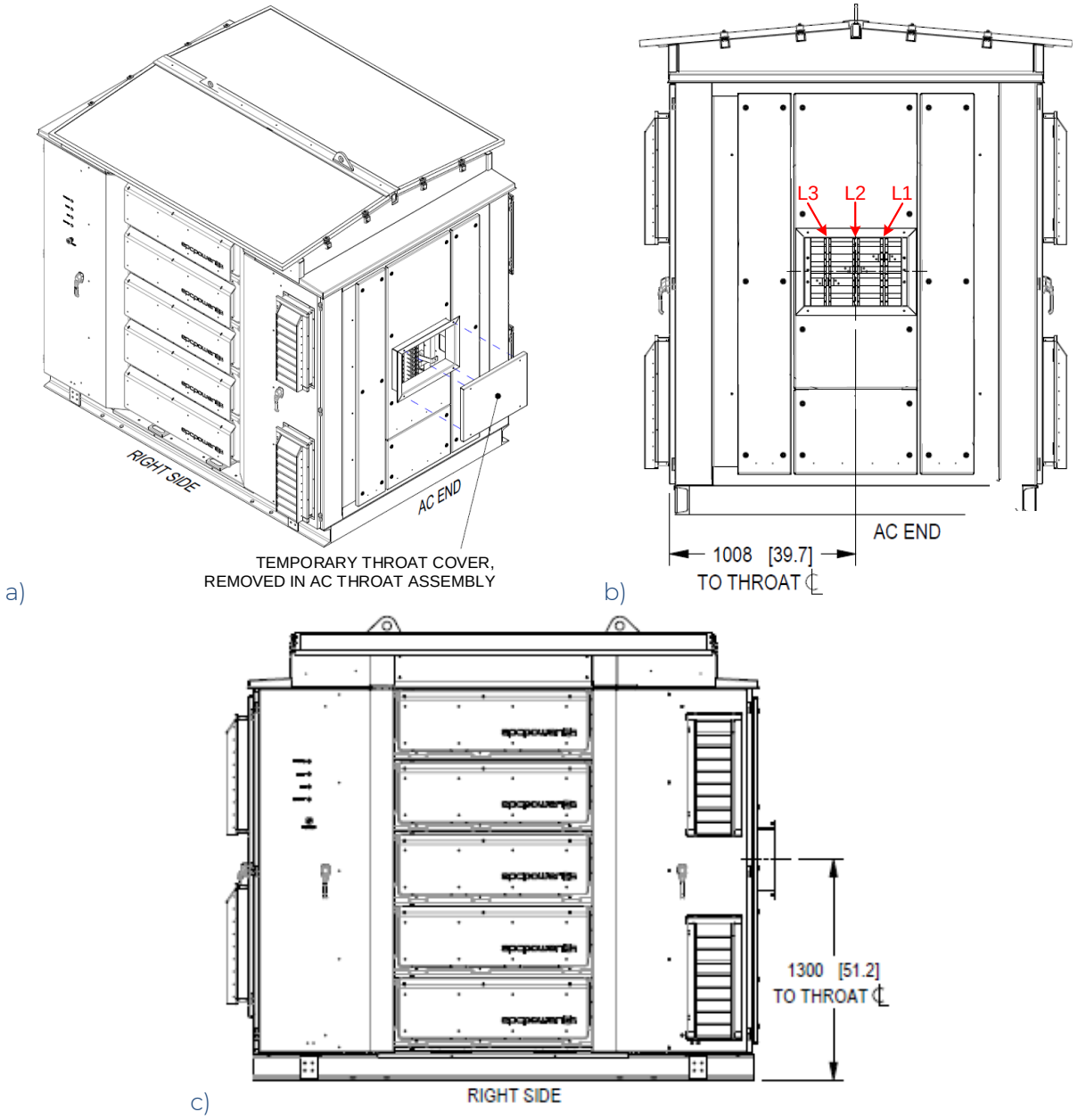


Figure 17. AC throat location (units in mm [in]), a) tilted view from the AC end top, b) AC end view with recommended phase order marked in red, c) right-side view.

4.1.9 Control and Auxiliary Power Wiring Entry Points

The location of the control and auxiliary wiring gland plate in a M System is shown in Figure 14 together with DC cable entry plates. The panel has a selection of adjustable-diameter cable glands and space for customer-fitted conduit entries.

An illustration showing recommended control and auxiliary wiring routing outside the M System is shown in Figure 18.

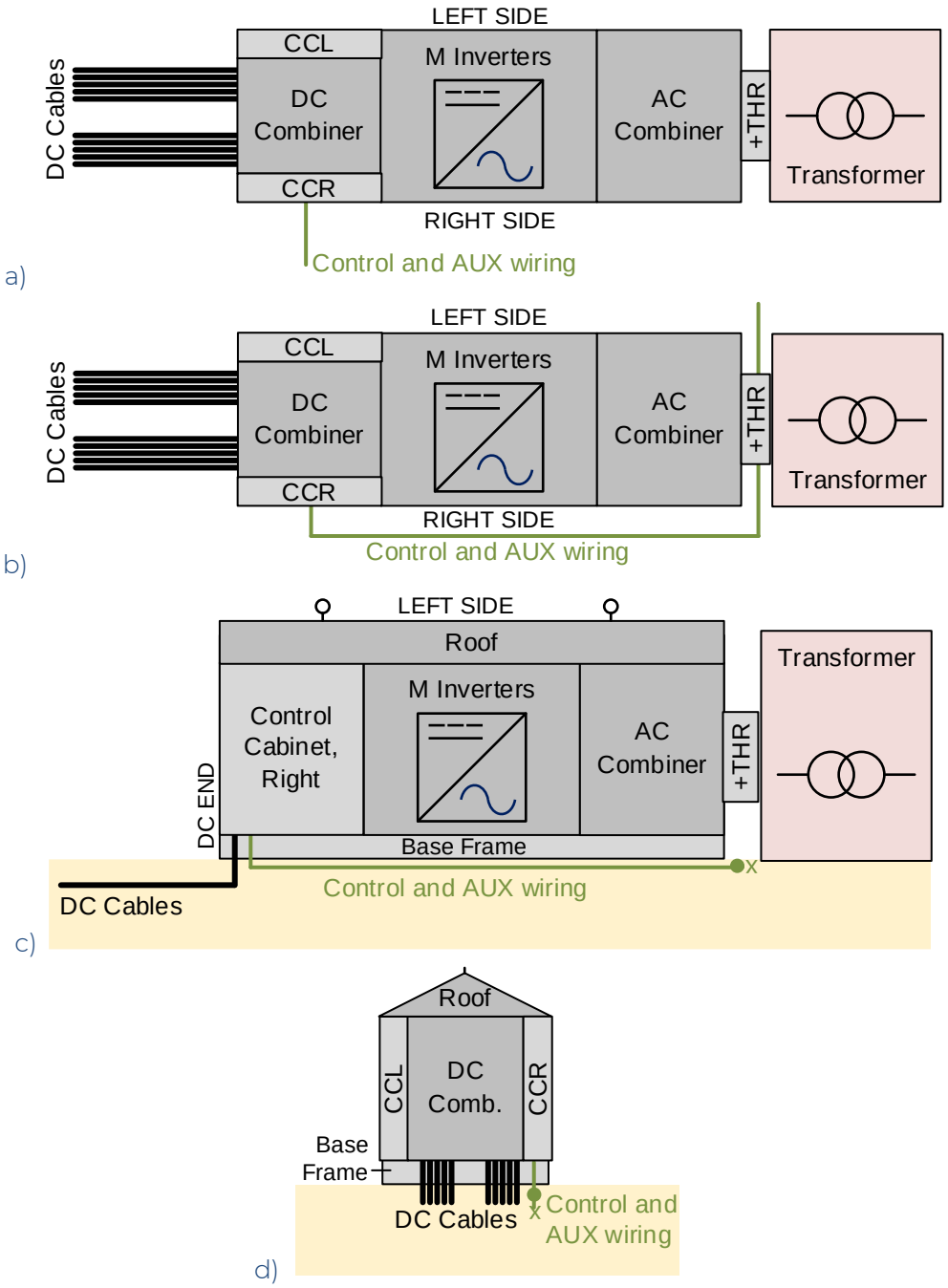


Figure 18. Recommended control and AUX wire routing without crossing the DC cables, where CCL and CCR are Control Cabinet Left and Right, respectively: a) top view of with wiring from right, b) top view with wiring from left, c) right-side view with wiring changing the side under the AC throat, c) DC end view of case c.

When control and auxiliary wire routing is planned, some requirements must be considered:

- Aligning or crossing the control and AUX wiring with the DC power cables should be avoided as shown in in Figure 18.

- If the plant design does not allow the separation of the power cables and the control and AUX wiring:
    - Leading the control and AUX cables with DC power cables in alignment should be avoided in the plant design.
    - If the control and auxiliary cables must cross the DC power cables, this should be at a 90° angle to the DC power cables.

4.1.10 Lifting

M Systems can only be lifted using an overhead lift or a crane. Prior to lifting, inspect eyebolts to make sure they are free from defects. The center of gravity (CoG) is located as listed in Table 2 and illustrated in Figure 19 and Figure 20 with the lifting lug locations. The BESS type M System with DC and AC switches is assumed in defining the total mass and its equal distribution between the quarters of the M System (DC end left and right and AC end left and right) in Table 2 and CoG. Different options may lead to slightly different masses and CoG.

The general overhead lifting guidance is also shown in Figure 19 and Figure 20. It is the only method of lifting the M System into location. Install two separate lift lines (lengths L_A and L_B in Figure 19), one to each lifting eye.

Table 2. Center of gravity (CoG)

	CoG from DC End door (mm [in])	CoG from bottom (mm [in])	CoG from left side door (mm [in])	Total Mass (kg [lbs])	Mass per 1/4 (kg [lbs])
M System	1502 [59.1]	1322 [52.1]	1008 [39.7]	3400 [7500]	850 [1875]

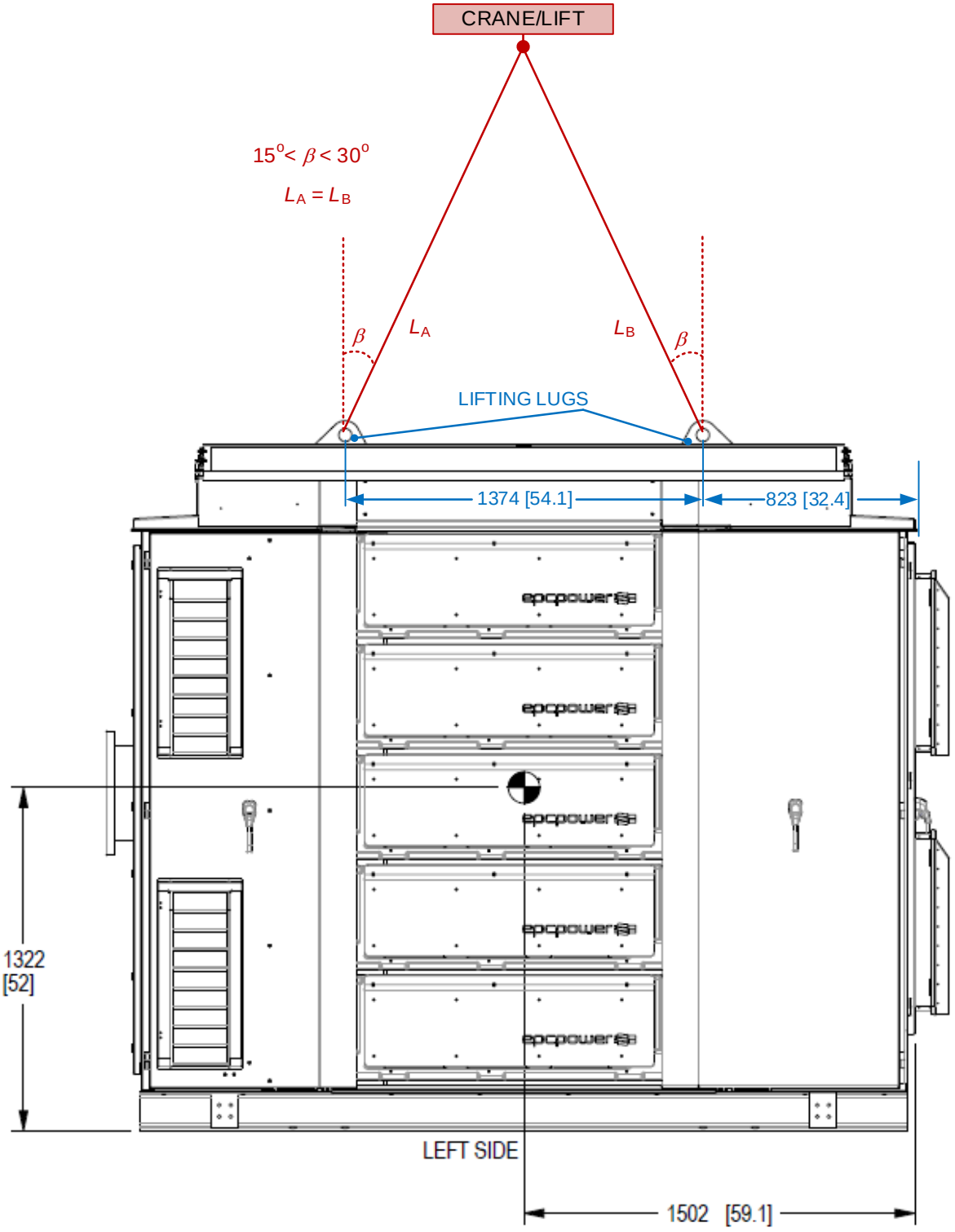


Figure 19. The CoG. lifting lug locations (in blue) and lifting principle with angle range (in dark red), left-side view (units in mm [in]).

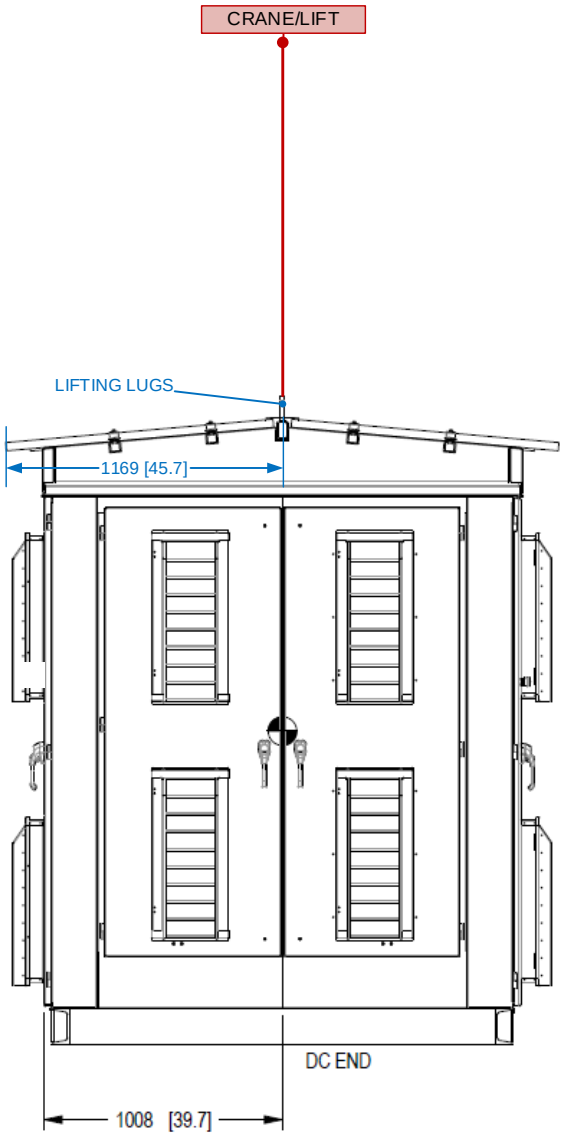


Figure 20. The CoG. lifting lug locations (in blue) and lifting principle with angle range (in dark red); DC-end view (units in mm [in]).

CAUTION	**CAUTION** Do not allow the M System to tip over; always set it on a level surface. Use lifting eyes and straps when appropriate.	**ATTENTION** Ne laissez pas 'onduleur basculer; placez toujours l'onduleur sur une surface plane. Utilisez des anneaux et des sangles de levage, le cas échéant.
CAUTION	**CAUTION** When lifting from overhead, ensure a vertical lift on both eyebolts.	**ATTENTION** Lors du levage depuis le plafond, assurez un levage vertical de tous les boulons à œil.

4.1.11 Transportation

The default transportation mode for M Systems is overland transportation, and an M System complies with typical North American road transportation requirements. An M System can be transported on flat-bed trucks or by rail as part of a skid or alone.

A M System can only be lifted using an overhead lift or a crane. Prior to lifting, inspect eyebolts to make sure they are free from defects. The center of gravity (CoG) is located as listed in Table 2 and illustrated in Figure 19 and Figure 20. A typical BESS M System with DC and AC switches is assumed in defining the masses and CoG. Different options may lead to slightly different masses and CoG.

4.1.12 Environmental Considerations

The M System combiner cabinets have NEMA Type 3R and IP55 rated enclosures, providing protection against rain, sleet, excess dust, sand, and snow protection in outdoor environments.

The M inverters have IP 65 rating fully preventing dust entry to sensitive areas in addition to the elements listed above.

4.2 Field Installation

 CAUTION	**CAUTION** After the installation, inspect the lifting eyes to ensure that they are not damaged.	**ATTENTION** Après l'installation, inspectez chacun des anneaux de levage pour vous assurer qu'ils ne sont pas endommagés.

The surface, clearance etc. requirements to be complied with before the field installation of M System starts are explained in section 4.1 and the field-storage conditions are specified in section 3.4.

4.2.1 M System Installation Procedure

The step-by-step procedure to install M System is explained below.

1. Check that you have all the tools required to perform the installation.
2. Check the foundation and clean the mounting surface from all sand, soil, leaves, etc.
    - See section 4.1.2 for the details.

3. Check that M System is not damaged
    - Confirm that all the mounting and anchoring features of the M System are undamaged.
4. Remove conduit entry plates and place them in a safe location where their gasketing is not damaged.
    - Note! The cable gland entry plates with option +DGP are not removed at this stage.
    - Removing the conduit entry plate(s) requires opening the DC-end doors and the dead front of the DC combiner. Put the dead front back in its place and close the doors after removing the entry plates.
5. Lift (see section 4.1.10) and position the M System on its location on the foundation.
6. Fasten the M System to the mounting features of the surface.
    - The locations of the available anchoring holes in the bottom frame beam (8 pcs of Ø28 mm (Ø1.1″) holes) are shown in Figure 4. Other anchoring methods, e.g. side clips for the edge of the bottom, are permitted.
7. Proceed to DC cabling connection as instructed in section 4.2.2 or 4.2.3.
    - Without the option +DGP, the conduits and DC cables must be installed and sealed immediately following section 4.2.2.
8. Proceed to AC throat connection as instructed in section 0.
    - If AC busbars are not exposed and covered by the transportation plate, the AC throat connection can be delayed, e.g. until the transformer is installed.
9. Proceed to control wiring as instructed in section 4.2.5.
    - As long as the cable glands of the control wiring are not opened, the control wiring can be delayed.
    - To ensure the operation of the humidity control regardless of the solar irradiation, it is recommended to connect the auxiliary power supply in the earliest possible instant (see section 0 for the details).
10. Make sure that all doors are properly closed and remaining package in place until commissioning occurs.
    - The general guidance for storage is presented in section 3.4.

Actions before commissioning (<2 weeks before):

11. Complete items 7, 8, 9, and 10, if previously delayed.
12. Check the air intakes, exhausts, and filters to make sure they are properly mounted, fully open, and without any blockages.

13. Check the entire surface of the M System for defects. All damage to the paint or to the galvanization in metal surfaces must be repaired once installation is complete to prevent corrosion.
    - Fill any defects in painted metal surfaces with appropriate paint
    - Cover any defects in galvanized metal surfaces with zinc paint or spray as e.g. 3M Zinc Spray, Maston Zinc Spray, Ambro-Sol Pure EP Zinc spray, or David's Zinc 182 which are available as spray and paint.
    - Order replacement parts for damaged plastic covers if M Inverter air intakes are affected.
14. Confirm the integrity of the enclosure and repair any inadequate sealing.
    - Check that the DC cabling entries are properly sealed (see section 4.2.2 or 4.2.3.).
    - Check that the control wiring entries are properly sealed (see section 4.2.5).
    - Check that the AC throat is properly sealed (see section 0).
    - Check the sealings of all the doors.
    - Make sure that all doors are properly closed, and all the latches are closed.

4.2.2 DC Entry Plate for Conduits

As a background, the required DC cable entry planning is presented in section 4.1.7.

The standard DC cable entry method is to use conduits and blind DC entry plates.
The procedure of the work is:

1. Remove the DC entry plates from the floor for the conduits as instructed in 4.2.1.
2. Measure the position of the bottom entry metal conduits and cut holes in the bottom DC conduit entry plates slightly larger than conduits.
3. Install conduit entry plates on the floor and seal entry points leaving no gaps between the plate and conduits.

See section 4.3.3 for information on how DC cables are mounted on the DC terminals.

Notes on sealing the conduit:

1. Once the conduit entry plates are reinstalled, the conduit must be sealed around its outer surface to prevent moisture, dust, air and debris from entering the cabinet.

2. Once the DC power cables are installed and are in their final position, any excess space in the conduit must be sealed with an expansion foam or sealant to prevent moisture, dust, air and debris from entering through the conduit.

An example sealing case of conduits is shown in Figure 21.

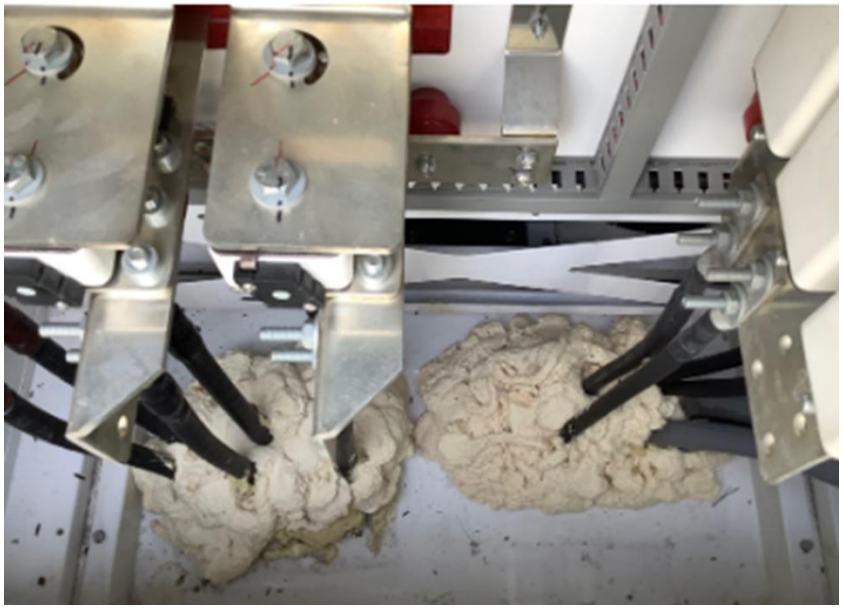


Figure 21. Sealing of conduit cable entries.

If external changes are made to the entry plates or DC combiner cabinet in DC cablings, all leakage gaps around the entry plates or conduits should be sealed with spray foam around the panels and conduits after the cables are inserted from the bottom. A possible sealant is GREAT STUFF (TM) Big Gap Filler Insulating Foam by The Dow Chemical Company 16oz HC ES QP.

4.2.3 DC Entry Plate for Cable Glands

As a background, the required DC cable entry planning is shown in section 4.1.7.

With the option code +DGP, cable glands are used as shown in Figure 22 and Figure 23.

- 30 cable glands per plate, a plate per side
    - 60 cable glands in total
    - IP66 / UL Type 4X
- The gland accommodates cable diameters of 22...36 mm

Cable gland type: Icotek KEL-DPF 50

See section 4.3.3 about where and how DC cables are mounted on the DC terminals.

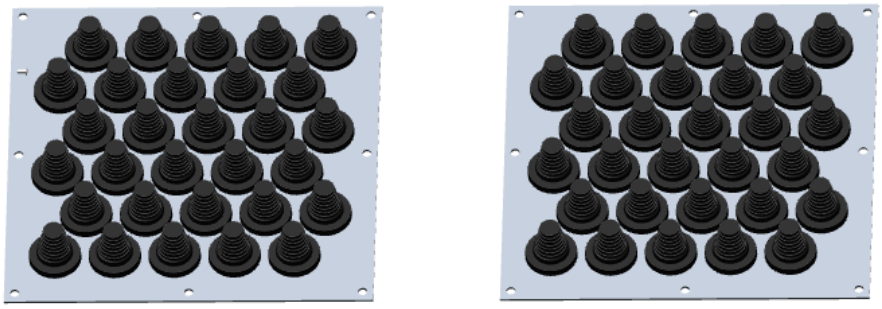


Figure 22. Cable-gland plates of the DC entry (+DGP option): 30 glands per plate.

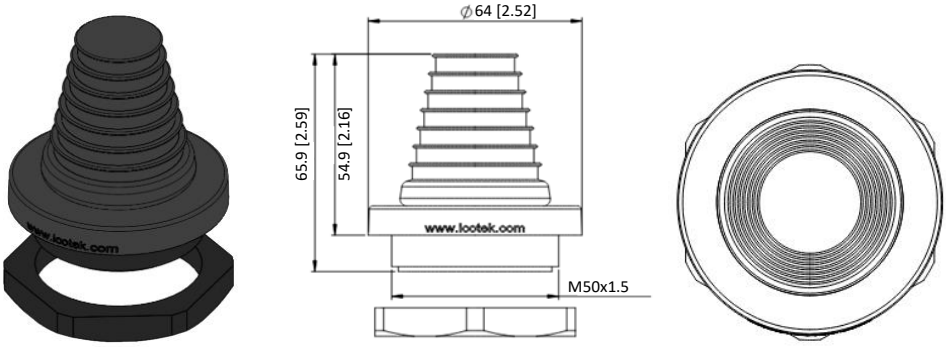


Figure 23. The cable gland in detail, (units in mm [in]).

4.2.4 AC Throat

As introduced in section 4.1.8, the AC throat to connect the M System to an MV transformer is located in the AC end. The busbar connection details are shown in Figure 24.

Remove the plate protecting the AC throat busbars only when the AC connections to the medium voltage transformer is being performed. See section 4.3.4 for the details.

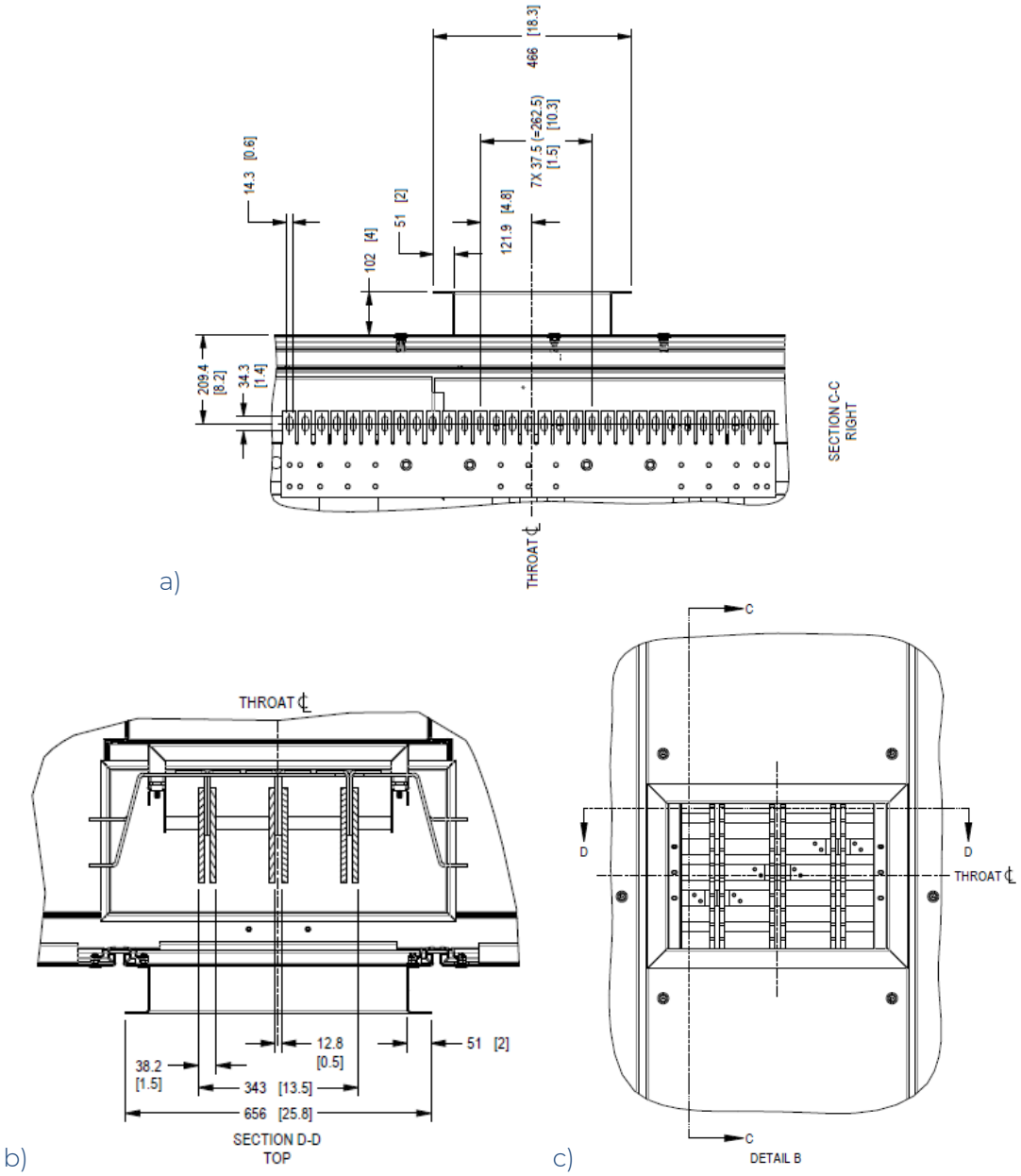


Figure 24. The AC throat busbar and collar a) right-side view, b) top view, c) AC-end view (units in mm [in]).

4.2.5 Control and Auxiliary Wiring Entry Plate

As a background, the required planning for Control and Auxiliary wiring cable entry is shown in section 4.1.9 and in Figure 14.

The customer may use the cable glands in the method considered the most optimum for the case. It is recommended to separate the control signal cables and possible AUX power wiring and to match their locations to the terminal blocks introduced in section 4.4.

4.3 Main Power Connections

WARNING	**WARNING** This unit may not be provided with a GFDI device. This inverter must be used with an external GFDI device if required by the Article 690 [Solar Photovoltaic (PV) Systems] of the National Electrical Code for the installation location.	**AVERTISSEMENT** Cet appareil peut ne pas être fourni avec un appareil GFDI. Cet onduleur doit être utilisé avec un appareil GFDI externe si requis par l'article 690 [Systèmes solaires photovoltaïques (PV)] du Code national de l'électricité pour le lieu d'installation.

4.3.1 Power Connection Overview

Figure 25 and Figure 26 have two typical high-level drawings of M System.

- A 10-inverter M BESS System with two DC supplies (batteries) with all main circuit options is shown in Figure 25, i.e. the variant +M10+02S05
- A 10-inverter M BESS System with ten DC supplies is shown in Figure 26, i.e. the variant +M10+10S01.

