ZONING BOARD OF ADJUSTMENTS
AGENDA
Tuesday, November 15, 2022 - 4:00 PM
Council Chambers, 2nd Floor, City Hall
209 Pearl Street

1. **CALL TO ORDER**
2. **ROLL CALL**
3. **PLEDGE OF ALLEGIANCE**
4. **ADOPTION OF AGENDA**
5. **APPROVAL OF MINUTES**
6. **PROOF OF PUBLICATION/POSTING**
7. **REVIEW OF MEETING PROCEDURES**
8. **PUBLIC HEARINGS**

   A. CASE #BA-22-005

   Public hearing on the request of Roger Jones for a variance from Section 15.08B.050, Site Development Regulations, of the Council Bluffs Municipal Code (Zoning Ordinance) to allow an accessory structure to be located in front of a principal structure with a front yard setback of 12 feet, as opposed to, the required front setback of 25 feet or the existing front setback line of the principal structure (whichever is greater) in the R-1/Single-Family Residential District on property legally described as Lot 8, Lakewood Villas, City of Council Bluffs, Pottawattamie County, Iowa. Location: 8 Lakewood Villa

   B. CASE #CU-22-004

   Continued public hearing on the request of Heartland Co-Op, represented by David Hoylman from ABP Engineering, for a conditional use permit to allow the expansion of a 'grain storage and distribution' facility in an I-2 District on property legally described as being part of the South 1/2 of Section 4-74-44, lying east of the Missouri River and west of River Road. Location: 2401 South 37th Street

9. **OTHER BUSINESS**
10. **ADJOURNMENT**

Any questions or concerns regarding this agenda and/or requests for special accommodations at this meeting should be directed to the Community Development Department at (712) 890-5350 or email at cgibbons@councilbluffs-ia.gov.

Zoning Board of Adjustment Communication

Department: Community Development
Case/Project No.: BA-22-005 CASE #BA-22-005 Council Action: 11/15/2022
Submitted by: Brandon Siracuse, Planner

Description

Public hearing on the request of Roger Jones for a variance from Section 15.08B.050, Site Development Regulations, of the Council Bluffs Municipal Code (Zoning Ordinance) to allow an accessory structure to be located in front of a principal structure with a front yard setback of 12 feet, as opposed to, the required front setback of 25 feet or the existing front setback line of the principal structure (whichever is greater) in the R-1/Single-Family Residential District on property legally described as Lot 8, Lakewood Villas, City of Council Bluffs, Pottawattamie County, Iowa. Location: 8 Lakewood Villa

Background/Discussion

See attached staff report.

Recommendation

ATTACHMENTS:

Description	Type	Upload Date
Staff Report & Attachments	Other	11/9/2022

TO: Zoning Board of Adjustment
FROM: Community Development Department

DATE: November 15, 2022

RE: **CASE #BA-22-005**
REQUEST: Public hearing on the request of Roger Jones for a variance from Section 15.08B.050, *R-1/Single-Family Residential District, Site Development Regulations*, of the Council Bluffs Municipal Code (Zoning Ordinance) to allow an accessory structure to be constructed in front of the principal structure, with a front setback of 12 feet from the front property line, as opposed to the requirement that accessory structures be setback the greater of 25 feet or the existing front setback line of the principal structure, on property legally described as Lot 8 and ½ of the adjoining canal, Lakewood Villas, City of Council Bluffs, Pottawattamie County, Iowa.

APPLICABLE CODE SECTION: **Section 15.08B.050 Site Development Regulations for the R-1/Single-Family Residential Zoning District**

Minimum setback	Accessory Structure
Front yard	*Greater of 25 feet or existing front setback line of principal structure*

RELIEF SOUGHT: A 13-foot, more or less, front yard setback variance

LEGAL DESCRIPTION: Lot 8 and ½ of the adjoining canal, Lakewood Villas, City of Council Bluffs, Pottawattamie County, Iowa

LOCATION: 8 Lakewood Villa

APPLICANT/OWNER: Roger Jones, 8 Lakewood Villa, Council Bluffs, IA 51501

BACKGROUND INFORMATION – The Community Development Department has received a request from Roger Jones for a variance from Section 15.08B.050, *Site Development Regulations*, of the Municipal Code (Zoning Ordinance) to allow an accessory structure to be located in front of the principal structure on the subject property, with a front setback of 12 feet, as opposed to the requirement that accessory structures be setback the greater of 25 feet or the existing front setback line of the principal structure.

The purpose of this request is to allow a 24' wide by 28' deep detached garage to be constructed on the subject property. According to the applicant, the "triangular" shape of the lot will not allow the proposed garage to be constructed in a location that would conform to the typical site development regulations. Specifically, the proposed garage would not meet the normal front setback requirements.

The Zoning Board of Adjustment granted variances for the subject property in 2010 (case #BA-10-004) to allow for a principal structure to be setback 12 feet from the front property line, as opposed to the required 25 feet, and 6 feet (±) from the interior side property line, as opposed to the required 8.92 feet. The property owner had requested this variance to enable construction of a 28' wide by 28' deep attached garage. The property owner never constructed this attached garage, and they now wish to build a detached garage instead. Because

the previously granted variances apply to a principal structure, the property owners need to obtain a separate variance to enable construction of an accessory structure within the required front yard setback.

The following attachments have been included for your reference:
Attachment A: Location/Zoning Map
Attachment B: Proposed Plot Plan

VARIANCE HISTORY OF LAKEWOOD VILLA – Since the City annexed the Lakewood Villas area in 1969, the Zoning Board of Adjustment has granted variances for at least 21 of the 71 properties contained within. In 1986, the Zoning Board of Adjustment granted a 2.5 foot side yard setback variance for the property two lots to the north (6 Lakewood Villa), and in 1991 the Board granted a 14 foot front yard setback variance for the lot abutting to the south. Additionally, several variances have been granted in the past to allow accessory structures (including garages) in front of the principal structure, including a relatively recent 61-foot variance granted in 2016 to allow a detached garage in front of the principal structure at 18 Lakewood Villa. Because of all the variances, possible illegal construction, and non-conforming structures in existence prior to annexation, the majority of residential structures do not meet the required 25-foot front yard setback, and detached garages located within the required front yard setback are a common feature.

CURRENT ZONING AND LAND USE – Lakewood Villa is zoned R-1/Single-Family Residential District and is developed with single family dwellings. Lake Manawa State Park, zoned A-1/Open Space Conservation District, surrounds the subdivision.

The following variances have been issued at the subject property:

- Case #BA-10-004: Variances to allow a 12-foot front yard setback and 6-foot (±) side yard setback for a principal structure on the subject property.

CITY DEPARTMENTS AND UTILITIES – All City departments and local utility providers were notified of the requested variance. The following comments were received:

Community Development Department had the following comments:

- Approval of the requested variance shall not be interpreted as approval of a permit to construct any structure. The applicant shall obtain all applicable permits before commencing construction.
- The applicants have not requested a special privilege, as the majority of the homes in Lakewood Villas do not meet the required 25-foot front setback due to variances, possible illegal construction, and non-conforming structures in existence prior to annexation. Additionally, many properties have accessory structures located in front of a principal structure for the same reasons.
- The shape of the lot and the locations of the house, rear deck, and boat slip make constructing a garage in the rear yard impossible per current city zoning code. Approval of this request will not compromise the spirit and intent of the Zoning Ordinance. It is the opinion of the Community Development Department that what the applicant has proposed is reasonable.
- A literal enforcement of the provisions of the Municipal Code in this case would result in an unnecessary hardship. Detached garages within the required front yard setback are common in Lakewood Villas. The subject property has no garage currently, unlike most other properties in Lakewood Villas, and the proposed garage can only be built in its proposed location. The requested variance is based on physical impediments, not design preferences or convenience to the property owners.
- Approval of this request would be consistent with past front and interior side yard setback variances granted to allow an attached garage on the subject property. In addition, the detached garage requires only one variance as proposed, whereas the previously proposed attached garage required two variances.
- The applicant has indicated that the proposed garage will be setback 4(±) feet from the interior side property line. This setback exceeds the required 3-foot interior side yard setback for an accessory

structure in the R-1 district. However, any eave on the proposed garage shall be designed such that the eave is not located within the required 3-foot interior side yard setback.

- A continuous hard surface driveway meeting the standards within Chapter 15.23, *Off-Street Parking, Loading and Unloading*, of the Municipal Code (Zoning Ordinance) is required in order to connect the garage to the public street. The subject property contains an existing hard surface driveway approximately 9' wide; however, the applicant's submitted plot plan indicates an 18' wide driveway. The applicant shall be responsible for obtaining the required permit(s) to complete driveway approach expansion work in the right-of-way prior to commencing such work.
- The proposed detached garage shall be subject to all R-1 district site development standards for which variances have not been granted.

Council Bluffs Fire Department stated that they have no comments in regards to the variance request.

Council Bluffs Public Works Department stated that they have no comments in regards to the variance request.

Council Bluffs Building Permits and Inspections stated they do not oppose the variance. If the ZBA grants the requested variance, the division will work with the applicant on any construction item(s) necessary due to proximity to the property line.

NEIGHBORHOOD RESPONSE – All property owners within 200 feet of the subject property were notified of the requested variance. No comments have been received as of the date of this report.

COMMENTS - Evidence must be presented to demonstrate that a literal enforcement of the Ordinance will create a hardship for which relief is necessary. The Board of Adjustment shall approve a variance to grant relief when 'unforeseen applications of this Ordinance…create particular hardships.' No variance shall be granted unless the Board of Adjustment makes findings of fact based on the standards and conditions that follow. A variance less than requested may be granted by the Board when the record supports the applicant's right to some relief, but not to the entire relief requested. *(§15.02.080 – Variances)*

1. *The particular property, because of size, shape, topography or other physical conditions suffers singular disadvantage through the application of this ordinance, which does not apply to other properties in the vicinity.* Like many lots in Lakewood Villas, the subject property is irregularly shaped and has unique physical conditions. The lot is situated along a canal shared by all properties within the Lakewood Villas subdivision. The subject property is significantly wider at its front (eastern) side than at its rear (western) side. The front property line measures approximately 93.9 feet while the rear property line measures approximately 35.7 feet, less than the minimum required lot width. Additionally, much of the rear yard is made up of the canal and a boat slip, leaving inadequate space in the rear yard to construct a detached garage.

2. *Because of such disadvantage, the owner is unable to make reasonable use of the affected property*. The subject property currently does not have an enclosed parking area and it would not be reasonably possible to construct a garage on the property without the requested variance. Reasonable use could be made of the subject property with conforming outdoor parking in the interior side yard on the north side of the property, but, to build a garage, a variance would be required to overcome the unique size and dimensions of the subject property.

3. *The disadvantage does not exist because of conditions created by the owner or previous owners of the property.* The existing lot was not created by the owners of the property and is a nonconforming lot of record. The lot's shape (which becomes progressively narrower from front to rear) and the presence of a canal in much of the rear year encumbers the applicant's ability to construct a garage in a location that conforms to the R-1 district's site development regulations.

4. *Granting the variance will not confer on the applicant any special privileges that are denied by this ordinance to other properties or structures in the same district.* Granting the requested setback variance does not constitute a special privilege, as the variance is necessary to overcome the limitations of the lot's shape and physical features. The applicant could build a hard surface outdoor parking area in the side yard on the north side of the house, but detached garages within the normally required front yard setback are common within the Lakewood Villas subdivision. Without the requested variance, the applicant is denied the ability to build a garage similar to those on many nearby properties.

5. *Granting the variance will not be contrary to the public interest, will not adversely affect other property in the vicinity, and will be in harmony with the purpose and intent of this ordinance.* The variance process is to provide a narrowly circumscribed means by which relief may be granted from unforeseen applications of this ordinance that create particular hardships. Granting the requested variance to construct the proposed detached garage will not be contrary to the public interest and will not adversely impact surrounding properties.

RECOMMENDATION

The Community Development Department recommends **approval** of a variance from Section 15.08B.050, *Site Development Regulations*, of the Municipal Code (Zoning Ordinance) to allow an accessory structure to be located in front of the principal structure on the subject property, with a front setback of 12 feet, as opposed to the requirement that accessory structures be setback the greater of 25 feet or the existing front setback line of the principal structure on property legally described as Lot 8, Lakewood Villas, City of Council Bluffs, Pottawattamie County, Iowa, based on the reasons stated above.

Christopher Gibbons, AICP
Planning Manager

Brandon Siracuse
Planner

Attachment A

CITY OF COUNCIL BLUFFS - ZONING BOARD OF ADJUSTMENT
CASE #BA-22-005 LOCATION/ZONING MAP

Subject Property Case #BA-22-005

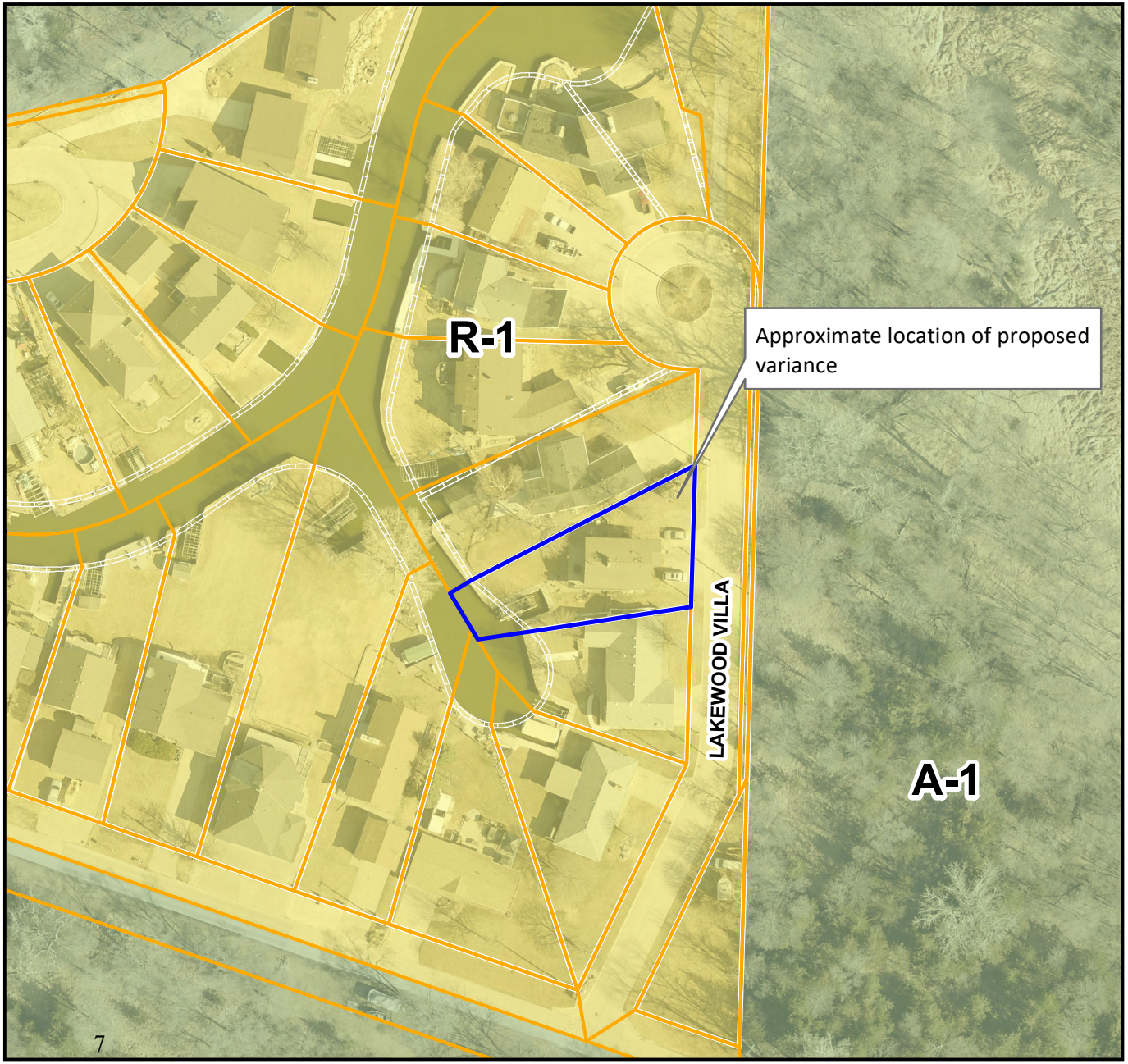
Parcels

0 50 100

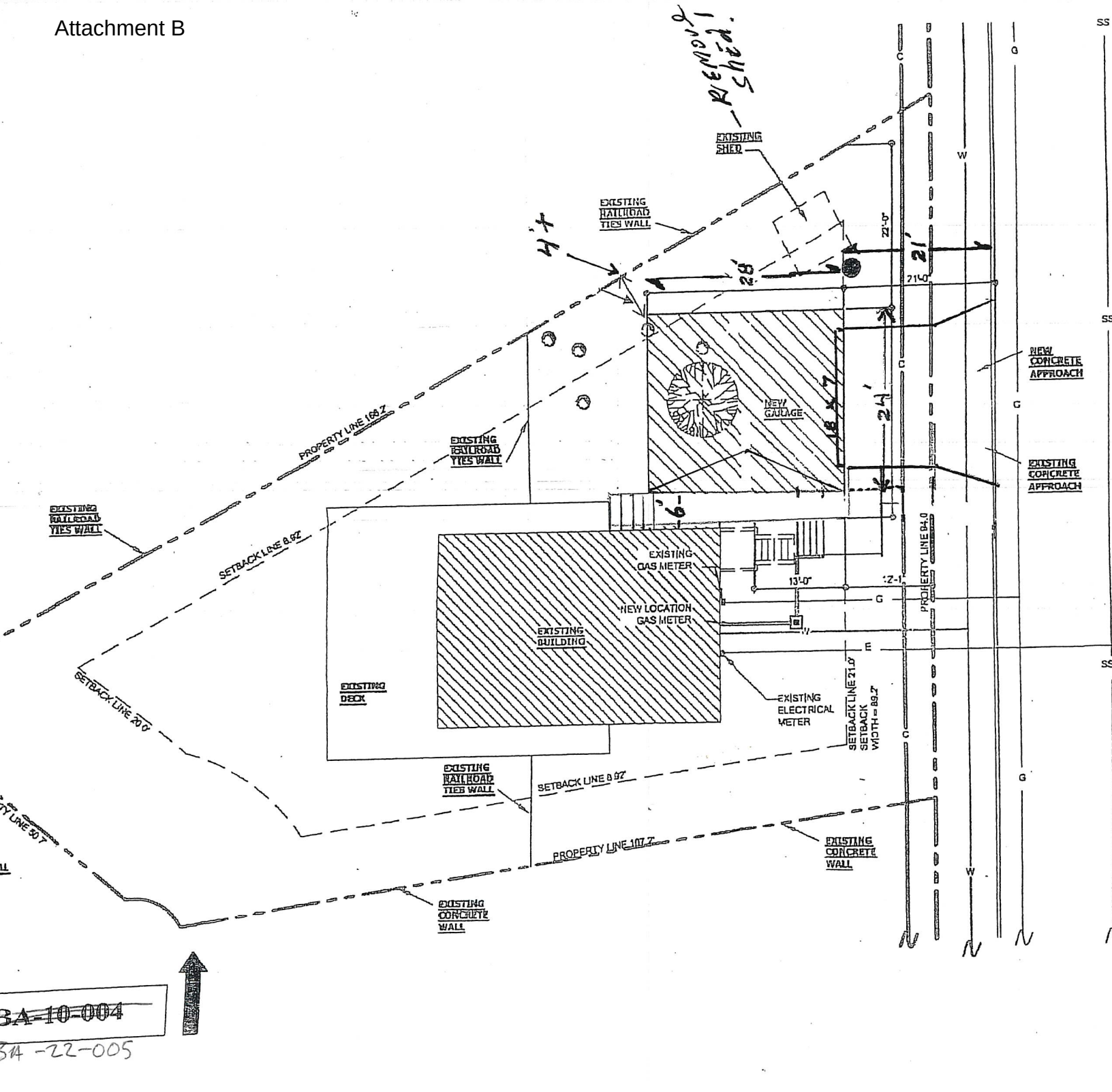
1 Inch = 104 Feet

Last Amended: 10/10/2022

Council Bluffs Community Development Department
209 Pearl Street
Council Bluffs, IA 51503
Telephone: (712) 890-5350



Attachment B



Zoning Board of Adjustment Communication

Department: Community Development
Case/Project No.: CU-22-004 CASE #CU-22-004 Council Action: 11/15/2022
Submitted by: Moises Monrroy, Planner

Description

Continued public hearing on the request of Heartland Co-Op, represented by David Hoylman from ABP Engineering, for a conditional use permit to allow the expansion of a 'grain storage and distribution' facility in an I-2 District on property legally described as being part of the South 1/2 of Section 4-74-44, lying east of the Missouri River and west of River Road. Location: 2401 South 37th Street

Background/Discussion

See attached staff report.

Recommendation

ATTACHMENTS:

Description	Type	Upload Date
Staff Report & Attachments	Other	11/10/2022

TO:	Zoning Board of Adjustment
FROM:	Community Development Department
DATE:	~~October 18, 2022~~ November 15, 2022
RE:	**CASE #CU-22-004**
REQUEST:	Public hearing on the request of Heartland Co-op, represented by David Hoylman from ABP Engineering, for a conditional use permit to allow the expansion of a 'grain storage and distribution' facility in an I-2/General Industrial District on property legally described as being part of the South ½ of Section 4-74-44, lying east of the Missouri River and west of River Road.
APPLICABLE CODE SECTIONS:	**Section 15.02.020 Zoning Board of Adjustment** The Zoning Board of Adjustment shall have the following powers, pursuant to this ordinance: B. To make final decisions on applications for conditional uses. **Section 15.21.030 Conditional Uses in the I-2/General Industrial District** E. Grain storage and distribution
LEGAL DESCRIPTION:	Part of the South ½ of Section 4-74-44, lying east of the Missouri River and west of River Road.
LOCATION:	2401 South 37th Street, Council Bluffs, IA 51501
APPLICANT/OWNER:	Heartland Co-op, 2829 Westown Parkway, Suite 350, West Des Moines, IA 50266
REPRESENTED BY:	David Hoylman, ABP Engineering, 440 Regency Parkway Drive, Suite 200, Omaha, NE 68114

BACKGROUND INFORMATION – The Community Development Department has received a request from Heartland Co-op, represented by David Hoylman from ABP Engineering, for a conditional use permit to allow the expansion of a 'grain storage and distribution' facility in an I-2 District on property legally described as being part of the South ½ of Section 4-74-44, lying east of the Missouri River and west of River Road. The purpose of this request is as follows:

1. Bring the subject property into conformance with Title 15: Zoning of the Municipal Code as 'grain storage and distribution' is only allowed in an I-2 District with a conditional use permit.
2. Allow the existing plant site to expand by adding new grain silos, two grain hoop buildings, conveyor equipment, internal roadways for vehicle circulation, and restoration of the capability of loading out grain to barges on the Missouri River; and
3. Adopt a site-specific development plan which will establish standards relative to building heights/setbacks, off-street parking/traffic circulation, lot coverage, stormwater management, signage, etc. for the overall plant operation.

As per the applicant's letter of intent (see Attachment 'C'), the proposed expansion of the existing 'grain storage and distribution' use will be completed in three phases:

Phase 1: Construction of the new grain silos and associated traffic circulation routes/receiving lanes is anticipated to begin in late 2022 and to be completed in late 2023.
Phase 2: Construction of the conveyor system and support loading tower on the Missouri River is anticipated to begin in two to four years.
Phase 3: Construction of the two hoop buildings and associated traffic circulation routes/receiving lanes is anticipated to begin in two to four years.

The following attachments have been included for your reference:

Attachment A: Location/Zoning Map
Attachment B: Letter of Authorization
Attachment C: Letter of Intent
Attachment D: Site Plan
Attachment E: Building Drawings
Attachment F: Barge Loadout Drawing Set
Attachment G: IPL Preliminary Technical Memorandum Response
Attachment H: Geotechnical Reports
Attachment I: Drainage Study
Attachment J: Operations Plan
Attachment K: IPL Tech Rech Review Response – Preliminary Technical Memorandum
Attachment L: IPL Tech Review Response – Drawing Set
Attachment M: IPL Tech Review Response – Emergency Action Plan
Attachment N: Ameristar Casino & Hotel Letter of Opposition

On October 18, 2022, the Council Bluffs Zoning Board of Adjustment voted to continue the public hearing for the applicant's conditional use permit. The Board requested the applicant research and provide information on the following items:

1. Traffic study that takes into consideration full build-out of the plant site and the associated traffic demands (e.g. trucks and rail);
2. Clarification on the hours of operation for the plant
3. Data on how long it takes to load/unload the trucks, and how/where the trucks will be que'd onsite so that it does not disrupt traffic flow along River Road.
4. Data on rail traffic to service the plant site (e.g., # of rail cars and the frequency/timing of when those railcars will visit the site)
5. How noise and dust levels be handled at their plant site.

The applicant has since prepared a memorandum (see Attachment O) that responds the above items. Additionally, the applicant, adjacent property owners (Ameristar, OPUS, and Warren Distribution), and the City have held conversations about installing an additional traffic lane on a portion of Nebraska Avenue to help alleviate traffic concerns for patrons visiting Ameristar Casino. No formal agreement or commitment from any party has been made on building a new turn lane on Nebraska Avenue. Ameristar Casino has stated they will only drop their objection to Heartland's conditional use permit request if there are improvements made to Nebraska Avenue which address traffic concerns to their property.

CURRENT ZONING AND LAND USE – The subject property is zoned I-2/General Industrial District. Surrounding properties to the north, south and east are also zoned I-2 District. The Missouri River is located directly to the west of the subject property.

Existing land uses in the general vicinity include Ameristar Casino to the north, which is zoned P-C/Planned Commercial District, Warren Distribution to the south, and vacant land owned by Opus to the east. The future land use map of the Bluffs Tomorrow: 2030 Comprehensive Plan designates the subject property as 'Light Industrial.'

NEIGHBORHOOD RESPONSE – All property owners within 200 feet were notified of the conditional use permit request. The Community Development Department has received the following comment:

- Paul Czak, general manager of Ameristar Casino & Hotel (2200 River Road), submitted a letter expressing Ameristar's opposition to the request (see Attachment 'N'). Mr. Czak stated that the addition of new silos, buildings, equipment, barges and internal roadways would hinder the casino's ability to compete with other casinos in the area. Mr. Czak also stated that the proposed expansion of the existing 'grain storage and distribution' operation would have an adverse impact on their customers due to the potential increase in traffic and noise.

CITY DEPARTMENTS AND UTILITIES – All City departments and local utility providers were notified of the proposed conditional use permit request. The following comments were received:

- The Community Development Department had the following comments:
  1. The existing 'grain storage and distribution' facility is a legal nonconforming use. At the time the facility began operation, the subject property was zoned GM/General Manufacturing District, which allowed 'grain storage and distribution' as a principal use. When the subject property was rezoned to the I-2/General Industrial District, the existing operation became a legal nonconforming use as 'grain storage and distribution' is a conditional use in the I-2 District. Since the applicant is proposing to expand the existing operation, a conditional use permit is required in order to bring the subject property into conformance with Title 15: Zoning of the Council Bluffs Municipal Code.
  2. The Bluffs Tomorrow: 2030 Comprehensive Plan designates the property as 'Light Industrial.' The plan defines 'Light Industrial' as areas "*used for industrial purposes that create minimal impacts on surrounding uses.*" Light industrial activities "*tend to occur inside structures, with outdoor areas limited to storage or distribution.*" The existing 'grain storage and distribution' use is generally consistent with the 'Light Industrial' designation.
  3. The minimum lot area for property zoned I-2/General Industrial District is 15,000 square feet. The subject property contains 32.1 acres of land, which exceeds minimum lot size requirements in the I-2 District.
     a. The boundary of the subject property shown on the submitted site plan in Attachment 'D' does not coincide with the property boundary shown on the Pottawattamie County online GIS map. The applicant shall confirm the location of all property lines and submit a revised site plan or a survey at the time of building permit application that includes the correct course bearing distances for the subject property.
  4. All proposed structures will comply with minimum I-2 District setback requirements, as per the submitted site plan in Attachment 'D'.
  5. No more than 70% of the total area of the subject property will be covered with structures, as per the submitted site plan in Attachment 'D'.
  6. The applicant is proposing to construct multiple structures that exceed the maximum height allowed in the I-2 District. All construction that occurs on the subject property shall be subject to the following building height requirements:

a. On August 25, 2005, the Zoning Board of Adjustment approved a variance at this site to allow the construction of multiple structures that exceeded the maximum height allowed in the I-2 District intended to support a ground storage pile (see Case #BA-05-006). Existing structures that exceeded the maximum height allowed in the I-2 District were brought into conformance as part of this variance. The Board approved another variance on June 11, 2014 to allow a new grain drying system to measure 169 feet 3 inches in height (see Case #BA-14-006). Both variances shall be incorporated into the approval of the proposed conditional use permit.
b. The proposed grain silos and associated conveyor equipment will exceed the maximum height allowed in the I-2 District. Due to the nature of the existing 'grain storage and distribution' use, the applicant's request to exceed the maximum height allowed in the I-2 District is reasonable and necessary for the continued operation of the facility. The building elevations for the proposed grain silos, hoop buildings and associated conveyor equipment shown as in Attachment 'E' are acceptable and shall be approved as part this request.
c. All other structures shall be subject to the maximum building height requirements in Section 15.21.050 of the Council Bluffs Municipal Code (Zoning Ordinance).

7. The submitted site plan in Attachment 'D' shows that an internal roadway for truck circulation and a new employee parking area will be constructed as part of this project. The proposed parking area and internal roadway shall be subject to the following off-street parking requirements:
   a. The minimum number of parking spaces shall be calculated using Schedule A in Section 15.23.060, *Parking Spaces Required*, of the Council Bluffs Municipal Code (Zoning Ordinance). In cases where several uses occupy a structure or parcel of land, the total requirement for off-street parking shall be the sum of the requirement of the different uses.
   b. The proposed employee parking area and internal roadway shall be designed and hard surfaced to City standards. The construction of the proposed employee parking area and internal roadway will be phased in conjunction with the construction of the new grain silos and hoop buildings. The proposed phasing of the project is acceptable.
   c. A parking lot permit for the proposed employee parking area shall be submitted along with the building permit application for Phase 1 of the project.
   d. The new employee parking area shall connect directly onto the proposed internal roadway.
   e. All off-street parking lots shall comply with Chapter 661—18, *Parking for Persons with Disabilities*, of the Iowa Administrative Code.
8. The submitted site plan in Attachment 'D' shows new 30-foot tall light poles will be installed on the subject property as part of this project. All outdoor lighting shall comply with Section 15.24.050, *Lighting Controls*, of the Council Bluffs Municipal Code (Zoning Ordinance). The height of the proposed light poles is acceptable. All light poles shall be painted or finished aluminum or steel. Wood poles shall not be allowed. Cut-off lenses shall incorporated to contain all light onsite and direct it away from the vision of passing motorists, cyclists and pedestrians. The applicant shall submit a photometric plan that shows the amount of lighting that will be generated as part of this project prior to installation.
9. Two signs are proposed to be installed as part of this project: (a) one 10' × 15' sign to be installed at the entrance of the facility, and (b) one illuminated sign to be installed on one of the new grain silos. The exact location of proposed signage on subject property has not been identified in the submitted plans. All signs on the subject property shall be installed in accordance with I-2

District signage standards. A separate permit shall be required for all proposed signage prior to installation.

10. The submitted site plan in Attachment 'D' shows new railroad track lines will be installed as part of this project. The applicant shall coordinate the location of the new track line with the owner of the adjacent railroad. The applicant shall be responsible for establishing any cross access easements necessary for the new track lines.
11. The submitted site plan in Attachment 'D' shows that several propane tanks will be stored on railroad right-of-way. Due to the inconsistency of the property boundary shown in Attachment 'D', at this time it is not certain whether the propane tanks will be located outside the subject property. All outdoor storage of propane tanks shall occur entirely within the subject property. Alternatively, the applicant shall provide proof of an agreement with the railroad that indicates the outdoor storage of propane tanks associated with the 'grain storage and distribution' facility will be allowed on the right-of-way.
12. The submitted site plan in Attachment 'D' shows a new loading tower, conveyor equipment and dolphins will installed on the Missouri River as part of the applicant's proposal to restore the capability of loading out grain to barges. All proposed improvements that impact the IPL levee system and/or the Missouri River shall be reviewed and approved by the U.S. Army Corps of Engineers and the City of Council Bluffs.
13. The applicant shall be responsible for implementing the necessary dust control measures to reduce the amount of dust/debris generated due to the operation of the existing 'grain storage and distribution' facility.
14. When Heartland Co-op purchased the subject property from Cargill Inc., the private septic system was inspected and deemed to have failed. The applicant shall work with the City of Council Bluffs to determine whether to connect into existing sanitary sewer in the vicinity or replace the failed septic system at the time of building permit application.
15. As per the plan of operations in Attachment 'J', the hours of operation shall be from 7:00 am to 4:30 pm. The applicant shall ensure noise generated due to the expansion of the existing 'grain storage and distribution' operation does not exceeds the levels established in Chapter 4.50, *Noise Control*, of the Council Bluffs Municipal Code.

- The Council Bluffs Permits and Inspections Division stated that they approve of the request. They also stated that the subject property appears to be protected by the levee, and noted that the project would still work even if it was not protected.
- The Council Bluffs Fire Department stated that they have no comments on the request.
- The Council Bluffs Public Works Department had the following comments:
  1. Drainage report has been received and reviewed. Stormwater management is identified but not designed as required by City code. Final plan and specifications shall include plans for stormwater management.
  2. Geotechnical report has been received.
  3. Concurrence letter from the IPL membership concerning levee safety review not included.
  4. Pavement for vehicle circulation has been noted.
  5. The U.S. Army Corps of Engineers (USACE) does not require a PL84-89 408 tech review at this location. The USACE is currently conducting a navigational channel review for the new Heartland tower and dolphins. The USACE has also indicated that the State of Iowa and the Chief Building Official of the City of Council Bluffs will need to review the no-rise on the new grain loading tower.
- Council Bluffs Water Works stated that they have no comments on the request. They also stated that the applicant should contact Council Bluffs Water Works if they have any questions about additional water service.

- MidAmerican Energy stated they have no conflicts or concerns with the request provided all minimum required clearances are maintained from existing and planned electric distribution facilities. They also stated that the applicant or their agents should contact MidAmerican Energy directly to discuss the project timeline and identify costs associated with the relocation or construction of electric facilities for the expansion.

COMMENTS - The development and execution of the Ordinance (Title 15) is based upon the division of the City into districts. Within each district the use of land and buildings, and the bulk and location of buildings and structures in relation to the land, are substantially uniform. It is recognized, however, that there are specific uses which, because of their unique characteristics, cannot be properly classified in any particular district or districts without consideration, in each case, of the impact of those uses upon neighboring land and of the public need for the particular use at the particular location. Such uses may be either public or private, and are of such an unusual nature that their operation may give rise to unique problems with respect to their impact upon neighboring property or public facilities. (*§15.02.090(A) – Conditional Uses*)

The Zoning Board of Adjustment shall make findings of fact, based upon the evidence presented at the public hearing, with respect to each of the applicable standards in Section 15.02.090(E), *Findings of Fact*.

The Zoning Board of Adjustment may impose such conditions and restrictions upon the location, construction, design and use of the property benefitted by a conditional use as may be necessary or appropriate to protect the public interest, adjacent property and property values. Failure to maintain such conditions or restrictions as may be imposed shall constitute grounds for revocation of the conditional use. The terms of relief granted, including any conditions or restrictions, shall be specifically set forth in the concluding statement separate from the findings of fact. No conditional use shall be approved unless the Zoning Board of Adjustment makes findings of fact based directly on the standards and conditions imposed by this section. The findings of fact are presented below in *italics*:

1. *The proposed conditional use will comply with all applicable regulations of this Ordinance, including lot requirements, bulk regulations, use limitations, and all other standards or conditions contained in the provisions authorizing such use.* The existing 'grain storage and distribution' facility is a legal nonconforming use that had previously been allowed by right when the subject property was zoned GM/General Manufacturing District. Approval of the proposed conditional use permit would bring the subject property into conformance with Title 15: Zoning of the Council Bluffs Municipal Code. The subject property contains 32.1 acres of land, which exceeds minimum lot size requirements in the I-2 District. Based on the submitted plan in Attachment 'D', all construction that occurs on the subject property will comply with minimum setback/maximum lot coverage requirements in Section 15.21.050 of the Council Bluffs Municipal Code (Zoning Ordinance).

   Existing structures on the subject property that exceed the maximum height allowed in the I-2 District were approved via variances in 2005 and 2014 (see Cases #BA-05-006 and #BA-14-006). Both variances shall be incorporated into the approval of the proposed conditional use permit. The applicant is proposing to construct additional structures that exceed the maximum height allowed in the I-2 District as part of this request. Due to the nature of the existing 'grain storage and distribution' use, the applicant's request to exceed the maximum height allowed in the I-2 District is reasonable and necessary for the continued operation of the facility. The building elevations for the proposed grain silos, hoop buildings and associated conveyor equipment shown as in Attachment 'E' are acceptable and shall be approved as part this request. All other structures shall be subject to the maximum building height requirements in Section 15.21.050 of the Council Bluffs Municipal Code (Zoning Ordinance).

2. *Adequate utility, drainage, and other necessary facilities or improvements have been or will be provided.* The subject property has a failed private septic system. The applicant shall work with the City of Council Bluffs to determine whether to connect into existing sanitary sewer in the vicinity or repair the failed septic system at the time of building permit application. The applicant shall work with the Council Bluffs Public Works Department to ensure all stormwater management is design to City standards. No other utility service extensions and/or infrastructure improvements are necessary for the proposed expansion of the existing 'grain storage and distribution' use on the subject property.

3. *Adequate access roads or entrance and exit drives will be designed and built to prevent traffic hazards and to minimize traffic conflicts and congestion in public streets and alleys.* The subject property has frontage on River Road. Access to the site is provided on South 37th Street. No traffic conflicts or congestion on the adjacent public streets are anticipated to occur. No additional improvements are necessary for the request.

4. *All necessary permits and licenses required for the operation of the conditional use have been obtained, or it clearly states that such permits are obtainable for the proposed conditional use on the subject property.* The applicant shall be required to obtain all necessary permits for the proposed expansion of the existing 'grain storage and distribution' use. The applicant shall comply with all applicable federal, state and local laws and requirements for such use. All proposed improvements that impact the IPL levee system and/or the Missouri River shall be reviewed and approved by the U.S. Army Corps of Engineers and the City of Council Bluffs.

5. *All exterior lighting shall be shaded as necessary to direct the light away from neighboring residential properties.* All outdoor lighting shall comply with Section 15.24.050, *Lighting Controls*, of the Council Bluffs Municipal Code (Zoning Ordinance). The height of the proposed light poles (30'-0") is acceptable. All light poles shall be painted or finished aluminum or steel. Wood poles shall not be allowed. Cut-off lenses shall incorporated to contain all light onsite and direct it away from the vision of passing motorists, cyclists and pedestrians. The applicant shall submit a photometric plan that shows the amount of lighting that will be generated as part of this project prior to installation.

6. *The location and size of the conditional use, the nature and intensity of the activities, to be conducted in connection with it, the size of the site, and the relationship of the site to adjacent roadways shall be considered to assure the use is in harmony with the appropriate and orderly development of the district and the neighborhood in which it is located.* The subject property is an appropriate site for the existing 'grain storage and distribution' use. Existing development to the south is industrial in nature, and it is anticipated land to the east will be developed with industrial uses. As such, it is anticipated the proposed expansion to the existing 'grain storage and distribution' use will have no negative impact on existing or future land uses in the surrounding area. Any traffic generated as part of the proposed expansion will not be incompatible with other industrial uses in the vicinity. The existing use is consistent with the future land use plan of the Bluffs Tomorrow: 2030 Comprehensive Plan.

   As per Attachments 'C' and 'J', the large ground piles of grain on the subject property, which historically have generated dust/debris that affects nearby businesses and vehicles, will be removed and replaced with two hoop buildings. Additionally, the new conveyor equipment will be fully enclosed. As such, it is anticipated that the amount of dust/debris that is generated as part of this operation will be significantly reduced as part of the proposed expansion, which will have a positive impact on the surrounding area. The applicant shall still be responsible for implementing the necessary dust control measures to reduce the amount of dust/debris generated due to the operation of the existing 'grain storage and distribution' facility.

7. *The location, nature and height of buildings, structures, walls, and fences on the site, and the nature and extent of landscaping and screening on the site shall be designed so that the use will not reasonably hinder or discourage the appropriate development, use, and enjoyment of the adjacent land, buildings and structures.* The new grain silos and associated conveyor equipment will exceed the maximum height allowed in the I-2 District. However, multiple existing structures on the subject property already exceed maximum I-2 District height requirements. As such, the proposed expansion project is not anticipated to hinder or discourage development in the surrounding area. The building elevations for the proposed grain silos, hoop buildings and associated conveyor equipment as shown in Attachment 'E' are acceptable and shall be approved as part this request

8. *The proposed conditional use will not cause substantial injury to the value of other property in the neighborhood in which it is located and will contribute to and promote the convenience and welfare of the public.* The proposed expansion of the existing 'grain storage and distribution' use is not anticipated to have a negative impact on property values for existing or future land uses in the surrounding area.

RECOMMENDATION – The Community Development Department recommends approval of the request for a conditional use permit to allow the expansion of a 'grain storage and distribution' facility in an I-2/General Industrial District on property legally described as being part of the South ½ of Section 4-74-44, lying east of the Missouri River and west of River Road, subject to the comments stated above and the following conditions:

1. The applicant shall secure all necessary permits and licenses for the proposed improvements on the subject property and shall comply with all applicable Federal, State and local codes. This shall include all proposed improvements that impact the IPL levee system and/or the Missouri River, which shall be reviewed and approved by the U.S. Army Corps of Engineers and the City of Council Bluffs.
2. The applicant shall work with the City of Council Bluffs to determine whether to connect into existing sanitary sewer in the vicinity or replace the failed septic system at the time of building permit application.
3. The hours of operation shall be Sunday through Saturday 7:00 A.M. to 4:30 P.M.
4. The applicant shall confirm the location of all property lines and submit a revised site plan or a survey at the time of building permit application that includes the correct course bearing distances for the subject property.
5. All construction that occurs on the subject property shall be subject to the minimum setback/maximum lot coverage requirements in Section 15.21.050 of the Council Bluffs Municipal Code (Zoning Ordinance). The site layout in Attachment 'D' is acceptable and shall be approved as part of this request.
6. All construction that occurs on the subject property shall be subject to the following building height requirements:
    a. Existing structures on the subject property that exceed the maximum height allowed in the I-2 District were approved via variances in 2005 and 2014 (see Cases #BA-05-006 and #BA-14-006). Both variances shall be incorporated into the approval of the proposed conditional use permit.
    b. The proposed grain silos and associated conveyor equipment will exceed the maximum height allowed in the I-2 District. The building elevations for the proposed grain silos, hoop buildings and associated conveyor equipment as shown in Attachment 'E' are acceptable and shall be approved as part this request.
    c. All other structures shall be subject to the maximum building height requirements in Section 15.21.050 of the Council Bluffs Municipal Code (Zoning Ordinance).

7. The proposed parking area and internal roadway shall be subject to the following off-street parking requirements:
   a. The minimum number of parking spaces shall be calculated using Schedule A in Section 15.23.060, *Parking Spaces Required*, of the Council Bluffs Municipal Code (Zoning Ordinance). In cases where several uses occupy a structure or parcel of land, the total requirement for off-street parking shall be the sum of the requirement of the different uses.
   b. The proposed employee parking area and internal roadway shall be designed and hard surfaced to City standards. The construction of the proposed employee parking and internal roadway will be phased in conjunction with the construction of the new grain silos and hoop buildings. The proposed phasing of the project is acceptable.
   c. A parking lot permit for the proposed employee parking area shall be submitted along with the building permit application for Phase 1 of the project.
   d. The new employee parking area shall connect directly onto the proposed internal roadway.
   e. All off-street parking lots shall comply with Chapter 661—18, *Parking for Persons with Disabilities*, of the Iowa Administrative Code.
8. All outdoor lighting shall comply with Section 15.24.050, *Lighting Controls*, of the Council Bluffs Municipal Code (Zoning Ordinance). The height of the proposed light poles (30'-0") is acceptable. All light poles shall be painted or finished aluminum or steel. Wood poles shall not be allowed. Cut-off lenses shall incorporated to contain all light onsite and direct it away from the vision of passing motorists, cyclists and pedestrians. The applicant shall submit a photometric plan that shows the amount of lighting that will be generated as part of this project prior to installation.
9. All signs on the subject property shall be installed in accordance with I-2 District signage standards. A separate permit shall be required for all proposed signage prior to installation.
10. The applicant shall be responsible for implementing the necessary dust control measures to reduce the amount of dust/debris generated due to the operation of the existing 'grain storage and distribution' facility.
11. The applicant shall coordinate the location of the new track line with the owner of the adjacent railroad. The applicant shall be responsible for establishing any cross access easements necessary for the new track line.
12. All outdoor storage of propane tanks shall occur entirely within the subject property. Alternatively, the applicant shall provide proof of an agreement with the railroad that indicates the outdoor storage of propane tanks associated with the 'grain storage and distribution' facility will be allowed on the right-of-way.
13. Any modifications to the approved conditional use permit which substantially alters the design, layout, configuration, and/or appearance of the project shall be reviewed and approved by the Zoning Board of Adjustment prior to such changes being made. Minor modifications to the approved conditional use permit that result in a design that is considered compatible with the overall development may be administratively approved by the Community Development Director or their designee.

Christopher N. Gibbons, AICP
Planning Manager
Community Development Department

Moises Monrroy
Planner
Community Development Department

Attachment 'A'

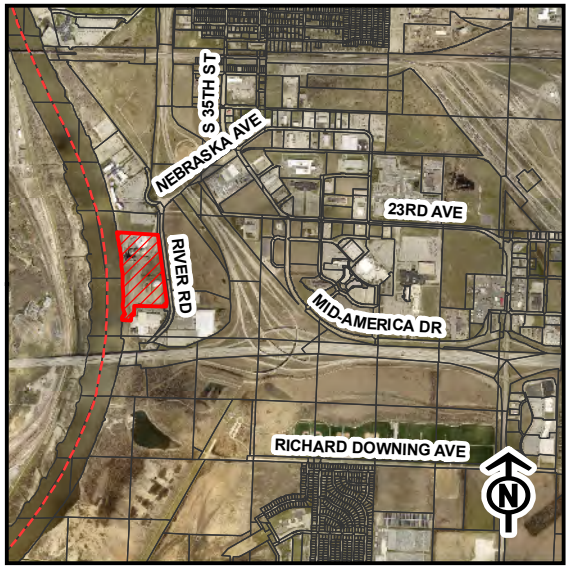
CITY OF COUNCIL BLUFFS - ZONING BOARD OF ADJUSTMENT
CASE #CU-22-004 LOCATION/ZONING MAP

Legend

Subject Property

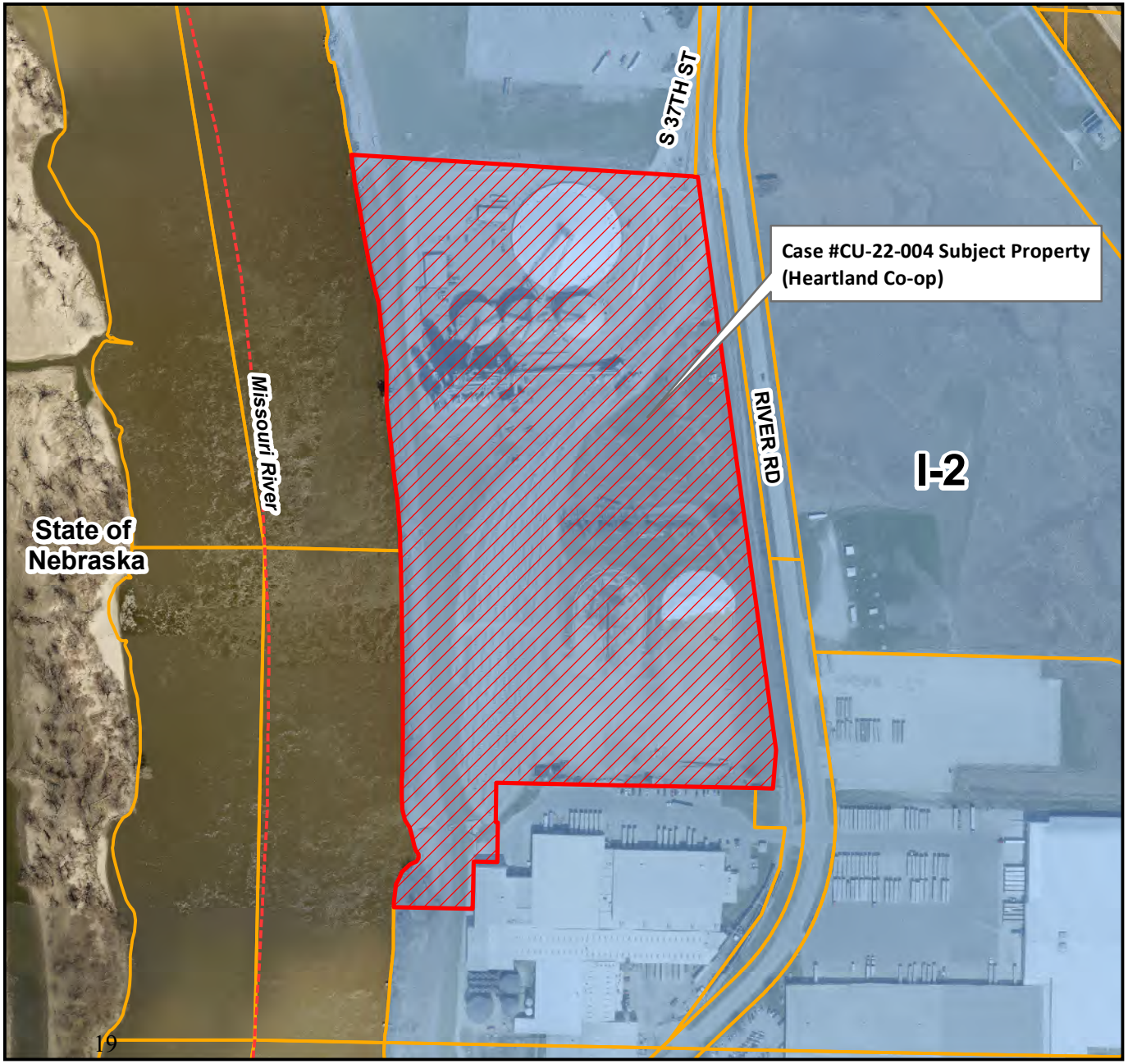
0 200 400

1 Inch = 400 Feet



Last Amended: 10/11/2022

Council Bluffs Community
Development Department
209 Pearl Street
Council Bluffs, IA 51503
Telephone: (712) 890-5350



Attachment 'B'

David Hoylman

From: Jeff Allen <jeff@mwmindustrial.com>
Sent: Monday, September 19, 2022 1:03 PM
To: Beth Barrineau; David Hoylman
Subject: FW: Council Bluffs Conditional Use Permit

Jeff Allen
MWM INDUSTRIAL
Office: 712-644-2711
Cell: 712-216-0537

From: Tom Hauschel <THauschel@heartlandcoop.com>
Sent: Monday, September 19, 2022 12:04 PM
To: Jeff Allen <jeff@mwmindustrial.com>
Subject: Council Bluffs Conditional Use Permit

Council Bluffs Zoning Board,

Heartland Co-op is granting Midwest Mechanical Industrial and ABP Engineering authority to apply for a conditional use permit on behalf of
Heartland Co-op for our property located at 1953 River Road, Council Bluffs, Iowa.

MWM Industrial and ABP Engineering will provide the necessary documents for review of the project.

HEARTLAND CO-OP
Tom Hauschel| CEO & General Manager
P: 515-974-4359 | C: 515-238-4787 | E: thauschel@heartlandcoop.com
"Helping farmers produce and market profitably"

September 20, 2022

Mr. Christopher Gibbons
Planning Manager
Community Development Department
City of Council Bluffs

Mr. Mark Augustine, P.E.
Civil Engineer II
Public Works Department
City of Council Bluffs

Subject: Heartland Coop Conditional Use Permit
ABP Project 22090

Dear Messrs. Gibbons and Augustine,

As you know, Heartland Coop (Heartland) plans improvements to its site in Council Bluffs that require an approved Conditional Use Permit (CUP). ABP Engineering (ABP) is pleased to submit this application for a CUP on behalf of Heartland. We believe that this Letter of Intent and other attachments fulfil requirements of the application form and comply with guidance offered by Community Development and Public Works over the past several months. ABP requests consideration of the application at the October 18 meeting of the Zoning Board of Adjustment (ZBA).

The goals of the improvements are to eliminate large ground piles of grain that collect during harvest each year and to restore the capability of loading out grain to barges on the Missouri River. The improvements are generally grouped into two projects, namely Receiving and Storage and Barge Loadout. The scopes of the projects are as follows:

Receiving and Storage

The scope of the receiving and storage project is as follows:

1. Replace a circular ground pile bunker at the north end of the property with slip-formed silos. Heartland intends eight Ø 80’ x 240’-9” silos and two Ø 40’ x 240’-9” silos.

2. Replace each of two oblong temporary ground piles at the south end of the property with a hoop building measuring approximately 528’ x 180’.

3. Construct two receiving lanes with sunken dump pits and associated conveyor equipment to feed the silos.

4. Construct a receiving lane with sunken dump pit and associated conveyor equipment to feed the hoop buildings.

5. Install a new truck scale adjacent to the silos for weigh-out of trucks using the silo receiving lanes. Existing scales will be used for silo weigh-in and for hoop building weigh-in and weigh-out.

6. Construct concrete roadways to accommodate circulation of trucks through the receiving lanes.

7. Construct a concrete parking lot adjacent to the administration building.

8. Install elevated conveyors to carry grain from the silos and hoop buildings to an existing grain leg.

Minimal dust collection improvements will be required due the utilization of fully enclosed conveyors.

Barge Loadout

The scope of the Barge Loadout project is as follows:

1. Add side draw openings, slide gates, and spouting to three existing grain bins facing the Missouri River.

2. Install conveyor and supports to collect grain from the junction of the bin spouts and convey it to the barge loader.

3. Erect a purpose-built loading tower to support the conveyor head section, loading spout, and control/grading room. An adjacent existing tower will remain for equipment storage. Heartland may also opt to refurbish the existing tower in lieu of the new tower.

As with the Receiving and Storage project, all conveyors will be fully enclosed, obviating the need for significant dust collection measures.

Phasing

Tentative phasing of the projects is as follows:

1. Phase 1 – Silos and associated receiving lanes and roadways. Work is anticipated to begin in late 2022 and to be complete in late 2023.

2. Phase 2 – Barge Loadout. Work is anticipated to begin in two to four years.

3. Phase 3 – Hoop buildings and associated receiving lanes and roadways. Work is anticipated to begin in two to four years.

Ancillary Improvements

It is ABP's understanding that Council Bluffs authorities expect the following improvements:

1. Add features to improve runoff quality and control. These will control runoff to the pre-developed five-year runoff rate and will retain the 100-year, 24-hour event with the flood gates closed. Further, the first 1.25” of rainfall will be retained for 24 hours, and total suspended solids (TSS) will be reduced by 80%.

2. Replace an existing, failed septic system. The design of the new system will depend on location of city mains and whether a lift station will be required.

Structures planned in connection with the above-described projects will cover approximately 17% of the area bounded by the site property lines.

Heartland is eager to proceed with the projects, and therefore requests your prompt attention to the application materials. ABP understands that a pre-application meeting will be scheduled leading up to the October 18 ZBA meeting, and we look forward to servicing any requests for information in preparation for, and in follow up to, that discussion.

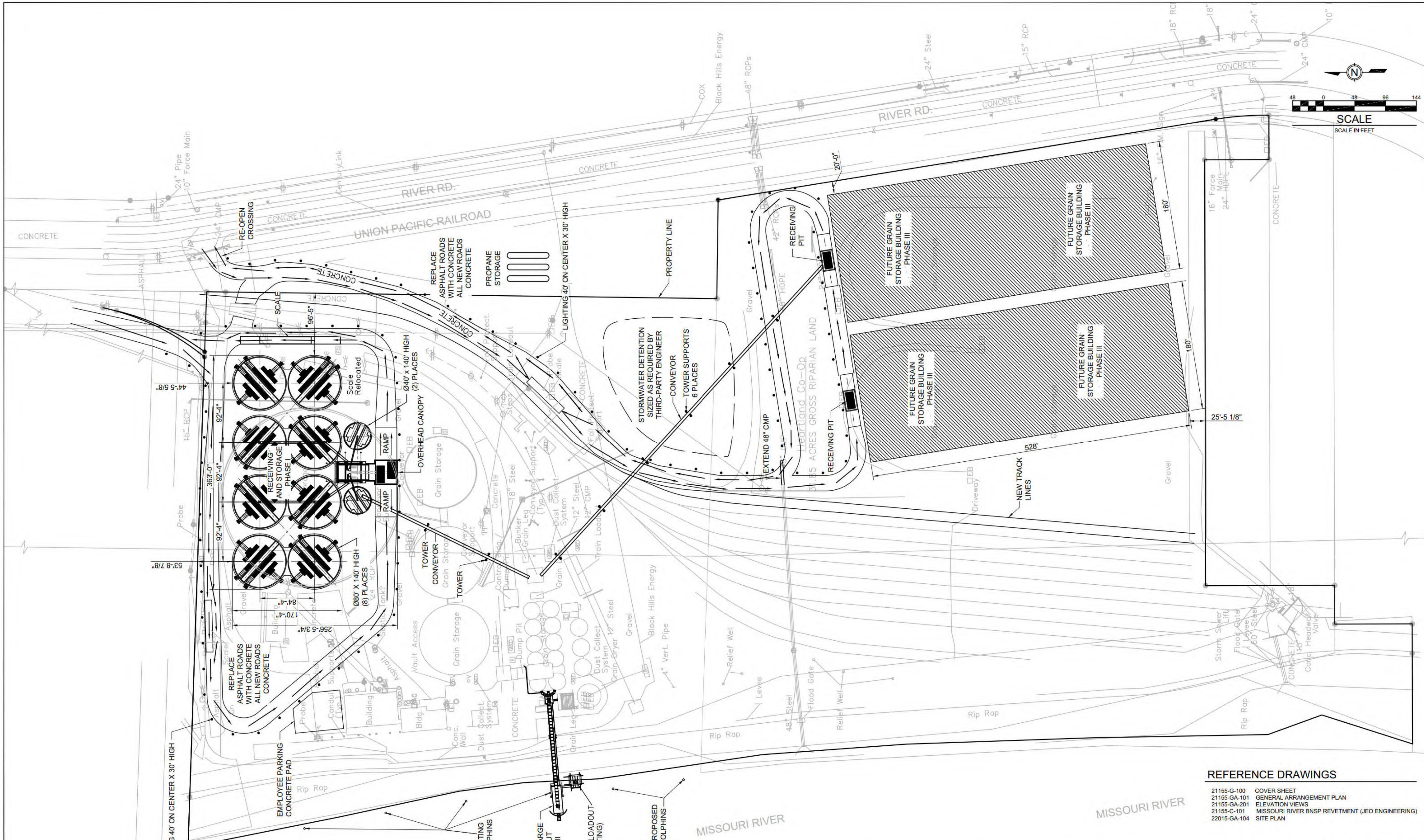
I appreciate your attention.