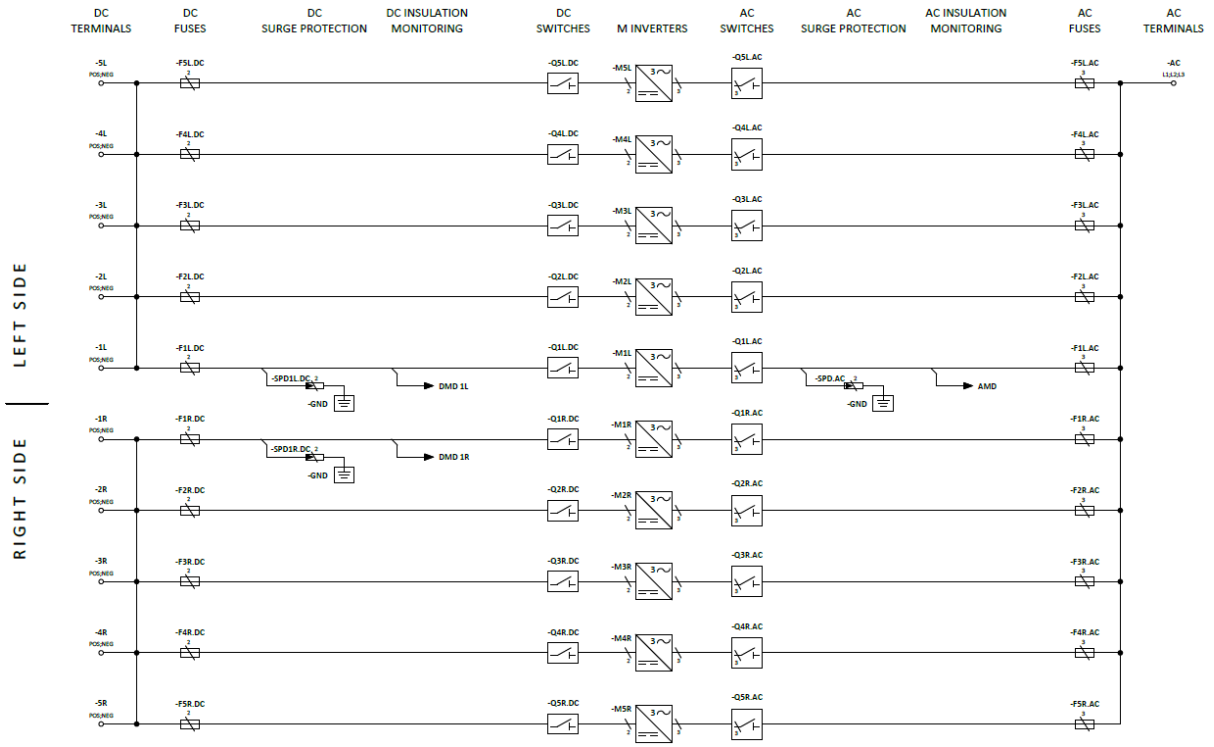


Figure 25. 10-inverter M System with two batteries as DC supplies for two inverter sets, i.e. variant +M10+02S05.

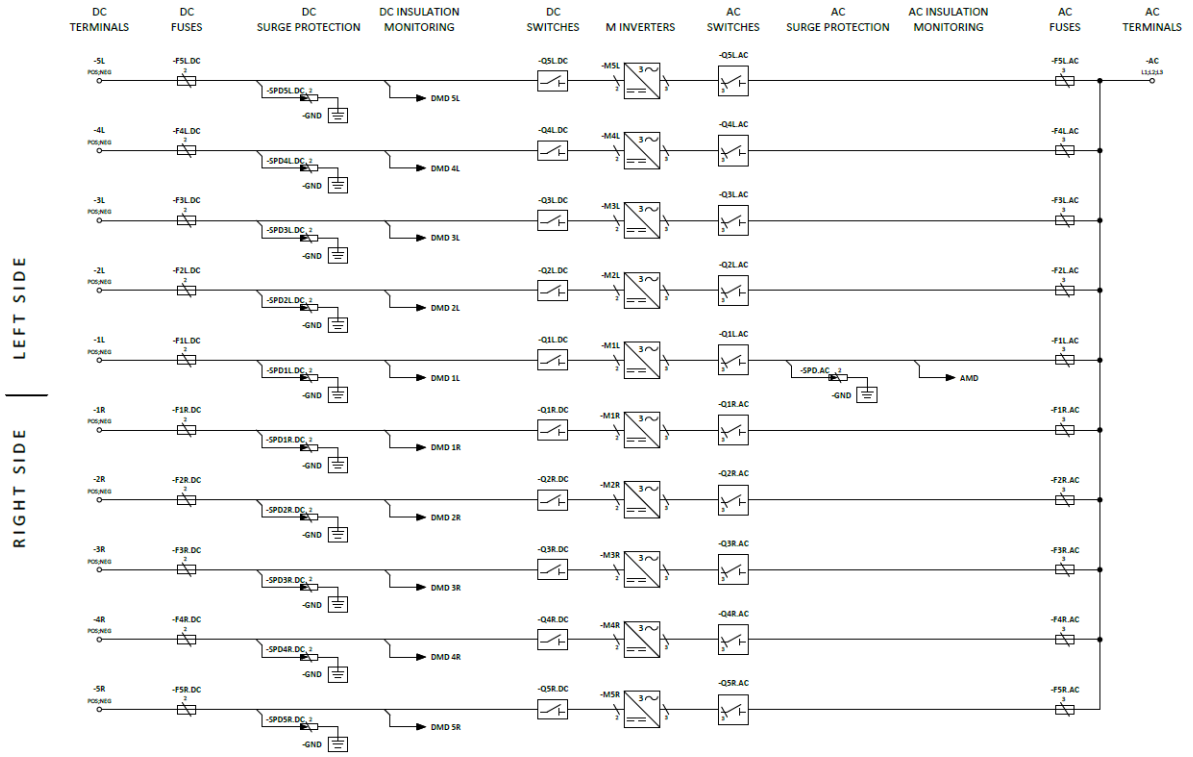


Figure 26. 10-inverter M System with ten batteries as DC supplies for ten inverters (sets) , i.e. variant +M10+10S01.

The power connections to the M System made in the field must comply with applicable local standards. General guidance for the power connections is presented in sections 4.3.2-4.3.4.

Please contact EPC Power if you have any questions regarding your specific unit.

M System uses L1/L2/L3 to identify AC voltage phases. L1/L2/L3 is equivalent to A/B/C, R/S/T, or U/V/W. The phases may be connected in any order; the inverter will self-detect the phase rotation when in the grid following mode.

4.3.2 Equipment Grounding Connections

The equipment grounding conductor (Protective Earthing conductor, i.e. PE conductor) must be connected to the M System.:

- The connection points are external frame-mounted terminals in the AC end shown in Figure 27
    - The terminal busbar details are shown in Figure 28.
    - This connection is exposed to weather and non-corrosive cable lugs, bolts, and nuts are to be used in the mounting of the ground conductors.
- **Equipment grounding (PE conductor) must enter the M System only from a single location.**

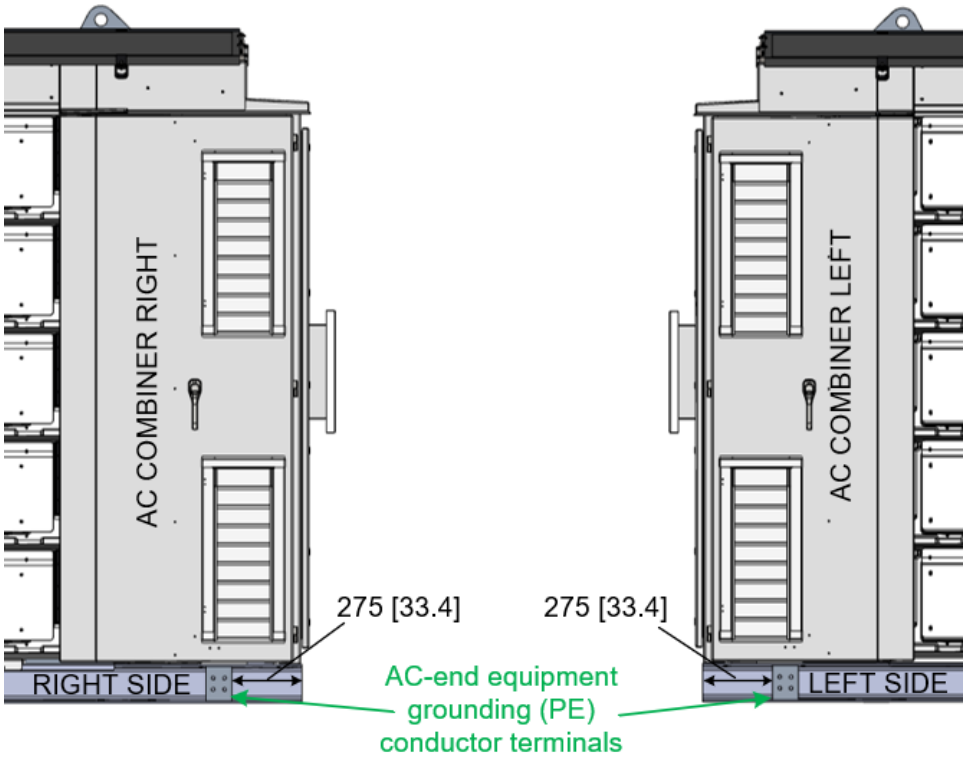


Figure 27. Location of the equipment grounding (PE conductor) terminals (units in mm [in]).

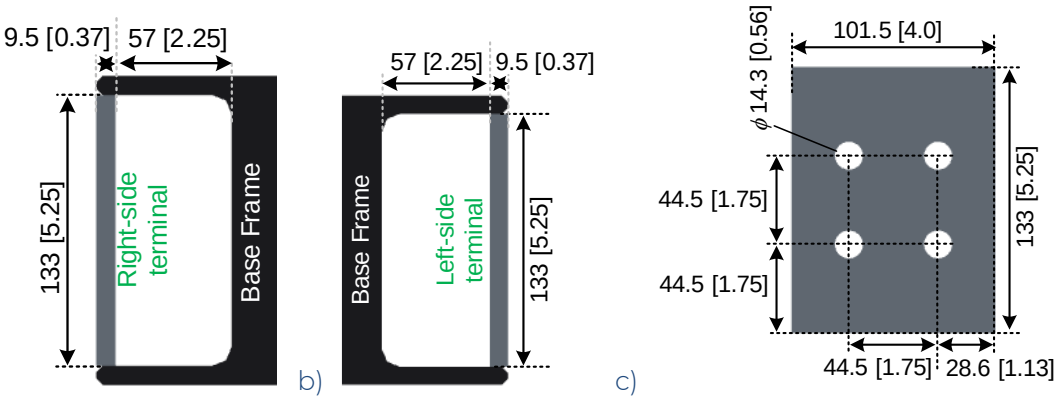


Figure 28. AC-end equipment grounding terminal details (units in mm [in]): a) and b) the terminal and base frame, c) terminal busbar.

The bolt hole pattern in the AC-end equipment grounding (PE conductor) connection is 4-hole wide NEMA pad:

- Hole spacing: 1 ¾″, i.e. 44.5 mm
- Hole diameter: 0.56″, i.e. 14.3 mm
- Terminal width: 4″, i.e. 101.5 mm

The use of double-hole crimped tongue cable lugs is recommended for all grounding connection when cables are used.

The equipment grounding conductor must be sized per the governing standard for site application and location.

- In USA and Canada, the equipment grounding conductor must typically be rated at ⅓ of the current rating of the main AC conductors.
    - Some example conductor cases are collected in Table 3.

Table 3. Equipment grounding current rating and conductor examples in the USA.

M System Variant	AC current [A_{AC}]	US ratings in 50°C [122°F] ambient				
		~1/3 current [A_{AC}]	75°C [167°F] cables in air		Bare conductors	
			Cu	Al	Cu	Al
+M10	4400	1467	4x400kcmil / 3x700kcmil	4x600kcmil	2x600kcmil	3x500kcmil
+M09	3960	1320	4x350kcmil / 3x600kcmil	4x500kcmil	2x500kcmil	3x400kcmil
+M08	3520	1173	4x300kcmil / 3x500kcmil	4x500kcmil / 3x700kcmil	2x500kcmil	3x300kcmil / 2x600kcmil
+M07	3080	1027	4x250kcmil / 3x400kcmil	4x350kcmil / 3x600kcmil	2x350kcmil	3x250kcmil / 2x500kcmil
+M06	2640	880	4x4/0AWG / 3x300kcmil	4x300kcmil / 3x500kcmil	2x300kcmil	2x400kcmil

4.3.3 DC Combiner Power Connections

DC cable entries and their optimal locations are introduced in section 4.1.7.

The dimensions of the terminal locations are shown in Figure 29 and Figure 30. The hole size and spacing of the terminal in the BESS variant is shown in Figure 31.

The use of double-hole crimped tongue cable lugs is recommended for all DC power and ground cables in DC combiner.

The bolt pattern provided in DC terminals is NEMA 2:

- Hole spacing: 1 ¾″, i.e. 44.5 mm
- Hole diameter: ½″, i.e. 13 mm

When the number of DC cables used does not match the number of M Inverters evenly (see Table 4), the cables should be distributed as evenly as possible between the DC terminals of the respective M Inverters. This may have an effect on the optimal DC cable route discussed in section 4.1.7.

Care must be taken during design and installation to ensure that the DC cables do not apply undue stresses or torques to the DC busbars. Therefore, the DC cabling entries must be made below the DC terminal busbars (see section 4.1.7) to eliminate unnecessary / any significant

cabling bend. The DC cabling without fasteners installed should align with the DC terminal busbars as exactly as possible. Under no circumstances should the fasteners between the DC terminal busbars and the DC cables be used to force the cables into alignment.

The cables must be mounted so that these distances are complied with:

- The distance through air between the bare metal DC-potential conductors/parts and between them and the frame parts other than the enclosure wall of the DC combiner: >18 mm
- The distance over the surface between the bare metal DC-potential conductors/parts and between them and the frame parts other than the enclosure wall of the DC combiner: >31 mm
- The distance between all bare metal DC-potential conductors/parts and the DC combiner enclosure wall: ≥42 mm.

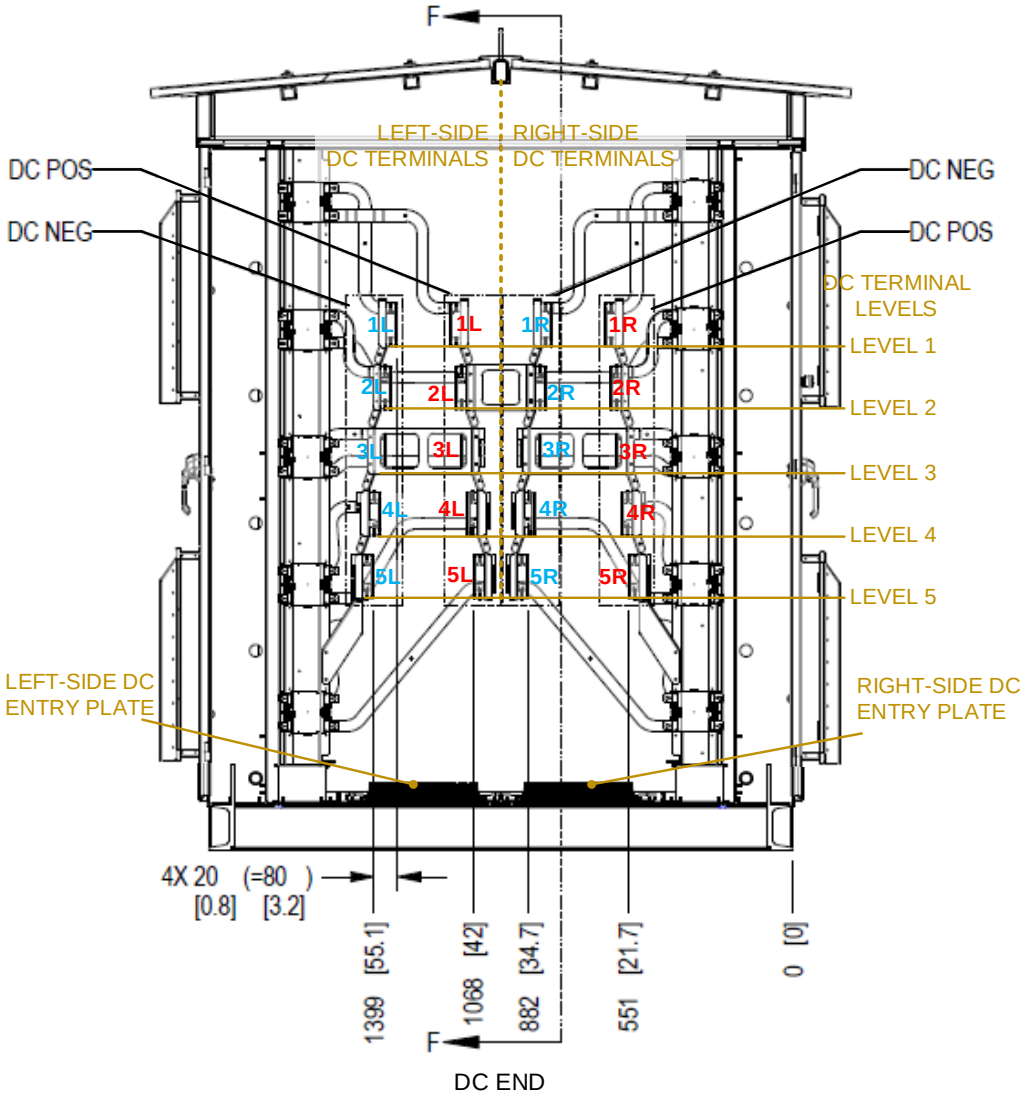


Figure 29. Cabling area dimensions in busbar terminal locations from DC End view (units in mm [in]). Sectioning of Figure 30 marked by F.

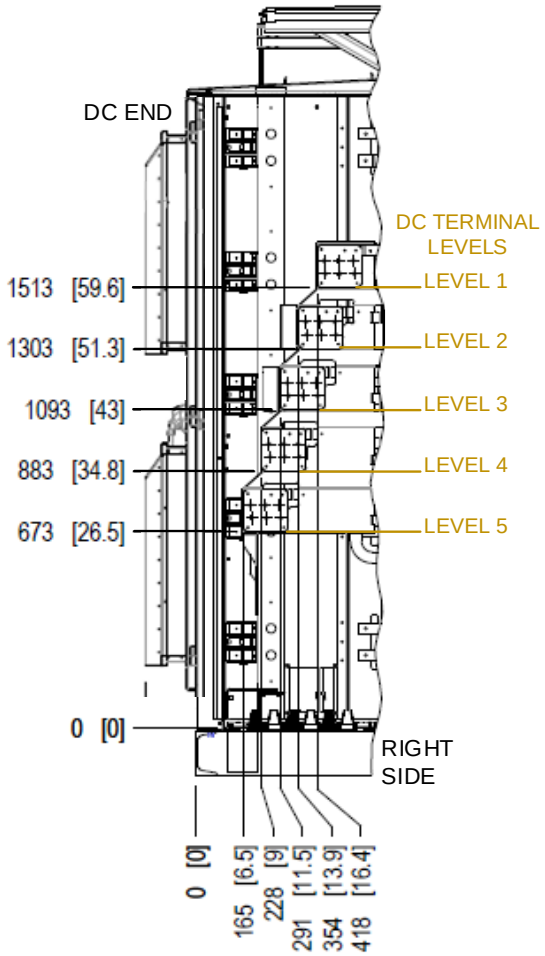


Figure 30. Sectioned right-side view with terminal levels (units in mm [in]).

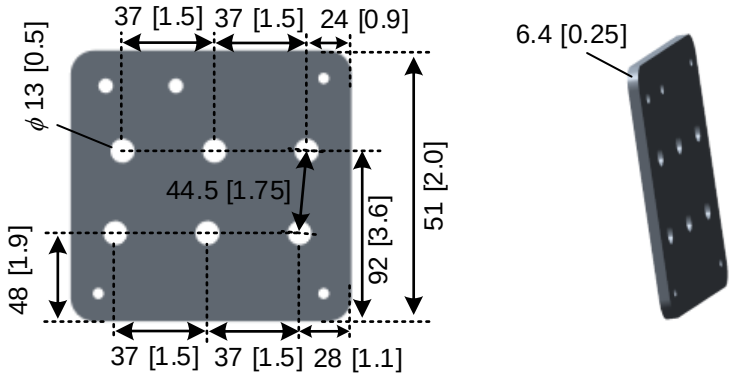


Figure 31. Terminal busbar in BESS-type M System for POS and NEG and in PV-type M System for NEG (units in mm [in]).

4.3.4 AC Throat Connection

The AC throat connection details are shown in section 4.2.4.

Mount the braids of +THR option or the customer's braids in the AC throat busbars. Mount the other ends of the braids in the terminal busbars of the medium voltage transformer.

Care must be taken during design and installation to ensure that the mounting AC braids do not apply undue stresses or torques to the AC busbars. Any damage to the M System or to +THR components caused by failure to follow these instructions is non-warrantable and must be repaired at cost.

When the +THR option is not used, it is the customer's responsibility to provide a solution per the governing standard for your application and location in addition to meeting the requirements introduced in section 4.1.8.

4.3.5 DC Power Cable Specifications

The DC power cables connected to the DC terminals are not to exceed 90°C [194°F] temperature in operation. The cables should be rated for 90°C [194°F] temperature.

Most ampacity charts provide cable size as a function of temperature rise above 30°C [86°F] ambient. This must be adjusted according to the expected maximum ambient temperature of the location and according to the cable assembly and routing concept: separate cables buried in ground, how many per conduit, etc.

NOTE! The cable dimensioning must be done according to nameplate DC current rating of the M Inverters / M System.

EPC Power recommends using a cable with an insulation system rated at the maximum DC bus voltage or greater.

Some DC power cable size and number examples (total number of cables including positive and negative ones) are shown in
Table 4 for different BESS configurations.

- The maximum number of DC power cables in BESS is 3 pcs per DC potential per M Inverter, but it is recommended to use cables with ampacities high-enough to allow the number to be limited to 2 pcs per DC potential.

Table 4. Some cabling examples of four BESS variants with symmetric DC sources.

	DC sources [pcs]	Minimum number of DC cables (POS and NEG summed) [pcs]							
		+M10		+M09		+M08		+M06	
		Total	Total per Inverter	Total	Total per Inverter	Total	Total per Inverter	Total	Total per Inverter
Al Cable: 600 kcmil / 300 mm²	1	36 (2x1x18)	3.6	32 (2x1x16)	3.55	28 (2x1x14)	3.5	22 (2x1x11)	3.67
	2	36 (2x2x9)	3.6	-	-	28 (2x2x7)	3.5	24 (2x2x6)	4
	3	-	-	36 (2x3x6)	4	-	-	24 (2x3x4)	4
	4	-	-	-	-	32 (2x4x4)	4	-	-
	5	40 (2x5x4)	4	-	-	-	-	-	-
	6	-	-	-	-	-	-	24 (2x6x2)	4
	8	-	-	-	-	32 (2x8x2)	4	-	-
	9	-	-	36 (2x9x2)	4	-	-	-	-
	10	40 (2x10x2)	4	-	-	-	-	-	-
Al Cable: 750 kcmil / 400 mm²	1	32 (2x1x16)	3.2	28 (2x1x14)	3.11	26 (2x1x13)	3.25	20 (2x1x10)	3.33
	2	32 (2x2x8)	3.2	-	-	28 (2x2x7)	3.5	20 (2x2x5)	3.33
	3	-	-	30 (2x3x5)	3.33	-	-	24 (2x3x4)	4
	4	-	-	-	-	32 (2x4x4)	4	-	-
	5	40 (2x5x4)	4	-	-	-	-	-	-
	6	-	-	-	-	-	-	24 (2x6x2)	4
	8	-	-	-	-	32 (2x8x2)	4	-	-
	9	-	-	36 (2x9x2)	4	-	-	-	-
	10	40 (2x10x2)	4	-	-	-	-	-	-

4.4 Control and Auxiliary Power Connections

	When working on control or communication circuits, a wrist strap, heel strap, or other ESD precaution should be used. Failure to do so may result in damage to the inverter or its control circuits.	Lorsque vous travaillez sur des circuits de commande ou de communication, un bracelet antistatique, une sangle de talon ou d'autres précautions ESD doivent être utilisés. Le non-respect des instructions peut entraîner des dommages à l'onduleur ou aux circuits de commande.
 CAUTION	When directly supplying 24 V_{DC} power to the inverter the supplied voltage must not exceed 27 V_{DC}.	Lors de la fourniture directe d'une alimentation 24 V_{CC} à l'onduleur, la tension fournie ne doit pas dépasser 27 V_{CC}.
 CAUTION	When directly supplying 48 V_{DC} power to the inverter the supplied voltage must not exceed 55 V_{DC}.	Lors de la fourniture directe d'une alimentation 48 V_{CC} à l'onduleur, la tension fournie ne doit pas dépasser 55 V_{CC}.

4.4.1 Terminal Block Interface

The layout of the interior of the control section, i.e. the left control cabinet of the M System is shown in Figure 32.

The control/communication wire and auxiliary (AUX) terminal blocks are detailed in

Table 5.

Terminal blocks used are DIN-rail mounted Phoenix Contact PT 1,5/S-QUATTRO blocks:

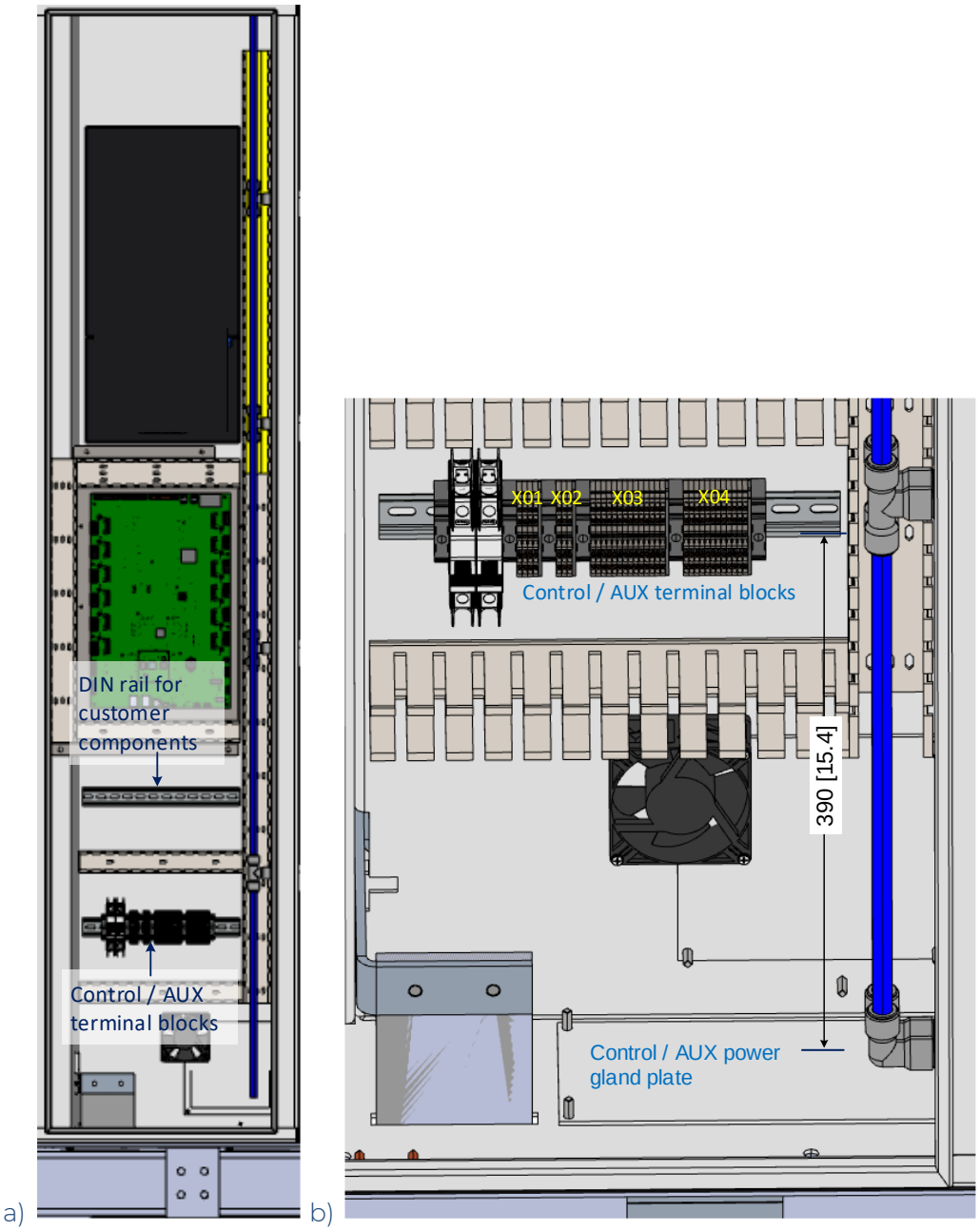
- Terminal blocks can accommodate conductors described in Table 6.
    - Use wire conductor cross section high enough for the ampacity required by the function.
- Push-in connections to spring contacts

Route cables and/or wires directly from the entry plate to the correct terminal blocks and fasten them to the back wall plate by zip ties.

- Avoid mixing possible auxiliary power supply cable/wires with the signal cables/wires.

Table 5. Terminal block arrangement

Block Section	Block #	Interface	Function	Notes
X01	.1	200-415 V_{AC} aux power input, 3-phase 50 Hz / 60 Hz	Line 1	Max. power: 2 kW (<6 A_{RMS}). Available with option +EAP (not with +IAP or +IDP)
	.2		Line 2	
	.3		Line 3	
	.4	TBD		Reserve
X02	.1	Remote voltage sense	L1 or L12	Wired with option +REM only. Maximum allowed line-to-line voltage: 50 V_{RMS}
	.2		L2 or L23	
	.3		L3 or L31	
X03	.1	+24 V_{DC} output	+24 V_{DC}	Maximum continuous output: 500 mA
	.2		0 V (GND)	
	.3	External IMD alarm	IMD alarm	For external dry contact, i.e. internally powered by 24 V_{DC}, max output ≤10 mA)
	.4		0 V (GND)	
	.5	Customer-defined alarm	Custom alarm	For external dry contact, i.e. internally powered by 24 V_{DC}, max output ≤10 mA)
	.6		0 V (GND)	
	.7	Customer-defined DI 1	DI 1	For external dry contact, i.e. internally powered by 24 V_{DC}, max output ≤10 mA)
	.8		0 V (GND)	
	.9	Customer-defined DI 2	DI 2	Externally powered, 24 V_{DC}
	.10		0 V (GND)	
	.11	Customer-defined DO 1	DO 1	Internally powered by 24 V_{DC}, max output of a DO: ≤20 mA continuous, ≤100 mA peak
	.12		0 V (GND)	
	.13	Customer-defined DO 2	DO 2	
	.14		0 V (GND)	
X04	.1	MV transformer alarm 1	Alarm 1	For external dry contacts, i.e. internally powered by 24 V_{DC}, max output ≤5 mA per alarm.
	.2	MV transformer alarm 2	Alarm 2	
	.3	MV transformer alarm 3	Alarm 3	
	.4	MV transformer alarm 4	Alarm 4	
	.5	MV transformer alarm 5	Alarm 5	
	.6	MV transformer alarm return	0 V (GND)	
	.7		0 V (GND)	



a) b)

Figure 32. Control section (interior of right control cabinet) of M System a) general right-side view with open left control cabinet door, b) control / AUX wiring in detail (units in mm [in]).

Use a small screwdriver or similar tool to open terminal block clamps when installing wires as shown in Figure 33. Wires should be terminated by ferrules before inserting them into terminal blocks. If ferrules cannot be used, any other termination method specified by manufacturer's instructions is acceptable. Use strain relief methods for conductors terminating on the DIN rail.

Table 6. Terminal block wiring details

Connection Type	Limit SI	Limit AWG/US
Conductor cross section solid/flexible min.	0.14 mm^2	26
Conductor cross section solid/flexible max.	1.5 mm^2	16
Conductor cross section flexible, with ferrule with/without plastic sleeve min.	0.14 mm^2	26
Conductor cross section flexible, with ferrule without plastic sleeve max.	1.5 mm^2	16
Conductor cross section flexible, with ferrule with plastic sleeve max.	1 mm^2	18
Stripping length	8...10 mm	0.315...0.393″
Internal cylindrical gage	A1 / B1	

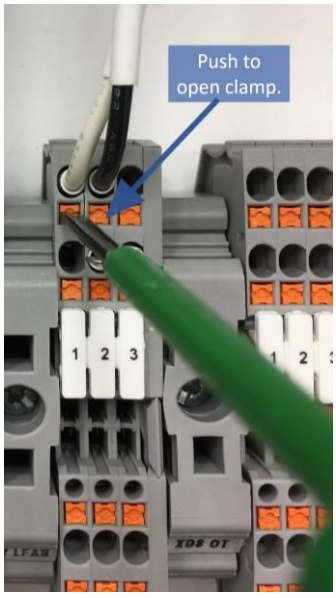


Figure 33. Opening the terminal block clamp

4.4.2 Communication Interface

The communication interface (Modbus TCP/IP) must have a dedicated (Ethernet) cable which is routed outside the M System, and it enters the left control cabinet through the dedicated cable gland in Control & AUX power entry plate. The cable is secured to the cabinet wall by zip ties so that the terminal plug has appropriate strain.

4.4.3 Integrated Fast Stop (FSTOP)

The integrated Fast Stop (FSTOP) button is located on the control cabinet left door as shown in Figure 34. Make sure that the FSTOP button is pushed down until commissioning to prevent unintentional operation of the M Inverters.