Sincerely,

David Hoylman

David Hoylman, M.S., P.E.
Senior Design Engineer, Mechanical

Attachment 'D'



REFERENCE DRAWINGS

21155-G-100	COVER SHEET
21155-GA-101	GENERAL ARRANGEMENT PLAN
21155-GA-201	ELEVATION VIEWS
21155-C-101	MISSOURI RIVER BNSP REVETMENT (JEO ENGINEERING)
22015-GA-104	SITE PLAN

ISSUED FOR REVIEW
NOT FOR CONSTRUCTION

ABP ENGINEERING

△	REVISION DESCRIPTION	BY:	CHK'D:	DATE:
A	ISSUED FOR PERMITTING REVIEW	KJC	DH	02/09/2022
B	ISSUED FOR REVIEW, UPDATED	KJC	DH	09/16/2022
C	ISSUED FOR REVIEW, UPDATED	KJC	DH	09/20/2022

CLIENT JOB NO.: 22015
DRAWING DATE: 02/08/2022
DRAFTER: K. CIECIOR
PROJECT DESIGNER: K. CIECIOR
PROJECT ENGINEER: R. PLACKE
SCALE: 1/64" = 1'-0"

HEARTLAND CO-OP

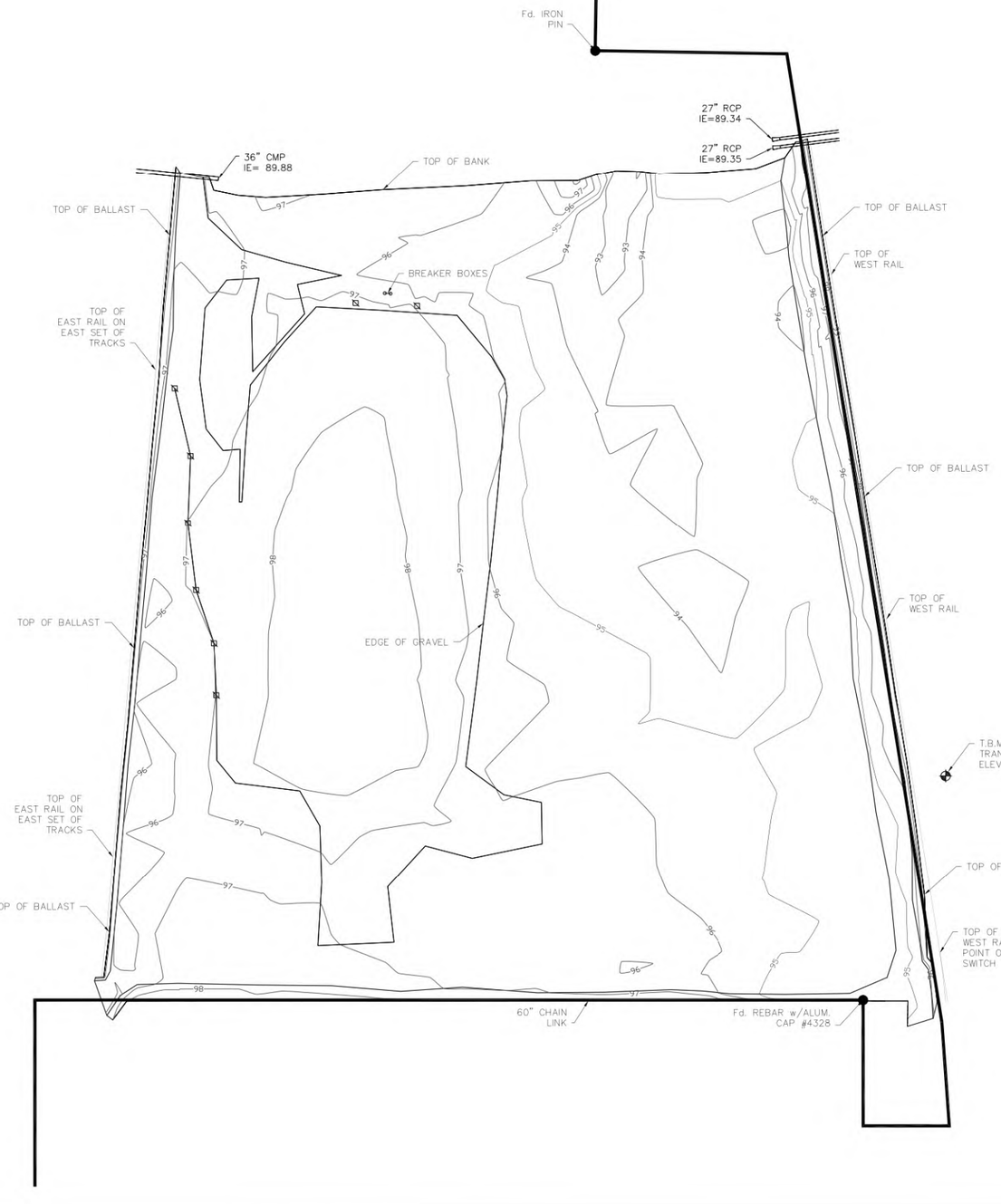
COUNCIL BLUFFS, IOWA

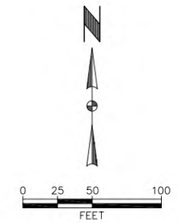
RECEIVING AND STORAGE

SITE PLAN

DEPARTMENT: N/A
DRAWING NUMBER: 22015-GA-104
REV: C

kciecior 9/20/2022 2:13:51 PM Z:\Projects\Job #s\2022\22015 MWM Heartland COOP CB Receiving and Storage\CAD Files\Drawings\22015-GA-104.dwg





LEGEND

- Fd. PROPERTY CORNER AS NOTED IN DRAWING
- BENCHMARK
- DRYER FAN

hgm ASSOCIATES INC.
640 FIFTH AVENUE COUNCIL BLUFFS, IOWA
PHONE: (712) 323-0530

DEF drawn
DEF designed
MGS approved
MAY '06 date
revision date

project TOPOGRAPHICAL SURVEY
client CARGILL AgHORIZONS
2401 S. 37th STREET, COUNCIL BLUFFS, IA 51501-6112
sheet

project no. 10676
sheet 1 OF 1

I hereby certify that this land surveying document was prepared and the related survey work was performed by me or under my direct personal supervision and that I am a duly licensed Land Surveyor under the laws of the State of Iowa.

LICENSED LAND SURVEYOR MELVIN G. SAMPLES 10569 IOWA

MELVIN G. SAMPLES DATE

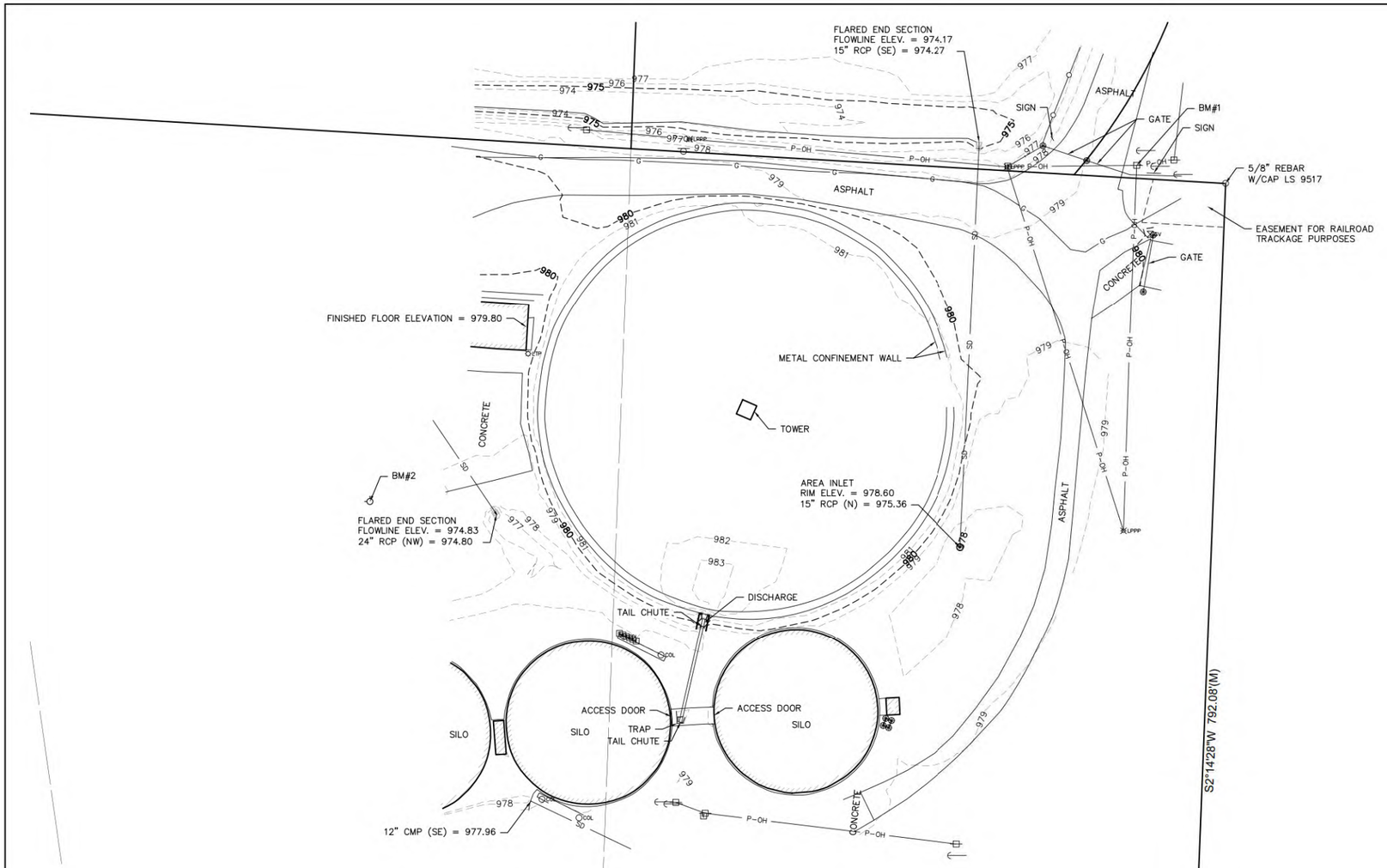
License Number 10569
My license renewal date is December 31, 2006.

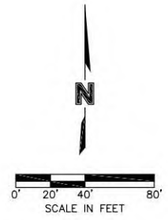
Pages or sheets covered by this seal:
SHEET 1 OF 1

REDUCED TO HALF SCALE

fb: hgm: 10676 SRV8\SURVEY\DRAFTING\10676_CARGILL_TOPO\DWG\10676_TOPO.DWG

CARGILL PLANT
PARTIAL TOPOGRAPHIC SURVEY





LEGEND

- BOUNDARY LINE
- PROPERTY LINE
- EASEMENT LINE
- C — UNDERGROUND GAS LINE
- P-OH — OVERHEAD POWER LINE
- SD — STORM SEWER LINE
- CHAIN LINK FENCE
- X — BARB WIRE FENCE
- (M) MEASURED DISTANCE
- (P) PLATTED DISTANCE
- SET REBAR W/ CAP LS NO.607 (UNLESS NOTED OTHERWISE)
- FOUND 5/8" REBAR (UNLESS NOTED OTHERWISE)
- FOUND CHISELED 'X'
- BOLLARD
- COLUMN
- ELECTRIC BOX
- GUY WIRE
- GAS VALVE
- LIGHT POLE
- POWER POLE W/ LIGHT
- POWER POLE
- STORM DRAIN MANHOLE
- SIGN
- TELEPHONE RISER
- VENT PIPE
- BUILDING ENVELOPE

BENCHMARKS

BENCHMARK NO. 1
HEAD OF RAILROAD SPIKE IN SOUTHWEST FACE OF POWER POLE. FIRST POWER POLE EAST OF THE MAIN ENTRANCE TO THE CARGILL PLANT. EL=983.34'

BENCHMARK NO. 2
TAIL OF ARROW ON A HYDRANT EAST OF THE NORTHEAST CORNER OF THE MAIN OFFICE BUILDING. EL=985.17'

OLSSON ASSOCIATES
7111 South 67th Street, Suite 200
Omaha, NE 68128
TEL 402.341.1116
FAX 402.341.5895
www.olssonassociates.com

REVISIONS

REV. NO.	DATE	REVISIONS DESCRIPTION

PARTIAL TOPOGRAPHIC SURVEY
CARGILL PLANT
COUNCIL BLUFFS, IOWA
2015

drawn by:	DSH
checked by:	EDF
approved by:	TLR
QA/QC by:	EDF/TLR
project no.:	015 2846
drawing no.:	
date:	11.05.15

SHEET 1 of 1

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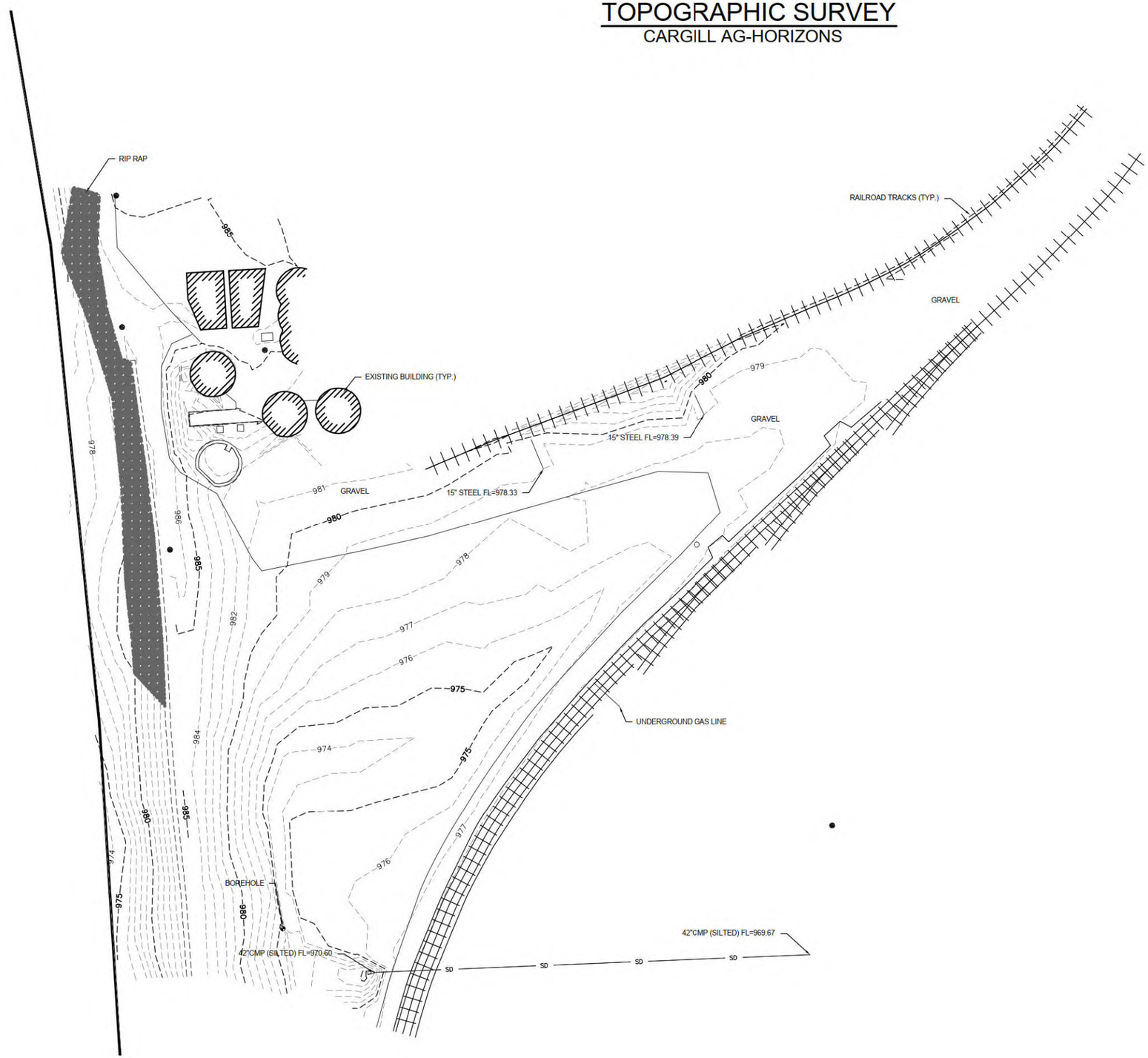
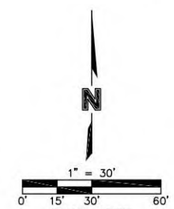
DATE: Nov 06, 2015 7:25am XREFS: 52846_SRVY_BNDY

TOPOGRAPHIC SURVEY
CARGILL AG-HORIZONS





NOTE:

THE UNDERGROUND UTILITIES SHOWN HAVE BEEN LOCATED FROM FIELD SURVEY INFORMATION AND EXISTING DRAWINGS. THE SURVEYOR MAKES NO GUARANTEES THAT THE UTILITIES SHOWN COMPRISE ALL SUCH UTILITIES IN THE AREA, EITHER IN-SERVICE OR ABANDONED. THE SURVEYOR FURTHER DOES NOT WARRANT THAT THE UTILITIES SHOWN ARE IN THE EXACT LOCATION INDICATED, ALTHOUGH THE SURVEYOR DOES CERTIFY THAT THEY ARE LOCATED AS ACCURATELY AS POSSIBLE FROM INFORMATION AVAILABLE. THE SURVEYOR HAS NOT PHYSICALLY LOCATED THE UNDERGROUND UTILITIES. THIS INCLUDES PRIVATE AND PUBLIC UTILITIES.

OLSSON ASSOCIATES®
2111 South 67th Street, Suite 200
Omaha, NE 68106
TEL 402.341.1116
FAX 402.341.5895
www.olssonassociates.com

REVISIONS

REV. NO.	DATE	REVISIONS DESCRIPTION

TOPOGRAPHIC SURVEY

CARGILL AG-HORIZONS

COUNCIL BLUFFS, IA

2014

drawn by:	EDF
checked by:	TLR
approved by:	TLR
QA/QC by:	TLR/EDF
project no.:	141153
drawing no.:	
date:	05.08.14

SHEET 1 of 1

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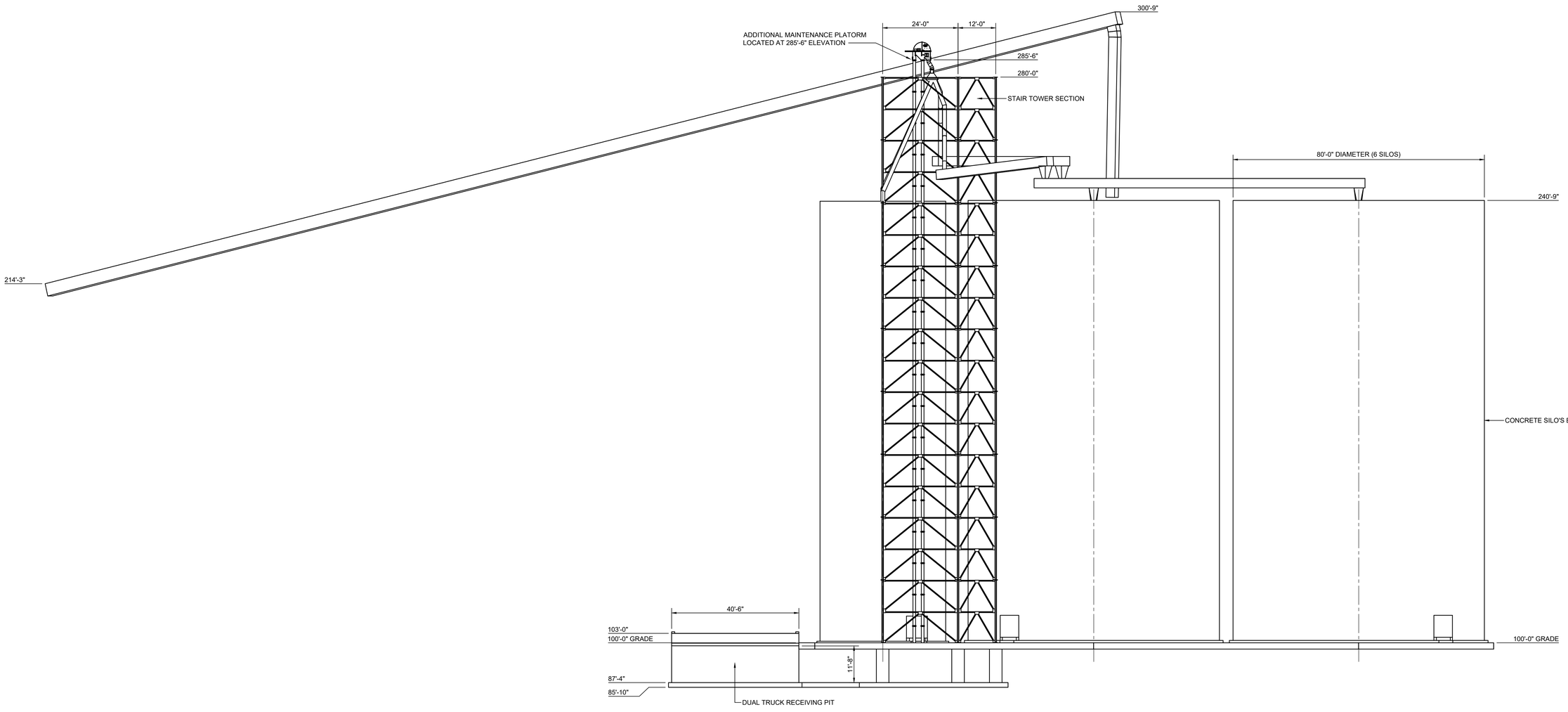
DATE: May 13, 2014 9:57am XREFS:

Attachment 'E'

16 0 8 16 24 32

SCALE

SCALE IN FEET



ELEVATION

GRAIN HANDLING AND STORAGE
LOOKING WEST

△	REVISION DESCRIPTION	BY:	CHK'D:	DATE:
A	ISSUED FOR PERMITTING REVIEW	KJC	RP	01/20/2022

CLIENT JOB NO.: 22015
DRAWING DATE: 01/12/2022
DRAFTER: K. CIECIOR
PROJECT DESIGNER: K. CIECIOR
PROJECT ENGINEER: R. PLACKE
SCALE: 1/16" = 1'-0"

HEARTLAND CO-OP

COUNCIL BLUFFS, IOWA

RECEIVING AND STORAGE

LOOKING WEST
SITE PLAN

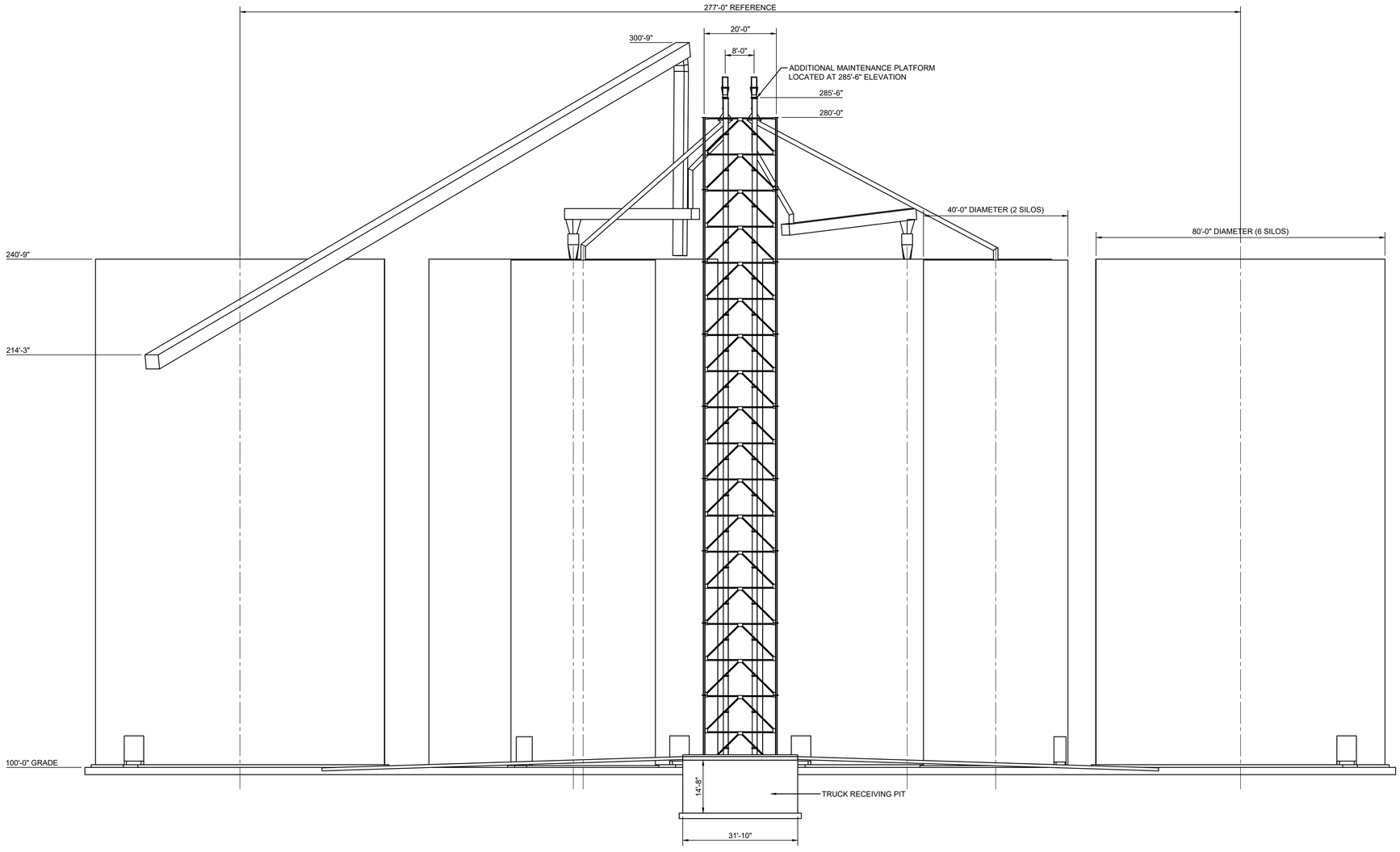
DEPARTMENT: N/A
DRAWING NUMBER: 22015-GA-201
REV: A

ABP ENGINEERING

16 0 8 16 24 32

SCALE

SCALE IN FEET



ELEVATION

GRAIN HANDLING AND STORAGE
LOOKING NORTH

△	REVISION DESCRIPTION	BY:	CHK'D:	DATE:
A	ISSUED FOR PERMITTING REVIEW	KJC	RP	01/20/2022

CLIENT JOB NO.: 22015
DRAWING DATE: 01/12/2022
DRAFTER: K. CIECIOR
PROJECT DESIGNER: K. CIECIOR
PROJECT ENGINEER: R. PLACKE
SCALE: 1/16" - 1'-0"