For additional external FSTOP, the customer-defined alarm in terminal X03.5 and X03.6 can be used.

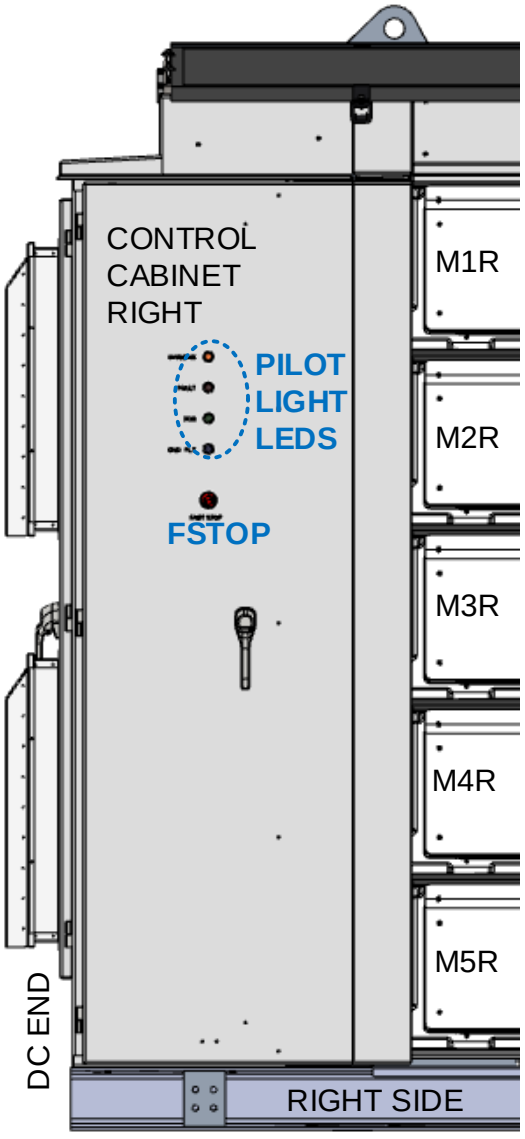


Figure 34. Location of FSTOP button.

5 Sealing Confirmation

A properly sealed inverter is critical for ensuring the long life of the inverter. To properly check the inverter, confirm the following:

1. All latches in all doors are closed
2. All cable entry points are sealed with airtight expanding foam or properly sized cable glands and all the cable entry plates are tightly on their place.
    a. See sections 4.2.2, 4.2.3, and 4.2.5
3. AC throat (see section 0):
    a. the covers are mounted tightly
    b. the throat interfaces are mounted tightly in both the M System and in the MV transformer end.

6 Installation Complete

Once the above sections are complete and the Installation Check Sheet (see the end of the document) is completed, the system is ready to be commissioned.

7 Photographic Feedback

For remote commissioning and ensuring long-term project success, photographs of the installation should be sent to EPC Power for review.

Appendix A - Acronym Index

A_{AC}	Ampere Alternating Current
AC	Alternating Current
AUX	Auxiliary
AWG	American Wire Gauge
BESS	Battery Energy Storage System
CCL	Control Cabinet, Left
CCR	Control Cabinet, Right
CoG	Center of Gravity
DC	Direct Current
DMM	Digital Multimeter
EMC	Electromagnetic Compatibility
ESD	Electrostatic Discharge
GFDI	Ground Fault Detector Interrupter
GND	Ground
IEC	International Electrotechnical Commission
IMD	Insulation Monitoring Device
NEC	National Electric Code
OEM	Original Equipment Manufacturer
RMA	Return Merchandise Authorization
SC	Short-circuit Current
UPS	Uninterruptible Power Supply
V_{AC}	Volts AC Power
V_{DC}	Volts DC Power

Installation Check Sheet

This check list is intended as a sign-off to confirm that each installation step is completed, and the system is ready for commissioning. Failure to complete this check sheet may cause commissioning delays and could potentially impact on the warranty.

Product Code	Serial Number	Customer Name	Customer Tag	Location of Equipment

Sections	Description	Initial	Date
3.1	M System has been received undamaged in the factory		
4.1	The site has been built according to the instructions and is fit for the installation of M System(s)		
4.1.1	M System has arrived at the site without transportation damage		
4.2	M System has been installed without installation damage		
4.3.2	Equipment grounding (PE) conductors have been installed and torqued per applicable standard and marked		
4.3.3	DC cables have been installed and torqued per applicable standard and marked		
4.3.4	AC throat braids have been installed and torqued per instructions. AC throat covers are assembled per instructions.		
4.2.5 4.4.2	Control and communication wiring has been installed and connected per instructions		
4.2.5	Auxiliary power has been connected when required		

	Name	Signature	Date
Installer			
Customer Representative			

JF2 DC LINK 5.1 CIVIL INFORMATION

Customer

Supplier LG EnergySolution

LG Energy Solution

Product Information

Product Model : LINK-FDA2AR13

Product Description : JF2 DC LINK 5.1 (0.25CP, US)

Document No. : F2D4-5.1US-DW04

Editing date : 2025.03.24

Supplier : LG EnergySolution

Total : 7

REV	DESCRIPTION	DATE	DRWN	CHKD	APPD
0	INITIAL RELEASE	2025.03.24	KM PARK	MC KIM	JB PARK

CUSTOMER

CONTRACTOR

SCALE N/A

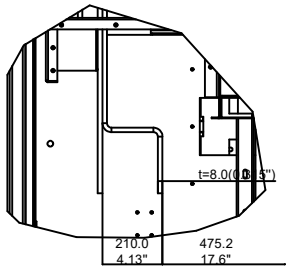
DIMENSION mm (ft'-inch")

TITLE JF2 DC LINK 5.1 CIVIL INFORMATION

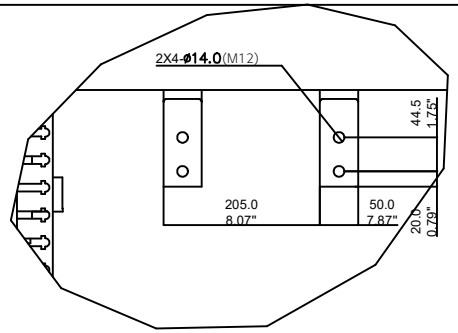
DWG NO. F2D4-5.1US-MC02

DWG SIZE A3

SHEET 07 SHEETS



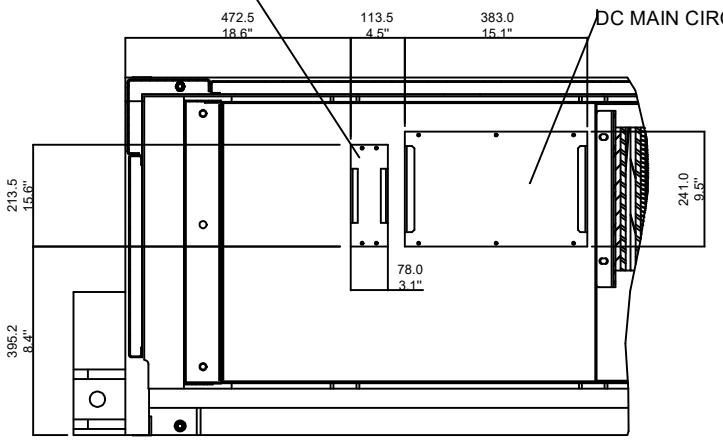
Detail A(6:1)
MAIN POWER CONNECTION



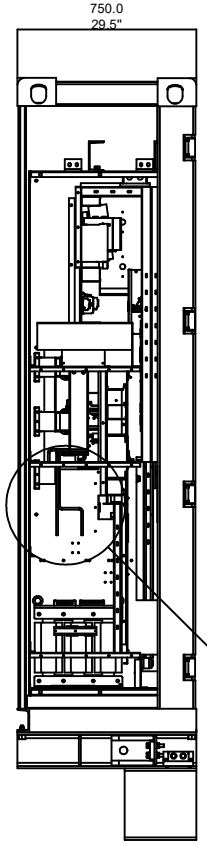
Detail B(8:1)
MAIN POWER CONNECTION [FRONT VIEW]

AC AUX & COMM. LINE

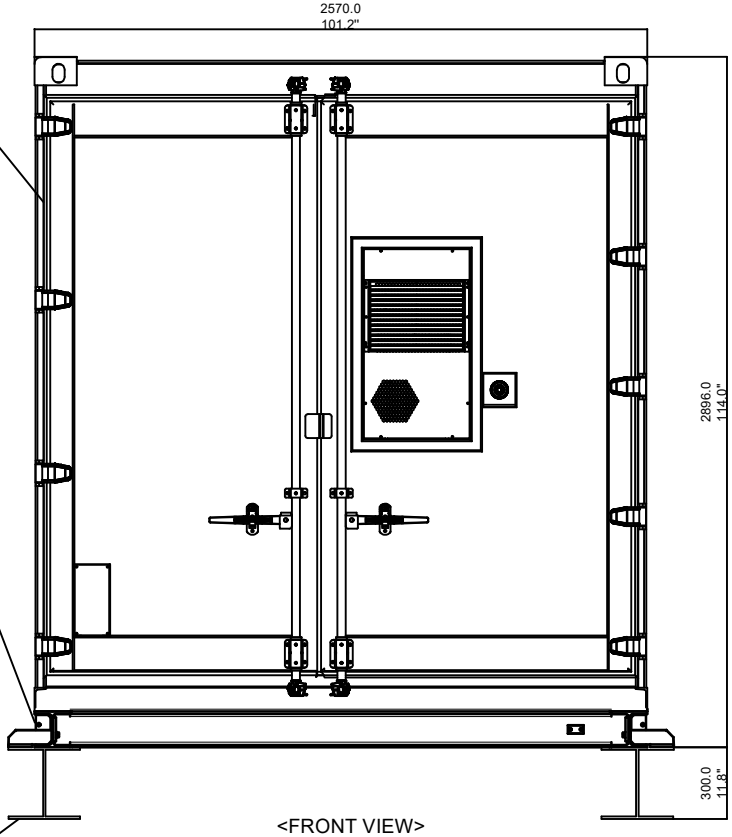
DC MAIN CIRCUIT



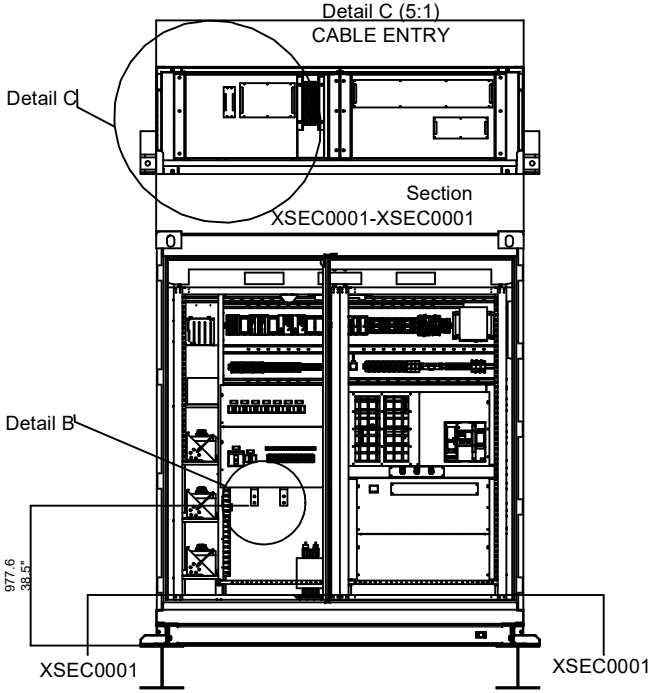
Detail C (5:1)
CABLE ENTRY



<SIDE VIEW>

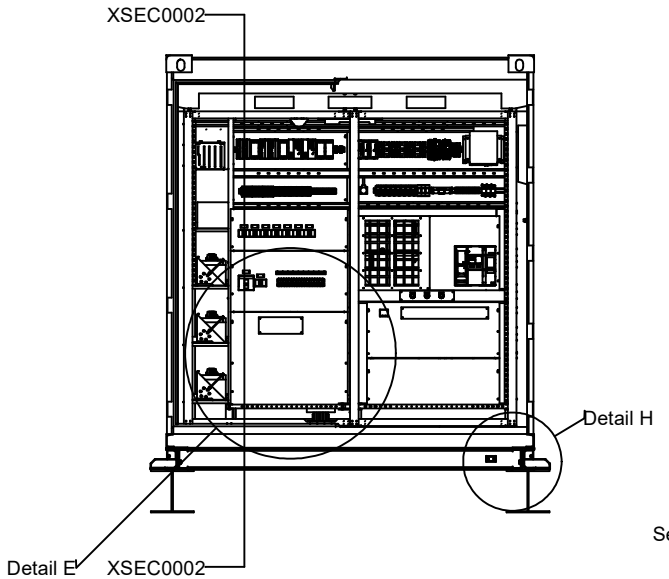


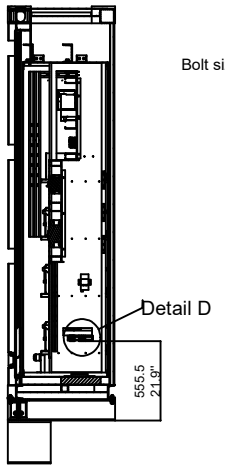
<FRONT VIEW>



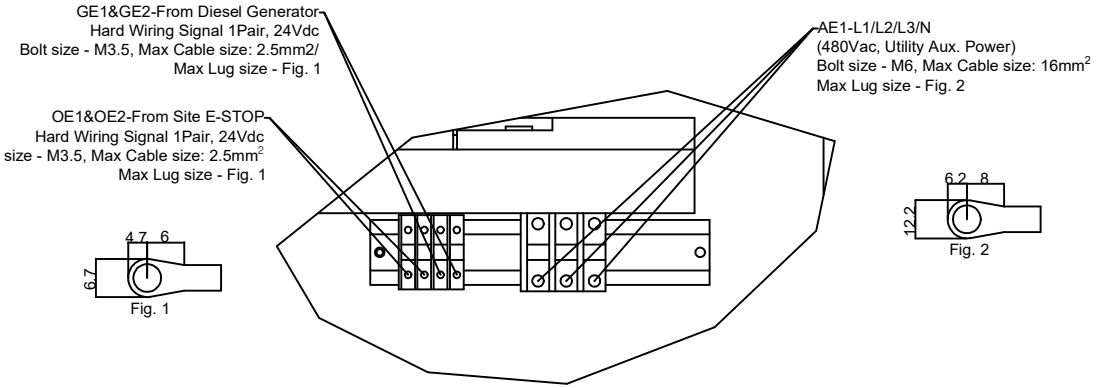
REV	DESCRIPTION	DATE	DRWN	CHKD	APPD
4					
3					
2					
1					
0	INITIAL RELEASE	2025.03.24	SW JEON	HW YU	TS CHO

CUSTOMER
CONTRACTOR
SCALE N/A
DIMENSION mm(ft'-inch")
TITLE JF2 DC LINK 5.1 CIVIL INFORMATION
DWG NO F2D4-5.1US-MC02
DWG SIZE A3
SHEET 02 / 07 SHEETS

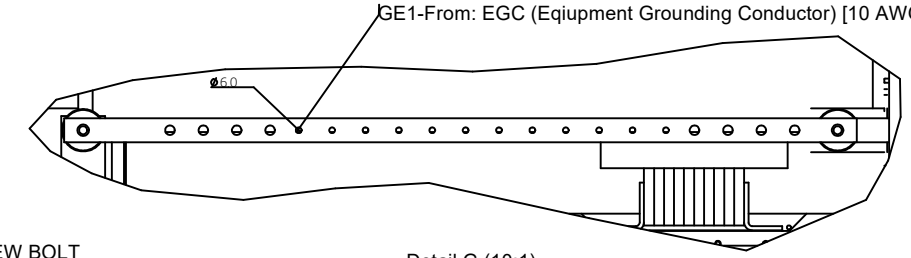




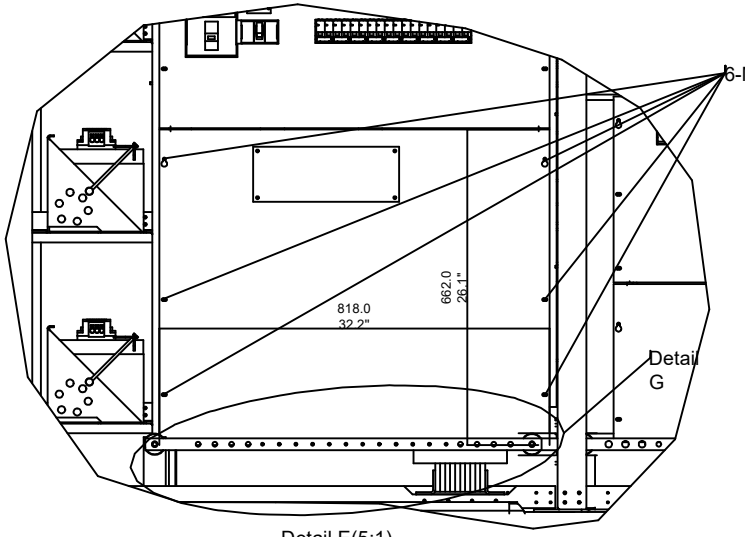
Section XSEC0002-XSEC0002



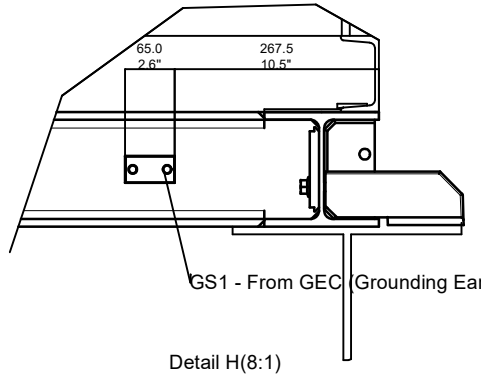
Detail D(20:1)
AUX POWER/E-STOP S/W CONNECTION



Detail G (10:1)
GROUND CABLE CONNECTION



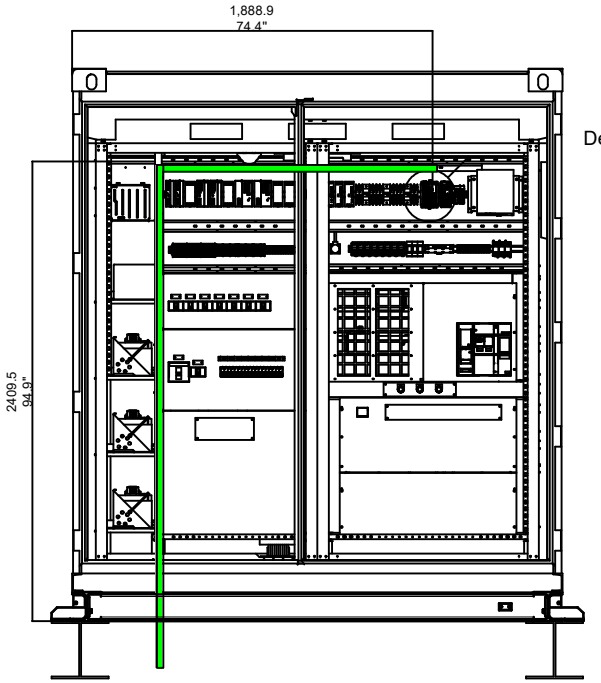
Detail E(5:1)
BOTTOM CABLE ENTRY [W:32.2" X H:26.1"]



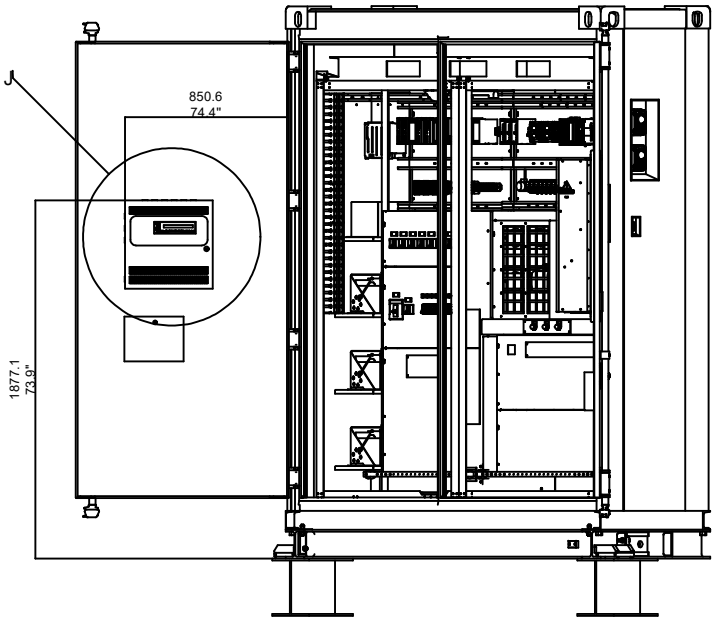
Detail H(8:1)
GROUND CABLE CONNECTION (GROUND PAD)

REV	DESCRIPTION	DATE	DRWN	CHKD	APPD
0	INITIAL RELEASE	2025.03.24	SW JEON	HW YU	TS CHO

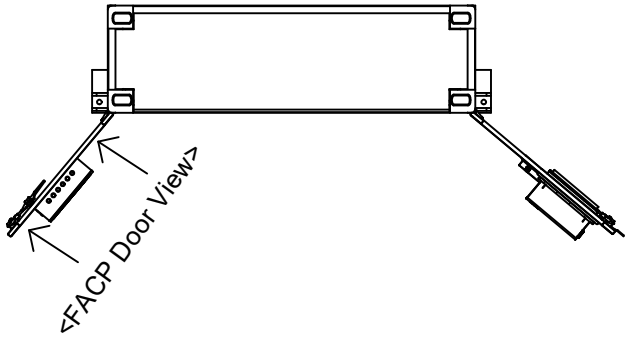
CUSTOMER
CONTRACTOR
SCALE N/A
DIMENSION mm(ft'-inch")
TITLE JF2 DC LINK 5.1 CIVIL INFORMATION
DWG NO F2D4-5.1US-MC02
DWG SIZE A3
SHEET 03 07 SHEETS

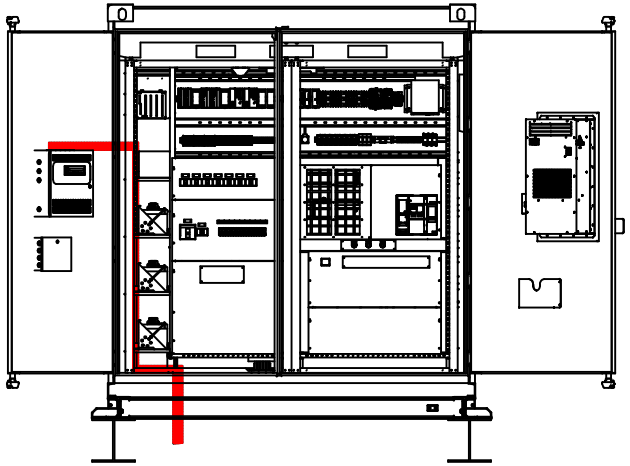


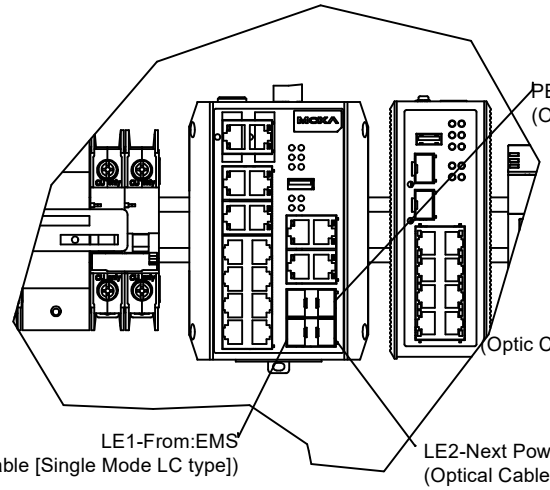
<Comm. Cable Line>



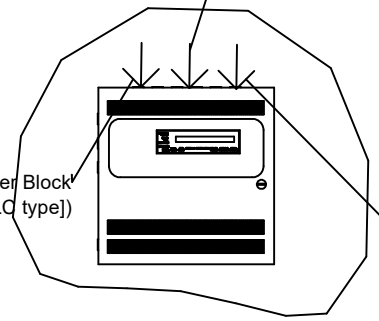
<FACP Door View>







Detail I(20:1)
Fiber Optic & Ethernet Cable Connection

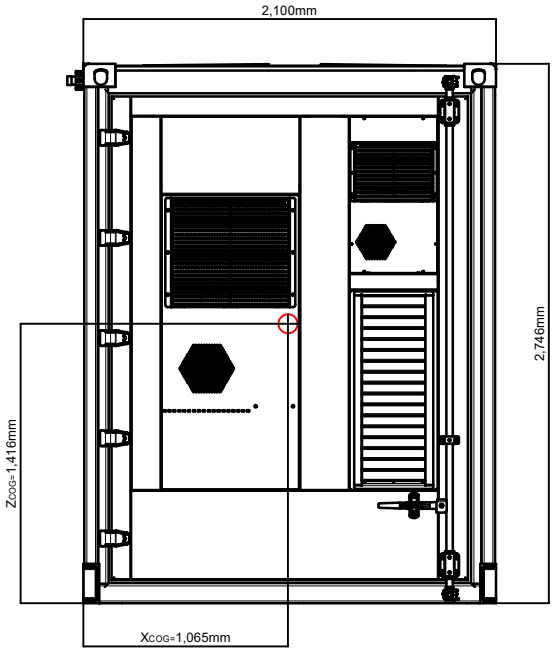


Detail J(4:1)
FACP Fiber Optic Connection

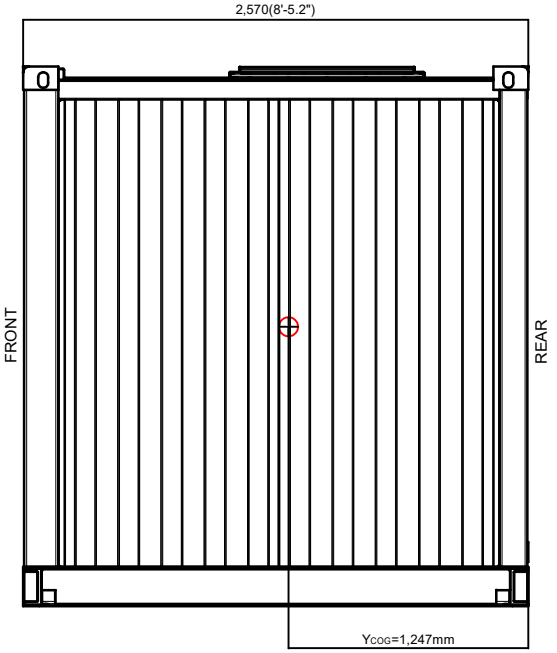
REV	DESCRIPTION	DATE	DRWN	CHKD	APPD
4					
3					
2					
1					
0	INITIAL RELEASE	2025.03.24	SW JEON	HW YU	TS CHO

CUSTOMER
CONTRACTOR
SCALE N/A
DIMENSION mm(ft'-inch")
TITLE JF2 DC LINK 5.1 CIVIL INFORMATION
DWG NO F2D4-5.1US-MC02
DWG SIZE A3
SHEET 04 / 07 SHEETS

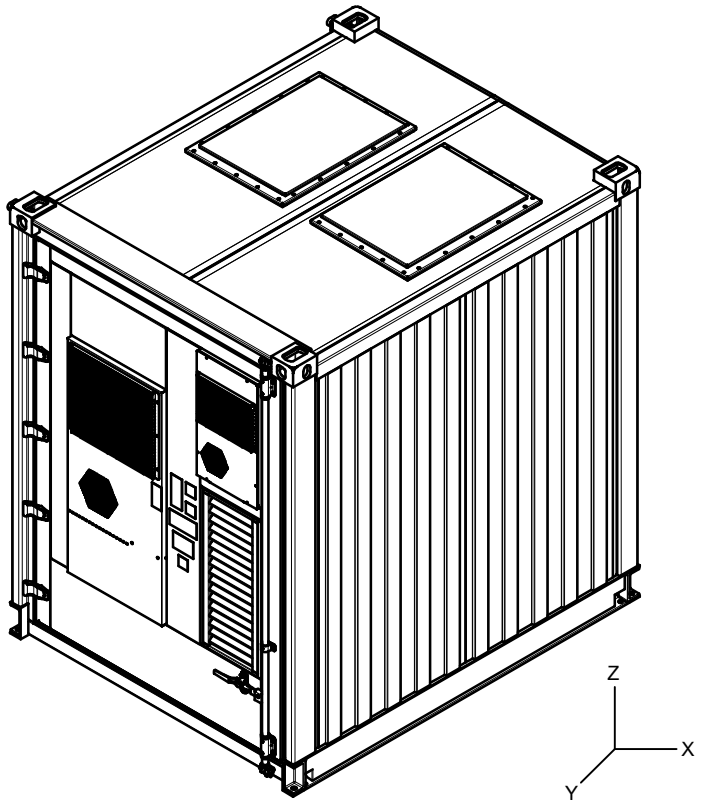
JF2 M-LINK COG INFORMATION



<FRONT VIEW>



<RIGHT VIEW>



<ISOMETRIC VIEW>

JF2 M-LINK APPROXIMATE WEIGHT & DIMENSION INFORMATION			
DESCRIPTION	DIMENSION (W X D X H, mm)	WEIGHT (LBS OR Ton)	REMARK
GROSS	2,100 X 2,570 X 2,746	14.5 Ton Approx.	-

CENTER OF GRAVITY COORDINATES		
x_{COG} [mm]	y_{COG} [mm]	z_{COG} [mm]
1,065	1,247	1,416
x_{COG} [ft-in]	y_{COG} [ft-in]	z_{COG} [ft-in]
3'-5.9"	4'-1.1"	4'-7.7"

THE SPECIFICATION MAY BE SUBJECT TO CHANGE

REV	DESCRIPTION	DATE	DRWN	CHKD	APPD
4					
3					
2					
1					
0	INITIAL RELEASE	2025.03.24	KM PARK	MC KIM	JB PARK

CUSTOMER

CONTRACTOR

SCALE N/A

DIMENSION mm (ft'-inch")

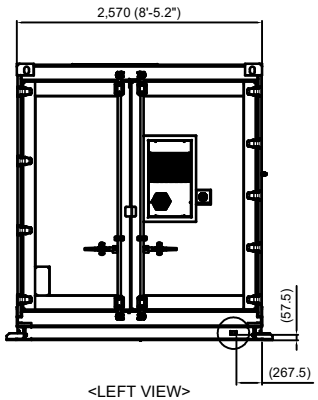
TITLE JF2 DC LINK 5.1 CIVIL INFORMATION

DWG NO. F2D4-5.1US-MC02

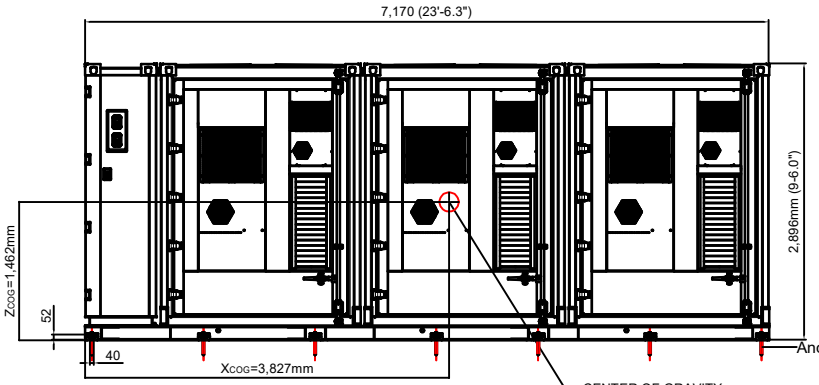
DWG SIZE A3

SHEET 05 / 07 SHEETS

JF2 DC LINK 5.1 COG&ANCHORING INFORMATION

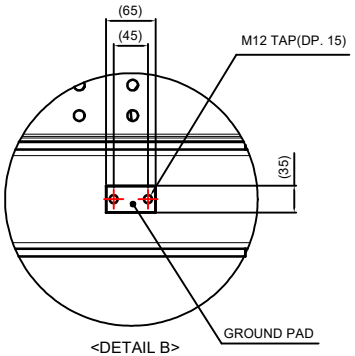


<LEFT VIEW>



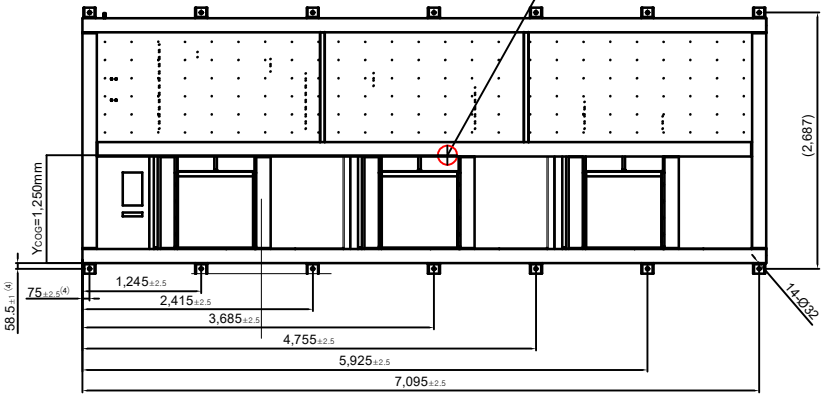
<FRONT VIEW>

CENTER OF GRAVITY
WITH ALL THE COMPONENTS INSTALLED

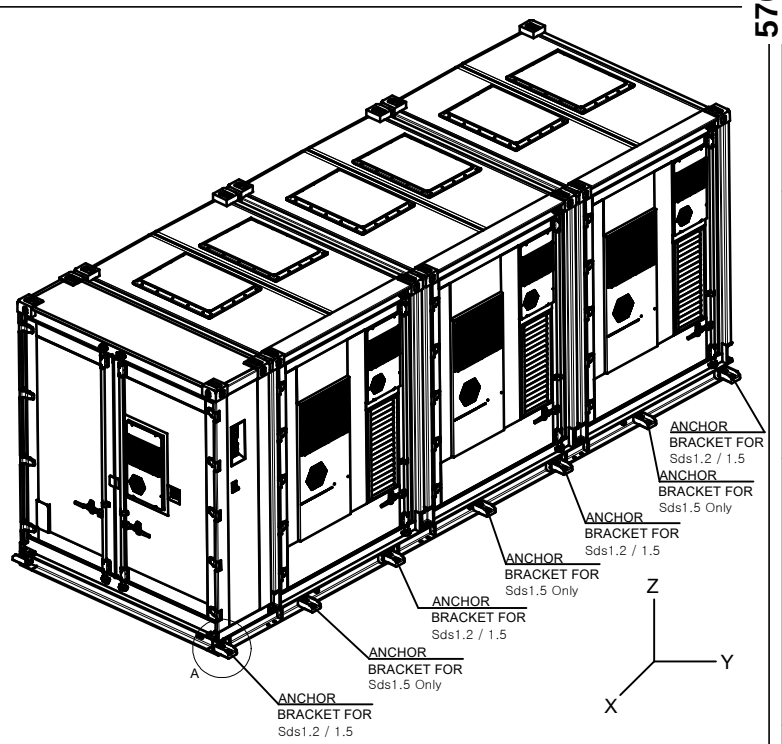


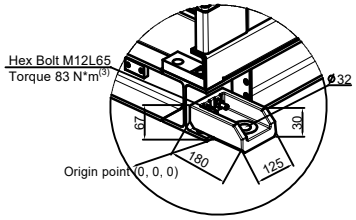
<DETAIL B>

*THIS FIGURE IS IN THE SAME(MIRROR) POSITION ON BOTH SIDES.