HEARTLAND CO-OP

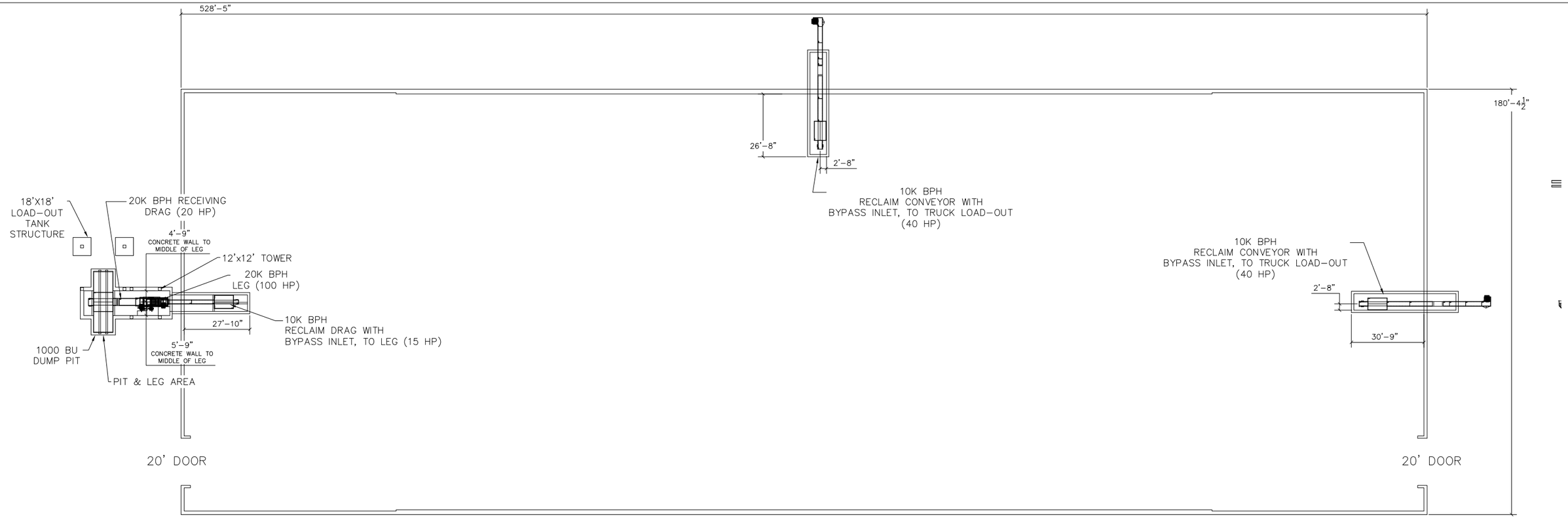
COUNCIL BLUFFS, IOWA

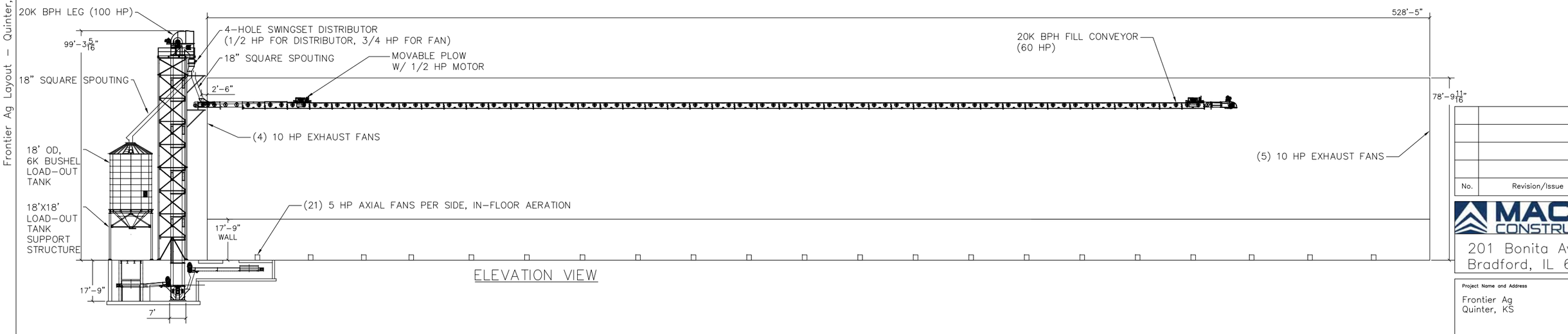
RECEIVING AND STORAGE

LOOKING WEST
SITE PLAN

DEPARTMENT: N/A
DRAWING NUMBER: 22015-GA-202
REV: A

ABP ENGINEERING





No.	Revision/Issue	Date

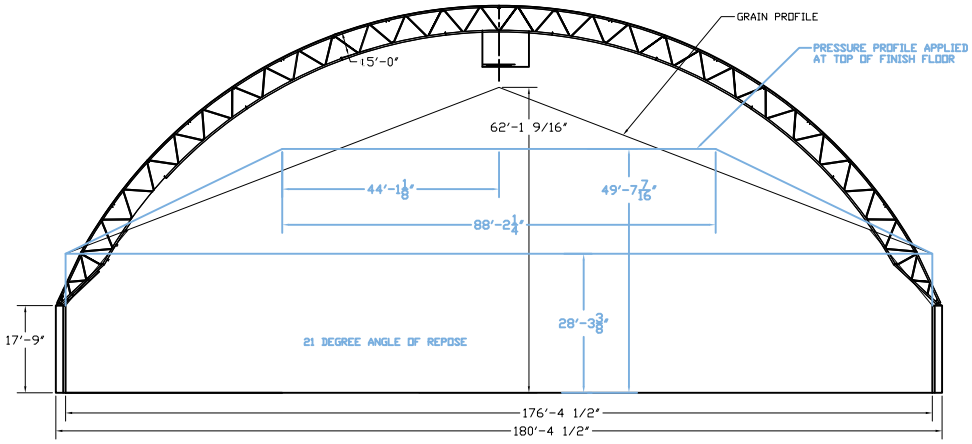
MACON CONSTRUCTION
201 Bonita Avenue
Bradford, IL 61421

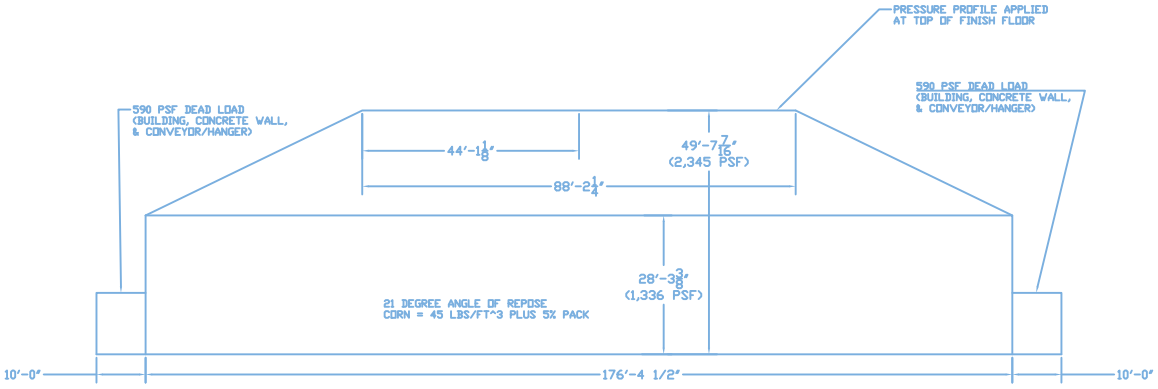
Project Name and Address
Frontier Ag
Quinter, KS

Plan & Elevation Layout

Project	Sheet
Date 3/4/2021	00
Scale	

Frontier Ag Layout – Quinter, KS.dwg


GRAIN PROFILE
PRESSURE PROFILE APPLIED AT TOP OF FINISH FLOOR
15'-0"
62'-1 9/16"
44'-1 1/8"
49'-7 7/16"
88'-2 1/4"
28'-3 3/8"
17'-9"
21 DEGREE ANGLE OF REPOSE
176'-4 1/2"
180'-4 1/2"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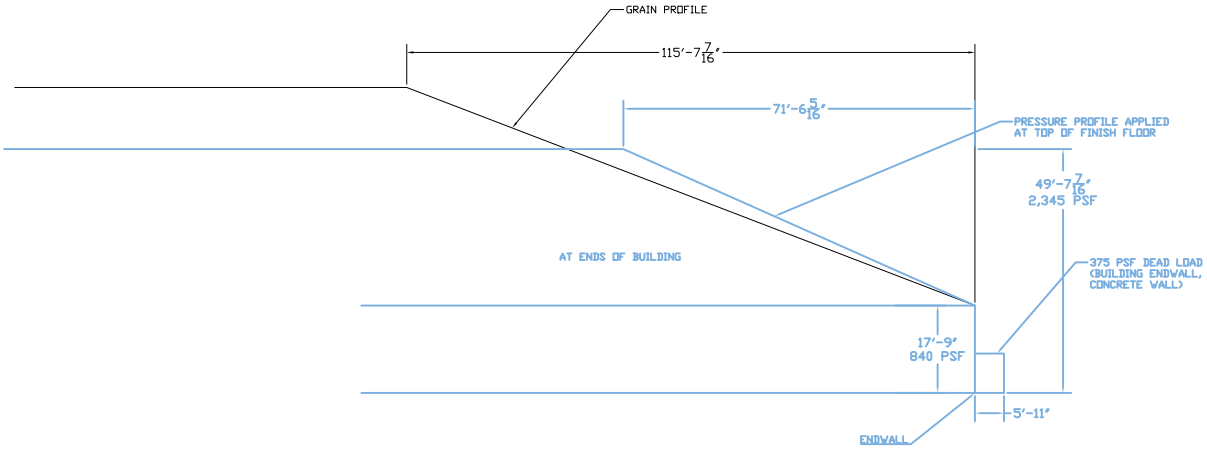
590 PSF DEAD LOAD (BUILDING, CONCRETE WALL, & CONVEYOR/HANGER)
590 PSF DEAD LOAD (BUILDING, CONCRETE WALL, & CONVEYOR/HANGER)
44'-1 1/8"
49'-7 7/16" (2,345 PSF)
88'-2 1/4"
28'-3 3/8" (1,336 PSF)
21 DEGREE ANGLE OF REPOSE CORN = 45 LBS/FT^3 PLUS 5% PACK
10'-0"
176'-4 1/2"
10'-0"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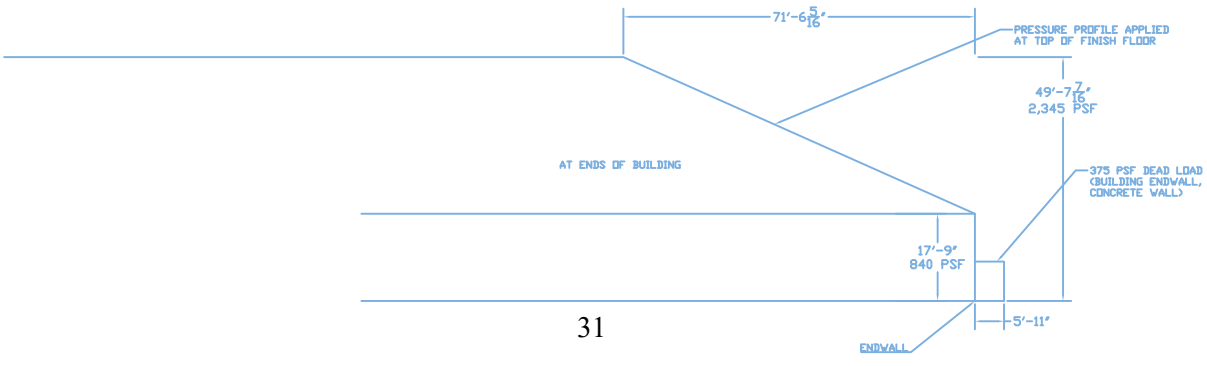
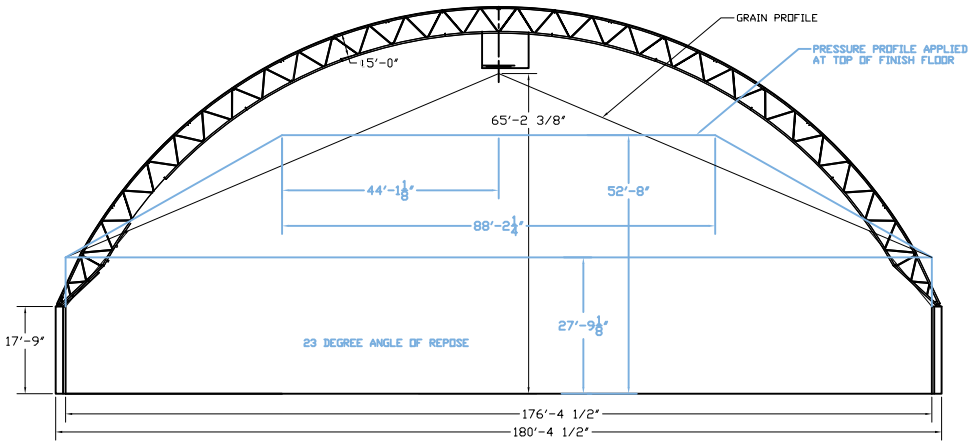
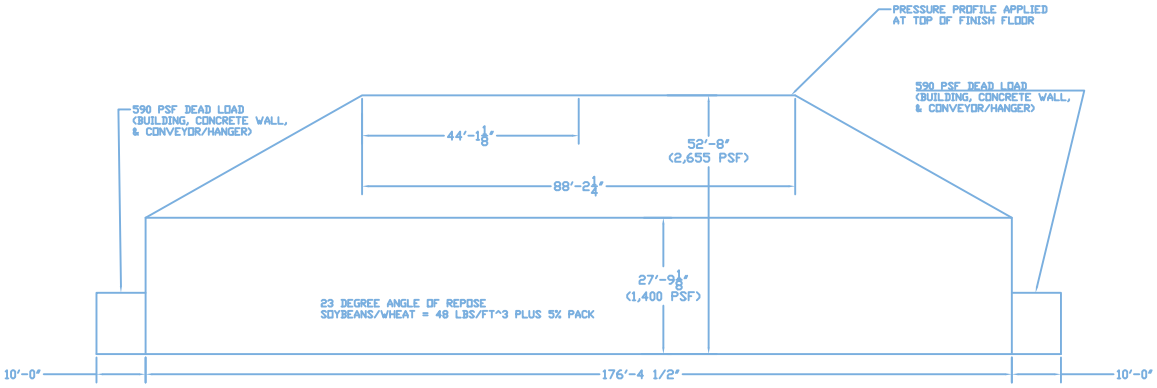
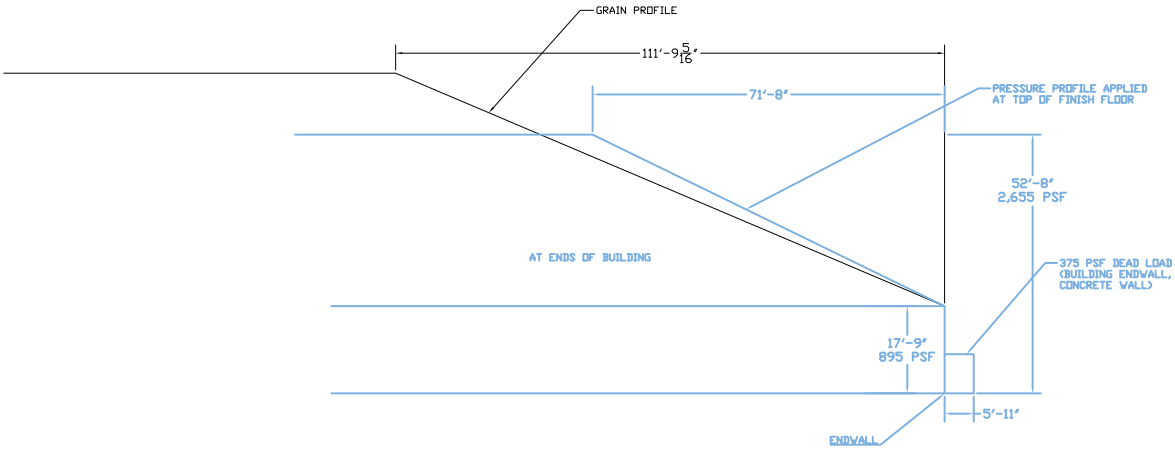
115'-7 7/16"
71'-6 5/16"
PRESSURE PROFILE APPLIED AT TOP OF FINISH FLOOR
49'-7 7/16" 2,345 PSF
AT ENDS OF BUILDING
375 PSF DEAD LOAD (BUILDING ENDWALL, CONCRETE WALL)
17'-9" 840 PSF
5'-11"
ENDWALL


71'-6 5/16"
PRESSURE PROFILE APPLIED AT TOP OF FINISH FLOOR
49'-7 7/16" 2,345 PSF
AT ENDS OF BUILDING
375 PSF DEAD LOAD (BUILDING ENDWALL, CONCRETE WALL)
17'-9" 840 PSF
5'-11"
ENDWALL


GRAIN PROFILE
PRESSURE PROFILE APPLIED AT TOP OF FINISH FLOOR
15'-0"
65'-2 3/8"
44'-1 1/8"
52'-8"
88'-2 1/4"
27'-9 1/8"
17'-9"
23 DEGREE ANGLE OF REPOSE
176'-4 1/2"
180'-4 1/2"


PRESSURE PROFILE APPLIED AT TOP OF FINISH FLOOR
590 PSF DEAD LOAD (BUILDING, CONCRETE WALL, & CONVEYOR/HANGER)
590 PSF DEAD LOAD (BUILDING, CONCRETE WALL, & CONVEYOR/HANGER)
44'-1 1/8"
52'-8" (2,655 PSF)
88'-2 1/4"
27'-9 1/8" (1,400 PSF)
23 DEGREE ANGLE OF REPOSE
SOYBEANS/WHEAT = 48 LBS/FT^3 PLUS 5% PACK
10'-0"
176'-4 1/2"
10'-0"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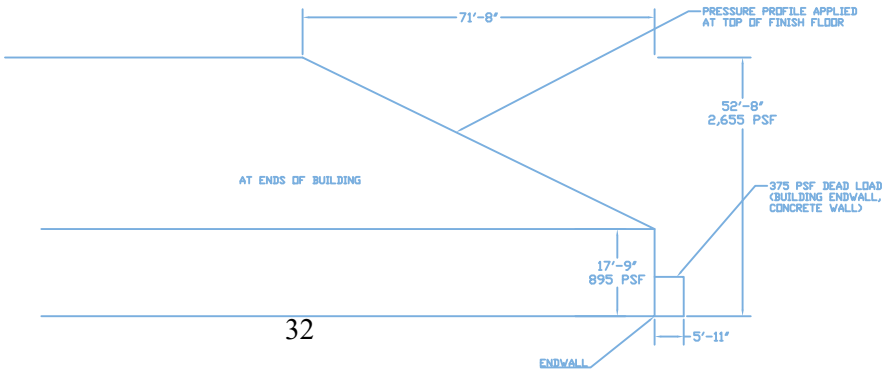
111'-9 5/16"
71'-8"
PRESSURE PROFILE APPLIED AT TOP OF FINISH FLOOR
52'-8" 2,655 PSF
AT ENDS OF BUILDING
375 PSF DEAD LOAD (BUILDING ENDWALL, CONCRETE WALL)
17'-9" 895 PSF
5'-11"
ENDWALL


71'-8"
PRESSURE PROFILE APPLIED AT TOP OF FINISH FLOOR
52'-8" 2,655 PSF
AT ENDS OF BUILDING
375 PSF DEAD LOAD (BUILDING ENDWALL, CONCRETE WALL)
17'-9" 895 PSF
5'-11"
ENDWALL

HEARTLAND CO-OP

HEARTLAND GRAIN FACILITY

RECEIVING AND STORAGE - BARGE LOADOUT

COUNCIL BLUFFS, IOWA

ISSUED FOR REVIEW

DWG. NO.	DESCRIPTION	REVISION	REVISION DATE
21155-G-100	COVER SHEET	A	09-16-2022
21155-GA-101	GENERAL ARRANGEMENT PLAN	C	09-16-2022
21155-GA-201	ELEVATION VIEWS	C	09-16-2022
21155-C-101	MISSOURI RIVER BNSP REVETMENT (JEO)	C	09-16-2022
22015-GA-104	SITE PLAN	B	09-16-2022

NOT FINAL
PRELIMINARY
SUBJECT TO CHANGE

33

I hereby certify that this engineering document was prepared by me or under my direct personal supervision and that I am a duly licensed Professional Engineer under the laws of the State of Iowa.

(Signature) (Date)

Printed or typed name *** ENGINEER PRINTED NAME ***

License Number *** NUMBER ***

My license renewal date is December 31, *** YEAR ***

Pages or sheets covered by this seal: 21155-G-100, 21155-GA-101, 21155-GA-201 22015-GA-104

ABP ENGINEERING
440 Regency Parkway Drive
Suite 200
Omaha, NE 68114
(402) 502-4242
www.abpengineeringllc.com

△	REVISION DESCRIPTION	BY:	CHK'D:	DATE:
A	ISSUED FOR REVIEW	KC	DH	09-16-2022

ABP PROJ NO: N/A
DRAFTER: ---
PROJECT DESIGNER: K. CIECIOR
PROJECT ENGINEER: D. HOYLMAN
SCALE: NONE

HEARTLAND CO-OP
COUNCIL BLUFFS, IOWA
HEARTLAND GRAIN FACILITY
COVER SHEET

DEPARTMENT: N/A
DRAWING NUMBER: 21155-G-100
REV: A

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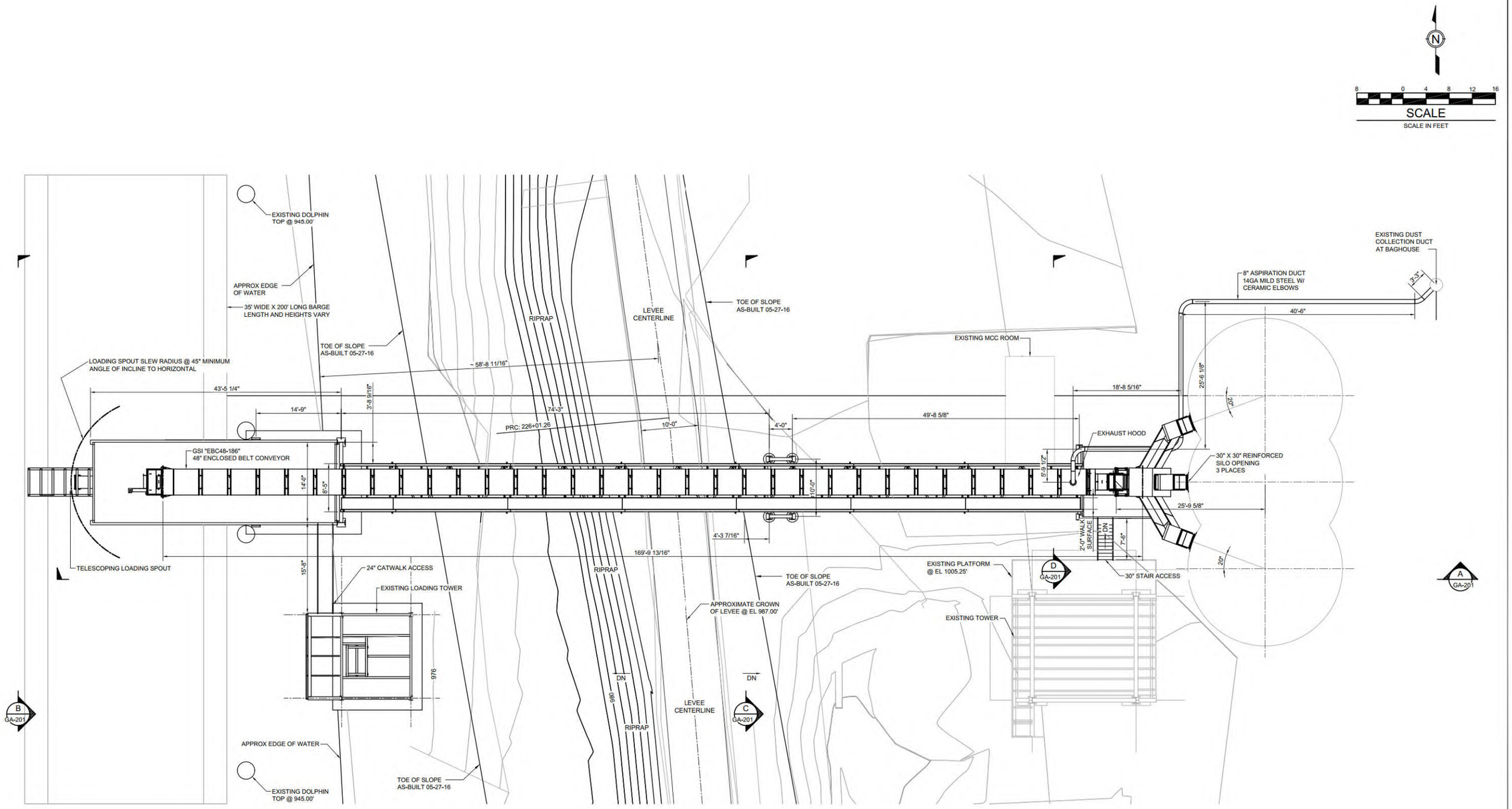

PLAN
BARGE LOADOUT SYSTEM
1/8" = 1'-0"

PRELIMINARY
NOT FOR CONSTRUCTION

REFERENCE DRAWINGS

21155-G-100	COVER SHEET
21155-GA-101	GENERAL ARRANGEMENT PLAN
21155-GA-201	ELEVATION VIEWS
21155-C-101	MISSOURI RIVER BNSP REVETMENT (JEO ENGINEERING)
22015-GA-104	SITE PLAN

GENERAL NOTES

1. OWNER SHALL PROVIDE PERIODIC INSPECTION AND OBSERVATION SERVICES BY DESIGN ENGINEER.
2. OWNER SHALL PROVIDE THIRD-PARTY MATERIAL TESTING SERVICES.
3. DISTURBANCES TO LEVEE PRISM SHALL BE BACKFILLED AND REPAIRED PER THE INDUSTRIAL PARK LEVEE OPERATIONS AND MAINTENANCE MANUAL.
4. CONTRACTOR SHALL PREPARE AND DELIVER AS-BUILT DRAWINGS AT THE CONCLUSION OF CONSTRUCTION ACTIVITIES.