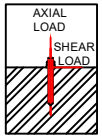


<BOTTOM VIEW>





<DETAIL A>



MAXIMUM ANCHOR DIRECTIONAL LOAD BY EXTERNAL CONDITIONS (2)	
AXIAL LOAD [N]	Sds 1.2 : 123,241N Sds 1.5 : 90,734N
SHEAR LOAD [N]	Sds 1.2 : 43,307N Sds 1.5 : 38,600N

(1) EACH ANCHOR AT DC-LINK BOTTOM EXERTS WEIGHT (AXIAL DIRECTION) ON GROUND PIERS. THIS TABLE SHALL BE USED WHEN INSTALLING DC-LINK ON GROUND SURFACE.

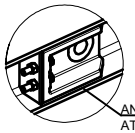
(2) TABLE INDICATES MAXIMUM POSSIBLE LOAD ON ANCHOR BOLT IN WORST CASE OF EXTERNAL CONDITION. EXTERNAL CONDITIONS INCLUDES DEAD LOAD, SEISMIC LOAD, WIND LOAD, SNOW LOAD. DETAIL EXTERNAL CONDITION CAN BE CHECKED IN JF2 DC LINK 5.1 ANALYSIS REPORTS.

(3) EACH ANCHOR BRACKET OF SDS 1.2 IS SHIPPED ATTACHED TO THE SKID. THE ADDITIONAL ANCHOR BRACKETS OF SDS 1.5 ARE ALSO SHIPPED ATTACHED TO THE SKID. ALL ANCHOR BRACKETS SHOULD BE INSTALLED ON-SITE.

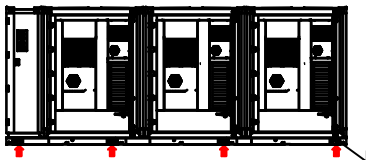
(4) FOR HOLES FOR FIXING ANCHOR BRACKET, IT IS RECOMMENDED TO WORK AFTER ASSEMBLING THE ANCHOR BRACKET AND COMFIRMING THE POSITION OF THE HOLE

JF2 DC LINK 5.1 APPROXIMATE WEIGHT & DIMENSION INFORMATION			
DESCRIPTION	DIMENSION (W X D X H, mm)	WEIGHT (LBS OR Ton)	REMARK
GROSS	7,170 X 2,570 X 2,896	48 Ton Approx.	-
SHIPPING	7,170 X 2,570 X 2,896	48 Ton Approx.	

CENTER OF GRAVITY COORDINATES		
x_{COG} [mm]	y_{COG} [mm]	z_{COG} [mm]
3,827	1,250	1,462
x_{COG} [ft-in]	y_{COG} [ft-in]	z_{COG} [ft-in]
12'-6.7"	4'-1.2"	4'-9.6"



ANCHOR BRACKET
ATTACHED TO THE SKID



Hex Bolt M12L65

: ANCHOR BRACKET ATTACHED TO THE SKID POINT
(IT IS IN THE SAME POSITION ON THE BACK)

THE SPECIFICATION MAY BE SUBJECT TO CHANGE

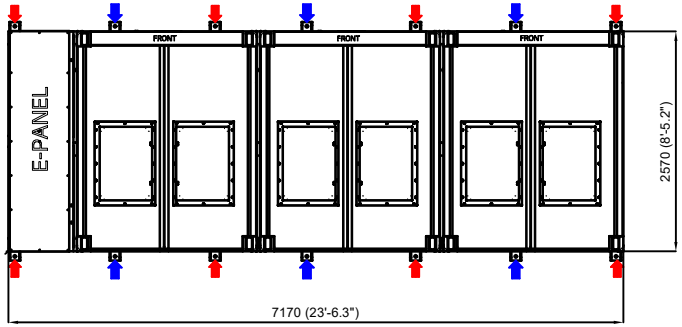
REV	DESCRIPTION	DATE	DRWN	CHKD	APPD
4					
3					
2					
1					
0	INITIAL RELEASE	2025.03.24	KM PARK	MC KIM	JB PARK

CUSTOMER
CONTRACTOR
SCALE N/A
DIMENSION mm (ft'-inch")
TITLE JF2 DC LINK 5.1 CIVIL INFORMATION
DWG NO. F2D4-5.1US-MC02
DWG SIZE A3
SHEET 06 / 07 SHEETS

JF2 DC LINK 5.1 RECOMMENDED MINIMUM CLEARANCE

: Anchor Point (SDS 1.5, 1.2)

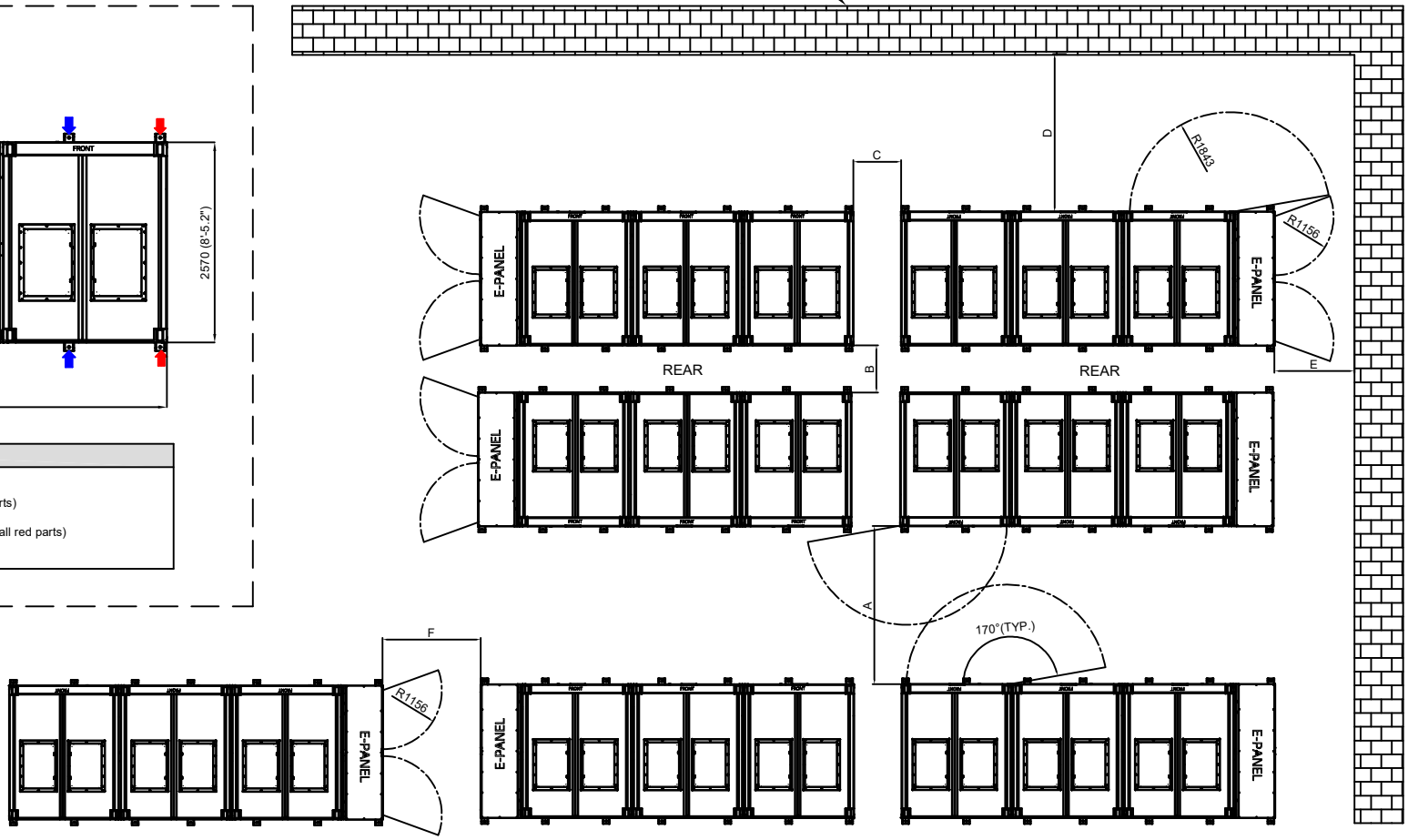
: Anchor Point (SDS 1.5)



NOTE
To satisfy ASCE-22 SDS=1.5, need to install 14 points. (red and blue parts)
To satisfy ASCE-22 SDS=1.2, need to install 8 points. (Only need to install red parts)

WALL & FENCE (ANY OBSTACLE)

: IMAGINARY LINE OF DOORS OPENING



ITEM	LOCATION	RECOMMENDED MINIMUM CLEARANCE [mm/ft]
A	FRONT TO FRONT	3,048 / 10'
B	REAR TO REAR	914.4 / 3'
C	SIDE TO SIDE	914.4 / 3'
D	FRONT TO FENCE	3,048 / 10'
E	SIDE TO FENCE	1,524 / 5'
F	E-PANEL TO E-PANEL	1,524 / 5'

NOTE
MINIMUM SWING OF DOOR, REGULATIONS FOR INSTALLATING ESS, SPACE FOR INSTALLING SITE ARE CONSIDERED WHEN CHOOSING THE MINIMUM CLEARANCE. THE CLEARANCE SHALL BE CHANGEABLE DEPENDING ON THE OTHER VARIOUS REQUIREMENTS. (EG. SITE CONDITIONS, LOCAL PERMIT, AHJ APPROVAL ETC.)

THE SPECIFICATION MAY BE SUBJECT TO CHANGE

REV	DESCRIPTION	DATE	DRWN	CHKD	APPD
4					
3					
2					
1					
0	INITIAL RELEASE	2025.03.24	KM PARK	MC KIM	JB PARK

CUSTOMER

CONTRACTOR

SCALE N/A

DIMENSION mm (ft'-inch")

TITLE JF2 DC LINK 5.1 CIVIL INFORMATION

DWG NO. F2D4-5.1US-MC02

DWG SIZE A3

SHEET 07 / 07 SHEETS

JF2 DC LINK 5.1 CIVIL INFORMATION

Customer

Supplier LG EnergySolution

LG Energy Solution

Product Information

Product Model : LINK-FDA2BL

Product Description : JF2 DC LINK 5.1 (0.25CP, US)

Document No. : F2D4-5.1US-MC02

Editing date : 2025.03.24

Supplier : LG EnergySolution

Total : 7

THE SPECIFICATION MAY BE SUBJECT TO CHANGE

REV	DESCRIPTION	DATE	DRWN	CHKD	APPD
4					
3					
2					
1					
0	INITIAL RELEASE	2025.03.24	KM PARK	MC KIM	JB PARK

CUSTOMER

CONTRACTOR

SCALE N/A

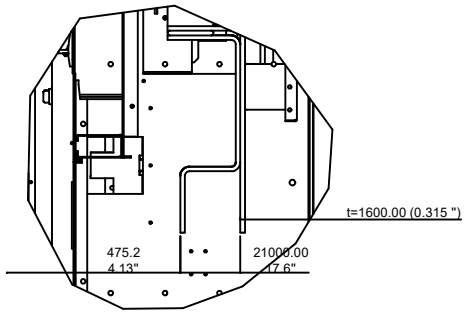
DIMENSION mm (ft'-inch")

TITLE JF2 DC LINK 5.1 CIVIL INFORMATION

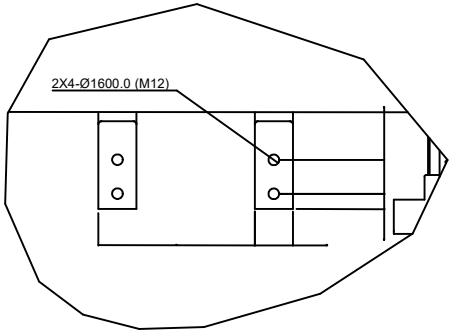
DWG NO. F2D4-5.1US-MC02

DWG SIZE A3

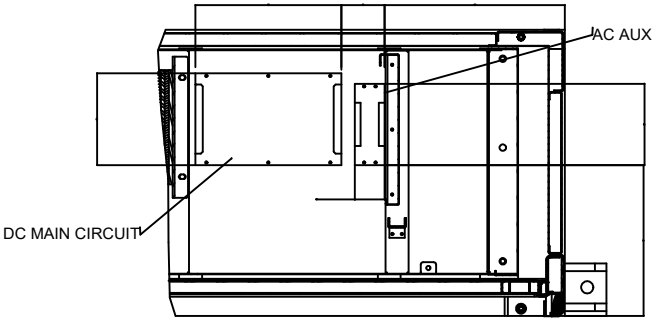
SHEET 01 / 07 SHEETS



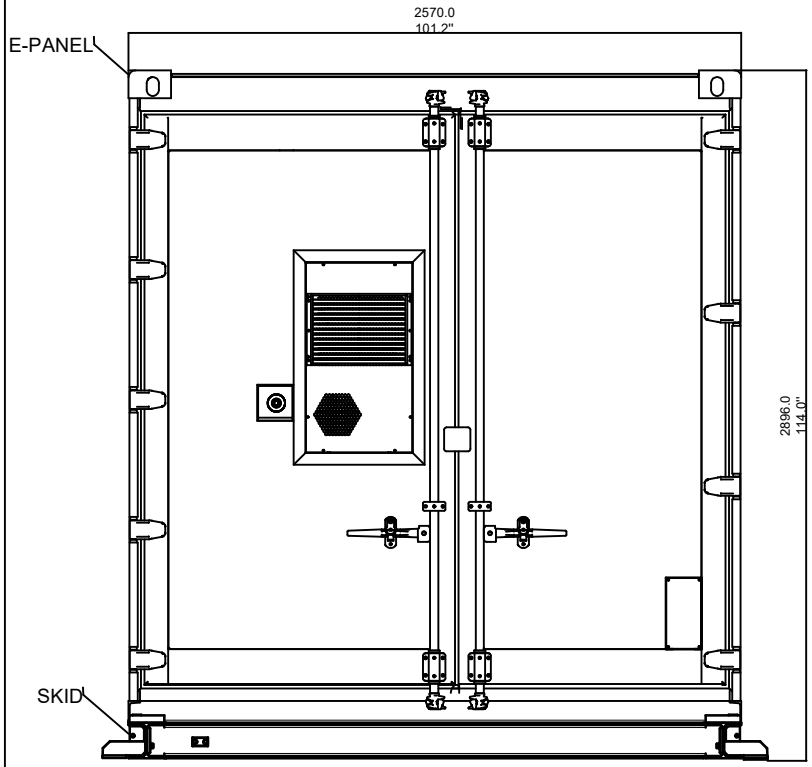
Detail A(6:1)
MAIN POWER CONNECTION



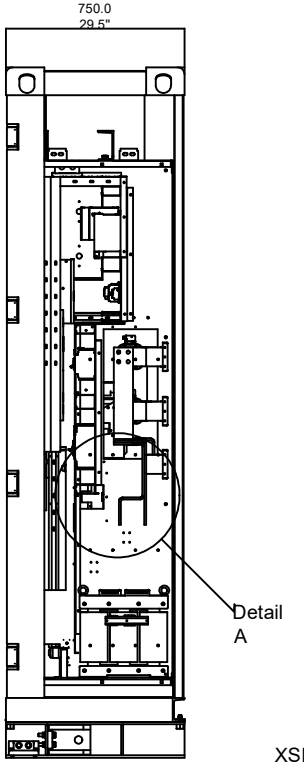
Detail B(8:1)
MAIN POWER CONNECTION [FRONT VIEW]



Detail C(4:1)
CABLE ENTRY



<FRONT VIEW>



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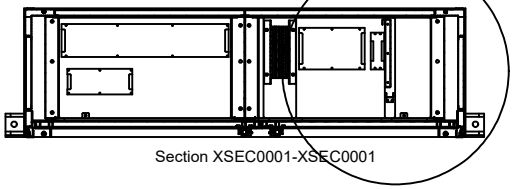

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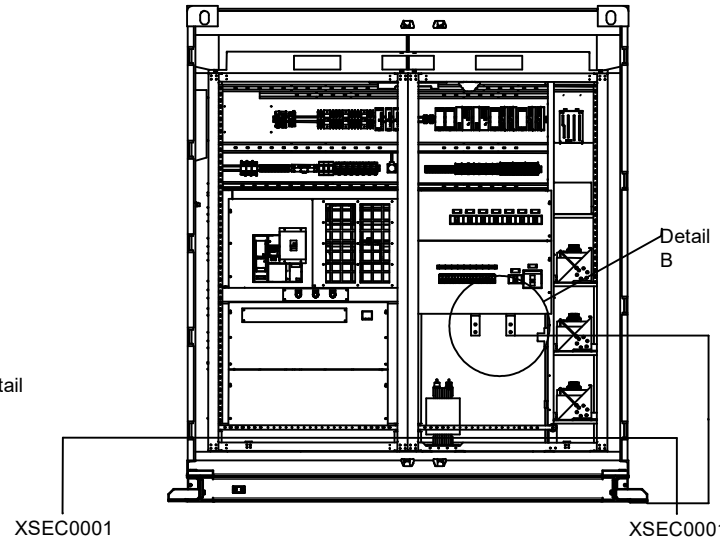
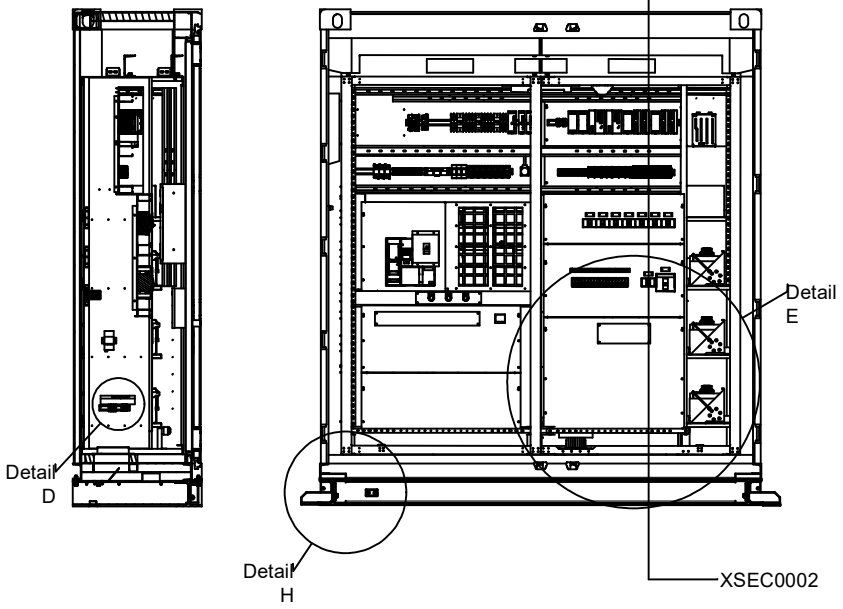


REV	DESCRIPTION	DATE	DRWN	CHKD	APPD
4					
3					
2					
1					
0	INITIAL RELEASE	2025.03.24	SW JEON	HW YU	TS CHO

CUSTOMER
CONTRACTOR
SCALE N/A
DIMENSION mm(ft'-inch")
TITLE JF2 DC LINK 5.1 CIVIL INFORMATION
DWG NO F2D4-5.1US-MC02
DWG SIZE A3
SHEET 02 07 SHEETS



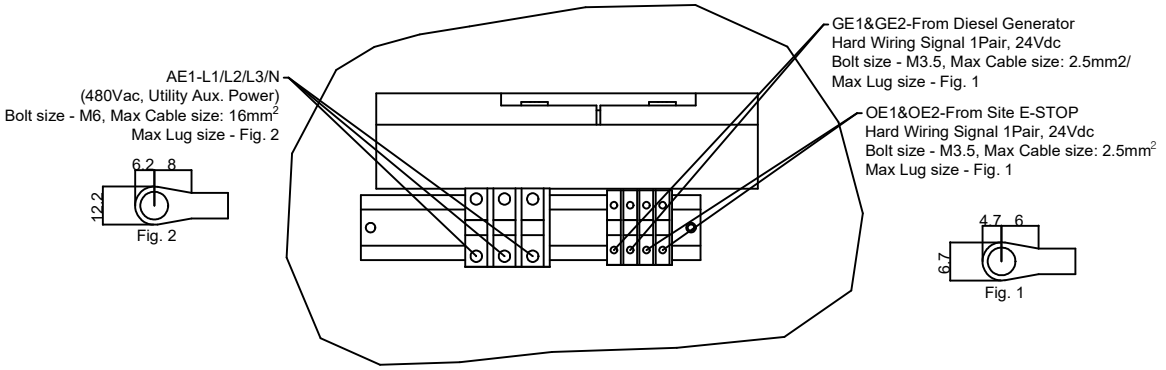
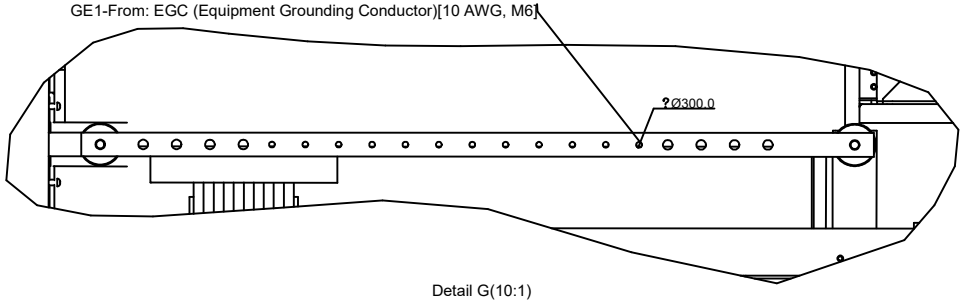


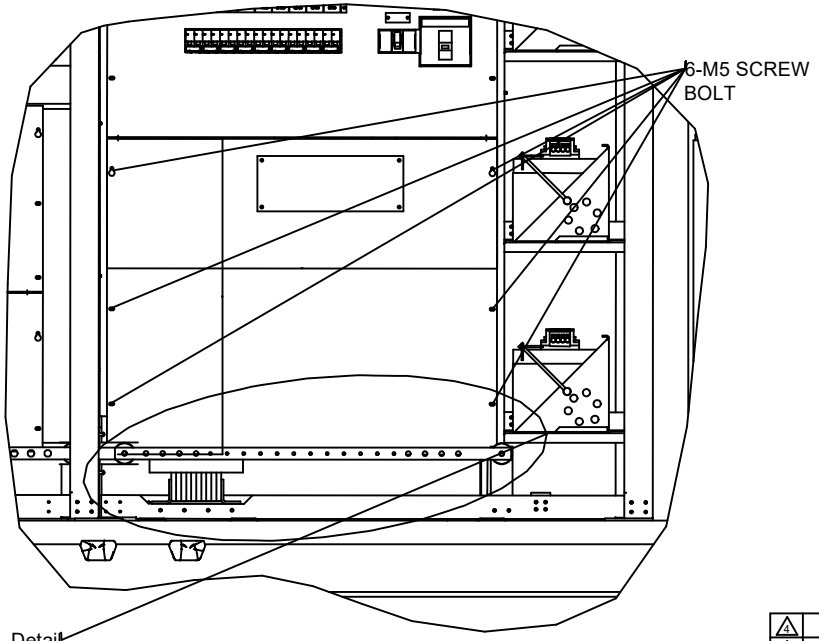
Fig. 2

Fig. 1

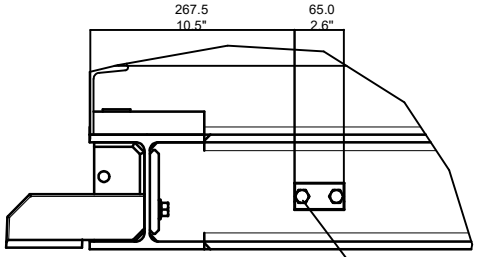
Detail D(20:1)
AUX POWER/E-STOP S/W
CONNECTION



Detail G(10:1)
GROUND CABLE CONNECTION



Detail E(5:1)
BOTTOM CABLE ENTRY [W:32.2 X H:26.1"]



Detail H(8:1)
GROUND CABLE CONNECTION (GROUND PAD)

GS1 - From GEC (Grounding Earth Conductor) [4/0 AWG, M12]

REV	DESCRIPTION	DATE	DRWN	CHKD	APPD
4					
3					
2					
1					
0	INITIAL RELEASE	2025.03.24	SW JEON	HW YU	TS CHO

CUSTOMER

CONTRACTOR

SCALE N/A

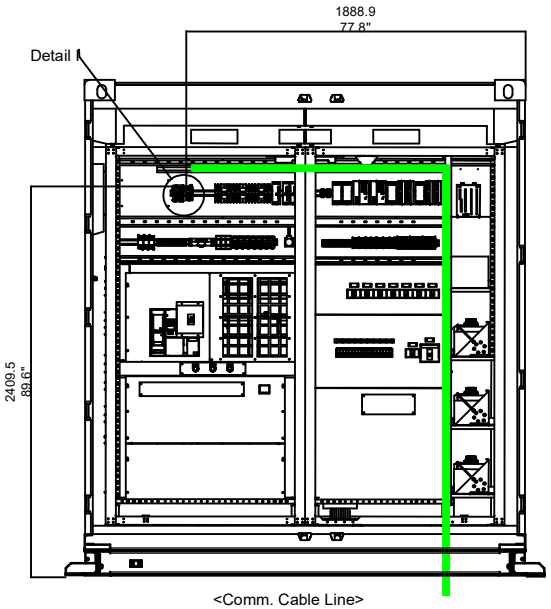
DIMENSION mm(ft'-inch")

TITLE JF2 DC LINK 5.1 CIVIL INFORMATION

DWG NO F2D4-5.1US-MC02

DWG SIZE A3

SHEET 03 / 07 SHEETS



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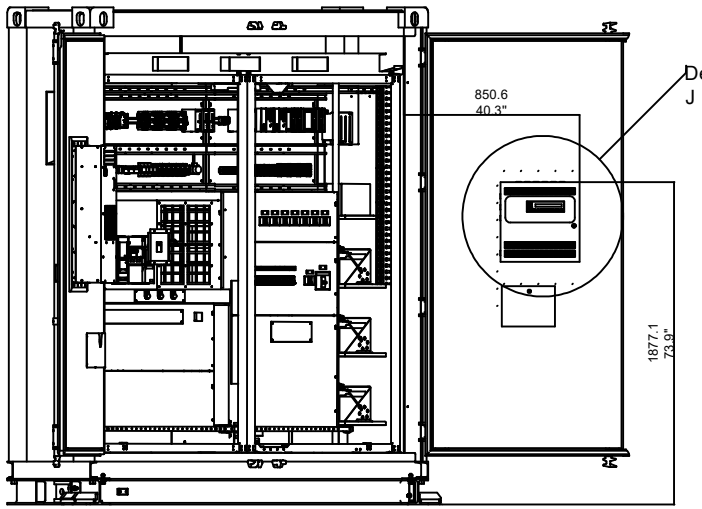
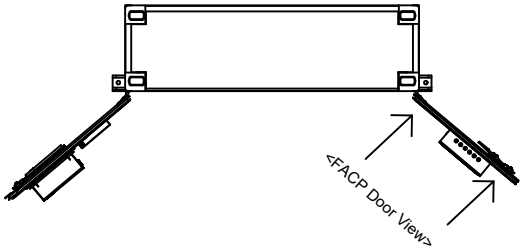
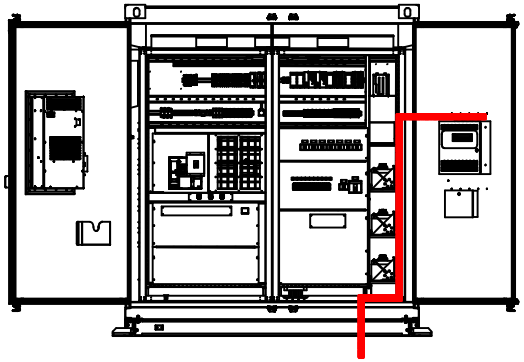
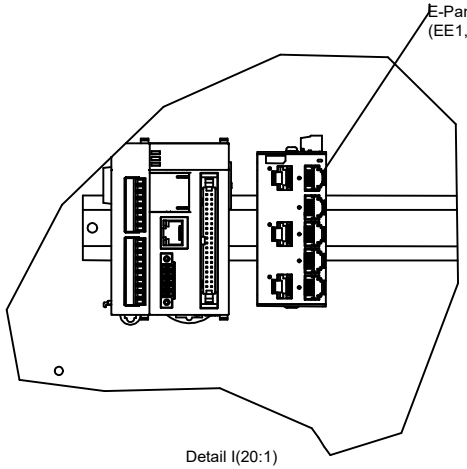


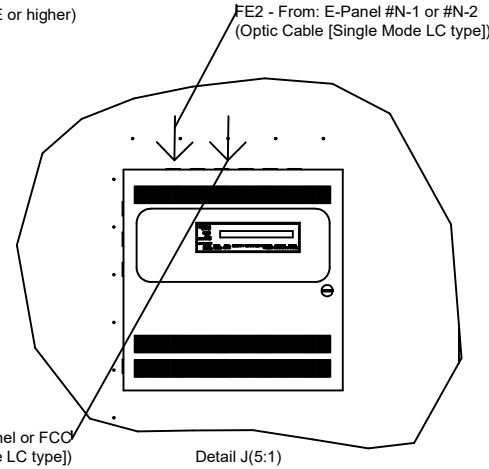
<FACP Door View>







Detail I(20:1)
Fiber Optic & Ethernet Cable Connection



Detail J(5:1)
FACP Optic Connection

REV	DESCRIPTION	DATE	DRWN	CHKD	APPD
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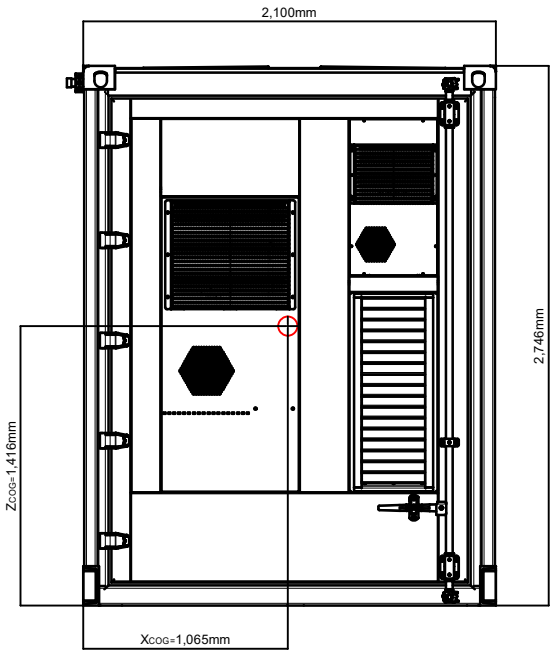
1					
2					
3					
4					

CUSTOMER
CONTRACTOR
SCALE N/A
DIMENSION mm(ft'-inch")
TITLE JF2 DC LINK 5.1 CIVIL INFORMATION
DWG NO F2D4-5.1US-MC02
DWG SIZE A3
SHEET 04 / 07 SHEETS

JF2 M-LINK COG INFORMATION



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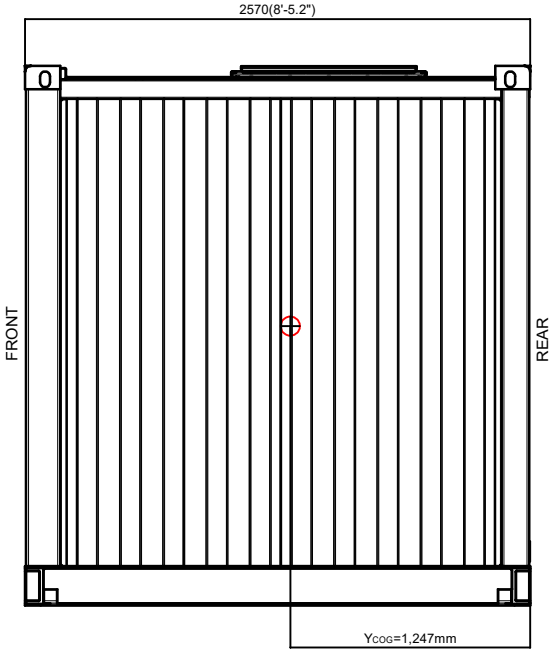

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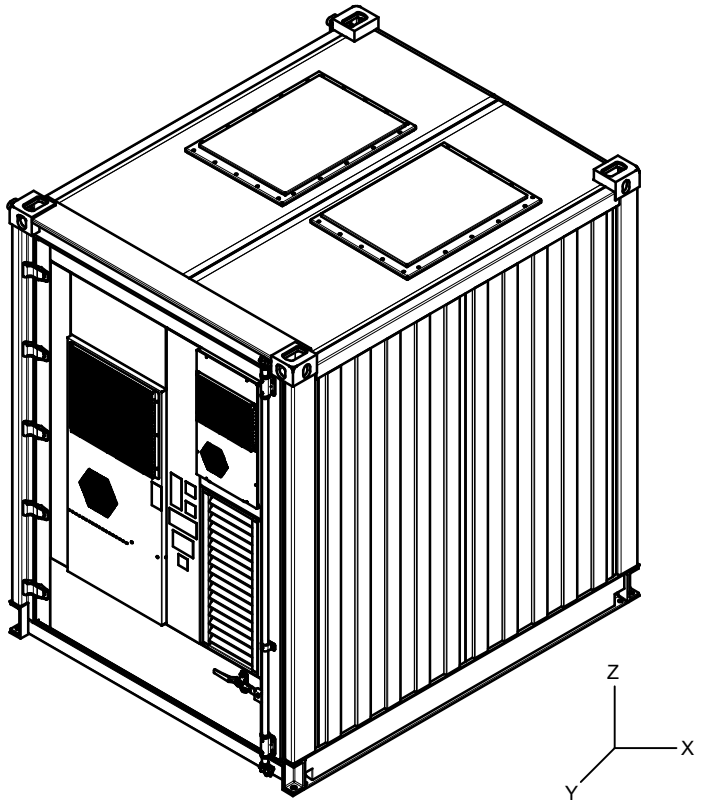


<ISOMETRIC VIEW>

JF2 M-LINK APPROXIMATE WEIGHT & DIMENSION INFORMATION			
DESCRIPTION	DIMENSION (W X D X H, mm)	WEIGHT (LBS OR Ton)	REMARK
GROSS	2,100 X 2,570 X 2,746	14.5 Ton Approx.	-

CENTER OF GRAVITY COORDINATES		
x_{COG} [mm]	y_{COG} [mm]	z_{COG} [mm]
1,065	1,247	1,416
x_{COG} [ft-in]	y_{COG} [ft-in]	z_{COG} [ft-in]
3'-5.9"	4'-1.1"	4'-7.7"

THE SPECIFICATION MAY BE SUBJECT TO CHANGE

REV	DESCRIPTION	DATE	DRWN	CHKD	APPD
4					
3					
2					
1					
0	INITIAL RELEASE	2025.03.24	KM PARK	MC KIM	JB PARK

CUSTOMER

CONTRACTOR

SCALE N/A

DIMENSION mm (ft'-inch")

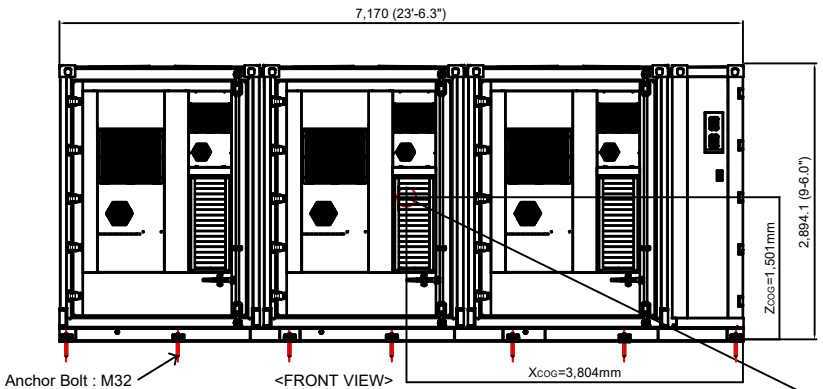
TITLE JF2 DC LINK 5.1 CIVIL INFORMATION

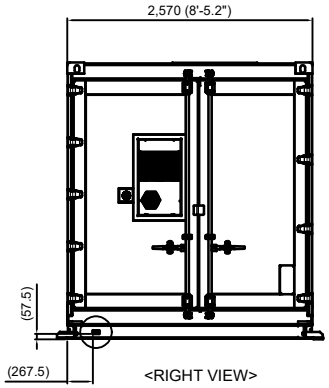
DWG NO. F2D4-5.1US-MC02

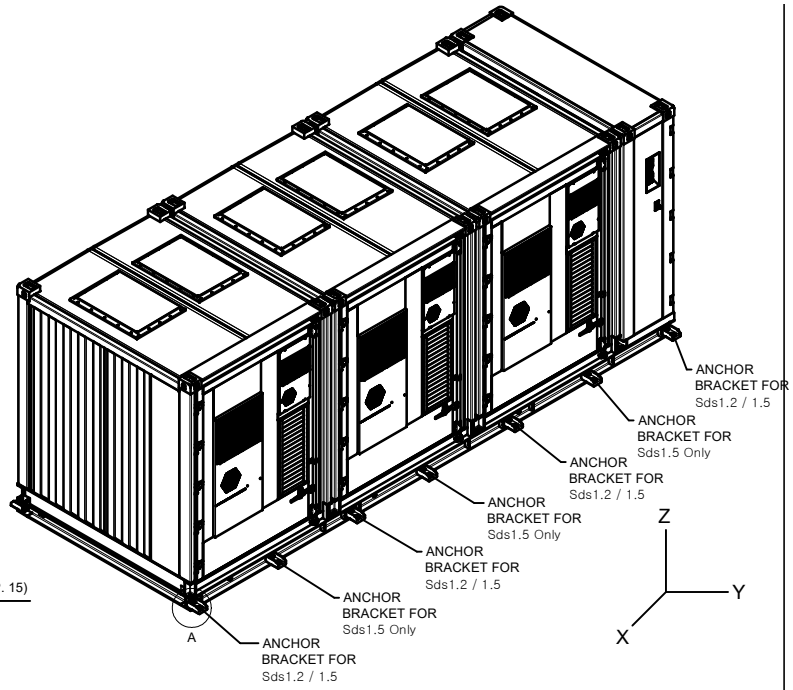
DWG SIZE A3

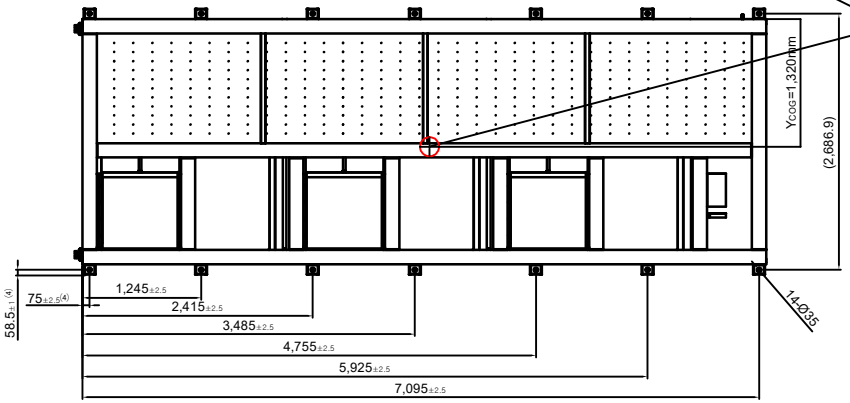
SHEET 05 / 07 SHEETS

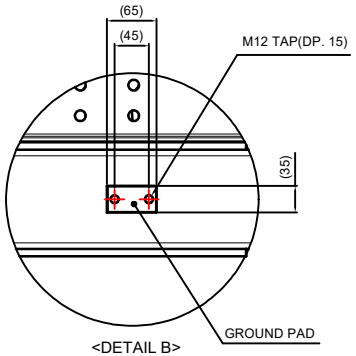
JF2 DC LINK 5.1 COG&ANCHORING INFORMATION



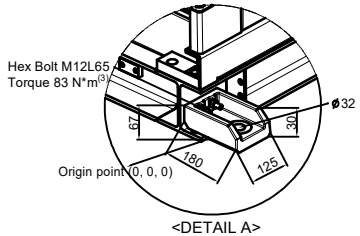


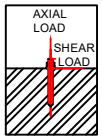






*THIS FIGURE IS IN THE SAME(MIRROR) POSITION ON BOTH SIDES.





MAXIMUM ANCHOR DIRECTIONAL LOAD BY EXTERNAL CONDITIONS (2)	
AXIAL LOAD [N]	Sds 1.2 : 123,241N Sds 1.5 : 90,734N
SHEAR LOAD [N]	Sds 1.2 : 43,307N Sds 1.5 : 38,600N

(1) EACH ANCHOR AT DC-LINK BOTTOM EXERTS WEIGHT (AXIAL DIRECTION) ON GROUND PIERS. THIS TABLE SHALL BE USED WHEN INSTALLING DC-LINK ON GROUND SURFACE.

(2) TABLE INDICATES MAXIMUM POSSIBLE LOAD ON ANCHOR BOLT IN WORST CASE OF EXTERNAL CONDITION. EXTERNAL CONDITIONS INCLUDES DEAD LOAD, SEISMIC LOAD, WIND LOAD, SNOW LOAD. DETAIL EXTERNAL CONDITION CAN BE CHECKED IN JF2 DC LINK 5.1 ANALYSIS REPORTS.

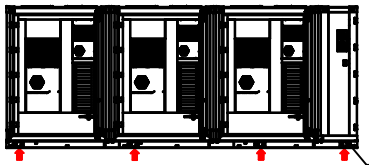
(3) EACH ANCHOR BRACKET OF SDS 1.2 IS SHIPPED ATTACHED TO THE SKID. THE ADDITIONAL ANCHOR BRACKETS OF SDS 1.5 ARE ALSO SHIPPED ATTACHED TO THE SKID. ALL ANCHOR BRACKETS SHOULD BE INSTALLED ON-SITE.

(4) FOR HOLES FOR FIXING ANCHOR BRACKET, IT IS RECOMMENDED TO WORK AFTER ASSEMBLING THE ANCHOR BRACKET AND COMFIRMING THE POSITION OF THE HOLE

JF2 DC LINK 5.1 APPROXIMATE WEIGHT & DIMENSION INFORMATION			
DESCRIPTION	DIMENSION (W X D X H, mm)	WEIGHT (LBS OR Ton)	REMARK
GROSS	7,170 X 2,570 X 2,896	48 Ton Approx.	-
SHIPPING	7,170 X 2,570 X 2,896	48 Ton Approx.	

CENTER OF GRAVITY COORDINATES		
x_{COG} [mm]	y_{COG} [mm]	z_{COG} [mm]
3,804	1,320	1,501
x_{COG} [ft-in]	y_{COG} [ft-in]	z_{COG} [ft-in]
12'- 5.8"	4'- 4"	4'-11.1"





: ANCHOR BRACKET ATTECHED TO THE SKID POINT
(IT IS IN THE SAME POSITION ON THE BACK)

THE SPECIFICATION MAY BE SUBJECT TO CHANGE

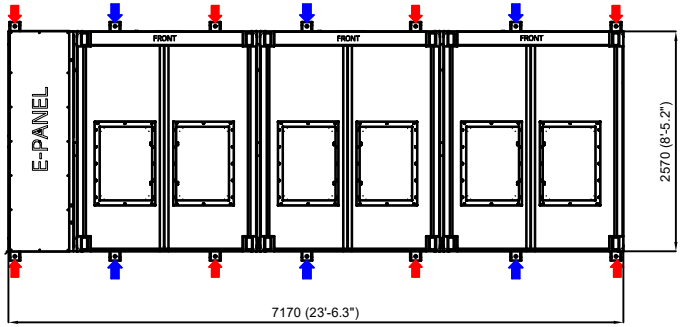
REV	DESCRIPTION	DATE	DRWN	CHKD	APPD
4					
3					
2					
1					
0	INITIAL RELEASE	2025.03.24	KM PARK	MC KIM	JB PARK

CUSTOMER
CONTRACTOR
SCALE N/A
DIMENSION mm (ft'-inch")
TITLE: JF2 DC LINK 5.1 CIVIL INFORMATION
DWG NO. F2D4-5.1US-MC02
DWG SIZE A3
SHEET 06 / 07 SHEETS

JF2 DC LINK 5.1 RECOMMENDED MINIMUM CLEARANCE

: Anchor Point (SDS 1.5, 1.2)

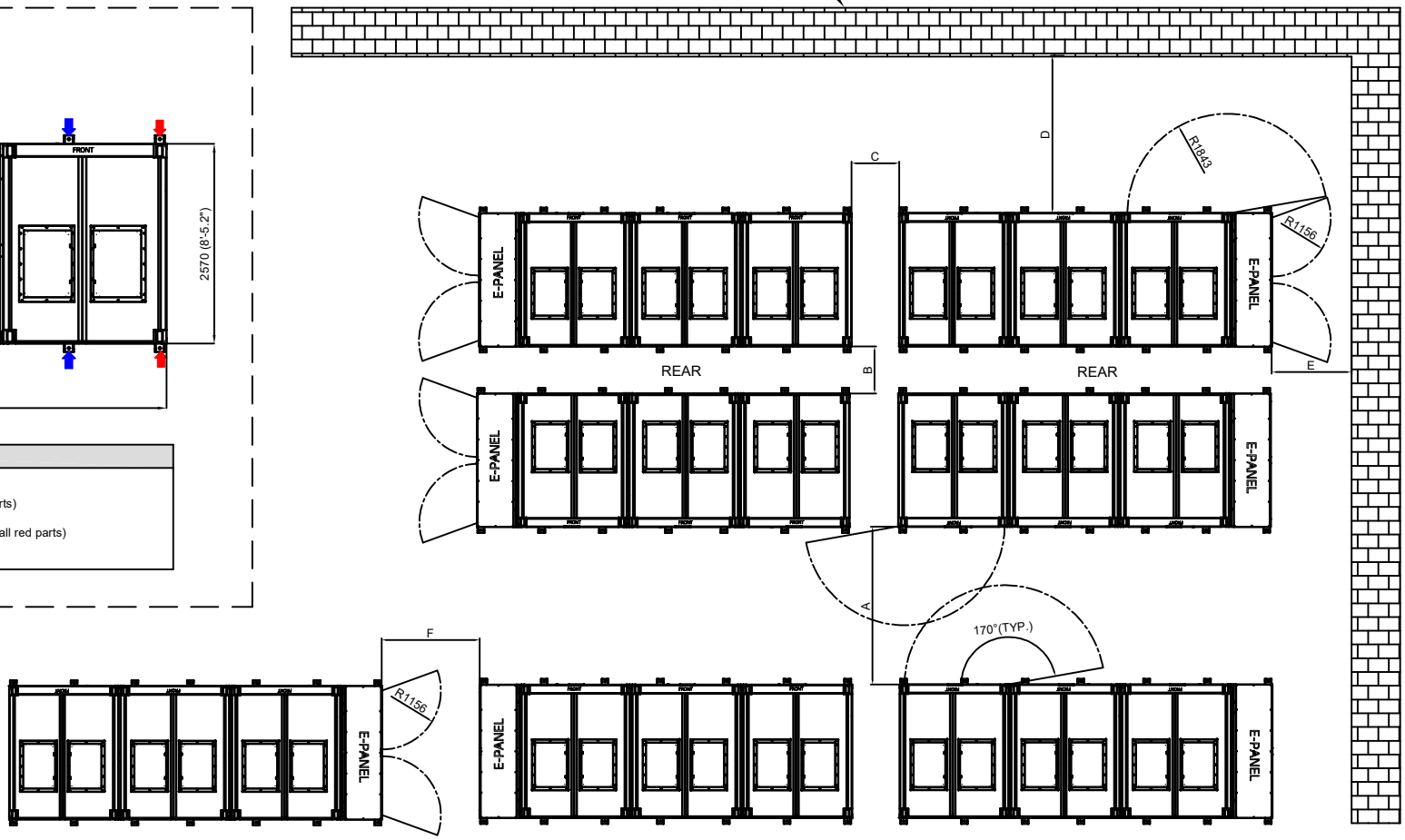
: Anchor Point (SDS 1.5)



NOTE
To satisfy ASCE-22 SDS=1.5, need to install 14 points. (red and blue parts)
To satisfy ASCE-22 SDS=1.2, need to install 8 points. (Only need to install red parts)

WALL & FENCE (ANY OBSTACLE)

: IMAGINARY LINE OF DOORS OPENING



ITEM	LOCATION	RECOMMENDED MINIMUM CLEARANCE [mm/ft]
A	FRONT TO FRONT	3,048 / 10'
B	REAR TO REAR	914.4 / 3'
C	SIDE TO SIDE	914.4 / 3'
D	FRONT TO FENCE	3,048 / 10'
E	SIDE TO FENCE	1,524 / 5'
F	E-PANEL TO E-PANEL	1,524 / 5'

NOTE
MINIMUM SWING OF DOOR, REGULATIONS FOR INSTALLATING ESS, SPACE FOR INSTALLING SITE ARE CONSIDERED WHEN CHOOSING THE MINIMUM CLEARANCE. THE CLEARANCE SHALL BE CHANGEABLE DEPENDING ON THE OTHER VARIOUS REQUIREMENTS. (EG. SITE CONDITIONS, LOCAL PERMIT, AHJ APPROVAL ETC.)

THE SPECIFICATION MAY BE SUBJECT TO CHANGE

REV	DESCRIPTION	DATE	DRWN	CHKD	APPD
4					
3					
2					
1					
0	INITIAL RELEASE	2025.03.24	KM PARK	MC KIM	JB PARK

CUSTOMER

CONTRACTOR

SCALE N/A

DIMENSION mm (ft'-inch")

TITLE JF2 DC LINK 5.1 CIVIL INFORMATION

DWG NO. F2D4-5.1US-MC02

DWG SIZE A3

SHEET 07 / 07 SHEETS

EXHIBIT N: CUSTOM SOIL RESOURCE REPORT FOR KALAMAZOO COUNTY, MICHIGAN

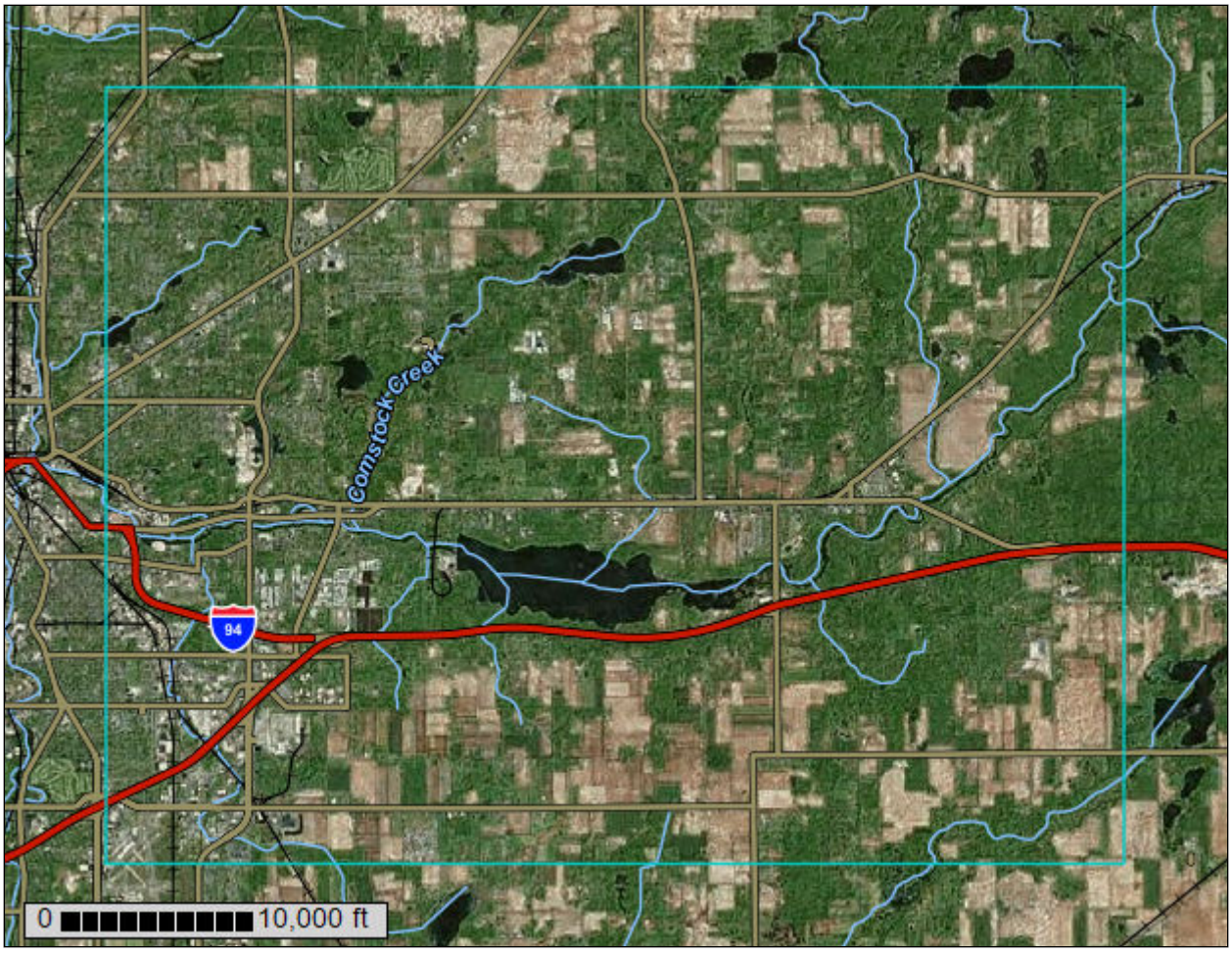
United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Kalamazoo County, Michigan



Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

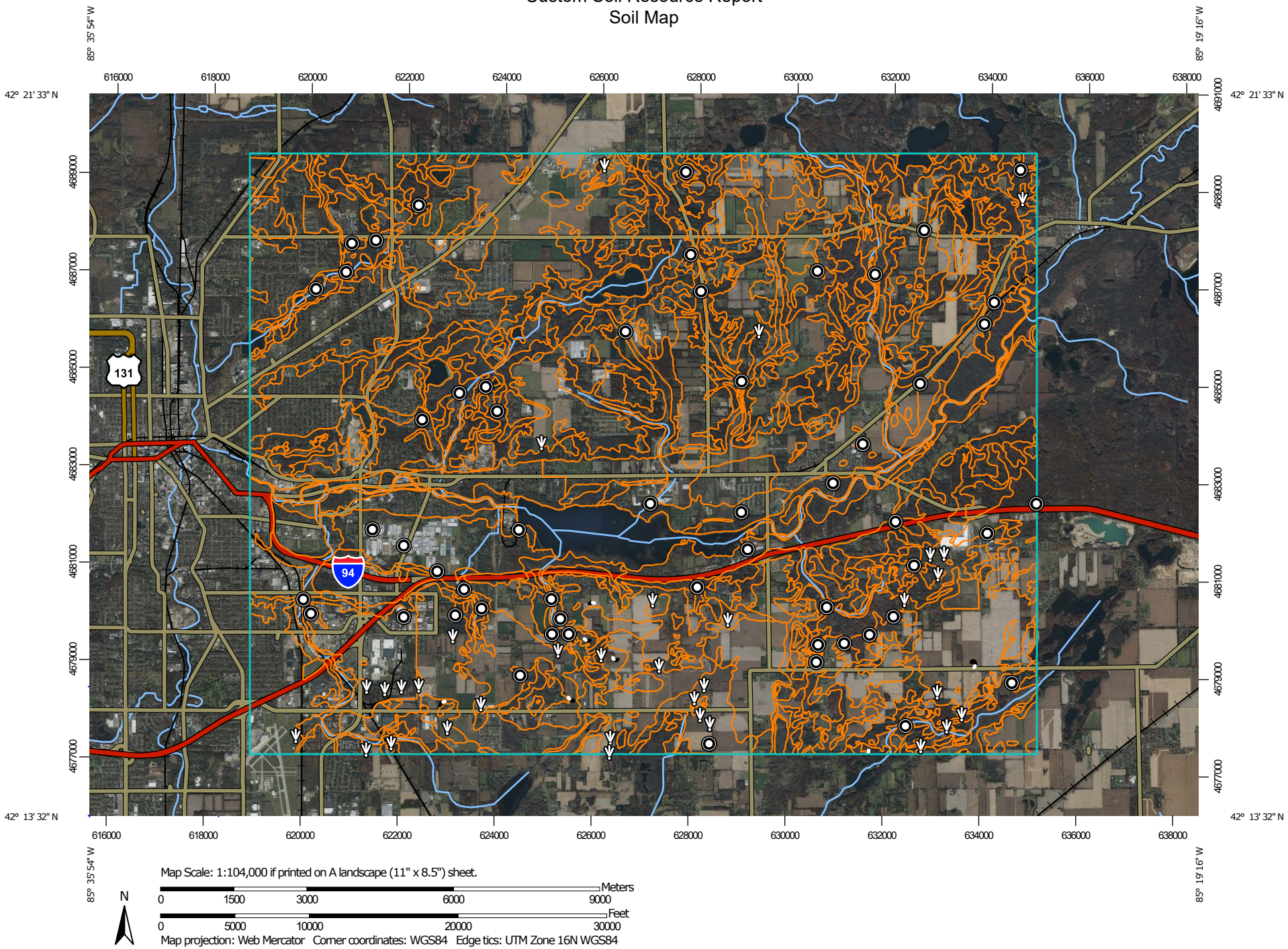
Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.