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△	REVISION DESCRIPTION	BY:	CHK'D:	DATE:
A	ISSUED FOR REVIEW	KJC	DH	12/23/21
B	ISSUED FOR REVIEW, UPDATED	KJC	DH	03/09/22
C	ISSUED FOR REVIEW, UPDATED	KJC	DH	09/16/22

CLIENT JOB NO.:	21155
DRAWING DATE:	12/23/21
DRAFTER:	K. CIECIOR
PROJECT DESIGNER:	K. CIECIOR
PROJECT ENGINEER:	HOYLMAN/HAASE
SCALE:	1/8" = 1'-0"

HEARTLAND COOP
COUNCIL BLUFFS, IOWA
HEARTLAND GRAIN FACILITY
BARGE LOADOUT
PLAN VIEW

DEPARTMENT:	DRAWING NUMBER:	REV:
N/A	21155-GA-101	C

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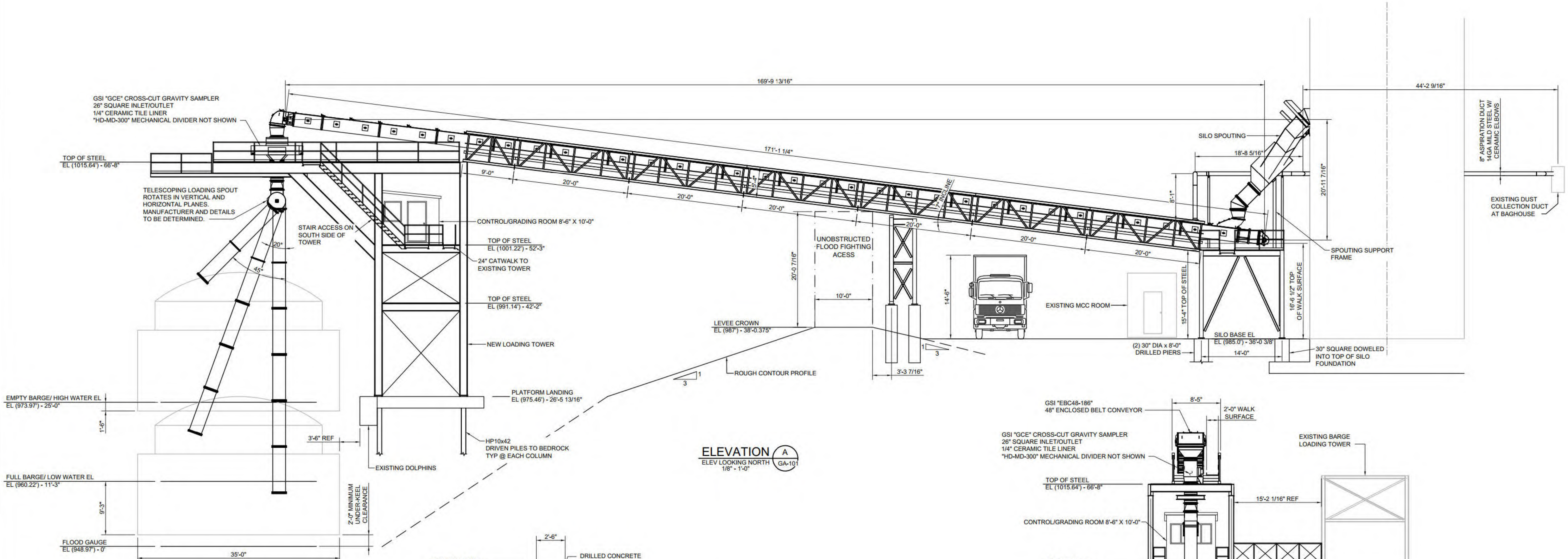
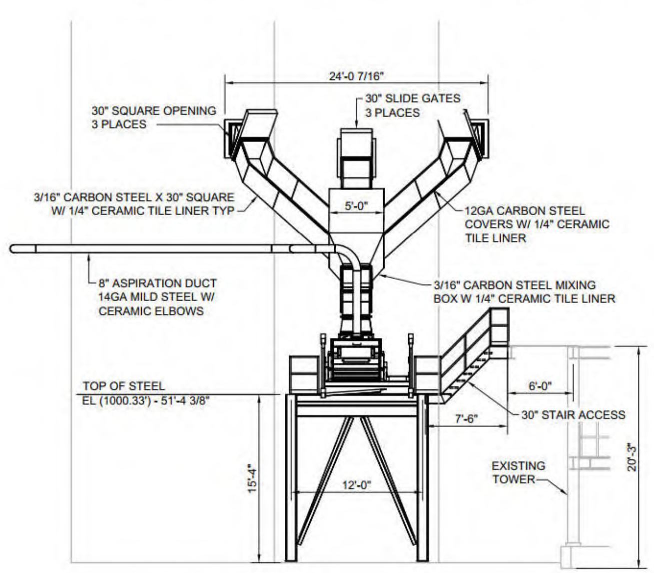
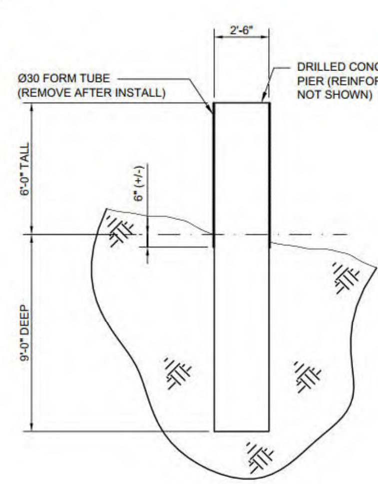


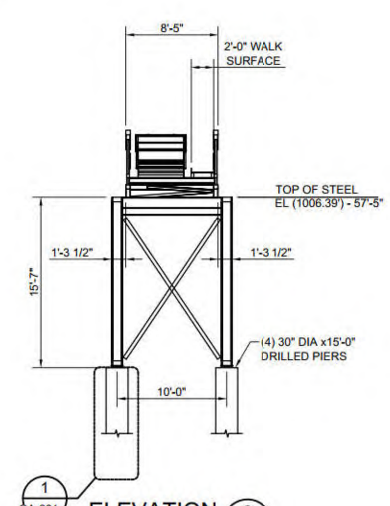
ELEVATION (A)
ELEV LOOKING NORTH
1/8" - 1'-0"
GA-101



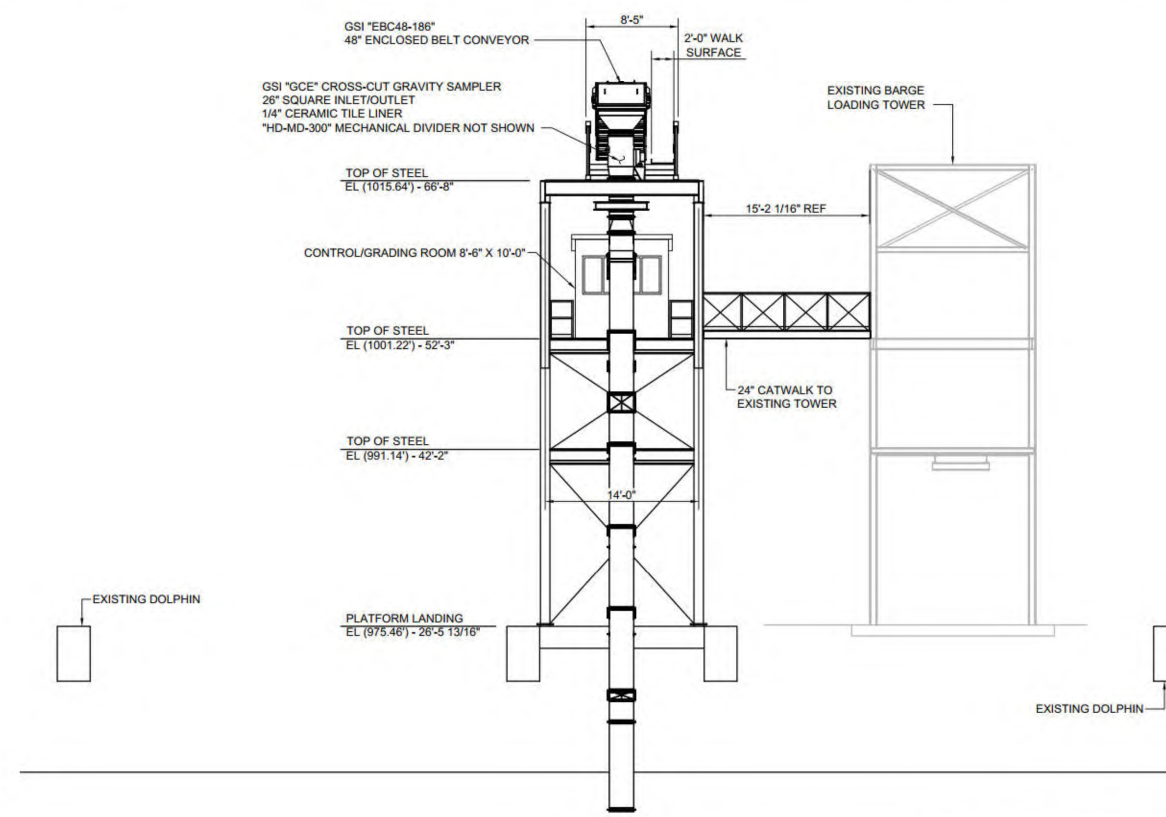
ELEVATION (D)
ELEV LOOKING EAST
1/8" - 1'-0"
GA-101



DETAIL (1)
1/4" = 1'-0"
LEVEE PIERS
GA-201



ELEVATION (C)
ELEV LOOKING EAST
1/8" - 1'-0"
GA-101



ELEVATION (B)
ELEV LOOKING EAST
1/8" - 1'-0"
GA-101

PRELIMINARY
NOT FOR CONSTRUCTION

GENERAL NOTES

1. OWNER SHALL PROVIDE PERIODIC INSPECTION AND OBSERVATION SERVICES BY DESIGN ENGINEER.
2. OWNER SHALL PROVIDE THIRD-PARTY MATERIAL TESTING SERVICES.
3. DISTURBANCES TO LEVEE PRISM SHALL BE BACKFILLED AND REPAIRED PER THE INDUSTRIAL PARK LEVEE OPERATIONS AND MAINTENANCE MANUAL.
4. CONTRACTOR SHALL PREPARE AND DELIVER AS-BUILT DRAWINGS AT THE CONCLUSION OF CONSTRUCTION ACTIVITIES.

REFERENCE DRAWINGS

21155-G-100	COVER SHEET
21155-GA-101	GENERAL ARRANGEMENT PLAN
21155-GA-201	ELEVATION VIEWS
21155-C-101	MISSOURI RIVER BNSP REVETMENT (JEO ENGINEERING)
22015-GA-104	SITE PLAN

ABP ENGINEERING
440 Regency Parkway Drive
Suite 200
Omaha, NE 68114
(402) 502-4242
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△	REVISION DESCRIPTION	BY:	CHK'D:	DATE:
A	ISSUED FOR REVIEW	KJC	DH	12/23/21
B	ISSUED FOR REVIEW, UPDATED	KJC	DH	03/09/22
C	ISSUED FOR REVIEW, UPDATED	KJC	DH	09/16/22

CLIENT JOB NO.: 21155
DRAWING DATE: 12/23/21
DRAFTER: K. CIECIOR
PROJECT DESIGNER: K. CIECIOR
PROJECT ENGINEER: HOYLMAN/HAASE
SCALE: 1/8" = 1'-0"

HEARTLAND COOP
COUNCIL BLUFFS, IOWA

HEARTLAND GRAIN FACILITY
BARGE LOADOUT
ELEVATION VIEWS

DEPARTMENT:	DRAWING NUMBER:	REV:
N/A	21155-GA-201	C

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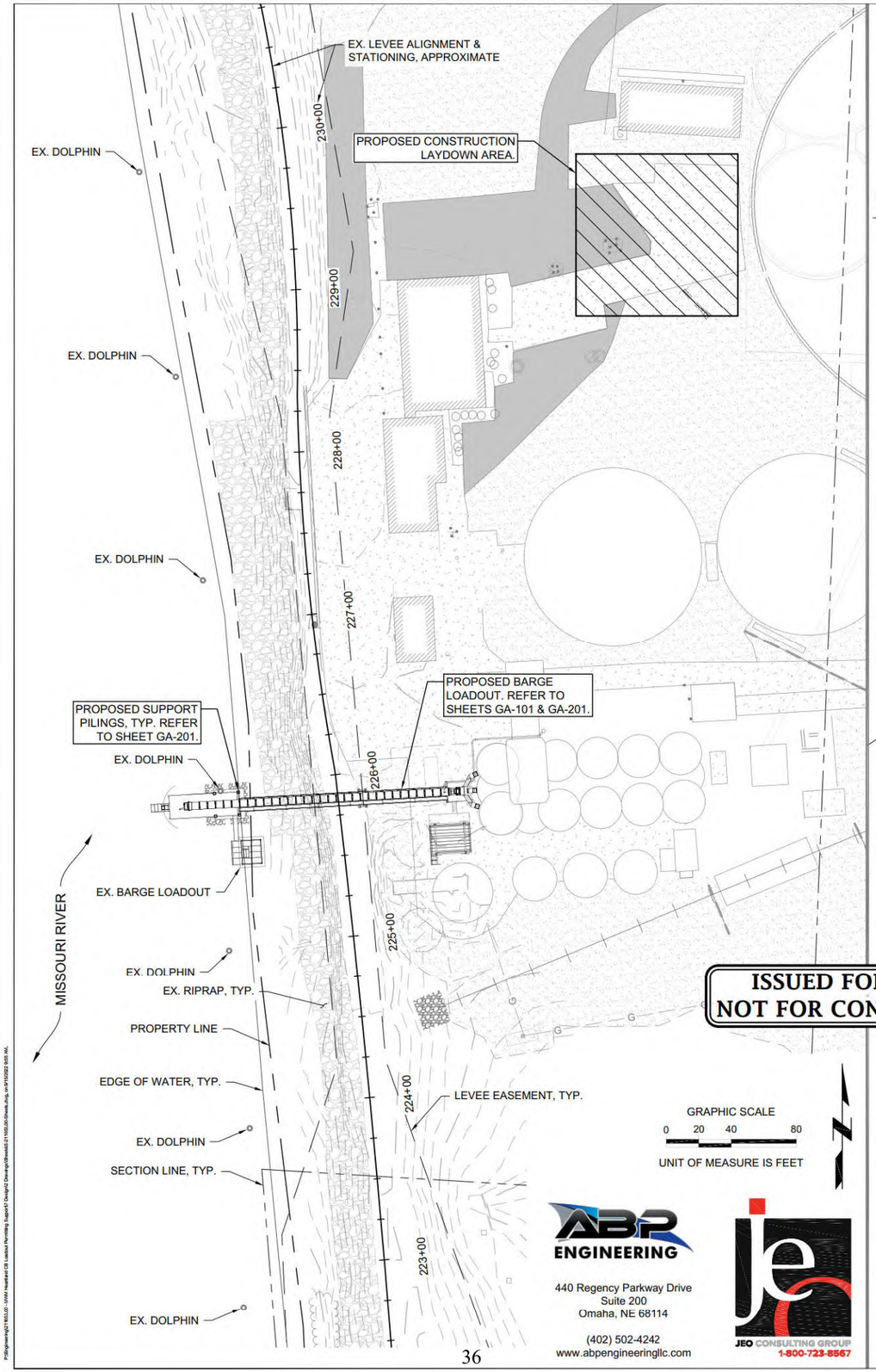

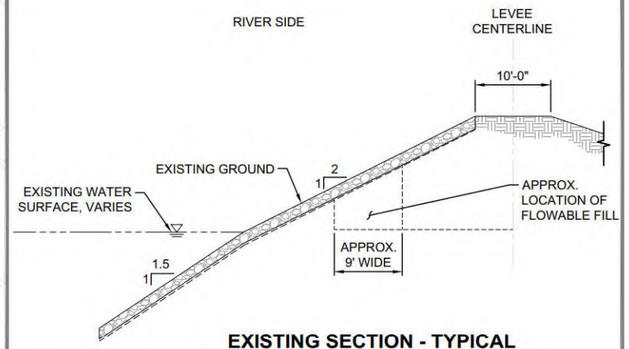

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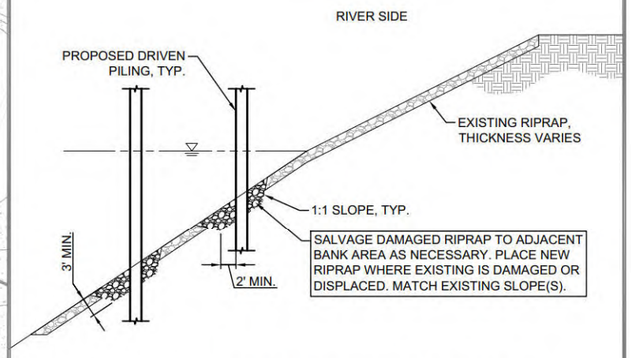
SCALE: N.T.S.



PROPOSED SECTION - TYPICAL
SCALE: N.T.S.

ISSUED FOR REVIEW
NOT FOR CONSTRUCTION

HEARTLAND CO-OP

MISSOURI RIVER BNSP REVETMENT MAINTENANCE & RESTORATION

PART 1 - GENERAL

1.01 DEFINITION OF WORK

A. This project is in the vicinity of the federally constructed Missouri River Bank Stabilization and Navigation Project (BSNP) revetment. The revetment must be maintained and restored to pre-construction as-built conditions by protecting existing stone where possible, replacing damaged stones, and adding new stone in any areas of damage or displacement. Rehabilitation of revetments in this contract will use stone fill exclusively, with no underlying fill material. The quantity of stone for each site is intended to bring the structures to the lines and grades shown on the Drawings.

B. The term "revetment" applies to the type of stabilization structure that is constructed along the bank of the river roughly parallel to the current. Revetments typically are constructed of stone, though their original construction often incorporated pilings.

1.02 SUBMITTALS

A. Stone
1. Material and geologic formation identification and supporting tests
2. Location of material(s) source(s) with relevant site certifications
3. Gradation and soundness testing results

1.03 MEASUREMENT AND PAYMENT

A. Stone Revetment/Riprap
1. Method of Measurement and Pay Unit: By the ton for each respective type of stone placed. A load ticket including the ticket number, date, truck number, empty truck weight and gross weight is required for all stone measured.
2. Includes, but is not limited to, supplying, weighing, hauling, delivery, placing and fabric where required.

PART 2 - PRODUCTS

2.01 STONE

A. All riprap stone shall conform to all requirements of these specifications and approved by the Engineer.

B. Broken concrete rubble will not be allowed as an allowable substitute for stone.

C. Quarried Stone or Field Boulders
1. The stone shall consist of broken, field boulders or quarried stone meeting the quality requirements outlined in these specifications.
2. Neither the breadth nor the thickness of any piece of stone shall be less than one-third of its length.
3. Stone shall be reasonably well graded from coarse to fine. Quarry operation shall be controlled to produce a reasonable well graded stone of the required size; Engineer may require changes as necessary to produce the required product. Dirt and fines of less than 1/2-inch maximum cross section, accumulated from inter-ledge layers or from blasting or handling operations or breaking shall not exceed 5 percent by weight.
4. The stone shall be reasonably well graded between the following limits:

Limits of Stone Weight (Percent Lighter by Weight)	Weight in Pounds (lbs)		Appr. Size as Sphere Dia. (in)	
%	Maximum	Minimum	Maximum	Minimum
100	750	460	25	21
90		410		20
50	350	220	19	16
30		138		14
15	200	43	16	10

D. All tests shall be performed by Contractor or quarry's agent. The stone protection material shall meet the following test limits when tested as indicated.
1. Bulk Specific Gravity, Saturated surface dry basis, ASTM C127, not less than 2.40
2. Soundness in Magnesium Sulfate, ASTM C88, loss at 5 cycles not more than 12%

PART 3 - EXECUTION

3.01 RIPRAP STONE PLACEMENT

A. Stone shall be placed with Engineer present to inspect conditions and completed work as shown on the Drawings or as directed by the Engineer.

B. Stone shall be placed in such manner as to produce a reasonably well-graded mass of rock with the minimum practicable percentage of voids. Riprap shall be placed to its full course thickness in one operation and in such manner as to avoid damage to the bedding material and to minimize segregation of the riprap. The finished riprap shall be free from objectionable pockets of small stones and clusters of larger stones.

C. Placing riprap stone in layers will not be permitted.

D. The stone shall be placed by skip or clamshell, rapid cast off barges by hand or machine, or by other methods approved by Engineer. Dumping of stone at the top of slopes and rolling or pushing into place will not be permitted. Maximum drop height shall be zero for stone placed above the water surface, and three feet above the final resting place for stone placed below the water surface.

E. A tolerance of plus or minus one-half foot will be allowed for the revetment grades shown on the Drawings. Variances to the side slopes shall be determined by the natural angle of repose of the stone, varying from 1V on 1.25-1.5H.

F. Rearranging of individual stone by mechanical equipment or by hand will be required to the extent necessary to obtain a well-graded distribution of stone sizes as specified above.

3.02 REVETMENT STONE PROTECTION AND REPLACEMENT, AS NECESSARY

A. Existing revetment (stone and piling) shall be protected during construction activities and shall only be modified if, and where, specifically identified to the lines and grades shown on the Drawings.

B. Where existing revetment stone is damaged or displaced by construction activity, that material shall be removed and placed back onto the revetment at a location in the project area approved by the Engineer. Damaged material shall be supplemented with a greater than or equal volume of new stone meeting the material requirements outlined previously.

3.03 SITE PROTECTION AND DOCUMENTATION

A. Contractor shall provide as-built drawings at the conclusion of construction activities.

B. Contractor shall ensure that no heavy equipment sits on or traverses the levee.

△	REVISION DESCRIPTION	BY:	CHK'D:	DATE:
A	ISSUED FOR REVIEW	JJS	MDB	6/29/22
B	RESTORATION CLARIFICATION	JJS	MDB	9/8/22
C	ISSUED FOR REVIEW, UPDATED	JJS	MDB	9/16/22

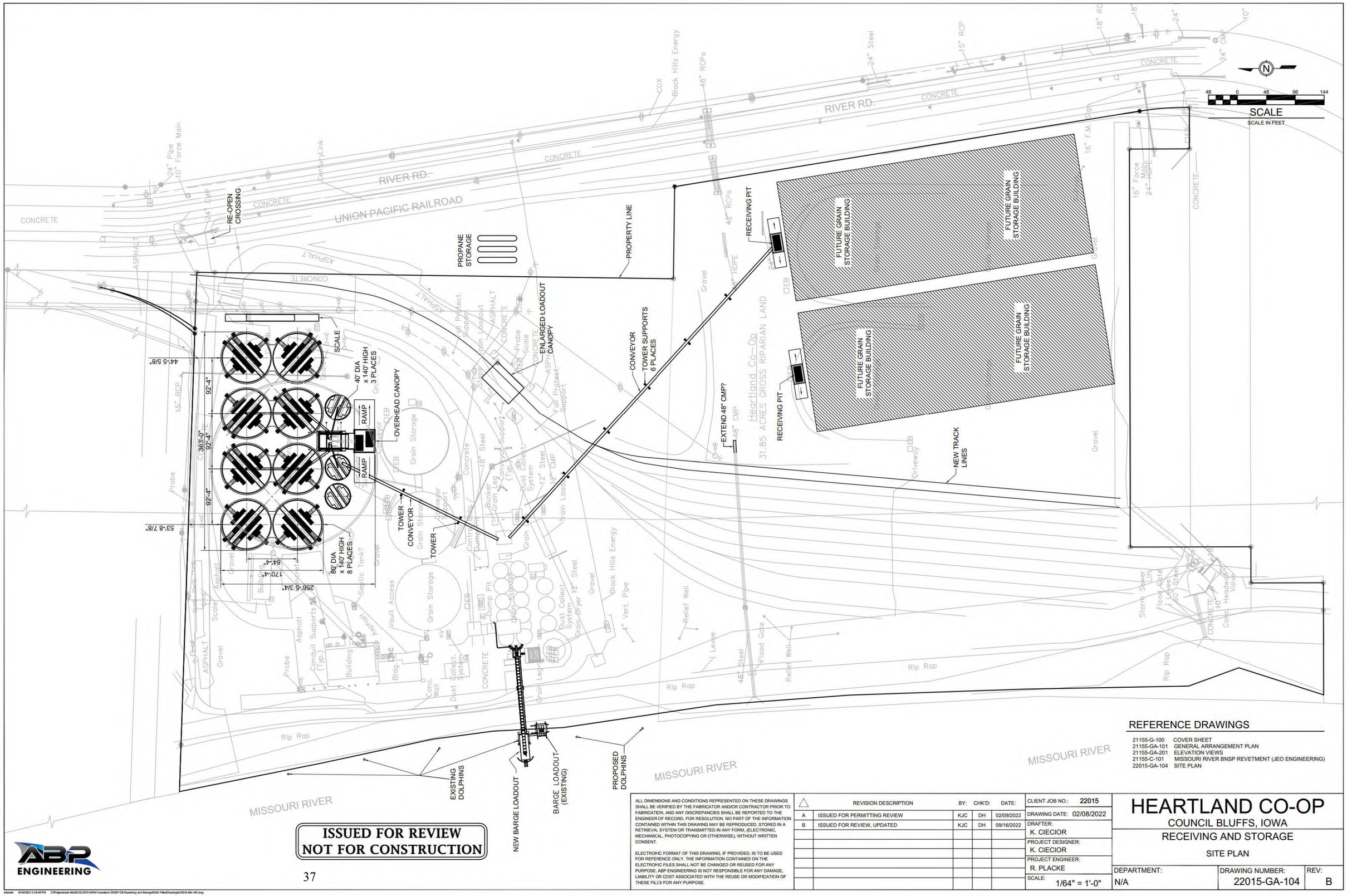
CLIENT JOB NO.: 21155
DRAWING DATE: 9/15/2022
DRAFTER: T. WESTFALL (JEO)
PROJECT DESIGNER: J. STINE (JEO)
PROJECT ENGINEER: J. STINE (JEO)
SCALE: AS SHOWN

HEARTLAND CO-OP
COUNCIL BLUFFS, IOWA
HEARTLAND GRAIN FACILITY
BARGE LOADOUT

DRAWING NUMBER: 21155-C-101
REV: C

ABP ENGINEERING
440 Regency Parkway Drive
Suite 200
Omaha, NE 68114
(402) 502-4242
www.abpengineeringllc.com

JEO CONSULTING GROUP
1-800-723-8567



REFERENCE DRAWINGS

21155-G-100	COVER SHEET
21155-GA-101	GENERAL ARRANGEMENT PLAN
21155-GA-201	ELEVATION VIEWS
21155-C-101	MISSOURI RIVER BNSP REVETMENT (JEO ENGINEERING)
22015-GA-104	SITE PLAN

ISSUED FOR REVIEW
NOT FOR CONSTRUCTION

ABR ENGINEERING

△	REVISION DESCRIPTION	BY:	CHK'D:	DATE:
A	ISSUED FOR PERMITTING REVIEW	KJC	DH	02/09/2022
B	ISSUED FOR REVIEW, UPDATED	KJC	DH	09/16/2022

CLIENT JOB NO.:	22015
DRAWING DATE:	02/08/2022
DRAFTER:	K. CIECIOR
PROJECT DESIGNER:	K. CIECIOR
PROJECT ENGINEER:	R. PLACKE
SCALE:	1/64" = 1'-0"

HEARTLAND CO-OP

COUNCIL BLUFFS, IOWA

RECEIVING AND STORAGE

SITE PLAN

DEPARTMENT:	DRAWING NUMBER:	REV:
N/A	22015-GA-104	B

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September 16, 2022

Mr. Kyle Nelson, P.E.
Project Manager
HGM Associates Inc.

Subject: Heartland Coop Barge Loadout
IPL Technical Review Response
HGM Project No. 107722
ABP Project No. 21155

Dear Mr. Nelson,

ABP Engineering (ABP) is in receipt of your Preliminary Technical Memorandum, dated July 29, pertaining to your review of plans for the Barge Loadout project at Heartland Coop (Heartland) in Council Bluffs, IA. Like you and your clients, ABP takes seriously the efficacy of the Industrial Park Levee (IPL), and we are pleased to address the concerns you raise. Please review our responses to the Memorandum. We are attaching the Memorandum for convenient reference.

Memorandum Heading: Recommendations

1. **The Designers shall add requirements to the contract documents that any disturbance to the levee prism shall be backfilled and repaired per the IPL Operations and Maintenance Manual.**

   ABP has added a General Note to attached drawings 21155-GA-101 and 21155-GA-201 calling for backfill and repair per the specified document.

2. **Construction observation shall be performed to monitor the Contractor's compliance with the provided plan set.**

   ABP has added a General Note to attached drawings 21155-C-101, 21155-GA-101, and 21155-GA-201 calling for the owner to provide inspection and observation services by the design engineer.

Memorandum Heading: Final Submittal Requests

1. **Include the full plan set of the proposed improvements to be reviewed.**

   I am attaching the plan set, revised per feedback contained in the Technical Memorandum. These include all anticipated structures. Locations and dimensions have been determined to an 80% level of development, as agreed during our call on August 25.

2. **What is the planned timeline for the construction of this project? Will it be during the typical low water season in the winter or during high water in the summer?**

Heartland intends to begin construction following this year's harvest. If this is feasible, construction will begin on or about November 15, 2022, and will conclude on or about March 31, 2023.

3. **What specifications were used [for] design of the structures, piling, etc? From where are the revetment requirements based?**

   Pile and drilled pier specifications align with ABP's understanding of best practices for such structures and are noted in views on drawing 21155-GA-201.

   Revetment stone specifications are taken from Unified Facilities Guide Specifications Division 35 – Waterway and Marine Construction, Section 35 31 19 – Stone.

4. **The location of the levee prism should be included in all sections. Levee prism slope extends infinitely past the toe of the bank. If penetrating the prism is intended, specs should be included for backfilling the disturbed area.**

   The levee prism has been added to drawing 21155-GA-201, as requested.

   We find that the proposed structures do not involve "backfilling" in the usual sense. Piles on the water side will be driven through the revetment with no preparatory excavation. Damaged stone will be replaced as specified on drawing 21155-C-101.

   Drilled piers on the land side will be hydroexcavated and removed earth will be replaced with steel reinforced concrete piers. ABP has added a detail view to drawing 21155-GA-201.

5. **How [are] the proposed piers/piling installed? What will be done to minimize disturbance within the levee prism, and how will excavations be replaced?**

   Notes describing installation of the piers and plies are included in views on drawing 21155-GA-201.

   The levee prism is expected to be unaffected except for the presence of the piers and piles themselves. All land side equipment will be set up beyond the levee toe. Certain work may occur from a barge in the river. No heavy equipment shall sit on or traverse the levee. ABP has added notes to drawings 21155-C-101, 21155-GA-101, and 21155-GA-201 to this effect.

   Any settlement that may occur during the project shall be monitored and repaired as described in the attached Emergency Action Plan (EAP).

   There will be no excavations per se.

6. **Show the levee clear zone for flood fight access and that nothing is located within this area. A 16.5' minimum clearance height should be provided.**

   Flood fighting access has been added to drawing 21155-GA-201.

7. **Where will equipment be positioned during construction? Will work within the water take place from the bank? If equipment and work is taking place on the levee, how will damage to the surface be prevented, and how will it be restored after construction?**

   Work within the water may be completed from the land side or water side. All land side equipment will be positioned beyond the levee toe. No heavy equipment shall sit on or traverse the levee. ABP has added notes to drawings 21155-C-101, 21155-GA-101, and 21155-GA-201 to this effect.

   Any settlement that may occur during the project shall be monitored and repaired as described in the EAP.

8. **Will any improvements be made to the existing dolphins?**

   No improvements to the existing dolphins are planned.

9. **If a high-water event occurs during construction, what plans will be in place to restore the levee integrity and allow flood fight access? An Emergency Action Plan should be prepared and provided.**

   The EAP is attached.

10. **Are there protections in place to prevent a barge from colliding with the proposed structure and causing damage to the levee?**

    We are assuming this query concerns post-construction operation of the facility. Preventing such collisions is the purpose of the existing dolphins and the two proposed dolphins downriver from the proposed barge loading structure (refer to attached drawing 22015-GA-104). It is anticipated that the barge operator will cease operations when the river reaches levels where the dolphins no longer afford this protection.

11. **A Geotechnical report should be provided for the project area. This should include specs for restoring all disturbed areas located within the levee.**

    We agreed in our August 25 call that no new exploration would be required if ABP is satisfied that recent borings are close enough to the proposed improvements for use in designing the new structures. We have indeed arrived at this conclusion, finding exploration performed within 130 ft in 2014 to be satisfactory.

    We find that excavations and backfilling in the usual senses do not apply. Unintentional disturbances to the levee shall be identified and restored as described in the EAP.

12. **What specs will be used for maintaining a quality assurance/quality control program for testing throughout construction?**

    ABP has added a General Note to drawings 21155-C-101, 21155-GA-101, and 21155-GA-201 calling for the owner to provide third-party material testing services and inspection and observation services by the design engineer. We are assuming that these engineers and

technicians will apply the same standards of care that reasonably careful practitioners would use in similar circumstances.

13. **Construction documents should include the requirement for As-Builts to be provided once construction is complete to update the levee records.**

    ABP has added a General Note to drawings 21155-C-101, 21155-GA-101, and 21155-GA-201 calling for the contractors to provide as-built drawings at the conclusion of construction activities.

14. **Additional details for the rip rap requirements and construction methods should be included. How will the rip rap be removed in the piling locations? How will the fabric beneath the rip rap be repaired in these excavation areas? Will work be completed under water or will the area be blocked off?**

    While certain details pertaining to construction methods will be determined by the contractor, ABP has added notes to drawing 21155-C-101 describing replacement of damaged revetment stones and calling for restoration of the revetment to pre-construction as-built conditions.

    Revetment stone will not be removed prior to driving piles. Per notes on drawing 21155-C-101, any stones damaged or displaced during construction shall be removed to another location on the levee and replaced.

    We find it unlikely that geotextile is in place so far from the levee centerline (at least 57 ft), especially underwater.

    Work within the water is expected to be completed in the prevailing pool of the Missouri River; no cofferdam is envisioned.

As you are aware, Heartland is eager to proceed with projects that depend on approval of a Conditional Use Permit for the site, and approval of the Permit in turn depends on the IPL membership approving the Barge Loadout project. Therefore, ABP eagerly awaits your response to the foregoing. Thank you.

Sincerely,

David Hoylman, M.S., P.E.
Senior Design Engineer, Mechanical

Attachments: Preliminary Technical Memorandum
Drawing Set
Emergency Action Plan (EAP)

ALLENDER BUTZKE ENGINEERS INC.
GEOTECHNICAL • ENVIRONMENTAL • CONSTRUCTION Q. C.

JANUARY 18, 2022 **PN 211419**

GEOTECHNICAL EXPLORATION

HEARTLAND COOPERATIVE COUNCIL BLUFFS
2401 RIVER ROAD
COUNCIL BLUFFS, IOWA

PERFORMED FOR

HEARTLAND COOPERATIVE
2829 WESTOWN PARKWAY, SUITE 350
WEST DES MOINES, IA 50266

SILOS

3660 109TH STREET • URBANDALE, IOWA 50322 • PHONE 515-252-1885 • FAX 515-252-1888

ALLENDER BUTZKE ENGINEERS INC.
GEOTECHNICAL • ENVIRONMENTAL • CONSTRUCTION Q. C.

January 18, 2022

Heartland Cooperative
2829 Westown Parkway, Suite 350
West Des Moines, IA 50266
Attn: Mr. Alex Roorda

RE: Geotechnical Exploration
Heartland Cooperative Council Bluffs
2401 River Road
Council Bluffs, Iowa
PN 211419

Dear Mr. Roorda:

As authorized by you, Allender Butzke Engineers Inc. (ABE) has completed the geotechnical exploration for the above referenced project. The geotechnical exploration was conducted to evaluate physical characteristics of subsurface conditions with respect to design and construction of this project. The enclosed report summarizes the project characteristics as we understand them, presents the findings of the borings and laboratory tests, discusses the observed subsurface conditions, and provides geotechnical engineering recommendations for this project.

We appreciate the opportunity to provide our geotechnical engineering services for this project. If you have any questions or need further assistance, please contact us at your convenience. We are also staffed and equipped to provide construction testing and inspection services on this project as well as environmental site assessments.

Respectfully submitted,
ALLENDER BUTZKE ENGINEERS INC.

Seth Hansen, P.E.
Project Engineer

David Logemann, P.E.
Principal Engineer

I hereby certify that this engineering document was prepared by me or under my direct personal supervision and that I am a duly licensed Professional Engineer under the laws of the State of Iowa.

1/18/22

David Logemann, P.E. License Number 12394 Date
My license renewal date is December 31, 2023.
Pages covered by this seal: All Pages.

1 PC and email above
1 Email Heartland Coop; Attn: Ron Groskreutz
1 Email Hoffmann Inc.; Attn: Alan Steiner
1 Email Hoffmann Inc.; Attn: David Mattes, P.E.

GEOTECHNICAL EXPLORATION

HEARTLAND COOPERATIVE COUNCIL BLUFFS
2401 RIVER ROAD
COUNCIL BLUFFS, IOWA

PN 211419

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GEOTECHNICAL EXPLORATION

HEARTLAND COOPERATIVE COUNCIL BLUFFS
2401 RIVER ROAD
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PN 211419

January 18, 2022

PROJECT INFORMATION

Heartland Co-op is planning the construction of 10 new concrete silos at their existing operation located in Council Bluffs, Iowa. David Mattes with Hoffman Incorporated indicated the 140 feet tall and 40- and 80-feet diameter concrete silos will generate maximum wall loads between 63 and 88 kips per lineal foot and floor pressures between 2,900 and 4,300 pounds per square foot. A grading plan was unavailable at the time of this report; however, we assume the new concrete silo foundations will be constructed to match the existing foundation level of the existing concrete silos southwest of the proposed silos. Based on existing grades we assume cut and fill depths of 5 feet or less will be required to achieve the assumed final grades.

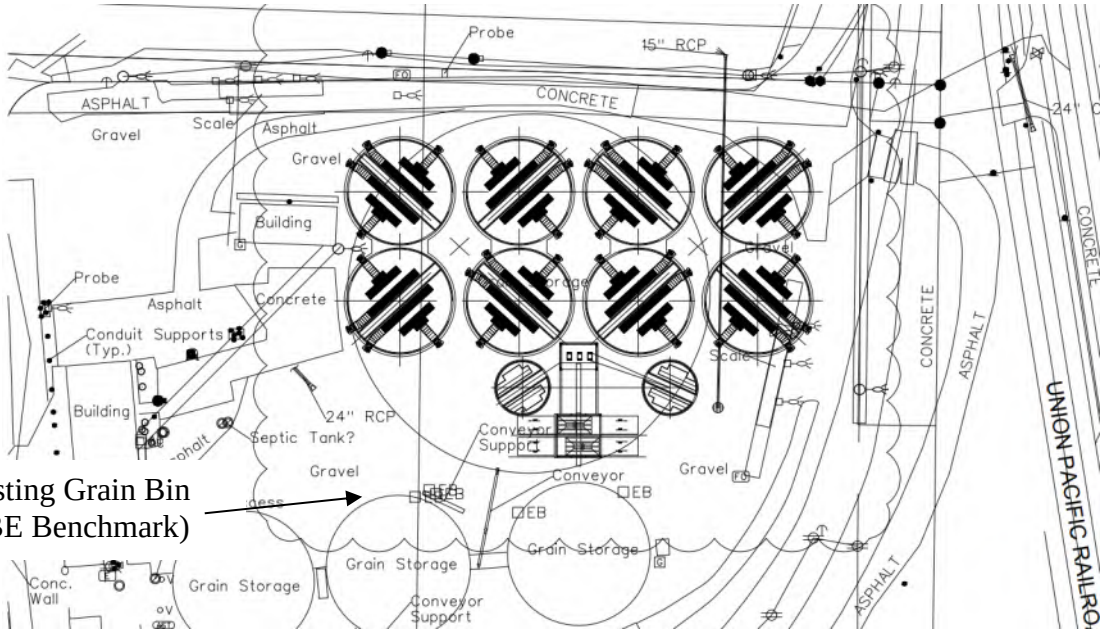


Figure No.1 – Proposed Silo Locations

FIELD EXPLORATION

Three borings, identified as Boring Nos. 1 through 3, were conducted at this site to depths between 40 and 99 feet below existing grades on September 9 and 10, 2021. Two borings, identified as Boring Nos. 4 and 5, were conducted at this site to depths of 98.5 and 99.1 feet below existing grades on January 11 and 12, 2022. Approximate locations of the borings are shown on the enclosed Site Plan. Boring Nos. 1 through 3 were measured from existing landmarks. Boring Nos. 4 and 5 were marked in the field by Heartland coop personnel.

The boring surface elevations, indicated on the enclosed Boring Logs, were referenced to the top of the ring footing of the existing center grain bin south of the proposed silos. This referenced location has been assigned an elevation of 100.0 feet for the purposes of this report. Methods of drilling, sampling, standard laboratory testing, and classifying of subsurface materials are discussed in the Boring Log Description/Legend pages of the Appendix.

SUBSURFACE CONDITIONS

Soil Profile

Detailed descriptions of soils encountered by this exploration are provided on the Boring Logs enclosed in the Appendix. The Profile of Borings (Plate A-1) presented in the Appendix depicts the relative deposit elevations in the borings. Unless otherwise indicated, the depths of soil stratum and groundwater levels are referenced from below the top of existing ground at the individual boring locations at the time of drilling.

In general, the borings encountered between 3 and 18 inches of crushed limestone at the ground surface. Existing fill consisting of clayey fine sand (SC), silty fine to medium sand (SM), sandy lean clay (CL), and crushed rock with fines was present overlying cohesive alluvium consisting of medium stiff fat clay (CH), medium stiff lean to fat clay (CL-CH), and soft lean clay (CL). The fill extended to depths between 3 and 9.5 feet. The compressible cohesive alluvium deposits extended to depths between 10 and 14.5 feet.

Granular alluvium consisting of loose to medium dense silty fine sand (SM) and fine to medium sand with silt (SP-SM) underlaid the cohesive alluvium. The sand extended to the depths of the borings in Boring Nos. 2 and 3. In Boring Nos. 1, 4, and 5 the sand extended to depths between 96.5 and 99.3 feet.

Light gray limestone bedrock was encountered between depths of 96.5 and 99.3 feet in Boring Nos. 1, 4, and 5. These borings terminated in very hard limestone between depths of 98.5 and 99.6 feet.

Groundwater Level Observations

The borings were monitored during and shortly after drilling operations to detect moisture seepage and groundwater accumulation. The results of our water level observations are noted on the Boring Logs enclosed in the Appendix.

During drilling operations, saturated sand was encountered between depths of 15 to 21 feet below existing grades. These short-term water levels are not necessarily a true indication of the groundwater table. Long-term observations would be necessary to accurately define the groundwater variations at this site. Fluctuation of groundwater levels can occur due to seasonal variations in the amount of rainfall, surface drainage, subsurface drainage, site topography, irrigation practices, ground cover (pavement or vegetation), and fluctuation of the nearby Missouri River.

ANALYSES AND RECOMMENDATIONS

Foundation Design

David Mattes with Hoffman Incorporated indicated the 140 feet tall and 40- and 80-feet diameter concrete silos will generate maximum wall loads between 63 and 88 kips per lineal foot and floor pressures between 2,900 and 4,300 pounds per square foot.

In our opinion, the highly compressible clay and the loose to medium dense sand deposits at this site would result in excessive total and differential settlements for shallow mat foundations. Therefore, we recommend the new silos be supported on auger cast-in-place (ACIP) pile or Auger Pressure Grouted Displacement (APG-D) pile deep foundation systems. ACIP piles would develop support through skin friction in the alluvial clay and sand in addition to end bearing support in the sand or limestone bedrock. AGP-D piles would develop skin friction and end bearing support in the granular alluvium densified during APG-D installation. The APG-D pile system uses a proprietary construction method and would be designed and installed by Berkel & Company Contractors. Due in part to displacement (densification) of the surrounding soils during pile installation, similar diameter and capacity APG-D piles are typically shorter than conventional ACIP piles. The following Tables A and B provides recommendations for allowable skin friction and end bearing values for ACIP deep foundations and estimated pile capacities.

TABLE A
ACIP PILE DESIGN SOIL PARAMETERS

Soil Formation	Applicable Elevation Range	Allowable Skin Friction, psf	Allowable End Bearing, psf
Existing Fill, Cohesive and Granular Alluvium	Above 50'	300[1]	--
Granular Alluvium	Below 50'	700[1]	15,000[1,2]
Limestone Bedrock	Encountered between 2.3' and 5'	--	100,000[1,3]

1) Allowable skin friction and end bearing assumes a factor of safety of 2.0 and a groundwater level near the existing ground surface. Skin friction should be ignored in upper 3.5 feet due to frost heave.
2) An allowable end bearing of 15,000 psf an be applied to ACIP piles extending below elevation 50 feet.
3) ACIP piles drilled to practical auger refusal on hard limestone could be designed for a higher allowable end bearing of 100,000 psf.

We estimate 16-, 18-, and 24-inch diameter ACIP piles extending to near elevation 20 feet (approximately 80 feet deep) bearing in medium dense sand would have allowable capacities on the order of 85, 100, and 135 tons, respectively. Furthermore, we estimate 16-, 18-, and 24-inch diameter ACIP piles extending to auger refusal in the hard limestone bedrock encountered between elevations 2.3 and 5 feet would have allowable capacities of at least 100, 125, and 225 tons, respectively, based on a grout strength of 4,000 pounds per square inch (psi). Higher allowable pile capacities could likely be achieved with higher grout strengths. These are example calculations; actual design of deep foundations will depend upon structural design requirements, anticipated loads, and the configuration which will be most economical to construct. As previously discussed, similar diameter displacement piles (APG-D piles) may result in greater capacities than the example ACIP piles capacities or similar capacities at shorter pile length.

Group reduction factors applied to the skin friction portions alone should be used for deep foundation members established closer than 3 times the pile diameter. We would be available to review proposed pile spacing and provide specific group reduction recommendations if requested. End bearing is not reduced by group action. Uplift reactions due to wind can be resisted by skin friction and buoyant weight of the foundation. We recommend that skin friction values for uplift be limited to 75 percent of the compression skin friction values as provided in Table A.

With deep foundations installed as previously described, we estimate long-term settlement due to structural loads will be less than one-half inch and differential settlement will be negligible. We recommend installation of all foundations be observed by a geotechnical engineer or his technical representative to determine that design bearing conditions have been achieved, to note changes in the foundation materials, and observe construction procedures.

Care should be exercised in the pile installation procedure to insure that a continuous full pile cross-section is maintained. Because some of the overburden soils at this site are granular materials (sand), a pile installation sequence program should be developed prior to production pile installation to maximize the distance between piles installed in a single day, while maintaining an appropriate production schedule, to reduce the possibility of cross-over between recently installed piles. If cross-over should occur, each instance will be evaluated to determine if the pile can either be safely re-drilled or if a replacement pile is required. We recommend that at least 1 axial load test be performed at the site to confirm pile capacity. Field load tests of ACP piles should be loaded to a minimum of 200 percent of pile design capacity.

Site Grading

Based on existing grades we assume cut depths of 5 feet or less and new fill thickness of 5 feet or less may be required to achieve the assumed final grades. Before any fill is placed the subgrade should be proof-rolled to delineate zones of soft soils present near the surface which may require additional removal or compaction. Any vegetation, if present, should be removed prior to placing fill.

We recommend that cohesive or cohesionless soils, free of rubble and organics, be used as compacted fill. Inorganic existing soils such as the existing fill would be suitable soil types for general fill applications if moisture conditioned. The cohesive alluvium (CL, CL-CH, and CH) soils would not be suitable for use beneath heavily loaded grain bin footings or floors but could be placed in areas where support for grain bin foundations and floor slabs is not required.

Table B lists recommended minimum compaction requirements for cohesive and cohesionless fill materials in specific applications. For cohesive soils, moisture contents within a range of -1 to +4 percent of the material's optimum moisture content are necessary to achieve the desired fill qualities.

TABLE B
RECOMMENDED DEGREE OF COMPACTION GUIDELINES

Construction Application	Standard Proctor (ASTM D698) Cohesive Soil	Standard Proctor (ASTM D698) Cohesionless Soil	*Relative Density (D4253 & D4254) Cohesionless Soil
Class 1	95%	98%	70%
Class 2	90%	93%	45%
Class 3	85%	88%	20%

Class 1 - Subgrade for building foundations, slabs-on-grade, pavements and other critical backfill areas.
Class 2 - Backfill adjacent to structures not supporting other structures - Minor subsidence possible.
Class 3 - Backfill in non-critical areas - Moderate subsidence possible.

*Use Relative Density technique (ASTM D4253 & D4254) where Standard Proctor technique (ASTM D698) does not result in a definable maximum dry density and optimum moisture content.

The on-site soils can be excavated utilizing conventional excavation equipment. Granular soils can generally be suitably compacted with vibratory compaction equipment whereas cohesive soils are more suitable for compaction with sheepsfoot or pneumatic type compactors. Care should be exercised in properly backfilling and compacting all trenches, especially utility trenches under or adjacent to the pavement. Loosely compacted or sand backfilled trenches can collect surface water and inadvertently direct it to the pavement subgrade and cause softening of the soil as well as increasing frost heave potential.

The contractor should be aware that very moist and soft lean clay (CL) alluvium and saturated sand (SM, SP-SM) soils at the site are easily disturbed by construction traffic and may not provide adequate support for heavy construction equipment, especially in deeper cut areas under repeated traffic loading. Therefore, low impact excavation methods, such as top loading with excavators may be required in deeper cut areas to reduce disturbance and deterioration of these softer soils. High construction traffic areas will require periodic repair of disturbed or loosened soils and likely a 1 to 2 feet thick layer of clean coarse crushed rock.

At the time of this geotechnical exploration, moisture contents of the existing fill and cohesive alluvium were generally near and well above, respectively, the recommended moisture content range for compaction. Adjustment of soil moisture content may be required in order to

lower or raise the moisture to within the recommended moisture content range. Discing and aeration is generally the most economical method to lower soil moisture content, if climatic conditions allow.

Excavation, Stability and Dewatering

Excavations at the site will encounter cohesive and granular soils. If shallow (less than 10 feet) excavations encounter only cohesive soils with no wet sand seams or layers, it is expected that the water seepage can be controlled by permitting it to drain into temporary construction sumps and be pumped outside the perimeter of the excavations. More extensive dewatering such as sand points and wells may be required for excavations which extend down into water bearing sand layers generally encountered below a depth of 10 to 15 feet. We recommend that prior to excavating in saturated sand, water levels be lowered and maintained 2 feet or more below the bottom of excavations to prevent upward seepage forces which could reduce subgrade support. Due to the high fines content of the sand (SM) and close proximity to the Missouri River dewatering would likely be difficult especially during periods of higher river levels.

The extent of bracing or sloping of open cut excavations will be dependent upon depth of cut, groundwater conditions, soils encountered, length of time the excavation will be open, area available for excavation and local governing regulations. Predominately cohesive soils may appear to stand nearly vertical in shallow excavations for short periods of time. However, soil creep, surcharge loads, precipitation, subsurface moisture seepage, construction activity vibrations and other factors may cause these soils to cave within an unpredictable period of time. Excavations encountering sand or loose fill may tend to cave rapidly, especially if water is flowing through them. Unstable granular excavation walls may also cause surrounding cohesive soils to become unstable. Temporary shoring, flattening of the excavation slopes or use of trench boxes may be required to maintain a safe condition. Provisions for shoring and bracing of excavations are required of the contractor by OSHA.

Subsurface Drainage

Unloading tunnels or dump pits constructed below existing grades will likely extend below the anticipated seasonal high groundwater table. To reduce buoyant forces, it would be necessary to install a drainage system to intercept the groundwater beneath subsurface tunnels. A drainage system could consist of perforated or slotted rigid PVC pipes having a minimum diameter of 4 inches. These pipes should be spaced approximately 30 feet or less center to center and be surrounded by free draining granular material (less than 3 percent passing the No. 200 sieve). The granular material should be 12 or more inches thick. The 12-inch drainage layer should be provided in addition to any granular working mat needed to facilitate construction since it will

likely become plugged with fines during construction (see Figure No. 2 in the following *Lateral Earth Pressures* section). The drainage system should be discharged to a suitable outlet such as sump pumps or a storm drain capable of handling the discharge.

Lateral Earth Pressures

Below grade walls constructed to retain soil should be designed to accommodate unbalanced lateral earth pressures. Estimated lateral earth pressures for cohesive and cohesionless (granular) backfill are presented in the following Table C. Active earth pressure design assumes that the wall can rotate and deflect at the top. If the wall is rigidly fixed, higher lateral earth pressures will develop against the wall and at-rest pressure parameters should be used for design. Increased earth pressures can also develop from restricted soil drainage, surcharge loads adjacent to the wall, and compaction of the adjacent backfill. Expansive materials (CH), either natural or backfill, should not be within 3 feet of below grade walls.

Coefficient of sliding friction values of 0.3 may be used for Portland cement concrete on a cohesive subgrade. Coefficient of sliding friction values of 0.8 may be used for Portland cement concrete on a compacted granular material subgrade. This ultimate value assumes no safety factor and design with this ultimate value should include a minimum factor of safety of 1.5.

Cohesionless (granular) backfill lateral earth pressure parameters may be used where granular backfill is installed behind the subsurface wall in accordance with the following Figure No. 2. The granular backfill should have a minimum width of 2 feet and be wide enough to accommodate the back slope limit line of 2:1 (vertical to horizontal) or flatter. The area between the required minimum zone of granular material and the actual limits of excavation may be backfilled with either cohesive or granular soils.

TABLE C
LATERAL EARTH PRESSURE PARAMETERS

Condition	Cohesive Soil (non-expansive clay)	Cohesionless Soil (Sand)	Cohesionless Soil (Crushed Rock)
Assumed Backfill Characteristics			
Approximate Total Density	130 pcf	120 pcf	130 pcf
Approximate Friction Angle	15º - 20º	30º - 35º	40º - 45º
Active Pressure Coefficient, K_a	0.5	0.3	0.2
At-Rest Pressure Coefficient, K_o	0.7	0.5	0.3
Passive Pressure Coefficient, K_p	2	3.3	5.2
Estimated Lateral Earth Pressure[1] (Equivalent Fluid Pressures)			
Active – Drained	65 pcf	35 pcf	25 pcf
Active - Undrained[2]	95 pcf	80 pcf	75 pcf
At-Rest – Drained	90 pcf	60 pcf	40 pcf
At-Rest - Undrained[2]	110 pcf	90 pcf	85 pcf
Passive – Drained	260 pcf	400 pcf	670 pcf
Passive - Undrained[3]	135 pcf	190 pcf	350 pcf

1) Assumes no safety factor, negligible wall friction, vertical wall, level backfill, zero surcharge loads and ignores cohesion shear strength.
2) Combined buoyant backfill unit weight and hydrostatic (water @ 62.4 pcf) loading.
3) Excludes hydrostatic loading.

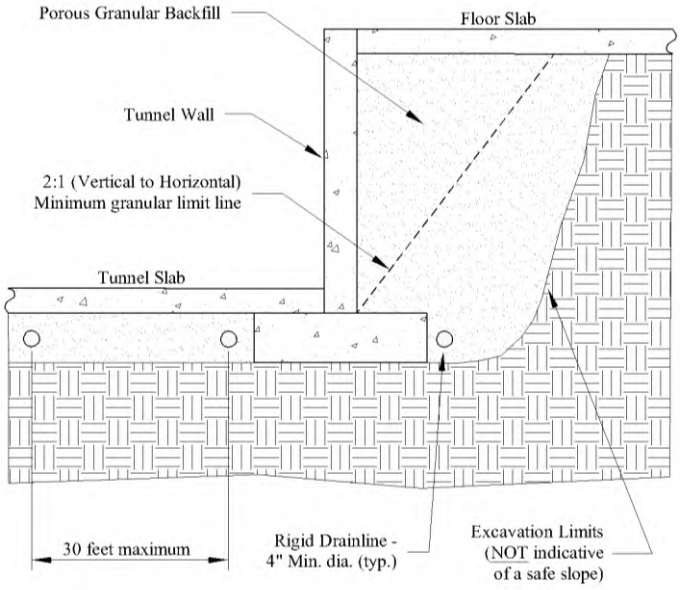


Figure No. 2 – Lateral Earth Pressures Example Section

Walls retaining fine-grained soils, and subjected to seasonally depressed temperatures, may be subject to long-term accumulative movement due to soil creep and freeze-thaw action. It is desirable to use free draining granular backfill behind such walls to minimize this movement. We recommend that a chimney of clean granular material (similar to Iowa DOT Specification 4131) be placed directly against the back of these walls and that the chimney be connected to a drain system. An acceptable drain system may be constructed using perforated pipe encased in clean granular material and sloped to sumps or storm drains.

Frost Heave

Key elements contributing to frost heave including freezing temperatures, available water, and fine-grained frost susceptible soils are generally present at sites in Iowa. As a result, frost heave problems are generally common (and most noticeable) in pavements or sidewalks adjacent to non-frost susceptible elements such as manholes, light poles, and exterior doors or frost protected stoops. Frost heave can cause pavement cracks to develop parallel to and several feet from curbs. This generally occurs where cleared paved areas exposed to freezing temperatures heave more than adjoining paved areas insulated by piled snow. Areas cleared of snow not exposed to periodic sunshine during the winter, such as under canopies, on the north shaded side of buildings and other shaded areas may experience more frost heave than other sunshine exposed areas. Sometimes it is not readily apparent why frost heave problems occur at one location and not at another seemingly similar location.

While it is appropriate to implement measures to reduce frost heave such as insulation, replacing frost susceptible soils with less frost susceptible soils, void forms, sealing cracks/joints to reduce surface water infiltration, or drainage improvements (surface and subsurface), these measures may simply move the frost heave problem to a different location where preventative measures have not been implemented. Having a smooth transition between heaved and non-heaved areas is desirable, but may be difficult and/or costly to accomplish. We are available to consult with you to discuss options for your consideration to reduce frost heave potential on this project.

GENERAL

The analyses and recommendations in this report are based in part upon the data obtained from the soil borings performed at the indicated locations and from any other information discussed in this report. This report does not reflect any variations which may occur between borings or across the site. The nature and extent of such variations may not become evident until

construction. If variations then appear evident, it will be necessary to reevaluate the recommendations of this report.

It is recommended that the geotechnical engineer be provided the opportunity to review the plans and specifications so that comments can be made regarding the interpretation and implementation of our geotechnical recommendations in the design and specifications. It is further recommended that the geotechnical engineer be retained for testing and observation during earthwork and foundation construction phases to help determine that the design requirements are fulfilled.

This report has been prepared for the exclusive use of our client for specific application to the project discussed and has been prepared in accordance with generally accepted geotechnical engineering practices. No warranty, expressed or implied, is made. In the event that any changes in the nature, design or location of the project as outlined in this report are planned, the conclusions and recommendations contained in this report shall not be considered valid unless the changes are reviewed and the conclusions of this report modified or verified in writing by the geotechnical engineer.

The scope of our service was not intended to include any environmental assessment or exploration for the presence of hazardous or toxic materials in the soil, surface water, groundwater or air on, below or adjacent to this site.

APPENDIX

BORING LOG DESCRIPTION/LEGEND

(page 1 of 3)

The material types encountered during the drilling operations were recorded on field logs. The profile represented on the Boring Log is based on final classification performed by a geotechnical engineer using the field logs, laboratory observation and testing. The material stratigraphy demarcation lines shown on the Boring Logs indicate changes in soil characteristics, however, actual soil changes or variations may occur as a gradual transition. Soil profile discussion, Log Boring information, water levels and recommendations presented in this report are based upon measured depths below ground levels existing at time of the field exploration, unless otherwise specified.

DRILLING AND SAMPLING

The borings were conducted with either a truck or all-terrain rotary drill rig using the drilling methods indicated on each Boring Log. Soil sampling and/or in-situ testing such as Shelby Tube (ST), split-spoon (SS), drive cone (DC), or core (C) was conducted at depth intervals which were selected in consideration of the characteristics of the proposed construction. Generally undisturbed soil samples are taken at 5 foot depth intervals or change in soil types. Disturbed soil samples from the auger, either jar size or bulk size samples, may be taken at intermediate intervals for the purpose of soil classification or laboratory testing. Borings conducted for soil classification only, will show no designation of sampling although disturbed sampling is performed. Soil samples obtained in the field were identified and sealed for transportation to the laboratory for performance of pertinent physical testing and engineering classification.