85° 35' 54" W
85° 19' 16" W
42° 21' 33" N
42° 13' 32" N
616000
618000
620000
622000
624000
626000
628000
630000
632000
634000
636000
638000
4691000
4689000
4687000
4685000
4683000
4681000
4679000
4677000
131
94
Map Scale: 1:104,000 if printed on A landscape (11" x 8.5") sheet.
N
Meters
0
1500
3000
6000
9000
Feet
0
5000
10000
20000
30000
Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 16N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:15,800.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Kalamazoo County, Michigan
Survey Area Data: Version 20, Sep 4, 2025

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Oct 4, 2022—Nov 7, 2022

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
AdraaA	Adrian muck, 0 to 1 percent slopes	1,225.6	2.5%
Aq	Aquents and Histosols ponded	15.9	0.0%
BdA	Brady sandy loam, 0 to 3 percent slopes	93.6	0.2%
BrA	Bronson sandy loam, 0 to 3 percent slopes	8.8	0.0%
CoB	Coloma loamy sand, 0 to 6 percent slopes	939.2	1.9%
DoA	Dowagiac loam, 0 to 3 percent slopes	655.8	1.3%
Gd	Gilford sandy loam, 0 to 2 percent slopes, gravelly subsoil	161.4	0.3%
Gn	Glendora sandy loam	1,222.2	2.5%
HgtahA	Houghton muck, 0 to 1 percent slopes	1,524.3	3.1%
Hs	Houghton and Sebewa soils, ponded	494.9	1.0%
KaA	Kalamazoo loam, 0 to 2 percent slopes	2,358.0	4.8%
KaB	Kalamazoo loam, 2 to 6 percent slopes	11,513.4	23.2%
KaC	Kalamazoo loam, 6 to 12 percent slopes	2,907.1	5.9%
OsB	Oshtemo sandy loam, 0 to 6 percent slopes	5,638.1	11.4%
OsC	Oshtemo sandy loam, 6 to 12 percent slopes	2,760.3	5.6%
OsD	Oshtemo sandy loam, 12 to 18 percent slopes	3,008.5	6.1%
OsE	Oshtemo sandy loam, 18 to 35 percent slopes	3,523.3	7.1%
Pb	Pits, gravel	279.9	0.6%
PfB	Plainfield loamy sand, 0 to 6 percent slopes	57.7	0.1%
RdB	Riddles loam, 0 to 6 percent slopes	1.1	0.0%
SaA	Schoolcraft loam, 0 to 2 percent slopes	322.4	0.6%
Sb	Sebewa loam, 0 to 2 percent slopes	267.5	0.5%
SeA	Sleeth loam, 0 to 3 percent slopes	689.2	1.4%

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
SI	Sanitary landfill	82.8	0.2%
SpB	Spinks loamy sand, 0 to 6 percent slopes	79.3	0.2%
SpC	Spinks loamy sand, 6 to 12 percent slopes	78.5	0.2%
SpD	Spinks loamy sand, 12 to 18 percent slopes	168.2	0.3%
StE	Spinks-Coloma loamy sands, 18 to 35 percent slopes	157.2	0.3%
ThA	Thetford loamy sand, 0 to 2 percent slopes	46.4	0.1%
Ua	Udipsamments, level to steep	139.1	0.3%
Ub	Urban land	1,065.9	2.1%
Ug	Urban land-Glendora complex	402.0	0.8%
UkB	Urban land-Kalamazoo complex, 0 to 6 percent slopes	4,665.1	9.4%
UkC	Urban land-Kalamazoo complex, 6 to 12 percent slopes	628.1	1.3%
UoD	Urban land-Oshtemo complex, 12 to 25 percent slopes	687.0	1.4%
W	Water	1,754.5	3.5%
Totals for Area of Interest		**49,634.7**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different

management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Kalamazoo County, Michigan

AdraaA—Adrian muck, 0 to 1 percent slopes

Map Unit Setting

National map unit symbol: 2zdl7
Landscape: Till plains
Elevation: 670 to 1,010 feet
Mean annual precipitation: 31 to 41 inches
Mean annual air temperature: 45 to 50 degrees F
Frost-free period: 135 to 170 days
Farmland classification: Farmland of local importance

Map Unit Composition

Adrian and similar soils: 92 percent
Minor components: 8 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Adrian

Setting

Landscape: Till plains
Landform: Depressions on outwash plains, Depressions on moraines on outwash plains
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope, dip
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Herbaceous organic material over sandy glaciofluvial deposits

Typical profile

Oa1 - 0 to 12 inches: muck
Oa2 - 12 to 34 inches: muck
Cg - 34 to 80 inches: sand

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.14 to 14.17 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Calcium carbonate, maximum content: 15 percent
Maximum salinity: Nonsaline (0.3 to 1.9 mmhos/cm)
Sodium adsorption ratio, maximum: 0.2
Available water supply, 0 to 60 inches: Very high (about 15.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 5w
Hydrologic Soil Group: A/D
Ecological site: F098XA006MI - Mucky Depressions

Hydric soil rating: Yes

Minor Components

Kingsville

Percent of map unit: 3 percent
Landscape: Lake plains, outwash plains
Landform: Outwash plains, Nearshore zones (relict)
Landform position (three-dimensional): Dip
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: F098XA020MI - Wet Sandy Drift Depressions
Hydric soil rating: Yes

Edwards

Percent of map unit: 2 percent
Landscape: Till plains
Landform: Depressions on outwash plains, Depressions on moraines on outwash plains
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope, dip
Down-slope shape: Concave, linear
Across-slope shape: Linear
Ecological site: F098XA006MI - Mucky Depressions
Hydric soil rating: Yes

Houghton

Percent of map unit: 2 percent
Landscape: Till plains
Landform: Depressions on outwash plains, Depressions on moraines on outwash plains
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope, dip
Down-slope shape: Concave
Across-slope shape: Linear
Ecological site: F098XA006MI - Mucky Depressions
Hydric soil rating: Yes

Gilford, gravelly subsoil

Percent of map unit: 1 percent
Landscape: Till plains, outwash plains
Landform: Glacial drainage channels, Glacial drainage channels
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: F098XA020MI - Wet Sandy Drift Depressions
Hydric soil rating: Yes

Aq—Aquents and Histosols ponded

Map Unit Setting

National map unit symbol: 1jjk0
Elevation: 600 to 1,400 feet
Mean annual precipitation: 30 to 36 inches
Mean annual air temperature: 45 to 48 degrees F
Frost-free period: 140 to 150 days
Farmland classification: Not prime farmland

Map Unit Composition

Aquents and similar soils: 51 percent
Histosols and similar soils: 49 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Aquents

Setting

Landform: Depressions, Marshes
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear

Typical profile

H1 - 0 to 60 inches: variable

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Depth to water table: About 0 inches
Frequency of flooding: None
Frequency of ponding: Frequent

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6w
Ecological site: F098XA012MI - Wet Loamy Depressions
Hydric soil rating: Yes

Description of Histosols

Setting

Landform: Depressions, Marshes
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Herbaceous organic material

Typical profile

Oa - 0 to 51 inches: muck

H2 - 51 to 60 inches: variable

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 5.95 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: None
Frequency of ponding: Frequent

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 5w
Hydrologic Soil Group: A/D
Ecological site: F098XA006MI - Mucky Depressions
Hydric soil rating: Yes

BdA—Brady sandy loam, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 68n2
Elevation: 600 to 1,200 feet
Mean annual precipitation: 30 to 36 inches
Mean annual air temperature: 45 to 48 degrees F
Frost-free period: 140 to 150 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Brady and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Brady

Setting

Landform: Outwash plains
Landform position (three-dimensional): Rise
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Sandy outwash

Typical profile

Ap - 0 to 12 inches: sandy loam
Bt - 12 to 24 inches: sandy loam
2BC - 24 to 56 inches: loamy sand
2C - 56 to 68 inches: sand

Properties and qualities

Slope: 0 to 3 percent

Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: About 12 to 36 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 25 percent
Available water supply, 0 to 60 inches: Moderate (about 7.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: B
Ecological site: F098XA011MI - Moist Loamy Drift Plains
Hydric soil rating: No

Minor Components

Bronson

Percent of map unit: 10 percent
Landform: Flats on outwash plains
Ecological site: F098XA011MI - Moist Loamy Drift Plains
Hydric soil rating: No

BrA—Bronson sandy loam, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 68n3
Elevation: 600 to 1,200 feet
Mean annual precipitation: 30 to 36 inches
Mean annual air temperature: 45 to 48 degrees F
Frost-free period: 140 to 150 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Bronson and similar soils: 87 percent
Minor components: 13 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Bronson

Setting

Landform: Outwash plains, Outwash plains, Outwash plains
Landform position (three-dimensional): Rise
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Over sandy outwash

Typical profile

Ap - 0 to 17 inches: sandy loam
Bt - 17 to 33 inches: sandy loam
BC - 33 to 48 inches: loamy sand
C - 48 to 66 inches: sand

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: About 24 to 42 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 25 percent
Available water supply, 0 to 60 inches: Moderate (about 6.2 inches)

Interpretive groups

Land capability classification (irrigated): 2s
Land capability classification (nonirrigated): 2s
Hydrologic Soil Group: B
Ecological site: F098XA011MI - Moist Loamy Drift Plains
Hydric soil rating: No

Minor Components

Brady

Percent of map unit: 7 percent
Landform: Drainageways on outwash plains
Ecological site: F098XA011MI - Moist Loamy Drift Plains
Hydric soil rating: No

Oshtemo

Percent of map unit: 6 percent
Landform: Flats on outwash plains, Flats on moraines
Ecological site: F098XA015MI - Dry Loamy Drift Plains
Hydric soil rating: No

CoB—Coloma loamy sand, 0 to 6 percent slopes

Map Unit Setting

National map unit symbol: 2w643
Landscape: Outwash plains, till plains
Elevation: 610 to 970 feet
Mean annual precipitation: 30 to 41 inches
Mean annual air temperature: 43 to 52 degrees F
Frost-free period: 140 to 200 days
Farmland classification: Not prime farmland

Map Unit Composition

Coloma and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Coloma

Setting

Landscape: Outwash plains, till plains
Landform: Moraines, Outwash plains
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve, head slope, nose slope, side slope
Down-slope shape: Convex, linear
Across-slope shape: Linear
Parent material: Sandy outwash

Typical profile

Ap - 0 to 9 inches: loamy sand
Bw - 9 to 33 inches: sand
E and Bt - 33 to 80 inches: sand

Properties and qualities

Slope: 0 to 6 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (1.42 to 14.17 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 0.1 mmhos/cm)
Sodium adsorption ratio, maximum: 1.0
Available water supply, 0 to 60 inches: Low (about 4.3 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 4s
Hydrologic Soil Group: A
Hydric soil rating: No

Minor Components

Oshtemo

Percent of map unit: 8 percent
Landscape: Outwash plains, till plains
Landform: Moraines, Outwash plains
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve, head slope, nose slope, side slope
Down-slope shape: Convex, linear
Across-slope shape: Linear
Ecological site: F097XA018MI - Dry Loamy Drift Plains
Hydric soil rating: No

Thetford

Percent of map unit: 1 percent
Landscape: Till plains, outwash plains
Landform: Outwash plains, Moraines
Landform position (two-dimensional): Footslope, toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave, linear
Across-slope shape: Linear
Ecological site: F097XA012MI - Moist Sandy Depression
Hydric soil rating: No

Elmdale

Percent of map unit: 1 percent
Landscape: Till plains
Landform: Moraines
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: F097XA022MI - Moist Loamy Drift Plains
Hydric soil rating: No

DoA—Dowagiac loam, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 68n7
Elevation: 400 to 1,200 feet
Mean annual precipitation: 30 to 36 inches
Mean annual air temperature: 45 to 48 degrees F
Frost-free period: 140 to 150 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Dowagiac and similar soils: 96 percent
Minor components: 4 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Dowagiac

Setting

Landform: Outwash plains
Landform position (three-dimensional): Rise
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Loamy outwash over sandy outwash

Typical profile

Ap - 0 to 9 inches: loam
Bt1 - 9 to 29 inches: clay loam
Bt2 - 29 to 38 inches: sandy loam

2C - 38 to 60 inches: sand

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 6.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2s
Hydrologic Soil Group: B
Ecological site: F098XA015MI - Dry Loamy Drift Plains
Hydric soil rating: No

Minor Components

Sleeth

Percent of map unit: 4 percent
Landform: Drainageways on outwash plains
Ecological site: F098XA011MI - Moist Loamy Drift Plains
Hydric soil rating: No

Gd—Gilford sandy loam, 0 to 2 percent slopes, gravelly subsoil

Map Unit Setting

National map unit symbol: 2w5lx
Landscape: Till plains, outwash plains
Elevation: 660 to 990 feet
Mean annual precipitation: 30 to 41 inches
Mean annual air temperature: 43 to 52 degrees F
Frost-free period: 140 to 200 days
Farmland classification: Prime farmland if drained

Map Unit Composition

Gilford, gravelly subsoil, and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Gilford, Gravelly Subsoil

Setting

Landscape: Till plains, outwash plains
Landform: Glacial drainage channels, Glacial drainage channels
Landform position (two-dimensional): Toeslope

Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Coarse-loamy drift over sandy and gravelly outwash

Typical profile

Ap - 0 to 11 inches: sandy loam
Bg - 11 to 30 inches: sandy loam
BCg - 30 to 35 inches: loamy sand
Cg - 35 to 80 inches: gravelly sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.14 to 14.17 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Calcium carbonate, maximum content: 26 percent
Maximum salinity: Nonsaline (0.0 to 0.3 mmhos/cm)
Sodium adsorption ratio, maximum: 1.0
Available water supply, 0 to 60 inches: Low (about 5.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: A/D
Ecological site: F098XA020MI - Wet Sandy Drift Depressions
Hydric soil rating: Yes

Minor Components

Brady

Percent of map unit: 5 percent
Landscape: Till plains, outwash plains
Landform: Glacial drainage channels, Glacial drainage channels
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: F098XA011MI - Moist Loamy Drift Plains
Hydric soil rating: No

Sebewa

Percent of map unit: 5 percent
Landscape: Till plains, outwash plains
Landform: Glacial drainage channels, Glacial drainage channels
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: F098XA012MI - Wet Loamy Depressions
Hydric soil rating: Yes

Adrian

Percent of map unit: 3 percent
Landscape: Outwash plains, till plains
Landform: Depressions on glacial drainage channels, Depressions on glacial drainage channels
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Linear
Ecological site: F098XA006MI - Mucky Depressions
Hydric soil rating: Yes

Granby

Percent of map unit: 2 percent
Landscape: Outwash plains, till plains
Landform: Glacial drainage channels, Glacial drainage channels
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: F098XA020MI - Wet Sandy Drift Depressions
Hydric soil rating: Yes

Gn—Glendora sandy loam

Map Unit Setting

National map unit symbol: 68nb
Elevation: 600 to 1,000 feet
Mean annual precipitation: 30 to 36 inches
Mean annual air temperature: 45 to 48 degrees F
Frost-free period: 140 to 150 days
Farmland classification: Not prime farmland

Map Unit Composition

Glendora and similar soils: 87 percent
Minor components: 13 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Glendora

Setting

Landform: Depressions flood plains
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Sandy alluvium

Typical profile

A - 0 to 10 inches: sandy loam
C - 10 to 60 inches: stratified sand to loamy sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: About 0 to 12 inches
Frequency of flooding: Frequent
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 5.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6w
Hydrologic Soil Group: A/D
Ecological site: F098XA004MI - Wet Floodplains
Hydric soil rating: Yes

Minor Components

Sebewa

Percent of map unit: 5 percent
Landform: Depressions on outwash plains
Ecological site: F098XA012MI - Wet Loamy Depressions
Hydric soil rating: Yes

Houghton

Percent of map unit: 4 percent
Landform: Depressions
Ecological site: F098XA006MI - Mucky Depressions
Hydric soil rating: Yes

Adrian

Percent of map unit: 4 percent
Landform: Depressions on lake plains
Ecological site: F098XA006MI - Mucky Depressions
Hydric soil rating: Yes

HgtahA—Houghton muck, 0 to 1 percent slopes

Map Unit Setting

National map unit symbol: 2zdlc
Landscape: Till plains
Elevation: 720 to 1,100 feet
Mean annual precipitation: 31 to 41 inches
Mean annual air temperature: 45 to 50 degrees F
Frost-free period: 135 to 170 days
Farmland classification: Not prime farmland

Map Unit Composition

Houghton and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Houghton

Setting

Landscape: Till plains
Landform: Depressions on outwash plains, Depressions on moraines on outwash plains
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope, dip
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Herbaceous organic material

Typical profile

Oa1 - 0 to 12 inches: muck
Oa2 - 12 to 35 inches: muck
Oa3 - 35 to 80 inches: muck

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.14 to 14.17 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Calcium carbonate, maximum content: 3 percent
Maximum salinity: Nonsaline to very slightly saline (0.4 to 2.7 mmhos/cm)
Sodium adsorption ratio, maximum: 0.8
Available water supply, 0 to 60 inches: Very high (about 23.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 5w
Hydrologic Soil Group: A/D
Ecological site: F098XA006MI - Mucky Depressions
Hydric soil rating: Yes

Minor Components

Adrian

Percent of map unit: 4 percent
Landscape: Till plains
Landform: Depressions on outwash plains, Depressions on moraines on outwash plains
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope, dip
Down-slope shape: Concave
Across-slope shape: Linear
Ecological site: F098XA006MI - Mucky Depressions

Hydric soil rating: Yes

Edwards

Percent of map unit: 3 percent
Landscape: Till plains
Landform: Depressions on outwash plains, Depressions on moraines on outwash plains
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope, dip
Down-slope shape: Concave, linear
Across-slope shape: Linear
Ecological site: F098XA006MI - Mucky Depressions
Hydric soil rating: Yes

Palms

Percent of map unit: 2 percent
Landscape: Outwash plains, till plains
Landform: Drainageways on till plains, Swamps on moraines, Depressions on moraines, Drainageways on moraines, Drainageways on outwash plains, Depressions on outwash plains, Depressions on till plains, Swamps on outwash plains, Swamps on till plains
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave, linear
Across-slope shape: Concave, linear
Ecological site: F098XA006MI - Mucky Depressions
Hydric soil rating: Yes

Gilford, gravelly subsoil

Percent of map unit: 1 percent
Landscape: Outwash plains, till plains
Landform: Glacial drainage channels, Glacial drainage channels
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: F098XA020MI - Wet Sandy Drift Depressions
Hydric soil rating: Yes

Hs—Houghton and Sebewa soils, ponded

Map Unit Setting

National map unit symbol: 68nf
Elevation: 360 to 1,000 feet
Mean annual precipitation: 30 to 36 inches
Mean annual air temperature: 45 to 48 degrees F
Frost-free period: 140 to 150 days
Farmland classification: Not prime farmland

Map Unit Composition

Houghton and similar soils: 45 percent
Sebewa and similar soils: 40 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Houghton

Setting

Landform: Depressions, Outwash plains
Landform position (three-dimensional): Dip
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Herbaceous organic material

Typical profile

Oa1 - 0 to 10 inches: muck
Oa2 - 10 to 60 inches: muck

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 5.95 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Available water supply, 0 to 60 inches: Very high (about 23.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8
Hydrologic Soil Group: A/D
Ecological site: F098XA006MI - Mucky Depressions
Hydric soil rating: Yes

Description of Sebewa

Setting

Landform: Outwash plains
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Loamy over sandy and gravelly outwash

Typical profile

Ap - 0 to 11 inches: loam
Btg - 11 to 23 inches: clay loam
2Cg - 23 to 60 inches: loamy sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Runoff class: Low

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Calcium carbonate, maximum content: 25 percent
Available water supply, 0 to 60 inches: Low (about 5.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 5w
Hydrologic Soil Group: B/D
Ecological site: F098XA012MI - Wet Loamy Depressions
Hydric soil rating: Yes

Minor Components

Adrian

Percent of map unit: 3 percent
Landform: Depressions on lake plains
Ecological site: F098XA006MI - Mucky Depressions
Hydric soil rating: Yes

Granby

Percent of map unit: 3 percent
Landform: Depressions on lake plains
Ecological site: F098XA020MI - Wet Sandy Drift Depressions
Hydric soil rating: Yes

Glendora

Percent of map unit: 3 percent
Landform: Flood plains
Ecological site: F098XA004MI - Wet Floodplains
Hydric soil rating: Yes

Gilford

Percent of map unit: 3 percent
Landform: Depressions on outwash plains
Ecological site: F098XA012MI - Wet Loamy Depressions
Hydric soil rating: Yes

Edwards

Percent of map unit: 3 percent
Landform: Depressions on lakebeds
Ecological site: F098XA006MI - Mucky Depressions
Hydric soil rating: Yes

KaA—Kalamazoo loam, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 2w5lz

Landscape: Outwash plains, ice-margin complexes
Elevation: 740 to 1,010 feet
Mean annual precipitation: 30 to 41 inches
Mean annual air temperature: 43 to 52 degrees F
Frost-free period: 140 to 200 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Kalamazoo and similar soils: 95 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Kalamazoo

Setting

Landscape: Outwash plains, ice-margin complexes
Landform: Outwash plains, Outwash terraces
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve, tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Loess-influenced loamy outwash over sandy and gravelly outwash

Typical profile

Ap - 0 to 10 inches: loam
Bt1 - 10 to 27 inches: sandy clay loam
Bt2 - 27 to 35 inches: sandy loam
2BC - 35 to 52 inches: loamy sand
2C - 52 to 80 inches: gravelly sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low (0.01 to 0.14 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 22 percent
Maximum salinity: Nonsaline (0.1 to 0.3 mmhos/cm)
Sodium adsorption ratio, maximum: 1.0
Available water supply, 0 to 60 inches: Moderate (about 7.6 inches)

Interpretive groups

Land capability classification (irrigated): 2s
Land capability classification (nonirrigated): 2s
Hydrologic Soil Group: C
Ecological site: F098XA015MI - Dry Loamy Drift Plains
Hydric soil rating: No

Minor Components

Spinks

Percent of map unit: 3 percent

Landscape: Outwash plains, ice-margin complexes
Landform: Outwash terraces, Outwash plains
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve, tread
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: F098XA014MI - Dry Sandy Drift Plains
Hydric soil rating: No

Bronson

Percent of map unit: 1 percent
Landscape: Outwash plains, ice-margin complexes
Landform: Outwash terraces, Outwash plains
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve, tread
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: F098XA011MI - Moist Loamy Drift Plains
Hydric soil rating: No

Sleeth

Percent of map unit: 1 percent
Landscape: Ice-margin complexes, outwash plains
Landform: Outwash terraces, Outwash plains
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope, tread
Down-slope shape: Concave, linear
Across-slope shape: Linear
Ecological site: F098XA011MI - Moist Loamy Drift Plains
Hydric soil rating: No

KaB—Kalamazoo loam, 2 to 6 percent slopes

Map Unit Setting

National map unit symbol: 2w5m0
Landscape: Outwash plains, ice-margin complexes
Elevation: 780 to 1,050 feet
Mean annual precipitation: 30 to 41 inches
Mean annual air temperature: 43 to 52 degrees F
Frost-free period: 135 to 200 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Kalamazoo and similar soils: 94 percent
Minor components: 6 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Kalamazoo

Setting

Landscape: Outwash plains, ice-margin complexes
Landform: Outwash terraces, Outwash plains
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Interfluve, head slope, nose slope, side slope, tread
Down-slope shape: Linear, convex
Across-slope shape: Linear
Parent material: Loess-influenced loamy outwash over sandy and gravelly outwash

Typical profile

Ap - 0 to 10 inches: loam
Bt1 - 10 to 27 inches: sandy clay loam
Bt2 - 27 to 35 inches: sandy loam
2BC - 35 to 52 inches: loamy sand
2C - 52 to 80 inches: gravelly sand

Properties and qualities

Slope: 2 to 6 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low (0.01 to 0.14 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 22 percent
Maximum salinity: Nonsaline (0.1 to 0.3 mmhos/cm)
Sodium adsorption ratio, maximum: 1.0
Available water supply, 0 to 60 inches: Moderate (about 7.6 inches)

Interpretive groups

Land capability classification (irrigated): 2e
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C
Ecological site: F098XA015MI - Dry Loamy Drift Plains
Hydric soil rating: No

Minor Components

Spinks

Percent of map unit: 3 percent
Landscape: Outwash plains, ice-margin complexes
Landform: Outwash plains, Outwash terraces
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Interfluve, head slope, nose slope, side slope, tread
Down-slope shape: Convex, linear
Across-slope shape: Linear
Ecological site: F098XA014MI - Dry Sandy Drift Plains
Hydric soil rating: No

Sleeth

Percent of map unit: 1 percent
Landscape: Outwash plains, ice-margin complexes
Landform: Outwash terraces, Outwash plains
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope, tread
Down-slope shape: Concave, linear
Across-slope shape: Linear
Ecological site: F098XA011MI - Moist Loamy Drift Plains
Hydric soil rating: No

Bronson

Percent of map unit: 1 percent
Landscape: Outwash plains, ice-margin complexes
Landform: Outwash terraces, Outwash plains
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Interfluve, head slope, nose slope, side slope, tread
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: F098XA011MI - Moist Loamy Drift Plains
Hydric soil rating: No

Sebewa

Percent of map unit: 1 percent
Landscape: Till plains
Landform: Drainageways on outwash plains, Drainageways on moraines
Landform position (two-dimensional): Footslope, toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave, linear
Across-slope shape: Linear
Ecological site: F098XA012MI - Wet Loamy Depressions
Hydric soil rating: Yes

KaC—Kalamazoo loam, 6 to 12 percent slopes

Map Unit Setting

National map unit symbol: 2w5m3
Landscape: Ice-margin complexes, outwash plains
Elevation: 800 to 1,020 feet
Mean annual precipitation: 30 to 41 inches
Mean annual air temperature: 43 to 52 degrees F
Frost-free period: 140 to 200 days
Farmland classification: Farmland of local importance

Map Unit Composition

Kalamazoo and similar soils: 89 percent
Minor components: 11 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Kalamazoo

Setting

Landscape: Ice-margin complexes, outwash plains
Landform: Outwash plains, Outwash terraces
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Head slope, nose slope, side slope, riser
Down-slope shape: Convex, linear
Across-slope shape: Linear
Parent material: Loess-influenced loamy outwash over sandy and gravelly outwash

Typical profile

Ap - 0 to 9 inches: loam
Bt1 - 9 to 27 inches: sandy clay loam
Bt2 - 27 to 35 inches: sandy loam
2BC - 35 to 52 inches: loamy sand
2C - 52 to 80 inches: gravelly sand

Properties and qualities

Slope: 6 to 12 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately low (0.01 to 0.14 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 22 percent
Maximum salinity: Nonsaline (0.1 to 0.3 mmhos/cm)
Sodium adsorption ratio, maximum: 1.0
Available water supply, 0 to 60 inches: Moderate (about 7.6 inches)

Interpretive groups

Land capability classification (irrigated): 2e
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C
Ecological site: F098XA015MI - Dry Loamy Drift Plains
Hydric soil rating: No

Minor Components

Spinks

Percent of map unit: 10 percent
Landscape: Ice-margin complexes, outwash plains
Landform: Outwash terraces, Outwash plains
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Interfluve, head slope, nose slope, side slope, tread
Down-slope shape: Linear, convex
Across-slope shape: Linear
Ecological site: F098XA014MI - Dry Sandy Drift Plains
Hydric soil rating: No

Sleeth

Percent of map unit: 1 percent
Landscape: Ice-margin complexes, outwash plains
Landform: Outwash terraces, Outwash plains
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope, tread
Down-slope shape: Concave, linear
Across-slope shape: Linear
Ecological site: F098XA011MI - Moist Loamy Drift Plains
Hydric soil rating: No

OsB—Oshtemo sandy loam, 0 to 6 percent slopes

Map Unit Setting

National map unit symbol: 2v2cd
Landscape: Outwash plains, till plains
Elevation: 710 to 1,010 feet
Mean annual precipitation: 30 to 41 inches
Mean annual air temperature: 43 to 52 degrees F
Frost-free period: 140 to 200 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Oshtemo and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Oshtemo

Setting

Landscape: Outwash plains, till plains
Landform: Moraines, Outwash terraces, Outwash plains
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Interfluve, head slope, nose slope, side slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Loamy drift over calcareous sandy and gravelly drift

Typical profile

Ap - 0 to 8 inches: sandy loam
E - 8 to 13 inches: sandy loam
Bt - 13 to 36 inches: sandy loam
E and Bt - 36 to 55 inches: loamy sand
2C - 55 to 80 inches: gravelly sand

Properties and qualities

Slope: 0 to 6 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained

Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.14 to 14.17 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 34 percent
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Sodium adsorption ratio, maximum: 1.0
Available water supply, 0 to 60 inches: Moderate (about 6.3 inches)

Interpretive groups

Land capability classification (irrigated): 3s
Land capability classification (nonirrigated): 3s
Hydrologic Soil Group: A
Ecological site: F098XA015MI - Dry Loamy Drift Plains
Hydric soil rating: No

Minor Components

Spinks

Percent of map unit: 3 percent
Landscape: Outwash plains, till plains
Landform: Moraines, Outwash plains, Outwash terraces
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Interfluve, head slope, nose slope, side slope
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: F098XA014MI - Dry Sandy Drift Plains
Hydric soil rating: No

Brady

Percent of map unit: 3 percent
Landscape: Outwash plains, till plains
Landform: Moraines, Outwash plains, Outwash terraces
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: F098XA011MI - Moist Loamy Drift Plains
Hydric soil rating: No

Bronson

Percent of map unit: 3 percent
Landscape: Outwash plains, till plains
Landform: Moraines, Outwash plains, Outwash terraces
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Head slope, nose slope, side slope
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: F098XA011MI - Moist Loamy Drift Plains
Hydric soil rating: No

Gilford

Percent of map unit: 1 percent
Landscape: Till plains, outwash plains

Landform: Moraines, Outwash plains, Outwash terraces
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave, linear
Across-slope shape: Concave, linear
Ecological site: F098XA012MI - Wet Loamy Depressions
Hydric soil rating: Yes

OsC—Oshtemo sandy loam, 6 to 12 percent slopes

Map Unit Setting

National map unit symbol: 2v2cf
Landscape: Till plains, outwash plains
Elevation: 740 to 1,030 feet
Mean annual precipitation: 30 to 41 inches
Mean annual air temperature: 43 to 52 degrees F
Frost-free period: 140 to 200 days
Farmland classification: Farmland of local importance

Map Unit Composition

Oshtemo and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Oshtemo

Setting

Landscape: Till plains, outwash plains
Landform: Moraines, Outwash plains, Outwash terraces
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Head slope, nose slope, side slope
Down-slope shape: Convex, linear
Across-slope shape: Linear
Parent material: Loamy drift over calcareous sandy and gravelly drift

Typical profile

Ap - 0 to 8 inches: sandy loam
E - 8 to 13 inches: sandy loam
Bt - 13 to 36 inches: sandy loam
E and Bt - 36 to 55 inches: loamy sand
2C - 55 to 80 inches: gravelly sand

Properties and qualities

Slope: 6 to 12 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.14 to 14.17 in/hr)
Depth to water table: More than 80 inches

Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 34 percent
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Sodium adsorption ratio, maximum: 1.0
Available water supply, 0 to 60 inches: Moderate (about 6.3 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: A
Ecological site: F098XA015MI - Dry Loamy Drift Plains
Hydric soil rating: No

Minor Components

Spinks

Percent of map unit: 3 percent
Landscape: Till plains, outwash plains
Landform: Moraines, Outwash plains, Outwash terraces
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Head slope, nose slope, side slope
Down-slope shape: Convex, linear
Across-slope shape: Linear
Ecological site: F098XA014MI - Dry Sandy Drift Plains
Hydric soil rating: No

Bronson

Percent of map unit: 3 percent
Landscape: Till plains, outwash plains
Landform: Moraines, Outwash terraces, Outwash plains
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Head slope, nose slope, side slope
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: F098XA011MI - Moist Loamy Drift Plains
Hydric soil rating: No

Brady

Percent of map unit: 3 percent
Landscape: Outwash plains, till plains
Landform: Moraines, Outwash terraces, Outwash plains
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: F098XA011MI - Moist Loamy Drift Plains
Hydric soil rating: No

Gilford

Percent of map unit: 1 percent
Landscape: Till plains, outwash plains
Landform: Moraines, Outwash terraces, Outwash plains
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave, linear
Across-slope shape: Concave, linear

Ecological site: F098XA012MI - Wet Loamy Depressions
Hydric soil rating: Yes

OsD—Oshtemo sandy loam, 12 to 18 percent slopes

Map Unit Setting

National map unit symbol: 2w64x
Landscape: Till plains, outwash plains
Elevation: 760 to 1,030 feet
Mean annual precipitation: 30 to 41 inches
Mean annual air temperature: 43 to 52 degrees F
Frost-free period: 140 to 230 days
Farmland classification: Farmland of local importance

Map Unit Composition

Oshtemo and similar soils: 89 percent
Minor components: 11 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Oshtemo

Setting

Landscape: Till plains, outwash plains
Landform: Outwash plains, Moraines, Outwash deltas
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Head slope, nose slope, side slope
Down-slope shape: Convex, linear
Across-slope shape: Convex, linear
Parent material: Loamy drift over calcareous sandy and gravelly drift

Typical profile

A - 0 to 7 inches: sandy loam
E - 7 to 12 inches: sandy loam
Bt - 12 to 35 inches: sandy loam
E and Bt - 35 to 54 inches: loamy sand
2C - 54 to 80 inches: gravelly sand

Properties and qualities

Slope: 12 to 18 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.14 to 14.17 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 34 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 1.0

Available water supply, 0 to 60 inches: Moderate (about 6.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: A
Ecological site: F098XA022MI - Loamy Slopes
Hydric soil rating: No

Minor Components

Plainfield

Percent of map unit: 5 percent
Landscape: Outwash plains, till plains
Landform: Moraines, Outwash plains
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Head slope, nose slope, side slope
Down-slope shape: Convex, linear
Across-slope shape: Convex, linear
Ecological site: F098XA021MI - Sandy Slopes
Hydric soil rating: No

Spinks

Percent of map unit: 2 percent
Landscape: Till plains, outwash plains
Landform: Moraines, Outwash plains
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Head slope, nose slope, side slope
Down-slope shape: Convex, linear
Across-slope shape: Convex, linear
Ecological site: F098XA021MI - Sandy Slopes
Hydric soil rating: No

Brady

Percent of map unit: 2 percent
Landscape: Outwash plains, till plains
Landform: Moraines, Outwash plains, Outwash deltas
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave, linear
Across-slope shape: Concave, linear
Ecological site: F098XA011MI - Moist Loamy Drift Plains
Hydric soil rating: No

Hillsdale

Percent of map unit: 2 percent
Landscape: Till plains
Landform: Moraines
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Head slope, nose slope, side slope
Down-slope shape: Convex, linear
Across-slope shape: Convex, linear
Ecological site: F098XA022MI - Loamy Slopes
Hydric soil rating: No

OsE—Oshtemo sandy loam, 18 to 35 percent slopes

Map Unit Setting

National map unit symbol: 2w64y
Landscape: Ice-margin complexes, outwash plains
Elevation: 720 to 1,030 feet
Mean annual precipitation: 30 to 41 inches
Mean annual air temperature: 43 to 52 degrees F
Frost-free period: 140 to 230 days
Farmland classification: Not prime farmland

Map Unit Composition

Oshtemo and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Oshtemo

Setting

Landscape: Ice-margin complexes, outwash plains
Landform: Moraines, Outwash deltas, Outwash plains
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Head slope, nose slope, side slope
Down-slope shape: Convex, linear
Across-slope shape: Convex, linear
Parent material: Loamy drift over calcareous sandy and gravelly drift

Typical profile

A - 0 to 7 inches: sandy loam
E - 7 to 11 inches: sandy loam
Bt - 11 to 34 inches: sandy loam
E and Bt - 34 to 53 inches: loamy sand
2C - 53 to 80 inches: gravelly sand

Properties and qualities

Slope: 18 to 35 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.14 to 14.17 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 34 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 1.0
Available water supply, 0 to 60 inches: Moderate (about 6.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: A
Ecological site: F098XA022MI - Loamy Slopes
Hydric soil rating: No

Minor Components

Plainfield

Percent of map unit: 7 percent
Landscape: Ice-margin complexes, outwash plains
Landform: Outwash deltas, Outwash plains, Moraines
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Head slope, nose slope, side slope
Down-slope shape: Convex, linear
Across-slope shape: Convex, linear
Ecological site: F098XA021MI - Sandy Slopes
Hydric soil rating: No

Brady

Percent of map unit: 1 percent
Landscape: Outwash plains, ice-margin complexes
Landform: Moraines, Outwash deltas, Outwash plains
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave, linear
Across-slope shape: Concave, linear
Ecological site: F098XA011MI - Moist Loamy Drift Plains
Hydric soil rating: No