Drilling Methods

CFA - Continuous Flight Auger: 4, 6, or 8-inch diameter (ASTM D1452).
RD - Rotary Drilling: Using drilling fluid in cased or uncased boring (ASTM D2113).
HSA - Hollow Stem Auger: 6 or 8-inch diameter, continuous flight auger remains in boring with soil removed from the hollow stem through which undisturbed sampling is conducted.
HA - Hand Auger: 4-inch or less diameter.

Sample Types

ST - Shelby Tube: Thin-walled tube samples of cohesive soils (ASTM D1587).
SS - Split Spoon with 140 lb. manual hammer: Standard penetration test and split-barrel samples (ASTM D1586).
SSA - Split Spoon with 140 lb. automatic hammer: Standard penetration test and split-barrel samples (ASTM D1586).
DC - Drive Cone: Dynamic in-place testing of soil using a 2-inch diameter cone with a 60 degree point driven into the soil for continuous 1-foot intervals in the same manner as Split Spoon, no sample is obtained.
C - Core: Sampling hard soil or bedrock with a diamond core barrel in a rotary drill boring (ASTM D2113).
SPT - Standard Penetration Test: Number of blows required to drive sampler (split spoon or drive cone) into the soil with a 140-pound weight dropping a distance of 30-inches (ASTM D1586), number of blows recorded for each 6-inch interval in an 18-inch (or more) penetration depth, values shown are for each 6-inch interval (if series of number sets are shown) or a total of the last two 6-inch intervals (if only one number is shown) which is commonly referred to as "N" in blows per foot. High resistance is indicated by a high number of blows for a lesser penetration depth listed in inches.
BS - Bulk Sample: Disturbed.
CPT - Cone Penetration Test: Quasi-static in-place testing of soils using a 60 degree cone and friction sleeve which are steadily pushed into the soil and measure skin friction and end bearing (ASTM D3441).

STANDARD LABORATORY TESTING

Representative undisturbed soil samples obtained by the Shelby Tube sampler were tested for moisture content (ASTM D2216), density (dry) and unconfined compressive strength (ASTM D2166) in the laboratory. Results of these tests appear on the respective Boring Logs. Additional soil testing including particle size analysis (ASTM D422) and Atterberg Limits (ASTM D4318) may be conducted, if necessary, to define in more detail pertinent soil characteristics for classification in accordance with the Unified Soil Classification System. Specialized laboratory tests (if conducted) to determine pertinent soil characteristics are discussed in the "Laboratory Testing" section of the report.

WATER LEVEL MEASUREMENT

Water levels indicated on the Boring Logs are the levels measured in the borings at the times indicated. In pervious soils, the indicated levels may reflect the location of groundwater. In low permeability soils, the accurate determination of groundwater levels is not possible with short term observations.

BORING LOG DESCRIPTION/LEGEND

(page 2 of 3)

DESCRIPTIVE SOIL CLASSIFICATION

Soil description is based on the Unified Classification System as outlined in ASTM Designations D-2487 and D-2488. This classification is primarily based upon visual and apparent physical soil characteristics, comparison with other soil samples, and our experience with the soil. Additional laboratory testing may be conducted, if necessary to define in more detail pertinent soil characteristics. The Unified Soil Classification group symbol shown on the boring logs corresponds with the group names listed below. The description includes soil constituents, moisture conditions, color and any other appropriate descriptive terms.

Group Symbol	Group Name	Group Symbol	Group Name	Group Symbol	Group Name	Group Symbol	Group Name
GW	Well-Graded Gravel	SW	Well-Graded Sand	CL	Lean Clay	CH	Fat Clay
GP	Poorly-Graded Gravel	SP	Poorly-Graded Sand	ML	Silt	MH	Elastic Silt
GM	Silty Gravel	SM	Silty Sand	OL	Organic Clay Organic Silt	OH	Organic Clay Organic Silt
GC	Clayey Gravel	SC	Clayey Sand			PT	Peat

RELATIVE PROPORTIONS			GRAIN SIZE TERMINOLOGY	
Descriptive Term(s) (Of components also present in sample)	Sand and Gravel % of Dry Weight	Fines % of Dry Weight	Major Component of Sample	Size Range
Trace	<15	<5	Cobbles	12 in. to 3 in. (300mm to 75mm)
With	15-30	5-12	Gravel	3 in. to #4 sieve (75mm to 4.75mm)
Modifier	>30	>12	Sand	#4 to #200 sieve (4.75mm to 0.074mm)
			Silt or Clay	Passing #200 sieve (.074 mm)

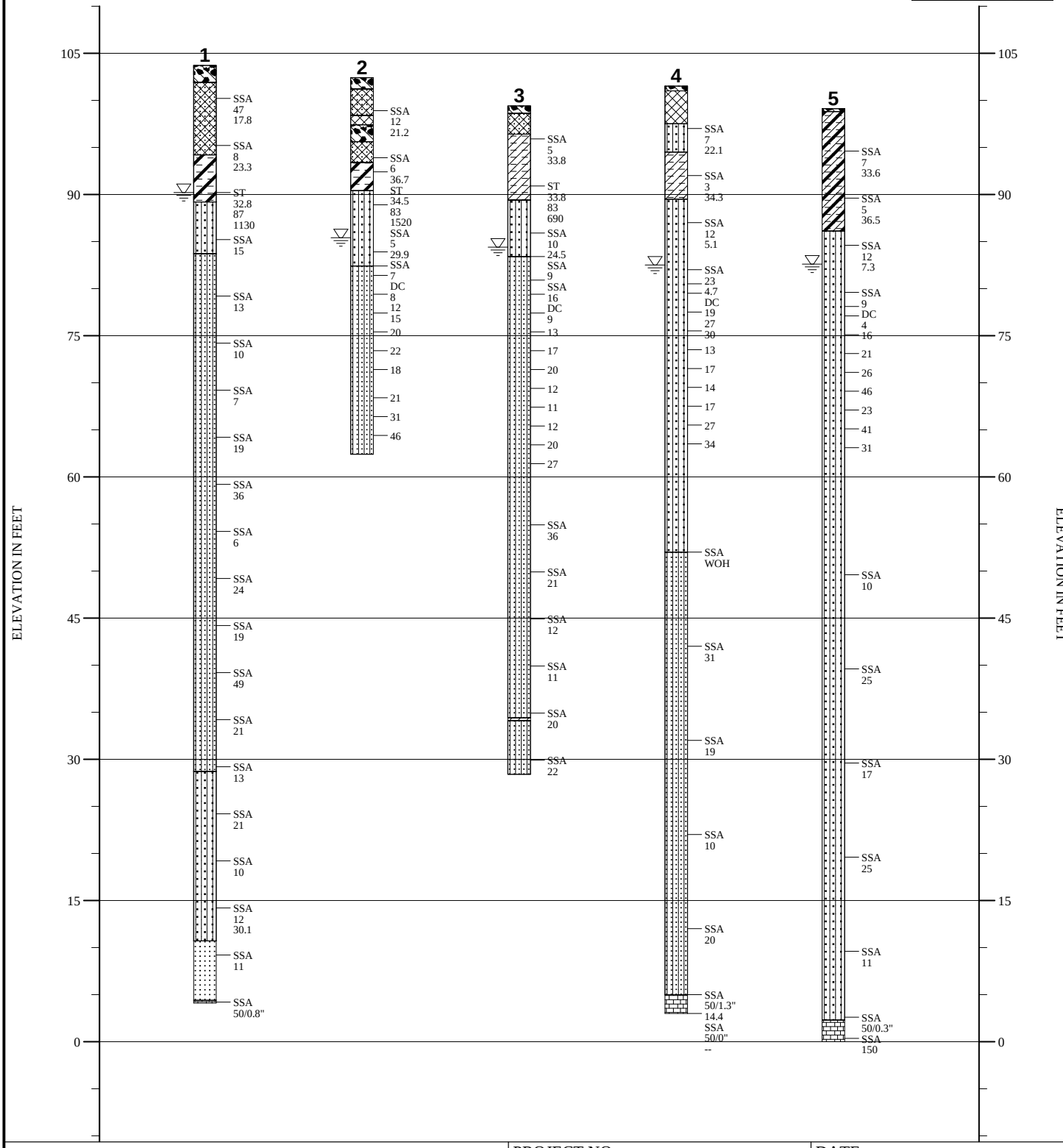
CONSISTENCY OF FINE-GRAINED SOILS			RELATIVE DENSITY OF COARSE-GRAINED SOILS	
Unconfined Compressive Strength, Qu, psf	Consistency	SPT, bpf	SPT, bpf	Relative Density
< 500	Very Soft	0-2	0-4	Very Loose
500-1,000	Soft	2-4	4-10	Loose
1,000-2,000	Medium Stiff	4-8	10-30	Medium Dense
2,000-4,000	Stiff	8-15	30-50	Dense
4,000-8,000	Very Stiff	15-30	50-80	Very Dense
8,000-16,000	Hard	30-100	80+	Extremely Dense
> 16,000	Very Hard	>100		

BORING LOG DESCRIPTION/LEGEND

ABBREVIATIONS

COMMONLY USED ABBREVIATIONS	
ft. or ' - feet	elev. - Elevation
in. or " - inches	% - Percent
psf - pounds per square foot	No. - Number
plf - pound per lineal foot	TB - Test Boring
pcf - pounds per cubic feet	N - blow count (SPT, bpf)
kip - 1000 pounds	USCS - Unified Soil Classification System
ksf - 1000 pounds per square foot	LL - Liquid Limit
klf - 1000 pounds per lineal foot	PL - Plastic Limit
tsf - tons per square foot	PI - Plasticity Index
bpf - blows per foot (SPT, N)	

PROFILE OF BORINGS



Strata symbols

- Crushed Rock
- Sand Fill
- Fat Clay Alluvium
- Silty Sand
- Poorly Graded Sand With Silt
- Poorly Graded Sand
- Limestone
- Lean Clay Fill
- Lean Clay Alluvium

PROJECT NO.: 211419	DATE: 1/18/2022
PROJECT: Heartland Coop Council Bluffs 2401 River Road Council Bluffs, Iowa	
PLATE: A-1	SCALE: 15 feet/in.

ALLENDER BUTZKE ENGINEERS, INC.

BORING LOG NO. 1

Project No.: **211419**

Project: **Heartland Coop Council Bluffs**
2401 River Road
Council Bluffs, Iowa

Client: **Heartland Coop**
2829 Westown Parkway, Suite 350
West Des Moines, Iowa 50266

Surface Elevation: **103.7'**
Datum: **Top of Ftg of Center Bin = 100.0'**

Date Drilled: **9/9/2021**
Drilling Depth, ft.: **99.6**

Drilling Method: **4" CFA/HSA**
Page: **1** of **1**

Elevation ft.	Depth ft.	Sample No.	Type	SPT bpf	Moisture Content, %	Dry Density pcf	Unconfined Compressive Strength psf	Material Description*	Graphic Log	USCS	Water Level	Depth / Elevation ft.
	0							**CRUSHED ROCK WITH FINES (21"±)**				1.8
		1	SSA	47	17.8			Brown clayey fine sand, trace limestone fragments, damp		SC		101.9
								FILL				9.5
		2	SSA	8	23.3			Dark gray after 7.5'		CH		94.2
90	15	3	ST		32.8	87	1130	Dark gray fat clay, moist **COHESIVE ALLUVIUM**			▽	14.5
		4	SSA	15				Gray silty fine sand, saturated		SM		89.2
		5	SSA	13				Gray fine to medium sand with silt after 20'		SP-SM		
75	30	6	SSA	10								
		7	SSA	7								
		8	SSA	19								
60	45	9	SSA	36								
		10	SSA	6								
		11	SSA	24				**GRANULAR ALLUVIUM**				
45	60	12	SSA	19								
		13	SSA	49								
		14	SSA	21								
30	75	15	SSA	13				Gray silty fine sand after 75'		SM		
		16	SSA	21								
		17	SSA	10								
15	90	18	SSA	12	30.1			Clay seams from 88' to 93'				
		19	SSA	11				Gray fine to medium sand after 93'		SP		99.3
		20	SSA	50/0.8"				Light gray limestone, damp				4.4
0	105							**BEDROCK** End of Boring				99.6 4.1

*The stratification lines represent the approximate boundary lines between material types: in-situ, the transition may be gradual.

Water Level Observation
Time: at completion _____ hrs. _____ days
Depth to water: **13.5CW** ft. ▽ _____ ft. ▼ _____ ft. ▼

ALLENDER BUTZKE ENGINEERS, INC.
Geotechnical | Environmental | Construction Q.C.

BORING LOG NO. 2

Project No.: **211419**

Project: **Heartland Coop Council Bluffs**
2401 River Road
Council Bluffs, Iowa

Client: **Heartland Coop**
2829 Westown Parkway, Suite 350
West Des Moines, Iowa 50266

Surface Elevation: **102.4'**
Datum: **Top of Ftg of Center Bin = 100.0'**

Date Drilled: **9/9/2021**
Drilling Depth, ft.: **40**

Drilling Method: **4" CFA/HSA**
Page: **1** of **1**

Elevation ft.	Depth ft.	Sample No.	Type	SPT bpf	Moisture Content, %	Dry Density pcf	Unconfined Compressive Strength psf	Material Description*	Graphic Log	USCS	Water Level	Depth / Elevation ft.
								CRUSHED ROCK WITH FINES (14"±)				1.2
		1	SSA	12	21.2			Brown silty fine to medium sand, damp		SM		101.2
								Very dark gray sandy lean clay, trace gravel from 4' to 5'		CL		9
		2	SSA	6	36.7			Gray fine crushed rock with fines, damp from 5' to 6.8'		CH		93.4
90		5	ST		34.5	83	1520	**FILL**		SM		12
	15	3	SSA	5	29.9			Dark gray after 6.8'			▽	90.4
		4	SSA	7				Gray fat clay, moist				
				8				**COHESIVE ALLUVIUM**		SP-SM		
				12				Dark gray silty fine sand, moist to very moist				
75				15				Saturated after 16'				
				20				Gray fine to medium sand with silt after 20'				
	30	6	DC	22				**GRANULAR ALLUVIUM**				
				18								
				21								
				31								
				46								40
60								End of Boring				62.4
	45											
45												
	60											
30												
	75											
15												
	90											
0												
	105											

*The stratification lines represent the approximate boundary lines between material types: in-situ, the transition may be gradual.

Water Level Observation

Time: at completion _____ hrs. _____ days

Depth to water: **17** ft. ▽ _____ ft. ▽ _____ ft. ▽

ALLENDER BUTZKE ENGINEERS, INC.

Geotechnical | Environmental | Construction Q.C.

BORING LOG NO. 3

Project No.: 211419

Project: **Heartland Coop Council Bluffs**
2401 River Road
Council Bluffs, Iowa

Client: **Heartland Coop**
2829 Westown Parkway, Suite 350
West Des Moines, Iowa 50266

Surface Elevation: **99.4'**
Datum: **Top of Ftg of Center Bin = 100.0'**

Date Drilled: **9/10/2021**
Drilling Depth, ft.: **71**

Drilling Method: **4" CFA/HSA**
Page: **1** of **1**

Elevation ft.	Depth ft.	Sample No.	Type	SPT bpf	Moisture Content, %	Dry Density pcf	Unconfined Compressive Strength psf	Material Description*	Graphic Log	USCS	Water Level	Depth / Elevation ft.
	0							**CRUSHED ROCK WITH FINES (9"±)**				0.8
		1	SSA	5	33.8			Brown clayey fine sand, trace gravel, moist		SC		98.6
								FILL		CL		3
90		2	ST	33.8	83	690		Dark gray lean clay, moist				96.4
								COHESIVE ALLUVIUM		CL		10
		3	SSA	10	24.5			Brown silty fine sand, moist		SM		89.4
	15	16	SSA	9				Saturated after 15.5'			▽	
		4	SSA	16				Gray fine to medium sand with silt after 16'		SP-SM		
				9				Gray after 16'				
75				13								
				17								
	30	5	DC	20								
				12								
				11								
				12								
				20								
60				27				**GRANULAR ALLUVIUM**				
	45	9	SSA	36								
		10	SSA	21								
45		11	SSA	12								
	60	12	SSA	11								
		13	SSA	20				Dark gray clay seam at 65'				
30		14	SSA	22								71
								End of Boring				28.4
	75											
15												
	90											
0												
	105											

*The stratification lines represent the approximate boundary lines between material types: in-situ, the transition may be gradual.

Water Level Observation
Time: at completion _____ hrs. _____ days
Depth to water: **15CW** ft. ▽ _____ ft. ▽ _____ ft. ▽

ALLENDER BUTZKE ENGINEERS, INC.
Geotechnical | Environmental | Construction Q.C.

BORING LOG NO. 4

Project No.: 211419

Project: **Heartland Coop Council Bluffs**
2401 River Road
Council Bluffs, Iowa

Client: **Heartland Coop**
2829 Westown Parkway, Suite 350
West Des Moines, Iowa 50266

Surface Elevation: **101.5'**
Datum: **Top of Ftg of Center Bin = 100.0'**

Date Drilled: **1/11/2022**
Drilling Depth, ft.: **98.5**

Drilling Method: **HSA**
Page: **1** of **1**

Elevation ft.	Depth ft.	Sample No.	Type	SPT bpf	Moisture Content, %	Dry Density pcf	Unconfined Compressive Strength psf	Material Description*	Graphic Log	USCS	Water Level	Depth / Elevation ft.
	0							**CRUSHED ROCK WITH FINES (6"±)**				0.5
								Brown and dark brown very sandy lean clay, moist		CL		101
		1	SSA	7	22.1			**FILL**		SM		4
								Brown silty fine sand, very moist		CL		97.5
90		2	SSA	3	34.3			Gray lean clay, very moist from 7' to 12'				
	15							Brown-gray after 12'				
		3	SSA	12	5.1							
		4	SSA	23	4.7						▽	
				19				Saturated after 21'				
				27								
75				30								
	30			13								
		12	DC	17								
				14								
				17								
				27								
				34								
60												
	45											
		5	SSA	WOH				Dark gray after 49.5'		SP-		
								GRANULAR ALLUVIUM		SM		
45												
	60	6	SSA	31								
		7	SSA	19								
30												
	75							Trace coarse sand and gravel after 75'				
		8	SSA	10								
15												
	90	9	SSA	20								
												96.5
		10	SSA	50/1.3"	14.4			Light gray limestone, damp				5
		11	SSA	50/0"	--			**BEDROCK**				98.5
0								End of Boring				3
	105											

*The stratification lines represent the approximate boundary lines between material types: in-situ, the transition may be gradual.

Water Level Observation
Time: at completion _____ hrs. _____ days
Depth to water: **19CW** ft. ▽ _____ ft. ▼ _____ ft. ▼

ALLENDER BUTZKE ENGINEERS, INC.
Geotechnical | Environmental | Construction Q.C.

BORING LOG NO. 5

Project No.: **211419**

Project: **Heartland Coop Council Bluffs**
2401 River Road
Council Bluffs, Iowa

Client: **Heartland Coop**
2829 Westown Parkway, Suite 350
West Des Moines, Iowa 50266

Surface Elevation: **99.1'**
Datum: **Top of Ftg of Center Bin = 100.0'**

Date Drilled: **1/12/2022**
Drilling Depth, ft.: **99.1**

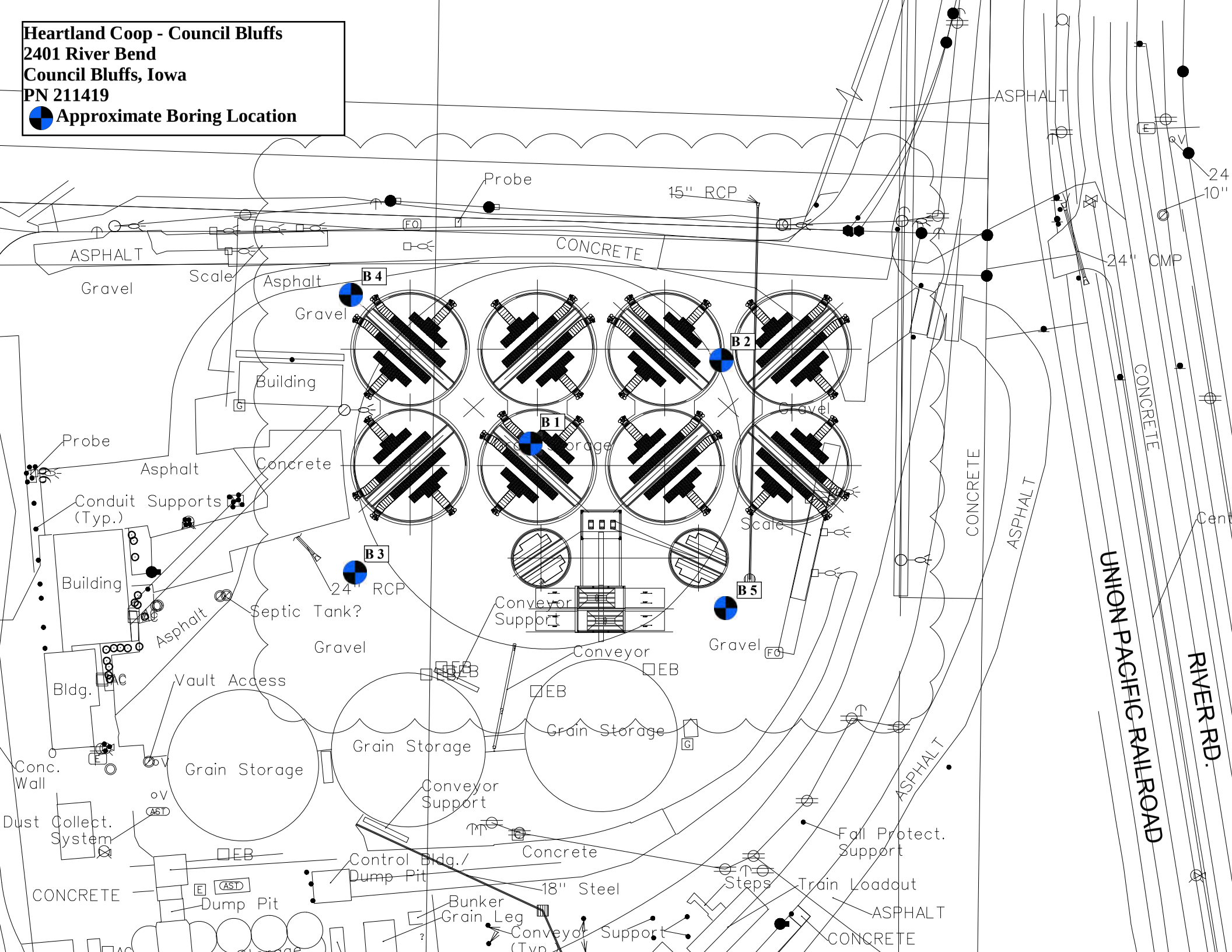
Drilling Method: **HSA**
Page: **1** of **1**

Elevation ft.	Depth ft.	Sample No.	Type	SPT bpf	Moisture Content, %	Dry Density pcf	Unconfined Compressive Strength psf	Material Description*	Graphic Log	USCS	Water Level	Depth / Elevation ft.
	0							**CRUSHED ROCK WITH FINES (3"±)**				0.3
		1	SSA	7	33.6			Dark gray lean to fat clay, moist		CL-CH		98.8
								With sand after 5.5'				
90		2	SSA	5	36.5			**COHESIVE ALLUVIUM**				13
	15	3	SSA	12	7.3			Brown silty fine sand, moist		SM		86.1
								Dark gray and saturated after 16'			▽	
		4	SSA	9								
75				4								
				16								
				21								
	30	12	DC	26								
				46								
				23								
				41								
60				31								
	45											
		5	SSA	10								
45								**GRANULAR ALLUVIUM**				
	60	6	SSA	25								
30		7	SSA	17								
	75											
		8	SSA	25								
15												
	90	9	SSA	11				Trace coarse sand and gravel after 90.5'				
												96.8
		10	SSA	50/0.3"				Light gray limestone, damp				2.3
0		11	SSA	150				**BEDROCK**				99.1
	105							End of Boring				0

*The stratification lines represent the approximate boundary lines between material types: in-situ, the transition may be gradual.

Water Level Observation
Time: at completion _____ hrs. _____ days
Depth to water: **16.5CW** ft. ▽ _____ ft. ▽ _____ ft. ▽

ALLENDER BUTZKE ENGINEERS, INC.
Geotechnical | Environmental | Construction Q.C.


Heartland Coop - Council Bluffs
2401 River Bend
Council Bluffs, Iowa
PN 211419
Approximate Boring Location
B 1
B 2
B 3
B 4
B 5
ASPHALT
CONCRETE
Gravel
Probe
15" RCP
24" CMP
Scale
Asphalt
Building
Concrete
Conduit Supports (Typ.)
24" RCP
Septic Tank?
Conveyor Support
Conveyor
Vault Access
Bldg.
Grain Storage
Conc. Wall
Dust Collect. System
Control Bldg./ Dump Pit
Concrete
18" Steel
Bunker
Grain Leg
Fall Protect. Support
Steps
Train Loadout
UNION PACIFIC RAILROAD
RIVER RD.

NOTES

David Hoylman

From: Jeff Allen <jeff@mwmindustrial.com>
Sent: Tuesday, September 20, 2022 7:07 AM
To: David Hoylman
Subject: FW: Soils report for Council Bluffs, IA south ground piles

Follow Up Flag: Follow up
Flag Status: Completed

Categories: Saved to Windows Folder

Jeff Allen
MWM INDUSTRIAL
Office: 712-644-2711
Cell: 712-216-0537

From: Alex Roorda <ARoorda@heartlandcoop.com>
Sent: Monday, September 19, 2022 4:31 PM
To: Jeff Allen <jeff@mwmindustrial.com>; Tom Hauschel <THauschel@heartlandcoop.com>; Ron Groskreutz <RGroskreutz@heartlandcoop.com>
Subject: Fw: Soils report for Council Bluffs, IA south ground piles

---

From: Seth Hansen <hansen@abengineers.com>
Sent: Monday, September 19, 2022 4:30 PM
To: Alex Roorda <ARoorda@heartlandcoop.com>
Cc: Dave Logemann <logemann@abengineers.com>
Subject: RE: Soils report for Council Bluffs, IA south ground piles

Alex,

See our comment below…

It is our understanding deep pit structures for the flat storage building will be located 100 feet or more east of the existing railroad tracks which extends 200 +/- feet or more east of the existing levee. Therefore, in our opinion, instability of temporary excavations for deep pit structures that are located 300 feet or more from the levee will not impact the stability of the levee.

Seth Hansen, P.E.
Project Engineer

ALLENDER BUTZKE ENGINEERS INC.
GEOTECHNICAL • ENVIRONMENTAL • CONSTRUCTION Q. C.

SEPTEMBER 12, 2022 **PN 221311**

GEOTECHNICAL EXPLORATION

NEW STORAGE FACILITY
2401 RIVER ROAD
COUNCIL BLUFFS, IOWA

PERFORMED FOR

HEARTLAND COOPERATIVE
2829 WESTOWN PARKWAY, SUITE 350
WEST DES MOINES, IA 50266

HOOP
BUILDINGS

3660 109TH STREET • URBANDALE, IOWA 50322 • PHONE 515-252-1885 • FAX 515-252-1888

ALLENDER BUTZKE ENGINEERS INC.
GEOTECHNICAL • ENVIRONMENTAL • CONSTRUCTION Q. C.

September 12, 2022

Heartland Cooperative
2829 Westown Parkway, Suite 350
West Des Moines, IA 50266
Attn: Mr. Alex Roorda

RE: Geotechnical Exploration
New Storage Facility
2401 River Road
Council Bluffs, Iowa
PN 221311

Dear Mr. Roorda:

As authorized by you, Allender Butzke Engineers Inc. (ABE) has completed the geotechnical exploration for the above referenced project. The geotechnical exploration was conducted to evaluate physical characteristics of subsurface conditions with respect to design and construction of this project. The enclosed report summarizes the project characteristics as we understand them, presents the findings of the borings and laboratory tests, discusses the observed subsurface conditions, and provides geotechnical engineering recommendations for this project.

We appreciate the opportunity to provide our geotechnical engineering services for this project. If you have any questions or need further assistance, please contact us at your convenience. We are also staffed and equipped to provide construction testing and inspection services on this project as well as environmental site assessments.

Respectfully submitted,
ALLENDER BUTZKE ENGINEERS INC.

Seth Hansen, P.E.
Project Engineer

David Logemann, P.E.
Principal Engineer

I hereby certify that this engineering document was prepared by me or under my direct personal supervision and that I am a duly licensed Professional Engineer under the laws of the State of Iowa.

9/12/22

Seth A. Hansen, P.E. License Number 26401 Date

My license renewal date is December 31, 2023.

Pages covered by this seal: All Pages.

1 PC and Email Above

GEOTECHNICAL EXPLORATION

NEW STORAGE FACILITY
2401 RIVER ROAD
COUNCIL BLUFFS, IOWA

PN 221311

TABLE OF CONTENTS

GEOTECHNICAL EXPLORATION

NEW STORAGE FACILITY
2401 RIVER ROAD
COUNCIL BLUFFS, IOWA

PN 221311

September 12, 2022

PROJECT INFORMATION

Heartland Cooperative is planning the construction of a new grain storage facility at their existing operation in Council Bluffs, Iowa. It is our understanding the new storage facility will consist of 2 buildings with approximate plan dimensions of 180 by 380 feet. Perimeter walls will consist of 18 feet tall cast-in-place concrete retaining walls. We understand the stored grain pile inside the building may be as tall as 55 to 60 feet above final grade near the center of the buildings.