Hillsdale

Percent of map unit: 1 percent
Landscape: Ice-margin complexes, outwash plains
Landform: Outwash deltas, Outwash plains, Moraines
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Head slope, nose slope, side slope
Down-slope shape: Convex, linear
Across-slope shape: Convex, linear
Ecological site: F098XA022MI - Loamy Slopes
Hydric soil rating: No

Spinks

Percent of map unit: 1 percent
Landscape: Ice-margin complexes, outwash plains
Landform: Moraines, Outwash plains, Outwash deltas
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Head slope, nose slope, side slope
Down-slope shape: Convex, linear
Across-slope shape: Convex, linear
Ecological site: F098XA021MI - Sandy Slopes
Hydric soil rating: No

Pb—Pits, gravel

Map Unit Setting

National map unit symbol: 68np
Mean annual precipitation: 30 to 36 inches
Mean annual air temperature: 45 to 48 degrees F
Frost-free period: 140 to 150 days
Farmland classification: Not prime farmland

Map Unit Composition

Pits: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

PfB—Plainfield loamy sand, 0 to 6 percent slopes

Map Unit Setting

National map unit symbol: 68nq
Elevation: 600 to 1,200 feet
Mean annual precipitation: 30 to 36 inches
Mean annual air temperature: 45 to 48 degrees F
Frost-free period: 140 to 150 days
Farmland classification: Not prime farmland

Map Unit Composition

Plainfield and similar soils: 87 percent
Minor components: 13 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Plainfield

Setting

Landform: Outwash plains
Landform position (three-dimensional): Rise
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Sandy glacial drift; sandy outwash

Typical profile

Ap - 0 to 10 inches: loamy sand
B - 10 to 38 inches: sand
C - 38 to 60 inches: sand

Properties and qualities

Slope: 0 to 6 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Excessively drained
Runoff class: Negligible

Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 3.9 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 4s
Hydrologic Soil Group: A
Ecological site: F098XA014MI - Dry Sandy Drift Plains
Hydric soil rating: No

Minor Components

Spinks

Percent of map unit: 7 percent
Landform: Knolls on moraines, Flats on outwash plains, Knolls on outwash plains, Flats on moraines
Ecological site: F098XA014MI - Dry Sandy Drift Plains
Hydric soil rating: No

Thetford

Percent of map unit: 6 percent
Landform: Drainageways on outwash plains
Ecological site: F098XA019MI - Moist Sandy Drift Plains
Hydric soil rating: No

RdB—Riddles loam, 0 to 6 percent slopes

Map Unit Setting

National map unit symbol: 31gsy
Landscape: Ice-margin complexes, till plains
Elevation: 870 to 1,000 feet
Mean annual precipitation: 31 to 41 inches
Mean annual air temperature: 46 to 50 degrees F
Frost-free period: 135 to 170 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Riddles and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Riddles

Setting

Landscape: Ice-margin complexes, till plains
Landform: Moraines
Landform position (two-dimensional): Summit, shoulder, backslope

Landform position (three-dimensional): Interfluve, nose slope, side slope
Down-slope shape: Convex, linear
Across-slope shape: Linear, convex
Parent material: Loamy till

Typical profile

Ap - 0 to 8 inches: loam
E - 8 to 13 inches: sandy loam
Bt1 - 13 to 23 inches: sandy clay loam
Bt2 - 23 to 42 inches: sandy clay loam
BC - 42 to 55 inches: sandy loam
C - 55 to 79 inches: sandy loam

Properties and qualities

Slope: 0 to 6 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.01 to 1.42 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 30 percent
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Sodium adsorption ratio, maximum: 9.0
Available water supply, 0 to 60 inches: Low (about 5.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: B
Ecological site: F098XA015MI - Dry Loamy Drift Plains
Hydric soil rating: No

Minor Components

Oshtemo

Percent of map unit: 3 percent
Landscape: Ice-margin complexes, till plains
Landform: Moraines
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Interfluve, nose slope, side slope
Down-slope shape: Convex, linear
Across-slope shape: Linear, convex
Ecological site: F098XA015MI - Dry Loamy Drift Plains
Hydric soil rating: No

Kalamazoo

Percent of map unit: 3 percent
Landscape: Ice-margin complexes, till plains
Landform: Moraines
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Interfluve, nose slope, side slope
Down-slope shape: Convex, linear
Across-slope shape: Linear, convex
Ecological site: F098XA015MI - Dry Loamy Drift Plains

Hydric soil rating: No

Blount

Percent of map unit: 2 percent
Landscape: Ice-margin complexes, till plains
Landform: Moraines
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave, linear
Across-slope shape: Linear
Ecological site: F098XA011MI - Moist Loamy Drift Plains
Hydric soil rating: No

Sleeth

Percent of map unit: 2 percent
Landscape: Ice-margin complexes, till plains
Landform: Moraines
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave, linear
Across-slope shape: Linear
Ecological site: F098XA011MI - Moist Loamy Drift Plains
Hydric soil rating: No

SaA—Schoolcraft loam, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 68nt
Elevation: 400 to 1,200 feet
Mean annual precipitation: 30 to 36 inches
Mean annual air temperature: 45 to 48 degrees F
Frost-free period: 140 to 150 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Schoolcraft and similar soils: 96 percent
Minor components: 4 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Schoolcraft

Setting

Landform: Outwash plains
Landform position (three-dimensional): Rise
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Loamy over sandy outwash

Typical profile

Ap - 0 to 12 inches: loam
Bt1 - 12 to 29 inches: clay loam

Bt2 - 29 to 38 inches: sandy loam
2C - 38 to 60 inches: sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 7.3 inches)

Interpretive groups

Land capability classification (irrigated): 2s
Land capability classification (nonirrigated): 2s
Hydrologic Soil Group: B
Ecological site: R098XA016MI - Prairie Loamy Drift Plains
Hydric soil rating: No

Minor Components

Sleeth

Percent of map unit: 4 percent
Landform: Drainageways on outwash plains
Ecological site: F098XA011MI - Moist Loamy Drift Plains
Hydric soil rating: No

Sb—Sebewa loam, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 2v2c9
Landscape: Till plains
Elevation: 700 to 1,050 feet
Mean annual precipitation: 30 to 41 inches
Mean annual air temperature: 43 to 52 degrees F
Frost-free period: 140 to 200 days
Farmland classification: Prime farmland if drained

Map Unit Composition

Sebewa and similar soils: 93 percent
Minor components: 7 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Sebewa

Setting

Landscape: Till plains
Landform: Drainageways on outwash plains, Drainageways on moraines

Landform position (two-dimensional): Footslope, toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave, linear
Across-slope shape: Linear
Parent material: Loamy drift over sandy and gravelly outwash

Typical profile

Ap - 0 to 11 inches: loam
Btg1 - 11 to 21 inches: clay loam
Btg2 - 21 to 33 inches: clay loam
2Cg - 33 to 80 inches: sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.01 to 1.42 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Calcium carbonate, maximum content: 45 percent
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Sodium adsorption ratio, maximum: 3.0
Available water supply, 0 to 60 inches: Moderate (about 7.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: B/D
Ecological site: F098XA012MI - Wet Loamy Depressions
Hydric soil rating: Yes

Minor Components

Matherton

Percent of map unit: 5 percent
Landscape: Till plains
Landform: Drainageways on moraines, Drainageways on outwash plains
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: F098XA011MI - Moist Loamy Drift Plains
Hydric soil rating: No

Gilford

Percent of map unit: 2 percent
Landscape: Till plains
Landform: Drainageways on moraines, Drainageways on outwash plains
Landform position (two-dimensional): Footslope, toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave, linear
Across-slope shape: Linear
Ecological site: F098XA012MI - Wet Loamy Depressions
Hydric soil rating: Yes

SeA—Sleeth loam, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 68nx
Elevation: 400 to 1,020 feet
Mean annual precipitation: 30 to 36 inches
Mean annual air temperature: 45 to 48 degrees F
Frost-free period: 140 to 150 days
Farmland classification: Prime farmland if drained

Map Unit Composition

Sleeth and similar soils: 93 percent
Minor components: 7 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Sleeth

Setting

Landform: Outwash plains
Landform position (three-dimensional): Rise
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Loamy over sandy and gravelly outwash

Typical profile

Ap - 0 to 10 inches: loam
Bt - 10 to 13 inches: clay loam
Btg - 13 to 46 inches: sandy clay loam
2C - 46 to 66 inches: gravelly sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: About 12 to 36 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 30 percent
Available water supply, 0 to 60 inches: Moderate (about 8.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: C
Ecological site: F098XA011MI - Moist Loamy Drift Plains
Hydric soil rating: No

Minor Components

Sebewa

Percent of map unit: 7 percent
Landform: Depressions on lake plains, Depressions on outwash plains
Ecological site: F098XA012MI - Wet Loamy Depressions
Hydric soil rating: Yes

Sl—Sanitary landfill

Map Unit Setting

National map unit symbol: 1jjk5
Mean annual precipitation: 30 to 36 inches
Mean annual air temperature: 45 to 48 degrees F
Frost-free period: 140 to 150 days
Farmland classification: Not prime farmland

Map Unit Composition

Sanitary landfill: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

SpB—Spinks loamy sand, 0 to 6 percent slopes

Map Unit Setting

National map unit symbol: 2tpkp
Landscape: Outwash plains, till plains
Elevation: 670 to 1,050 feet
Mean annual precipitation: 30 to 41 inches
Mean annual air temperature: 43 to 52 degrees F
Frost-free period: 140 to 200 days
Farmland classification: Farmland of local importance

Map Unit Composition

Spinks and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Spinks

Setting

Landscape: Outwash plains, till plains
Landform: Moraines, Glacial drainage channels, Outwash plains
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Interfluve, head slope, nose slope, side slope, tread
Down-slope shape: Convex, linear

Across-slope shape: Linear
Parent material: Sandy drift

Typical profile

Ap - 0 to 9 inches: loamy sand
Bw - 9 to 28 inches: sand
E and Bt - 28 to 69 inches: loamy sand
C - 69 to 80 inches: sand

Properties and qualities

Slope: 0 to 6 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (1.42 to 14.17 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 20 percent
Maximum salinity: Nonsaline (0.0 to 0.4 mmhos/cm)
Sodium adsorption ratio, maximum: 2.0
Available water supply, 0 to 60 inches: Low (about 5.2 inches)

Interpretive groups

Land capability classification (irrigated): 3s
Land capability classification (nonirrigated): 3s
Hydrologic Soil Group: A
Ecological site: F098XA013MI - Piney Dry Sandy Drift Plains
Hydric soil rating: No

Minor Components

Thetford

Percent of map unit: 3 percent
Landscape: Till plains, outwash plains
Landform: Outwash plains, Moraines
Landform position (two-dimensional): Footslope, toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave, linear
Across-slope shape: Linear
Ecological site: F098XA019MI - Moist Sandy Drift Plains
Hydric soil rating: No

Tekenink

Percent of map unit: 2 percent
Landscape: Till plains
Landform: Moraines
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: F098XA008MI - Piney Dry Loamy Till Knolls
Hydric soil rating: No

Oshtemo

Percent of map unit: 2 percent

Landscape: Outwash plains, till plains
Landform: Moraines, Outwash plains, Glacial drainage channels
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Interfluve, head slope, nose slope, side slope, tread
Down-slope shape: Convex, linear
Across-slope shape: Linear
Ecological site: F098XA008MI - Piney Dry Loamy Till Knolls
Hydric soil rating: No

Gilford, gravelly subsoil

Percent of map unit: 2 percent
Landscape: Outwash plains, till plains
Landform: Glacial drainage channels, Glacial drainage channels
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: F098XA020MI - Wet Sandy Drift Depressions
Hydric soil rating: Yes

Metea

Percent of map unit: 1 percent
Landscape: Till plains
Landform: Moraines
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Interfluve, head slope, nose slope, side slope
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: F098XA013MI - Piney Dry Sandy Drift Plains
Hydric soil rating: No

SpC—Spinks loamy sand, 6 to 12 percent slopes

Map Unit Setting

National map unit symbol: 2tpkq
Landscape: Outwash plains, till plains
Elevation: 700 to 1,070 feet
Mean annual precipitation: 30 to 41 inches
Mean annual air temperature: 43 to 52 degrees F
Frost-free period: 140 to 200 days
Farmland classification: Farmland of local importance

Map Unit Composition

Spinks and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Spinks

Setting

Landscape: Outwash plains, till plains
Landform: Outwash plains, Glacial drainage channels, Moraines
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Head slope, nose slope, side slope
Down-slope shape: Convex, linear
Across-slope shape: Linear
Parent material: Sandy drift

Typical profile

Ap - 0 to 9 inches: loamy sand
Bw - 9 to 28 inches: sand
E and Bt - 28 to 69 inches: loamy sand
C - 69 to 80 inches: sand

Properties and qualities

Slope: 6 to 12 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (1.42 to 14.17 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 20 percent
Maximum salinity: Nonsaline (0.0 to 0.4 mmhos/cm)
Sodium adsorption ratio, maximum: 2.0
Available water supply, 0 to 60 inches: Low (about 5.2 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: A
Ecological site: F098XA013MI - Piney Dry Sandy Drift Plains
Hydric soil rating: No

Minor Components

Oshtemo

Percent of map unit: 4 percent
Landscape: Till plains, outwash plains
Landform: Moraines, Outwash plains, Glacial drainage channels
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Head slope, nose slope, side slope
Down-slope shape: Convex, linear
Across-slope shape: Linear
Ecological site: F098XA008MI - Piney Dry Loamy Till Knolls
Hydric soil rating: No

Thetford

Percent of map unit: 3 percent
Landscape: Outwash plains, till plains
Landform: Glacial drainage channels, Moraines, Outwash plains

Landform position (two-dimensional): Footslope, toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave, linear
Across-slope shape: Linear
Ecological site: F098XA019MI - Moist Sandy Drift Plains
Hydric soil rating: No

Metea

Percent of map unit: 2 percent
Landscape: Till plains
Landform: Moraines
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Head slope, nose slope, side slope
Down-slope shape: Convex, linear
Across-slope shape: Linear
Ecological site: F098XA013MI - Piney Dry Sandy Drift Plains
Hydric soil rating: No

Filer

Percent of map unit: 1 percent
Landscape: Till plains
Landform: Moraines
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Head slope, nose slope, side slope
Down-slope shape: Convex, linear
Across-slope shape: Linear
Ecological site: F098XA008MI - Piney Dry Loamy Till Knolls
Hydric soil rating: No

SpD—Spinks loamy sand, 12 to 18 percent slopes

Map Unit Setting

National map unit symbol: 2tpkr
Landscape: Outwash plains, till plains
Elevation: 730 to 1,060 feet
Mean annual precipitation: 30 to 41 inches
Mean annual air temperature: 43 to 52 degrees F
Frost-free period: 140 to 200 days
Farmland classification: Not prime farmland

Map Unit Composition

Spinks and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Spinks

Setting

Landscape: Outwash plains, till plains
Landform: Outwash plains, Moraines

Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Head slope, nose slope, side slope
Down-slope shape: Convex, linear
Across-slope shape: Concave, convex
Parent material: Sandy drift

Typical profile

Ap - 0 to 8 inches: loamy sand
Bw - 8 to 28 inches: sand
E and Bt - 28 to 69 inches: loamy sand
C - 69 to 80 inches: sand

Properties and qualities

Slope: 12 to 18 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (1.42 to 14.17 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 20 percent
Maximum salinity: Nonsaline (0.0 to 0.4 mmhos/cm)
Sodium adsorption ratio, maximum: 2.0
Available water supply, 0 to 60 inches: Low (about 5.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: A
Ecological site: F098XA021MI - Sandy Slopes
Hydric soil rating: No

Minor Components

Oshtemo

Percent of map unit: 5 percent
Landscape: Outwash plains, till plains
Landform: Outwash plains, Moraines
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Head slope, nose slope, side slope
Down-slope shape: Convex, linear
Across-slope shape: Concave, convex
Ecological site: F098XA022MI - Loamy Slopes
Hydric soil rating: No

Metea

Percent of map unit: 3 percent
Landscape: Till plains
Landform: Moraines
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Head slope, nose slope, side slope
Down-slope shape: Convex, linear
Across-slope shape: Concave, convex
Ecological site: F098XA021MI - Sandy Slopes
Hydric soil rating: No

Thetford

Percent of map unit: 2 percent
Landscape: Outwash plains, till plains
Landform: Outwash plains, Moraines
Landform position (two-dimensional): Footslope, toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave, linear
Across-slope shape: Linear
Ecological site: F098XA019MI - Moist Sandy Drift Plains
Hydric soil rating: No

StE—Spinks-Coloma loamy sands, 18 to 35 percent slopes

Map Unit Setting

National map unit symbol: 68p1
Elevation: 580 to 1,360 feet
Mean annual precipitation: 30 to 36 inches
Mean annual air temperature: 45 to 48 degrees F
Frost-free period: 140 to 150 days
Farmland classification: Not prime farmland

Map Unit Composition

Spinks and similar soils: 46 percent
Coloma and similar soils: 44 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Spinks

Setting

Landform: Outwash plains
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope, crest
Down-slope shape: Concave
Across-slope shape: Convex
Parent material: Sandy outwash

Typical profile

Ap - 0 to 10 inches: loamy sand
E - 10 to 28 inches: loamy sand
E and Bt - 28 to 86 inches: sand

Properties and qualities

Slope: 18 to 35 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: More than 80 inches

Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 4.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: A
Ecological site: F098XA021MI - Sandy Slopes
Hydric soil rating: No

Description of Coloma

Setting

Landform: Flats till plains
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Concave
Across-slope shape: Convex
Parent material: Sandy outwash

Typical profile

A - 0 to 10 inches: loamy sand
E - 10 to 42 inches: sand
E and Bt - 42 to 66 inches: stratified sand to sandy loam

Properties and qualities

Slope: 18 to 30 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Excessively drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 5.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: A
Ecological site: F098XA021MI - Sandy Slopes
Hydric soil rating: No

Minor Components

Oshtemo

Percent of map unit: 5 percent
Landform: Hills on outwash plains, Hills on moraines
Landform position (two-dimensional): Backslope
Ecological site: F098XA022MI - Loamy Slopes
Hydric soil rating: No

Plainfield

Percent of map unit: 5 percent
Landform: Flats on outwash plains
Ecological site: F098XA014MI - Dry Sandy Drift Plains

Hydric soil rating: No

ThA—Thetford loamy sand, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 68p2
Elevation: 600 to 1,200 feet
Mean annual precipitation: 30 to 36 inches
Mean annual air temperature: 45 to 48 degrees F
Frost-free period: 140 to 150 days
Farmland classification: Farmland of local importance

Map Unit Composition

Thetford and similar soils: 93 percent
Minor components: 7 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Thetford

Setting

Landform: Outwash plains
Landform position (three-dimensional): Rise
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Sandy outwash

Typical profile

Ap - 0 to 9 inches: loamy sand
E - 9 to 21 inches: loamy sand
E and Bt - 21 to 66 inches: loamy sand

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: About 12 to 24 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 4.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: A/D
Ecological site: F098XA019MI - Moist Sandy Drift Plains
Hydric soil rating: No

Minor Components

Bronson

Percent of map unit: 4 percent
Landform: Flats on outwash plains
Ecological site: F098XA011MI - Moist Loamy Drift Plains
Hydric soil rating: No

Spinks

Percent of map unit: 3 percent
Landform: Flats on outwash plains, Knolls on outwash plains, Flats on moraines, Knolls on moraines
Ecological site: F098XA014MI - Dry Sandy Drift Plains
Hydric soil rating: No

Ua—Udipsamments, level to steep

Map Unit Setting

National map unit symbol: 68p3
Elevation: 740 to 1,000 feet
Mean annual precipitation: 30 to 36 inches
Mean annual air temperature: 45 to 48 degrees F
Frost-free period: 140 to 150 days
Farmland classification: Not prime farmland

Map Unit Composition

Udipsamments and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Udipsamments

Setting

Landform: Outwash plains
Landform position (three-dimensional): Side slope
Down-slope shape: Concave, linear
Across-slope shape: Convex, linear
Parent material: Sandy drift

Typical profile

H1 - 0 to 60 inches: sand

Properties and qualities

Slope: 0 to 25 percent
Depth to restrictive feature: More than 80 inches
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 4.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Ecological site: F098XA014MI - Dry Sandy Drift Plains
Hydric soil rating: No

Ub—Urban land

Map Unit Setting

National map unit symbol: 68p4
Mean annual precipitation: 30 to 36 inches
Mean annual air temperature: 45 to 48 degrees F
Frost-free period: 140 to 150 days
Farmland classification: Not prime farmland

Map Unit Composition

Urban land: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Ug—Urban land-Glendora complex

Map Unit Setting

National map unit symbol: 68p5
Elevation: 600 to 1,000 feet
Mean annual precipitation: 30 to 36 inches
Mean annual air temperature: 45 to 48 degrees F
Frost-free period: 140 to 150 days
Farmland classification: Not prime farmland

Map Unit Composition

Urban land: 50 percent
Glendora and similar soils: 35 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Glendora

Setting

Landform: Depressions flood plains
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Sandy alluvium

Typical profile

A - 0 to 10 inches: sandy loam
C - 10 to 60 inches: stratified sand to loamy sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: About 0 to 12 inches
Frequency of flooding: Frequent
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 5.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6w
Hydrologic Soil Group: A/D
Ecological site: F098XA004MI - Wet Floodplains
Hydric soil rating: Yes

Minor Components

Sebewa

Percent of map unit: 5 percent
Landform: Depressions on lake plains, Depressions on outwash plains
Ecological site: F098XA012MI - Wet Loamy Depressions
Hydric soil rating: Yes

Houghton

Percent of map unit: 5 percent
Landform: Depressions
Ecological site: F098XA006MI - Mucky Depressions
Hydric soil rating: Yes

Adrian

Percent of map unit: 5 percent
Landform: Depressions on lake plains
Ecological site: F098XA006MI - Mucky Depressions
Hydric soil rating: Yes

UkB—Urban land-Kalamazoo complex, 0 to 6 percent slopes

Map Unit Setting

National map unit symbol: 2w5m5
Landscape: Outwash plains
Elevation: 770 to 970 feet
Mean annual precipitation: 30 to 41 inches
Mean annual air temperature: 43 to 52 degrees F
Frost-free period: 140 to 200 days
Farmland classification: Not prime farmland

Map Unit Composition

Urban land: 65 percent
Kalamazoo and similar soils: 30 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Urban Land

Setting

Landscape: Outwash plains
Anthropogenic Feature: Urban land

Properties and qualities

Slope: 0 to 6 percent
Depth to restrictive feature: 0 inches to manufactured layer

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8
Hydrologic Soil Group: D
Hydric soil rating: No

Description of Kalamazoo

Setting

Landscape: Outwash plains, ice-margin complexes
Landform: Outwash plains, Outwash terraces
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Interfluve, head slope, nose slope, side slope, tread
Down-slope shape: Convex, linear
Across-slope shape: Linear
Parent material: Loess-influenced loamy outwash over sandy and gravelly outwash

Typical profile

Ap - 0 to 10 inches: loam
Bt1 - 10 to 27 inches: sandy clay loam
Bt2 - 27 to 35 inches: sandy loam
2BC - 35 to 52 inches: loamy sand
2C - 52 to 80 inches: gravelly sand

Properties and qualities

Slope: 0 to 6 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low (0.01 to 0.14 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 22 percent
Maximum salinity: Nonsaline (0.1 to 0.3 mmhos/cm)
Sodium adsorption ratio, maximum: 1.0
Available water supply, 0 to 60 inches: Moderate (about 7.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C
Ecological site: F098XA015MI - Dry Loamy Drift Plains
Hydric soil rating: No

Minor Components

Spinks

Percent of map unit: 2 percent
Landscape: Outwash plains, ice-margin complexes
Landform: Outwash plains, Outwash terraces
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Interfluve, head slope, nose slope, side slope, tread
Down-slope shape: Convex, linear
Across-slope shape: Linear
Ecological site: F098XA014MI - Dry Sandy Drift Plains
Hydric soil rating: No

Bronson

Percent of map unit: 2 percent
Landscape: Outwash plains, ice-margin complexes
Landform: Outwash plains, Outwash terraces
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Interfluve, head slope, nose slope, side slope, tread
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: F098XA011MI - Moist Loamy Drift Plains
Hydric soil rating: No

Sleeth

Percent of map unit: 1 percent
Landscape: Outwash plains, ice-margin complexes
Landform: Outwash terraces, Outwash plains
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope, tread
Down-slope shape: Concave, linear
Across-slope shape: Linear
Ecological site: F098XA011MI - Moist Loamy Drift Plains
Hydric soil rating: No

UkC—Urban land-Kalamazoo complex, 6 to 12 percent slopes

Map Unit Setting

National map unit symbol: 68p7
Elevation: 400 to 1,360 feet

Mean annual precipitation: 30 to 36 inches
Mean annual air temperature: 45 to 48 degrees F
Frost-free period: 140 to 150 days
Farmland classification: Not prime farmland

Map Unit Composition

Urban land: 50 percent
Kalamazoo and similar soils: 45 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Urban Land

Setting

Landform: Outwash plains
Landform position (two-dimensional): Backslope

Description of Kalamazoo

Setting

Landform: Outwash plains
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Loamy over sandy outwash

Typical profile

Ap - 0 to 11 inches: loam
Bt - 11 to 38 inches: clay loam
2B - 38 to 55 inches: loamy coarse sand
2C - 55 to 60 inches: gravelly sand

Properties and qualities

Slope: 6 to 12 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 25 percent
Available water supply, 0 to 60 inches: Moderate (about 6.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: B
Ecological site: F098XA015MI - Dry Loamy Drift Plains
Hydric soil rating: No

Minor Components

Coloma

Percent of map unit: 3 percent
Landform: Knolls on outwash plains
Ecological site: F098XA014MI - Dry Sandy Drift Plains

Hydric soil rating: No

Sleeth

Percent of map unit: 2 percent
Landform: Drainageways on outwash plains
Ecological site: F098XA011MI - Moist Loamy Drift Plains
Hydric soil rating: No

UoD—Urban land-Oshtemo complex, 12 to 25 percent slopes

Map Unit Setting

National map unit symbol: 68p8
Elevation: 580 to 1,360 feet
Mean annual precipitation: 30 to 36 inches
Mean annual air temperature: 45 to 48 degrees F
Frost-free period: 140 to 150 days
Farmland classification: Not prime farmland

Map Unit Composition

Urban land: 58 percent
Oshtemo and similar soils: 25 percent
Minor components: 17 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Urban Land

Setting

Landform: Outwash plains
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope, crest
Down-slope shape: Concave
Across-slope shape: Convex

Description of Oshtemo

Setting

Landform: Hills moraines
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Concave
Across-slope shape: Convex
Parent material: Coarse-loamy over sandy outwash

Typical profile

Ap - 0 to 9 inches: sandy loam
Bt - 9 to 29 inches: sandy loam
B - 29 to 69 inches: sand

Properties and qualities

Slope: 12 to 25 percent

Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 6.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: A
Ecological site: F098XA022MI - Loamy Slopes
Hydric soil rating: No

Minor Components

Coloma

Percent of map unit: 9 percent
Landform: Ridges on outwash plains
Landform position (two-dimensional): Backslope
Ecological site: F098XA021MI - Sandy Slopes
Hydric soil rating: No

Plainfield

Percent of map unit: 8 percent
Landform: Flats on outwash plains
Ecological site: F098XA014MI - Dry Sandy Drift Plains
Hydric soil rating: No

W—Water

Map Unit Composition

Water: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

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EXHIBIT O: ENVIRONMENTAL REPORTS

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March 27, 2026

Mr. Ján Porvaznik
Swift Energy Storage, LLC
412 West 15th Street, 15th Floor
New York, New York 10011
Submitted via email: japv@cip-tt.com

Re: Environmental Impact Analysis for the Swan Battery Energy Storage System (BESS) Project in Comstock Township, Kalamazoo County, Michigan

Dear Ján Porvaznik:

Swift Energy Storage, LLC (Swift) contracted SWCA Environmental Consultants (SWCA) to complete a suite of environmental studies to assess the potential impacts to resources associated with the Swan Battery Energy Storage System (BESS) Project (project) in Kalamazoo County, Michigan (project). This analysis presents a summary of our findings and also presents recommendations to mitigate potential impacts.

The initial study area encompassed approximately 144 acres, which is composed primarily of privately owned, maintained golf course. SWCA understands that the final project area will be located within this area.

The studies that SWCA conducted and a summary of our findings follow, which is referred to as an Environmental Impact Analysis per the Comstock Township Ordinance.

Critical Environmental Issues Analysis: Report Prepared January 2026

This study consisted of a desktop review of publicly and readily available data, such as published literature, online resources, SWCA in-house sources, regulatory agency data, reports, maps, aerial photography, databases, public records, and geographic information system (GIS) data sets, to characterize the site setting and identify natural, biological, and cultural resources that may be present within the project area and study area.

No environmental fatal flaws were identified. SWCA concluded that constraints associated with land use, aquatic resources, biological resources, and cultural resources were low or low to moderate. SWCA recommended further studies to better quantify the potential for impacts to resources.

Cultural Resources Desktop Study: Report Prepared January 2026

SWCA conducted a detailed desktop analysis. The objective of the desktop review was to identify existing cultural resources within the project area and to assess the probability of encountering intact cultural materials to inform project facility siting. Additionally, the study area was evaluated to gain an understanding of the type and density of cultural resources in the vicinity of the project area to allow for conclusions to be drawn regarding potential undocumented resources that may be present within the project area.

Results indicated the presence of one previously recorded archaeological site location within the study area. This location is noted as being unverified by the Michigan State Historic Preservation Office (Michigan SHPO) and has not been evaluated for the National Register of Historic Places (NRHP). The soils and previous disturbance in the study area limits the potential for the site to contain intact precontact archaeological deposits. Although no regulatory framework mandated further study, SWCA suggested that a field study may be appropriate for due diligence purposes. For aboveground historic resources, there are no known resources listed in or eligible for the NRHP.

Due Diligence Phase I Archaeological Survey: Report Prepared March 2026

Background research for the project, conducted in December 2025 and January 2026, revealed there is a previously identified site (20KZ65) within the northwestern portion of the project area. The site dates from the Late Archaic and Middle Woodland, but its function is undetermined and location unverified. In February 2026, SWCA completed a due diligence archaeological survey within a 17.0-acre (6.8-ha) section of 20KZ65 (survey area). The objective of the due diligence archaeological survey was to confirm the presence/absence of cultural materials related to 20KZ65 within the survey area to inform project facility siting.

A total of 306 shovel test pits were excavated within the survey area, all of which were negative for pre and postcontact artifacts. The majority of shovel test pit profiles exhibited moderate to heavy disturbance related to golf course construction, indicating the portion of the site within the golf course was destroyed when the golf course was constructed ca. 1995. The due diligence archaeological survey did not relocate 20KZ65 within the survey area. SWCA therefore recommends the portion of 20KZ65 covered by the survey as not eligible for listing in the National Register of Historic Places, and no further work is recommended.

Aquatic Resources Delineation: Report Prepared March 2026

SWCA conducted an aquatic resources survey within the potential project area. The objectives of this survey were to identify and evaluate jurisdictional wetlands and other aquatic resources within the project area that may be subject to U.S. Army Corps of Engineers (USACE) and Michigan Department of Environment, Great Lakes, and Energy (EGLE) jurisdiction under Section 404 of the Clean Water Act (CWA) and Part 303, Wetlands Protection, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (NREPA), which includes Part 301, Inland Lakes and Streams and Part 31, Water Resources Protection Act.

SWCA identified aquatic resources in the forested area in the western portion of the site. However, we identified only one wetland in the potential project area. This low-quality wetland is present as an isolated feature on the landscape with no significant aquatic features present within 500 feet of its boundaries. This feature appears to be man-made as part of the golf course and is likely not under the jurisdiction of EGLE. Avoidance of the large forested area to the west of the planned project area is recommended. No floodplain was identified in the study area.

Threatened and Endangered Species Habitat Assessment: Report Prepared March 2026

SWCA conducted a desktop review of publicly available data to identify federally and state-listed threatened and endangered species that may occur within the project area. SWCA consulted the U.S. Fish and Wildlife Service (USFWS) Information for Planning and Consultation (IPaC) tool (Attachment B) (USFWS 2026a) and the Michigan Natural Features Inventory (MNFI) Rare Species Review (Attachment C) (MNFI 2026) to generate a list of threatened and endangered species that may be present in the project area. Following the desktop review, SWCA conducted a pedestrian field reconnaissance to identify

potentially suitable habitat for the species identified during the desktop assessment and to evaluate the likelihood of their occurrence within the project area.

SWCA concluded that habitat for one listed species, Indiana bat, is present in the potential project area. However, avoiding the large forested area to the west of the proposed project area and limiting large tree clearing to occur between November 1 and March 31, would result in the project not likely to adversely affect listed species.

CONCLUSIONS

SWCA conducted a series of environmental studies to determine the potential for environmental impacts to sensitive resources. Based on the proposed location of the project, its avoidance of the large forested area to the west, and implementation of the recommended measures, SWCA concludes that the project would have minimal impacts to the studied resources.

If you have any questions or need further information, please feel free to contact me at dsinars@swca.com or (630) 599-3022.

Sincerely,



Damon Sinars
Senior Project Manager

EXHIBIT P: SITE PLAN REVIEW CHECKLIST

SITE PLAN REVIEW CHECKLIST

YES NO N/A **Application Date: _____ Name: _____**

___ ___ ___ Complete Planning & Zoning Application submitted and Application Fee paid.

___ ___ ___ Name and address of owner, including the names and addresses of any officers of a corporation, or partners of a partnership, including documentation of ownership.

___ ___ ___ Legal description of the property.

___ ___ ___ Area of the subject parcel stated in acres or, if less than one acre, in square feet.

___ ___ ___ Present zoning classification of the property and general description of the proposed use.

___ ___ ___ Environmental Permits Checklist.

___ ___ ___ Hazardous Substance Reporting form.

3 Copies of the Initial Site Plan (or 2 if a set is also submitted electronically), addressing the following:

___ ___ ___ 1 – The site plan shall be of a scale of not less than one inch (1”) equals fifty feet (50’) and in sufficient detail that the reviewing body can readily interpret the site plan.

___ ___ ___ 2 – Name and address of the preparer; signed and sealed by a professional engineer, architect or land surveyor licensed by the State of Michigan.

___ ___ ___ 3 – Date prepared, including revisions.

___ ___ ___ 4 – Vicinity map showing the location of the site and relation to the surrounding street system and indicating adjacent parcels with the existing use.

___ ___ ___ 5 – Topography, both existing and proposed at two feet contour intervals, and its relationship to adjoining land. (Arrows should indicate direction of drainage.)

___ ___ ___ 6 – Soil characteristics and natural features (such as woodlots, marshlands, streams, lakes, drain basins, and similar features). Indicate oak trees > 8” and sugar maple trees > 12”.

___ ___ ___ 7 – Existing man-made features.

___ ___ ___ 8 – Location and address of existing and proposed buildings or structures on the site, indicating the height, size, floor plan, and construction type of each.

___ ___ ___ 9 – Building setback of front, side and rear yards and property line dimensions.

___ ___ ___ 10 – Minimum spacing between buildings on the site.

___ ___ ___ 11 – First floor elevation of buildings.

___ ___ ___ 12 – Grade elevation at all property corners, building corners, and street center line.

___ ___ ___ 13 – Percentage of land covered by buildings and percentage of land reserved for open space.

___ ___ ___ 14 – Line demarcating limits of land clearing. Clearing limited to minimum necessary for buildings, parking and grading for site improvements.

___ ___ ___ 15 – Dwelling unit density, typical front and side elevations and dimensioned floor plan for each dwelling unit type.

YES NO N/A

___ ___ ___ 16 – Adjacent right of ways or easements including the location of existing drives on the frontage opposite the site to be developed; if corner site, both sides.

___ ___ ___ 17 – Other public or private right of ways or easements existing or proposed.

___ ___ ___ 18 – Proposed drive locations, width and approach type.

___ ___ ___ 19 – Existing and proposed driving lanes and traffic patterns.

___ ___ ___ 20 – Existing and proposed parking and loading areas (including size and number of parking spaces).

___ ___ ___ 21 – Existing and proposed fire lanes and accessibility for fire-fighting equipment.

___ ___ ___ 22 – Location of refuse and recycling containers and enclosure details.

___ ___ ___ 23 – Location of HVAC, pedestrian walks, non-motorized facilities and recreation areas.

___ ___ ___ 24 – Location of utility poles, guys, underground gas, electric and telephone lines.

___ ___ ___ 25 – Location of water lines including proposed service, and hydrants and other appurtenances as required by the Fire Department.

___ ___ ___ 26 – Location of sanitary sewer lines including the location and size of the proposed service.

___ ___ ___ 27 – Location and type of on-site storm water drainage.

___ ___ ___ 28 – Location of existing and proposed fencing, landscaping, screening or other buffers required. Required landscaping must be indicated on the site plan or on a separate landscaping plan.

___ ___ ___ 29 – Fixture details, location and direction of all exterior on-site illumination.

___ ___ ___ 30 – Location, size and height of all existing and proposed signs.

___ ___ ___ 31 – Where applicable, location of existing and proposed ground water supply wells, septic systems and other waste water treatment systems.

___ ___ ___ 32 – Interior and exterior areas to be used for storage, use, loading/unloading, recycling or disposal of hazardous substances.

___ ___ ___ 33 – Underground and above ground storage tanks location, specifications and use.

___ ___ ___ 34 – Points of discharge for all drains and pipes.

___ ___ ___ 35 – Flood Plain Certification.

Approvals from the following agencies:

___ ___ ___ Road Commission of Kalamazoo County (269) 381-3171.

___ ___ ___ Michigan Department of Transportation – Kalamazoo TSC (269) 375-8622.

___ ___ ___ Kalamazoo County Environmental Health Bureau (269) 373-5210.

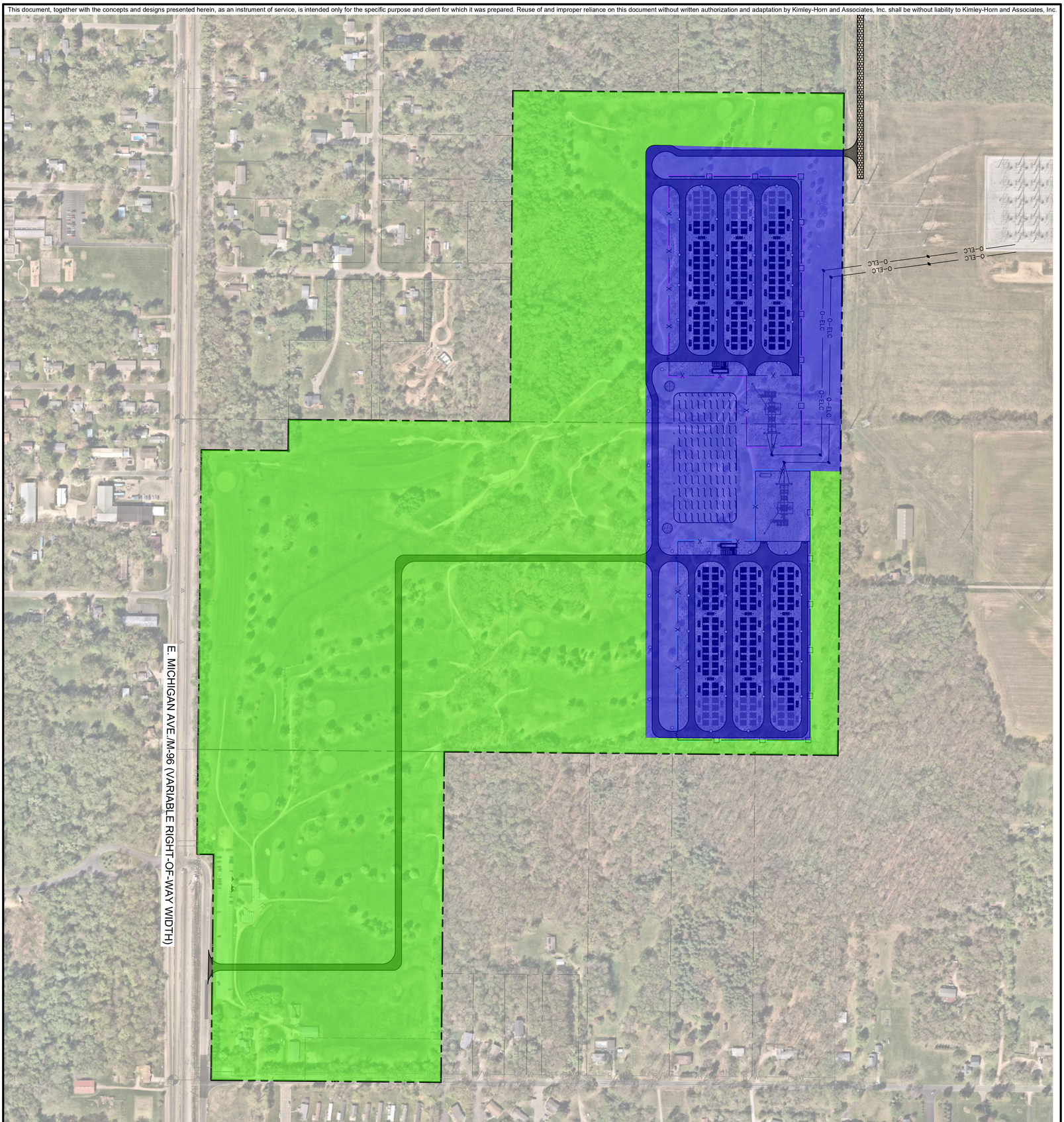
___ ___ ___ Kalamazoo County Drain Commissioner for Earth Change Permit (269) 384-8117.

___ ___ ___ Michigan Department of Environmental Quality for work in a floodway (269) 567-3500.

EXHIBIT Q: OPEN SPACE EXHIBIT

K:\TCW_LDEV\Copenhagen Infrastructure Partners\Swan BESS_MI\2 Design\CAD\Exhibits\Open Space\Open Space.dwg June 05, 2026 - 1:44pm

This document, together with the concepts and designs presented herein, as an instrument of service, is intended only for the specific purpose and client for which it was prepared. Reuse of and improper reliance on this document without written authorization and adaptation by Kimley-Horn and Associates, Inc. shall be without liability to Kimley-Horn and Associates, Inc.



NORTH

GRAPHIC SCALE IN FEET
0 100 200 400

LEGEND

PROPERTY BOUNDARY
PROPERTY LINE
BESS DEVELOPMENT AREA
OPEN SPACE AREA

PROPERTY SUMMARY

TOTAL PROPERTY AREA	+/- 144.28 AC
BESS DEVELOPMENT AREA	+/- 39.22 AC
OPEN SPACE AREA	+/- 105.06 AC

MISS DIG 811

ISSUED FOR PERMIT - NOT FOR CONSTRUCTION

SHEET NUMBER
EX-Q

SWAN BESS AND CYGNET BESS

PREPARED FOR
SWAN ENERGY STORAGE LLC AND
CYGNET ENERGY STORAGE LLC

COMSTOCK TOWNSHIP MI

OPEN SPACE EXHIBIT

KHA PROJECT	161262002
DATE	06/08/2026
SCALE	AS SHOWN
DESIGNED BY	JLL
DRAWN BY	EAS
CHECKED BY	BPG

CIP Copenhagen Infrastructure Partners

Kimley»Horn of Michigan, Inc.

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3000 TOWN CENTER, SUITE 2600
SOUTHFIELD, MI 48075
(312) 726 9445

No.	REVISIONS	DATE	BY
1	ENTITLEMENT SET	06/08/2026	BPG

664

EXHIBIT K: DECOMMISSIONING PLAN

DECOMMISSIONING PLAN

SWAN BESS

CYGNET BESS

COMSTOCK CHARTER TOWNSHIP

KALAMAZOO COUNTY, MI

PREPARED FOR:

SWAN ENERGY STORAGE, LLC
CYGNET ENERGY STORAGE, LLC
COPENHAGEN INFRASTRUCTURE SERVICE CO.
200 Wacker Drive
Suite 1600
Chicago, IL 60606

PREPARED BY:

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Prepared on: June 8, 2026

Kimley»Horn
of Michigan, Inc.

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1. INTRODUCTION

1.1 PURPOSE

This decommissioning plan is provided by Swan Energy Storage LLC and Cygnet Energy Storage LLC. (or the "Project Company") and will detail the projected decommissioning demands associated with the proposed Swan BESS and Cygnet BESS projects.

The purpose of this decommissioning plan is to provide procedures and an opinion of probable construction cost for partial or full closure and removal of the Battery Energy Storage System (BESS) facility. Comstock Township requires a decommissioning plan to supplement plans submitted as part of a Special Use Permit (SUP) package. This decommissioning plan details provisions for facility deconstruction and a site restoration and shall ensure that the site will be restored to a useful, nonhazardous, meadow-like condition. This decommissioning plan shall take effect upon facility abandonment, discontinuation of operation, or expiration of the use permit as defined by Comstock Township.

1.2 SITE LOCATION

Swan Energy Storage LLC and Cygnet Energy Storage LLC are proposing to develop a BESS facilities, each with a nameplate capacity of approximately 200 MW / 800 MWh in Comstock Township, Kalamazoo County, Michigan. The project site is located at 65 M 30th Street, in Comstock Township, Kalamazoo County, Michigan and within tax parcel identification number 07-16-455-051 and 07-16-330-011 and is zoned R-1C Cluster Housing District.

Swan Energy Storage, LLC and Cygnet Energy Storage, LLC. will design and permit the project with the authorities having jurisdiction, including Comstock Township, Kalamazoo County, and EGLE. Upon permit issuance, Owner/Operator will manage the construction, operation, and decommissioning of the project.

1.3 ANTICIPATED SERVICE LIFE

Unless the system is purchased by Comstock Township or other entity, the facility shall be decommissioned in accordance with this Decommissioning Plan ("Plan"), restoring to meadow-like state upon expiration or termination of the Power Purchase Agreement. Swan BESS and Cygnet BESS have an anticipated project life of 20 years, with the option to re-evaluate for continuation or decommissioning at the end of this 20-year period.

Decommissioning responsibilities shall include:

- Removal of aboveground and below ground cables, equipment, structures, fences, and foundations to a depth of four (4) feet by the end of the decommissioning period
- Restoration of the surface grade and soil after removal of equipment
- Revegetation of restored soil areas with native seed mixes, excluding any invasive species
- Management of materials and waste, projected costs, and a decommissioning fund agreement overview
- The time frame for the completion of site restoration work
- All other requirements of the Comstock Township Planning Commission

This decommissioning plan shall take effect upon any of the following conditions:

- The land lease (including the exercise of any extension options) ends and will either not be renewed or a new lease will not be entered into for the Project.
- The system does not produce power for sale for a consecutive 12-month period, except in the instance of a force majeure event in which the Project is being repaired and/or restored.
- The system is damaged and will not be repaired or replaced.
- System abandonment, discontinuation of operation, or as required by the Comstock Township Planning Commission.

1.4 DECOMISSIONING RISK OVER PROJECT LIFECYCLE

The probability of an event that would lead to abandonment or long-term interruption is extremely low during the first 15 to 20 years of the Project life. Accordingly, the risk of decommissioning the Project is extremely low during this time frame. The reasons why the risk to decommission the Project is extremely low in the early phases of the Project include, but are not limited to:

- Project owners have sophisticated financing structures that allow the lender or tax equity partner to step in and rectify the event that may lead to abandonment.

- Most critical BESS components have original equipment manufacturer (OEM) warranties with terms exceeding five years that include labor and parts. A warranty is an agreement or guarantee outlined by a manufacturer to a customer that defines performance requirements for a product or service. Warranties give customers a form of insurance if the purchased product or service does not adhere to quality standards. These warranties assure the Project owner, financing parties, and other stakeholders, that equipment will perform as expected which minimizes the risk of a decommissioning event. Average warranty lengths for critical BESS components range from 10 to 15 years, with some warranties on BESS units extending to 20 or 25+ years.

- BESS projects consist of many networked components designed to store and release electrical energy. The failure of any single component will not result in a substantial reduction of energy generation that could lead to a decommissioning event.

- BESS projects are required to maintain replacement value property damage insurance coverage and business interruption insurance coverage. Business interruption insurance covers the loss of income that a business suffers after a disaster or equipment failure.

- The replacement costs of BESS components will typically decline over time, and accordingly, costs to replace failed or damaged equipment after lapsed OEM warranties will not create large financial hurdles for the Project.

- In the early stages of the Project, the resale value of the equipment is significantly higher than the decommissioning costs, resulting in a net positive (revenue).

Per BESS Ordinance No. 564, Article 4 Section 4.61C 19.d, the Project will provide a surety bond or cash deposit for site decommissioning and stabilization.

Battery Energy Storage Systems (BESS) are an increasingly popular form of grid stability and backup power around the world and are an essential energy option for the future of the planet. BESS also offers the additional benefit of being easier to build, operate, and decommission with minimal environmental risks. Recent rises in popularity and use can be linked to lower installation and operation costs and it is expected that this pattern will continue, further reducing the risk of a decommissioning event.

1.5 DECOMMISSIONING RISKS OVER TIME

As previously noted, the probability of a decommissioning event that would lead to abandonment or long-term financial interruption is extremely low during the first 15 to 20 years of the Project life and accordingly, the financial risk to decommission the Project is also extremely low. A risk analysis approach is presented here for informational purposes only and has not been considered in the decommissioning cost estimates present in this Plan.

It is important to note that there are two aspects to consider when evaluating the risk for decommissioning the Project:

1. The risk of the need to decommission the Project as a whole (Project termination risk).
2. The risk of failing to recuperate the cost of the decommissioning activities (decommissioning funding).

The primary concern for the Comstock Township Zoning Board of Appeals is the ability to recuperate the cost of decommissioning and restoration of the land to pre-Project conditions. The presence of a Power Purchase Agreement (PPA) in the first 20 years of the Project makes the likelihood of decommissioning very low during that time. The graph below summarizes the estimated decommissioning risk of cost recovery for the Project. The graph utilizes a “one percent” risk as the lowest risk; however, the financial value of the Project or equipment in the early years would far exceed the cost of the decommissioning and restoration activities and therefore, the graph is conservative.



The factors taken into consideration in estimating the risk include, but were not limited to:

- Years 1-5 – Minimal Project termination or financial risk due to presence of PPA with guarantee to purchase power, resale of value components, component warranties, value of facility.
- Years 5-10 – Similar consideration of previous period, except minimal increased financial risk due to the decrease in resale value of used components and rise in technological improvements of new equipment in market.
- Years 10-15 – Similar consideration of previous period, with slightly increased risk as warranties start to expire. Value of equipment is still substantial but decreasing.
- Years 15-20 – Similar consideration of previous period, warranties continue to expire; value of equipment diminishes with age and technological improvements in market.

Years 20-25 – PPA expires, Project termination and funding risks increase, value of equipment diminishes, and technological improvements in market.

2. PROJECT COMPONENTS

2.1 SITE WORK PREPARATION

Prior to construction, appropriate construction best management practices shall be installed. This includes, but is not limited to, construction entrance and soil stabilization, perimeter control, and other security and erosion and sediment control measures. The stockpile area shall be delineated upon the implementation of silt fence or approved equal.

2.2 PROPOSED SITE IMPROVEMENTS

The existing site is 144.28 acres and has historically operated as a golf course and agricultural land. The BESS development area for the proposed BESS facility is approximately 39.22 acres. The existing contour elevations within the project area range from 803'-906'. Slopes are generally lower to the north and south, averaging around 0-10%. In the central portion of the site, a range of 5-20% is present within the wooded areas.

The proposed site conditions include gravel access road, yard rock, substation area, battery storage system equipment, and grass lined stormwater control pond. These developments will be located within the existing golf course. The entrance of the gravel road will use the existing driveway from the golf course off N 30th St. The proposed access drive will run through the existing golf course, and any existing trees within construction limits will be removed. An additional secondary entrance for emergency vehicles will run through the northern part of the site, off E Main St. Additional tree removal along the north eastern edge of the parcel as well as in the central portion of the parcel, as well as clearing and grubbing of the golf course is proposed. Re-grading will occur within the BESS yards, substation area, and access road.

2.3 BESS/ELECTRICAL EQUIPMENT

Initially on site there will be 196 battery enclosures and 49 skids installed for each project. Augmentation is planned for year 5 and 11 with an addition of 20 battery enclosures and 5 skids in year 5 and 24 battery enclosures and 6 skids in year 11 for each project. Electrical equipment shall be installed and shall maintain

clearances as required by Comstock Township, National Electric Code ("NEC"), and National Fire Protection Association ("NFPA"). To connect the battery containers to the on-site substation 9,500 linear feet of medium voltage wiring and 3,886 linear feet of low voltage wiring for Swan Energy Storage, LLC are proposed, and 10,332 linear feet of medium voltage wiring and 3,886 linear feet of low voltage wiring for Cygnet Energy Storage LLC are proposed.

2.4 STORMWATER MANAGEMENT

Post-development stormwater runoff will be captured and conveyed to a proposed stormwater pond on-site. The storm water basin will be located next to the BESS facility to capture, detain/retain, and treat runoff as well as protect the site from flooding during the project lifespan. The basin will be decommissioned with the rest of the project in addition to the site equipment. The stormwater basin will be backfilled with soil similar to existing soils in the project site.

2.5 SITE ACCESS

The project will feature internal roadways and perimeter fencing. All access roads on the site will comply with Township and County regulations for emergency response and equipment manufacturer specifications for delivery and maintenance. During the project's lifespan, the roadways and fencing will be consistently maintained. After decommissioning, the access roads may be kept to ensure continued access to the property area

3. PROJECT DECOMMISSIONING AND RECYCLING

3.1 DECOMMISSIONING OBJECTIVES

The decommissioning plan adheres to the standards of the Battery Energy Storage System (BESS) industry and standard lease and easement agreement terms. The decommissioning process will ensure the safe execution of the following tasks:

1. Remove and clean every battery storage unit or energy storage device, transformer, balance of plant (BOP) equipment, and substation equipment constructed on the property.

2. Remove and clean all structural foundations of the battery storage facility on the property. All holes or cavities created during removal will be backfilled with the excavated soil. Foundations will be removed to a depth of four feet.

3. Remove and clean all buried cables, including power, grounding, fiber-optic, and communication cables installed on the property. Any holes or cavities created during removal will be backfilled with the excavated soil. Cables buried deeper than four feet will remain.

4. Remove all overhead power or communication lines constructed on the property. Disconnection from the utility power grid.

5. Remove all stormwater basins established on the property. All holes or cavities created during removal will be backfilled with the excavated soil.

6. Remove all fences, gates, and onsite access roads established on the property. All holes or voids created during removal will be backfilled with the excavated soil.

7. Remove all underground utilities, including water service, irrigation service, sanitary sewer, storm sewer installed on the property. Any holes or cavities created during removal will be backfilled with the excavated soil. Utilities buried deeper than four feet will remain with proper abandonment.

The decommissioning project will be approached as a single, comprehensive effort, allowing for the most cost-effective demolition methods. Various means and methods may be employed for the dismantling process, though the specific means and methods will be determined by the contractor performing the work to ensure safe dismantling of the project.

This decommissioning plan is based on current best management practices and procedures. This Plan may be subject to revision based on new standards and emergent best management practices at the time of decommissioning. Permits will be obtained as required and notification will be given to necessary stakeholders prior to decommissioning.

The Project Company is responsible for this decommissioning, provided however that the Project Company may contract with a third-party to perform the decommissioning on its behalf. Nothing in this plan relieves any obligation that the real estate property owner may have to remove the Facility as outlined in Special Use Permit in the event the operator of the Facility does not fulfill this obligation.

3.2 TIMELINE

Once it is determined that the Project has reached the end of its usable life and decommissioning should begin, a detailed decommissioning report will be prepared. This report will coordinate the schedules and stages of decommissioning activities, record the equipment or materials removed, document the recipients of disposed or recycled materials, track changes in equipment custody, and provide a final site condition report. Preparation for decommissioning should commence before ceasing site operations, with all decommissioning activities expected to be completed within 12 months of the Project's closure.

Decommissioning of various stages can happen concurrently, but decommissioning the site will generally follow the order below.

1. BESS battery units, transformers and support equipment
2. Substation components and transmission line structures (if required)
3. Foundations
4. Underground Cables and Utilities
5. Stormwater BMPs
6. Perimeter fencing
7. Site access and internal roadways

3.3 DECOMMISSIONING TASKS

Upon determining that the Project has reached the end of its life and decommissioning can commence, the Project will be disconnected from its point of interconnection (POI) at the substation located north of the Project site. Prior to shutting down the facility, the Battery Energy Storage System (BESS) will be discharged to below 30% state of charge, or follow more stringent requirements set by the Department of Energy or Department of Transportation at the time of decommissioning. This ensures compliance with transportation guidelines for safely transferring the lithium-ion batteries for reuse or recycling. All equipment on-site, from the Project's substation to the BESS enclosures, will be isolated and grounded to minimize potential energy risks to personnel. The contractor responsible for decommissioning will provide

all necessary equipment and ensure compliance with lockout/tagout (LOTO) procedures to minimize risks. Proper personal protective equipment (PPE) will be required for all personnel at all times.

High-value assets will be removed early in the decommissioning schedule to reduce theft risk, improve cash flow, and separate recyclable materials for maximizing scrap recovery. High-value assets include precious alloys like copper, aluminum-brass tubes, stainless steel tubes, and other valuable metals used in plant systems. This category includes transformers, transformer coils, circuit breakers, electrical cables, batteries, and inverters. The removal methods will vary based on the asset's location and nature. Smaller transformers, equipment, and cables will likely be removed and shipped to scrap yards, while large transformers and inverters will require on-site disassembly before being sent to scrap yards.

Construction and Demolition (C&D) waste will be kept separate from scrap and concrete to prevent cross-contamination of waste or recycling streams. C&D demolition crews will use equipment like excavators with material handling attachments and skid steers to remove these materials. The materials will then be consolidated and loaded into bulk containers for disposal.

3.4 BESS BATTERY UNITS AND SUPPORT EQUIPMENT

The Project's Battery Energy Storage System (BESS) will be the first component to be removed from the site. All personnel working on the BESS equipment must be certified and trained in decommissioning procedures according to both manufacturer requirements and federal hazardous materials regulations. The batteries within the custom-built enclosures will be isolated down to the smallest individual component recommended by the manufacturer for on-site handling and then removed and packaged for reuse or recycling. Following the removal of battery modules, any internal equipment such as heating and cooling systems, fire suppression systems, and other components will be separated for recycling. The custom-built enclosures themselves will then be disassembled and separated for recycling. When decommissioning the electrical components, the grounding circuit will, whenever possible, be the last to be removed to ensure personnel safety. Foundations for the enclosures will remain in place until all other equipment has been disassembled and removed from the site. Specialized equipment needed for this task may include a crane, forklift, and specific equipment provided by the BESS manufacturer.

3.5 POWER CONVERSION SKIDS

All personnel decommissioning the power conversion equipment will be trained according to the manufacturer's requirements. Electrical cabling between battery enclosures and inverter or transformer components will be removed for recycling. Electronic equipment and transformers will be separated from power conversion equipment for resale or recycling. All on-site transformers will be drained of oil before being moved offsite. Cables connecting the power conversion systems to the Project substation will also be recycled. The grounding circuit will be the last to be removed whenever possible for safety. Foundations for the power conversion systems will remain until all other equipment is disassembled and removed. Specialized equipment may include a crane and tools from the power conversion system manufacturer.

3.6 AUXILIARY ELECTRICAL SYSTEMS

All personnel decommissioning the auxiliary electrical equipment will be trained according to the manufacturer's requirements. Auxiliary systems may include transformers, switchboards, panelboards, fire protection equipment, and heating and cooling systems. These components, connected to the BESS power

conversion system, will be removed and organized for recycling per manufacturer recommendations and relevant regulations. Additional handling requirements may be needed for certain equipment before recycling. The grounding circuit will be the last to be removed whenever possible for safety. Foundations will remain until all equipment is disassembled and removed. Specialized equipment, such as a crane and forklift, may be needed for this work.

3.7 ELECTRICAL CABLES AND CONDUITS

All direct buried electrical cables and conduits between equipment must be excavated and removed. The materials will be separated for recycling or C&D waste disposal. The BESS ground grid and underground electrical cables connecting to the Project substation will be removed for recycling up to the substation yard. Gravel terrain will be removed and disposed of off-site. All cavities created will be filled with soil similar to the original soil intended for agricultural development. Specialized equipment may include graders, skid steers, excavators, bulldozers, and dump trucks.

3.8 FOUNDATIONS

The remaining structures and foundations will be demolished up to four feet. Steel components will be separated, crushed, and recycled. Concrete will be crushed and disposed of. At the end of this task, there should be no in-ground components of the project besides site fencing (See section 3.10 for site perimeter fencing).

3.9 STORMWATER BASIN

All site stormwater basins on site will be backfilled and graded to match existing terrain. All voids created in completing this work will be filled with soil consistent to the existing conditions.

3.10 PERIMETER FENCING

Perimeter fencing will remain until all other assets of the project have been removed. The fencing will continue to provide site security and safety during the decommissioning process. Once the rest of the site has been cleared, fencing will be removed, and materials will be sent to recycling or waste.

3.11 SITE ACCESS AND DRIVES

Internal site roadways and drives will be removed and restored to, or closely with, the original site conditions and grades, to prepare the site to become a meadow field rather than revert to original use. All materials removed will be reused or recycled. All voids created during this process will be filled with soil consistent to the existing conditions. Site access roads may be preserved after the project with written approval from the owner.

3.12 RESTORATION OF SITE

The projects disturbed land will be restored to become a meadow field. This work will follow all removal as described in Section 3.3 above. Restoration will consist of re-grading to re-establish the pre-existing topography. In order to adequately restore the site to a meadow-like condition, documentation using pre-construction video and/or digital photography will be performed prior to construction activities. This information will be reviewed prior to preparation of decommissioning demolition documents and included in the submittal to the Comstock Township. Pre-construction documentation will also consist of detailed descriptions of existing vegetative and soil conditions as well as existing topography and drainage patterns.

At the time of decommissioning, the Project Company will restore the BESS Facility to a meadow-like condition. All waste and excess materials will be disposed of in accordance with municipal, provincial and federal regulations. Waste that can be recycled under municipal programs will be recycled accordingly. Provided, however, the Project Company shall not be required to replace any structures that were removed to build the BESS Facility.

The restoration will consist of de-compaction of the topsoil by disking or tilling and re-vegetation of the property. The Project Company will provide dust control during site restoration. At the end of the project, the area will be seeded and fertilized with native vegetation as needed to return the site to as close as practicable to initially agreed-upon condition. The future use of the land will be determined at the time of decommissioning. Deciding factors will be influenced by Comstock Township land use and comprehensive plans and regulations at such time in the future.

The developer will coordinate with the Comstock Township to monitor vegetation and drainage following restoration until permanent vegetation is established. Erosion and sediment control, re-seeding, soil stabilization, weed control and fertilization will be provided by the developer as needed until the site is stabilized and approved to be completed by the Comstock Township.

Upon completion of the site restoration, a final report of activities will be submitted to the Comstock Township documenting the process and results.

4. PROJECT DECOMMISSIONING COSTS

An engineer's opinion of probable construction was prepared as part of this decommissioning plan. Appendix A and Appendix B summarizes the probable costs associated with decommissioning.

Industry standard prices in 2026 for removal costs were determined using RSMeans cost data supplemented with other local data. Removal cost includes materials, contractor installation/demolition, mobilization and demobilization, overhead and profit, performance bonding, contingency, and engineering plans and permitting. Resale value of equipment of significant value were calculated with straight-line depreciation of the original material cost. The following assumptions were included in our estimate:

- All costs are shown in current 2026 dollars.
- Trucking costs are based on Q1, 2026 rates.
- Site mobilization for decommissioning is assumed to initiate from Kalamazoo, Michigan.
- Project quantities are based on the Swan BESS and Cygnet BESS Electrical Plans dated 03/27/2026.
- Waste disposal is assumed to be hauled to WM-Autumn Hills Landfill approximately 57 miles from the site.
- Recycled material is assumed to be hauled to Kent County Recycling and Education Center approximately 40 miles from the site.
- Cost fluctuations are expected based on market conditions prior to contract execution.
- Land value and/or sales are excluded from this estimate.

The net probable value of decommissioning was calculated as the removal value adjusted for inflation in Year 20. The expected removal value subtotal is **$4,869,000** for Swan Energy Storage LLC, and is **$4,846,000** for Cygnet Energy Storage LLC. Approximately **$1,095,000** is assumed for soft costs and contingencies for Swan Energy Storage, LLC, and **$1,090,000** is assumed for soft costs and contingencies for Cygnet Energy Storage, LLC., bringing the probable net present value of decommissioning including

contingencies to **$5,936,000** for Swan Energy Storage LLC, and is **$5,964,000** for Cygnet Energy Storage LLC**.** Assuming an inflation rate of 3.25% for 20 years, the probable value of decommissioning is estimated to be **$11,307,000** for Swan Energy Storage LLC, and is **$11,254,000** for Cygnet Energy Storage LLC**.**

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