Structural loads were provided by Nick Hoerr with Macon Construction. Mr. Hoerr indicated floor loads along the north and south walls will be on the order of 850 to 900 pounds per square foot with higher loads on the order of 1,300 to 1,400 pounds per square foot expected along the east and west exterior walls. Higher floor pressures on the order of 2,300 to 2,700 psf are anticipated near the central portion of the building. Along the exterior walls a maximum toe pressure of 2,600 pounds per square foot is expected due to overturning.

The area where the new building will be located has been used for the outdoor storage of grain. LiDAR elevation contours indicate grain may have been piled as high as 30 feet above existing grade at some locations. The site is currently rock surfaced and gently sloping with existing grades varying from between elevations 974 and 979 feet. Based on a discussion with Alex Roorda, it is our understanding final grades will be within 2 +/- feet of existing grades. Therefore, we assume cut depths and new fill thicknesses of 2 feet or less may be required to achieve desired final grades. Below grade loadout pits and reclamation tunnels are also planned at this site which may be 7 to 15 feet deep.

FIELD EXPLORATION

Four borings and five cone penetration tests (CPTs) were conducted at this site to depths between 30 and 40 feet below existing grades on July 11 and 12, 2022. Approximate locations of

the borings are shown on the enclosed Site Plan. Boring locations were selected by Heartland Coop personnel. The locations and ground surface elevations were determined by ABE using GPS survey equipment. The boring surface elevations, indicated on the enclosed Boring Logs, were Iowa Real-Time Network (RTN) derived. Methods of drilling, sampling, standard laboratory testing, and classifying of subsurface materials are discussed in the Boring Log Description/Legend pages of the Appendix.

SUBSURFACE CONDITIONS

Soil Profile

Detailed descriptions of soils encountered by this exploration are provided on the Boring Logs enclosed in the Appendix. The Profile of Borings (Plates A-1, A-2, and A-3) presented in the Appendix depicts the relative deposit elevations in the borings. Following is a discussion of the subsurface materials encountered in the borings. Unless otherwise indicated, the depths of soil stratum and groundwater levels are referenced from below existing grade at the individual boring locations at the time of drilling.

In general, the borings encountered about 1 foot of crushed limestone at the ground surface. Stiff to very stiff existing fill consisting of clayey fine sand (SC), silty fine to medium sand (SM), and lean to fat clay (CL-CH) was present below the crushed rock surface layer. The fill extended to depths between 3.5 and 5.5 feet.

Cohesive alluvium consisting of medium stiff to stiff lean clay (CL), lean to fat clay (CL-CH), and soft to medium stiff fat clay (CH) underlaid the fill in most borings. The compressible cohesive alluvium deposits extended to depths between 6.8 and 12 feet and were generally thicker on the north and east quarter of the site.

Granular alluvium consisting of loose to medium dense silty fine sand (SM) and fine to medium sand with silt (SP-SM) underlaid the cohesive alluvium. The sand extended to the depths of the borings and CPTs which were conducted to depths of 30 to 40 feet. Boring and CPT data would suggest the sand was saturated below depths of 12 to 13 feet.

Groundwater Level Observations

The borings were monitored during and shortly after drilling operations to detect moisture seepage and groundwater accumulation. The results of our groundwater level observations are noted on the Boring Logs enclosed in the Appendix.

During drilling operations, saturated sand was encountered between depths of 12 and 13.5 feet below existing grades in Boring Nos. 2, 6, and 8. Groundwater accumulation was observed between depths of 12.5 and 13.5 feet in Boring Nos. 2 and 8. Boring No. 4 was caved-in and wet near a depth of 6 feet. These short-term water levels are not necessarily a true indication of the groundwater table. Long-term observations would be necessary to accurately define the groundwater variations at this site.

Fluctuation of groundwater levels can occur due to seasonal variations in the amount of rainfall, surface drainage, subsurface drainage, site topography, irrigation practices, ground cover (pavement or vegetation), and stage of the adjacent Missouri River.

ANALYSIS AND RECOMMENDATIONS

Existing Fill

Existing fill soils were encountered at the ground surface extending to depths between 3.5 to 5.5 feet below existing grades. Boring information indicates that fill sections were generally moist and exhibited stiff to very stiff consistencies. However, other undocumented fill exhibiting less desirable support characteristics could be present in other unexplored areas. Without documented background of the fill placement, there would be some risk associated with constructing settlement sensitive structures on existing fill.

The most conservative and most reliable approach to the undocumented existing fill present at this site would be to over-excavate the existing fill and replace it with new engineered compacted fill. Boring information would suggest over-excavation depths of 3.5 to 5.5 feet may be required to completely remove the existing fill although deeper fill could be encountered in other unexplored areas. The on-site soils would be suitable for reuse as engineered compacted fill if moisture conditioned.

Considering the semi-flexible nature of this structure and the stiff to very stiff existing fill encountered at the boring locations, it may not be unreasonable for the Owner to consider supporting new structures over further tested and evaluated existing fill. After site stripping and prior to placement of fill, we recommend extensive geotechnical probing, proof-roll testing, and observations be conducted by an ABE geotechnical engineer during construction to further note suitability and support capability of the existing soils beneath the proposed building. If any deficient zones are encountered within the fill, we recommend that an over-excavation and backfill procedure be implemented. It should be recognized that test probing is intended to reduce the

frequency of inadvertently constructing over deficient soils, but because of the methods and practical extent (3 feet deep) of hand probing, not all deficient zones may be detected and corrected, especially in the lower portions of fill, which would still leave the owner accepting the risk of less desirable building and structure performance.

Site Preparation and Grading

The area where the borings were conducted encountered 1 foot of crushed rock at the ground surface. Existing grades existing grades in this area vary from between elevations 974 and 979 feet. Based on a discussion with Mr. Roorda it is our understanding final grade may be within 2 +/- feet of existing grade. Therefore we anticipate cut depths and new fill thicknesses of 2 feet may be required to achieve desired final grades. Prior to the placing of concrete floors or pavements on this site, or before any fill is placed, the loose granular material should be stripped. The granular material could be stockpiled and re-used as general fill.

Outside the rock surfaced areas where vegetation is present, we expect that a minimum stripping depth of 6 inches will be required. The stripping depths may vary due to localized variations in vegetation cover and subgrade stability. The strippings could be used for landscaping purposes in non-critical areas where support for foundations, floor slabs, and pavements is not required. The subgrade should then be proof-rolled to delineate zones of soft soils present near the surface which may require additional removal or compaction.

We recommend cohesive or cohesionless soils, free of rubble and organics, be used as compacted fill. Inorganic existing soil such as the existing fill, cohesive alluvium, and granular alluvium would be suitable soil types for general fill applications. The fat clay (CH) cohesive alluvium soils are moderately expansive and should not be present within 2 feet of movement sensitive structures.

The following Table A lists recommended minimum compaction requirements for cohesive and cohesionless fill materials in specific applications. For cohesive soils, moisture contents within a range of -1 to +4 percent of the material's optimum moisture content are necessary to achieve the desired fill qualities. Soil compacted closer to its optimum moisture content will exhibit greater stability under repeated construction traffic.

TABLE A
RECOMMENDED DEGREE OF COMPACTION GUIDELINES

Construction Application	Standard Proctor (ASTM D698) Cohesive Soil	Standard Proctor (ASTM D698) Cohesionless Soil	*Relative Density (D4253 & D4254) Cohesionless Soil
Class 1	95%	98%	70%
Class 2	90%	93%	45%
Class 3	85%	88%	20%

Class 1 - Subgrade for building foundations, slabs-on-grade, pavements and other critical backfill areas.
Class 2 - Backfill adjacent to structures not supporting other structures - Minor subsidence possible.
Class 3 - Backfill in non-critical areas - Moderate subsidence possible.

*Use Relative Density technique (ASTM D4253 & D4254) where Standard Proctor technique (ASTM D698) does not result in a definable maximum dry density and optimum moisture content.

The on-site soils can be excavated utilizing conventional excavation equipment. Granular soils can generally be suitably compacted with vibratory compaction equipment whereas cohesive soils are more suitable for compaction with sheepsfoot or pneumatic type compactors. Care should be exercised in properly backfilling and compacting all trenches, especially utility trenches under or adjacent to the pavement. Loosely compacted or sand backfilled trenches can collect surface water and inadvertently direct it to the pavement subgrade and cause softening of the soil as well as increasing frost heave potential.

At the time of this geotechnical exploration, moisture contents of the existing fill were generally near the recommended moisture content range for compaction. Moisture contents of the deeper cohesive alluvium were generally above to well above the optimum moisture content for compaction. Depending upon precipitation levels prior to and during construction, adjustment of soil moisture content may be required in order to lower or raise the moisture to within the recommended moisture content range. Controlled wetting and discing may be necessary to raise soil moisture content of dry soils. Discing and aeration is generally the most economical method to lower soil moisture content, if climatic conditions allow. Chemical modification (drying) of very moist soils with Class C fly ash, Portland cement, or quicklime can be accomplished if construction scheduling does not permit field drying. Common chemical modification methods may not be reactive when temperatures are near or below 40° Fahrenheit if grading or fill placement at the site will be conducted during colder weather.

Excavation Stability and Dewatering

Boring information indicates shallow excavations at this site will encounter both cohesive and granular soils. If excavations encounter only cohesive soils with no wet sand seams or layers, it is expected that the water seepage can be controlled by permitting it to drain into temporary construction sumps and be pumped outside the perimeter of the excavations.

More extensive dewatering such as sand points and wells may be required for excavations which extend down into water bearing sand layers generally below depths of 7 to 12 feet such as excavations for the dump pit and unloading tunnels. We recommend that prior to excavating in saturated sand, water levels be maintained 2 feet or more below the bottom of excavations in saturated sand to prevent upward seepage forces which could reduce subgrade support.

The extent of bracing or sloping of open cut excavations will be dependent upon depth of cut, groundwater conditions, soils encountered, length of time the excavation will be open, area available for excavation and local governing regulations. Predominately cohesive soils may appear to stand nearly vertical in shallow excavations for short periods of time. However, soil creep, surcharge loads, precipitation, subsurface moisture seepage, construction activity vibrations and other factors may cause these soils to cave within an unpredictable period of time. Excavations encountering sand may tend to cave rapidly, especially if water is flowing through the sand. Unstable granular excavation walls may also cause surrounding cohesive soils to become unstable. Temporary shoring, flattening of the excavation slopes or use of trench boxes may be required to maintain a safe condition. Determining the appropriate OSHA classifications of the soil types encountered and implementing the required provisions for sloping, shoring, and bracing of excavations throughout the project during construction are the responsibility of the contractor per OSHA.

Depending on river levels at the time of construction more extensive groundwater seepage may be encountered in excavations for below grade structures resulting in a higher risk for instability, especially during high water periods. In our opinion, if Missouri River flood conditions should overwhelm temporary excavation during construction the potential area of impact would have dimensions on the order of 3 times the depth of excavation (i.e., a perimeter of 45 feet). When backfilling below grade structures we recommend cohesive soils be reused for compacted backfill in the upper 10 feet to maintain the existing general floodplain soil profile of clay over sand.

Foundation Design

It is our understanding the proposed structures will consist of an 18 feet tall reinforced concrete retaining wall. Typical plans provided by Macon Construction indicate the bottom width

of the cast-in-place wall may vary between 11 and 18 feet wide. Structural loads were provided by Nick Hoerr with Macon Construction. Mr. Hoerr indicated floor loads along the north and south walls will be on the order of 850 to 900 pounds per square foot with higher loads on the order of 1,300 to 1,400 pounds per square foot expected along the east and west exterior walls. Higher floor pressures on the order of 2,300 to 2,700 psf are anticipated near the central portion of the building. Along the exterior walls a maximum toe pressure of 2,600 pounds per square foot due to overturning is also expected.

During a phone call with Mr. Phil Endress of Macon Construction, Mr. Endress indicated the exterior walls can tolerate up to 4 inches of total settlement with a maximum of 2 inches of differential settlement over 150 feet. It is also our understanding the center of the floors can tolerate up to 8 inches of total settlement with a maximum of 4 inches of differential settlement between the exterior wall and center of floors and reclamation tunnels.

We estimate exterior walls bearing on stiff further evaluated existing fill or new engineered compacted fill may experience total settlements on the order of 2 to 3 inches with differential settlements on the order of 1 to 2 inches. We estimate the heavily loaded interior floor slabs may experience total settlements on the order of 4 to 6 inches near the center of the buildings with differential settlements between the foundation walls and center of the floor on the order of 2 to 4 inches. Based on the provided total and differential settlement tolerances we assume this magnitude of total and differential settlements would be acceptable. We estimate the majority of the estimated settlement will occur within 1 to 2 months of the storage facility being filled with grain for the first time.

To reduce the risk of increased differential settlement, structures should be spaced and footings constructed to avoid bearing on deep wall backfill of adjacent below grade structures, such as pits, etc. Similarly, where over-excavation and compacted crushed rock will be utilized to improve support for proposed structures, adjacent structures should be spaced at a sufficient distance to avoid bearing on significantly differing subsurface materials, i.e., partially supported on natural clays and partially supported on deep compacted crushed rock.

As discussed in the ***Existing Fill*** section there would be some risk associated with constructing new structures over the existing fill at this site. To provide uniform support below foundation walls, we recommend foundation walls bear on a minimum of 3 feet of stiff further evaluated existing fill or new engineered compacted fill, pending the Owner's decision regarding existing fill. Where soft soils are encountered within 3 feet below the bottom of foundation level, such as may be encountered near Boring No. 8, we recommend the soft soils be over-excavated to a minimum depth of 3 feet below bottom of footing level and replaced with new engineered

compacted fill. Keeping final grades higher in elevation would be beneficial in reducing over-excavation of soft soils.

We understand the exterior retaining walls will generate a maximum toe pressure of 2,600 pounds per square foot due to overturning and an average pressure of less than 1,000 pounds per square foot. Typical plans provided by Macon indicate a compacted clean crushed rock will be provided below the outside toe of the retaining wall which will extend to frost-depth. In our opinion, foundations bearing on 2 feet or more of compacted clean crushed rock over stiff existing soils could be designed for a maximum net allowable soil bearing pressure of 3,000 pounds per square foot. The compacted crushed rock should extend outside the exterior footing edges a minimum of 2 feet. The remaining portion of the retaining wall could be constructed on 3 feet or more of stiff further tested and evaluated existing fill or new engineered compacted fill required to raise existing grades.

Continuous foundations should be adequately reinforced to limit deflections caused by non-uniform soil support characteristics. All exterior foundations and foundations in unheated areas should be placed a minimum of 3.5 feet below final grade to provide protection against frost penetration and reduce movements associated with changes in soil moisture content.

Observations and test probing of the foundation subgrade soils should be conducted by an ABE geotechnical engineer to determine that the soils are compatible with the design criteria. If zones of soft or otherwise unsuitable soils are encountered at foundation level, such as may be encountered near Boring No. 8 where soft cohesive alluvium soils may be present below wall foundations, we recommend an over-excavation and compacted backfill procedure be implemented. Over-excavations should extend 9 inches laterally in each direction beyond the foundation edges for each foot of over-excavation depth.

Floor Slab Support

Typical plans provided by Macon Construction indicate the interior floor slab may consist of Portland cement concrete may be 6 inches thick with No. 4 reinforcing bar at 16 inches on center each way. Interior floor slabs bearing on 1 foot or more of prepared existing cohesive subgrade can be designed for a modulus of subgrade reaction value of 100 pounds per cubic inch. If floor slabs will be supported on 6 inches or 12 inches of compacted crushed rock a higher modulus of subgrade reaction of 125 pci and 150 pci, respectively, could be used. Testing, observations and probing should be conducted during construction to delineate zones of soft soils which may require repair prior to concrete placement.

Subsurface Drainage and Buoyancy Considerations

Unloading tunnels and dump pits will be constructed below existing grades and will likely extend below the anticipated seasonal high groundwater table. It is our understanding the unloading tunnels may extend up to 9 feet below final grade and dump pits may extend up to 16 feet below final grade. Boring information would suggest the below grade tunnel and pit structures will likely extend into the granular alluvium. Groundwater levels in the granular alluvium would be similar to the elevation of the adjacent Missouri River. At the time of the field exploration river levels were near elevation 962 feet or approximately 13 to 17 feet below existing grades. Nearby river gauges indicate normal river levels generally fluctuate between elevations 960 and 970 feet.

Design of the below grade structures should include provisions to accommodate excess buoyant forces that will result from adjacent Missouri river flooding and high groundwater levels. The magnitude of excess buoyant forces acting on the base of a structure will depend on the differential height between flood/groundwater levels and base of the structure, differential heights being proportional to excess buoyant forces. Foundation design provisions may include engaging sufficient buoyant soil backfill and foundation weight to provide the necessary uplift resistance or installing partial or full-depth positive drainage below and/or adjacent to the structures.

If a drainage system is desired or buoyancy forces are to be reduced, the drainage system could consist of perforated or slotted rigid PVC pipes having a minimum diameter of 4 inches. These pipes should be spaced approximately 30 feet or less center to center and be surrounded by free draining granular material (less than 3 percent passing the No. 200 sieve). The granular material should be 12 or more inches thick. The 12-inch-thick drainage layer should be provided in addition to any granular working mat needed to facilitate construction since it may become plugged with fines during construction (see Figure No. 2 in the following *Lateral Earth Pressures* section of this report). The drainage system should be discharged to a suitable outlet such as sump pumps or a storm drain capable of handling the discharge.

Lateral Earth Pressures

Below grade walls constructed to retain soil should be designed to accommodate unbalanced lateral earth pressures. Estimated lateral earth pressures for cohesive and cohesionless (granular) backfill are presented in the following Table B. Active earth pressure design assumes that the wall can rotate and deflect at the top. If the wall is rigidly fixed, higher lateral earth pressures will develop against the wall and at-rest pressure parameters should be used for design. Increased earth pressures can also develop from restricted soil drainage, surcharge loads adjacent to the wall, and compaction of the adjacent backfill. Expansive materials (CH), either natural or backfill, should not be within 3 feet of below grade walls.

TABLE B
LATERAL EARTH PRESSURE PARAMETERS

Condition	Cohesive Soil (non-expansive clay)	Cohesionless Soil (Sand)	Cohesionless Soil (Crushed Rock)
Assumed Backfill Characteristics			
Approximate Total Density	130 pcf	120 pcf	130 pcf
Approximate Friction Angle	15^o - 20^o	30^o - 35^o	40^o - 45^o
Active Pressure Coefficient, K_a	0.5	0.3	0.2
At-Rest Pressure Coefficient, K_o	0.7	0.5	0.3
Passive Pressure Coefficient, K_p	2	3.3	5.2
Estimated Lateral Earth Pressure[1] (Equivalent Fluid Pressures)			
Active – Drained	65 pcf	35 pcf	25 pcf
Active - Undrained[2]	95 pcf	80 pcf	75 pcf
At-Rest – Drained	90 pcf	60 pcf	40 pcf
At-Rest - Undrained[2]	110 pcf	90 pcf	85 pcf
Passive – Drained	260 pcf	400 pcf	670 pcf
Passive - Undrained[3]	135 pcf	190 pcf	350 pcf

1) Assumes no safety factor, negligible wall friction, vertical wall, level backfill, zero surcharge loads and ignores cohesion shear strength.
2) Combined buoyant backfill unit weight and hydrostatic (water @ 62.4 pcf) loading.
3) Excludes hydrostatic loading.

Coefficient of sliding friction values of 0.3 may be used for Portland cement concrete on a cohesive subgrade. A higher coefficient of sliding friction value of 0.8 may be used for Portland cement concrete on a crushed rock subgrade. This ultimate value assumes no safety factor and design with this ultimate value should include a minimum factor of safety of 1.5.

It is our understanding compacted crushed rock will be placed to frost depth below the toe of the wall. To mobilize full passive resistance, the compacted crushed rock backfill should be wide enough to accommodate a backslope limit line of 2:1 (horizontal to vertical) or flatter extending out from the foundation toe. Utilizing a drain tile in front of the wall footing would also increase passive resistance by providing drained conditions.

Cohesionless (granular) backfill lateral earth pressure parameters may be used where granular backfill is installed behind the subsurface wall in accordance with the following Figure No. 2. The granular backfill should have a minimum width of 2 feet and be wide enough to accommodate the back slope limit line of 2:1 (vertical to horizontal) or flatter. The area between

the required minimum zone of granular material and the actual limits of excavation may be backfilled with either cohesive or granular soils.

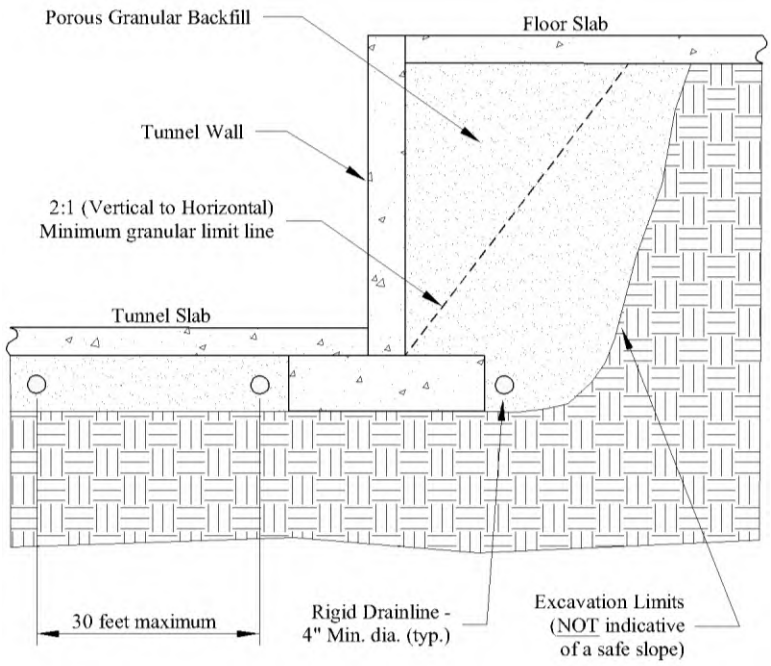


Figure No. 2 – Lateral Earth Pressures Example Section

Walls retaining fine-grained soils, and subjected to seasonally depressed temperatures, may be subject to long-term accumulative movement due to soil creep and freeze-thaw action. It is desirable to use free draining granular backfill behind such walls to minimize this movement. We recommend that a chimney of clean granular material (similar to Iowa DOT Specification 4131) be placed directly against the back of these walls and that the chimney be connected to a drain system. An acceptable drain system may be constructed using perforated pipe encased in clean granular material and sloped to sumps or storm drains.

Frost Heave

Key elements contributing to frost heave including freezing temperatures, available water, and fine-grained frost susceptible soils are generally present at sites in Iowa. As a result, frost heave problems are generally common (and most noticeable) in pavements or sidewalks adjacent to non-frost susceptible elements such as manholes, light poles, and exterior doors or frost protected stoops. Frost heave can cause pavement cracks to develop parallel to and several feet from curbs. This generally occurs where cleared paved areas exposed to freezing temperatures heave more than adjoining paved areas insulated by piled snow. Areas cleared of snow not exposed

to periodic sunshine during the winter, such as under canopies, on the north shaded side of buildings and other shaded areas may experience more frost heave than other sunshine exposed areas. Sometimes it is not readily apparent why frost heave problems occur at one location and not at another seemingly similar location.

While it is appropriate to implement measures to reduce frost heave such as insulation, replacing frost susceptible soils with less frost susceptible soils, void forms, sealing cracks/joints to reduce surface water infiltration, or drainage improvements (surface and subsurface), these measures may simply move the frost heave problem to a different location where preventative measures have not been implemented. Having a smooth transition between heaved and non-heaved areas is desirable, but may be difficult and/or costly to accomplish. We are available to consult with you to discuss options for your consideration to reduce frost heave potential on this project.

GENERAL

The analyses and recommendations in this report are based in part upon the data obtained from the soil borings performed at the indicated locations and from any other information discussed in this report. This report does not reflect any variations which may occur between borings or across the site. The nature and extent of such variations may not become evident until construction. If variations then appear evident, it will be necessary to reevaluate the recommendations of this report.

It is recommended that the geotechnical engineer be provided the opportunity to review the plans and specifications so that comments can be made regarding the interpretation and implementation of our geotechnical recommendations in the design and specifications. It is further recommended that the geotechnical engineer be retained for testing and observation during earthwork and foundation construction phases to help determine that the design requirements are fulfilled.

This report has been prepared for the exclusive use of our client for specific application to the project discussed and has been prepared in accordance with generally accepted geotechnical engineering practices. No warranty, expressed or implied, is made. In the event that any changes in the nature, design or location of the project as outlined in this report are planned, the conclusions and recommendations contained in this report shall not be considered valid unless the changes are reviewed and the conclusions of this report modified or verified in writing by the geotechnical engineer.

The scope of our service was not intended to include any environmental assessment or exploration for the presence of hazardous or toxic materials in the soil, surface water, groundwater or air on, below or adjacent to this site.

APPENDIX

BORING LOG DESCRIPTION/LEGEND

(page 1 of 3)

The material types encountered during the drilling operations were recorded on field logs. The profile represented on the Boring Log is based on final classification performed by a geotechnical engineer using the field logs, laboratory observation and testing. The material stratigraphy demarcation lines shown on the Boring Logs indicate changes in soil characteristics, however, actual soil changes or variations may occur as a gradual transition. Soil profile discussion, Log Boring information, water levels and recommendations presented in this report are based upon measured depths below ground levels existing at time of the field exploration, unless otherwise specified.

DRILLING AND SAMPLING

The borings were conducted with either a truck or all-terrain rotary drill rig using the drilling methods indicated on each Boring Log. Soil sampling and/or in-situ testing such as Shelby Tube (ST), split-spoon (SS), drive cone (DC), or core (C) was conducted at depth intervals which were selected in consideration of the characteristics of the proposed construction. Generally undisturbed soil samples are taken at 5 foot depth intervals or change in soil types. Disturbed soil samples from the auger, either jar size or bulk size samples, may be taken at intermediate intervals for the purpose of soil classification or laboratory testing. Borings conducted for soil classification only, will show no designation of sampling although disturbed sampling is performed. Soil samples obtained in the field were identified and sealed for transportation to the laboratory for performance of pertinent physical testing and engineering classification.

Drilling Methods

CFA - Continuous Flight Auger: 4, 6, or 8-inch diameter (ASTM D1452).
RD - Rotary Drilling: Using drilling fluid in cased or uncased boring (ASTM D2113).
HSA - Hollow Stem Auger: 6 or 8-inch diameter, continuous flight auger remains in boring with soil removed from the hollow stem through which undisturbed sampling is conducted.
HA - Hand Auger: 4-inch or less diameter.

Sample Types

ST - Shelby Tube: Thin-walled tube samples of cohesive soils (ASTM D1587).
SS - Split Spoon with 140 lb. manual hammer: Standard penetration test and split-barrel samples (ASTM D1586).
SSA - Split Spoon with 140 lb. automatic hammer: Standard penetration test and split-barrel samples (ASTM D1586).
DC - Drive Cone: Dynamic in-place testing of soil using a 2-inch diameter cone with a 60 degree point driven into the soil for continuous 1-foot intervals in the same manner as Split Spoon, no sample is obtained.
C - Core: Sampling hard soil or bedrock with a diamond core barrel in a rotary drill boring (ASTM D2113).
SPT - Standard Penetration Test: Number of blows required to drive sampler (split spoon or drive cone) into the soil with a 140-pound weight dropping a distance of 30-inches (ASTM D1586), number of blows recorded for each 6-inch interval in an 18-inch (or more) penetration depth, values shown are for each 6-inch interval (if series of number sets are shown) or a total of the last two 6-inch intervals (if only one number is shown) which is commonly referred to as "N" in blows per foot. High resistance is indicated by a high number of blows for a lesser penetration depth listed in inches.
BS - Bulk Sample: Disturbed.
CPT - Cone Penetration Test: Quasi-static in-place testing of soils using a 60 degree cone and friction sleeve which are steadily pushed into the soil and measure skin friction and end bearing (ASTM D3441).

STANDARD LABORATORY TESTING

Representative undisturbed soil samples obtained by the Shelby Tube sampler were tested for moisture content (ASTM D2216), density (dry) and unconfined compressive strength (ASTM D2166) in the laboratory. Results of these tests appear on the respective Boring Logs. Additional soil testing including particle size analysis (ASTM D422) and Atterberg Limits (ASTM D4318) may be conducted, if necessary, to define in more detail pertinent soil characteristics for classification in accordance with the Unified Soil Classification System. Specialized laboratory tests (if conducted) to determine pertinent soil characteristics are discussed in the "Laboratory Testing" section of the report.

WATER LEVEL MEASUREMENT

Water levels indicated on the Boring Logs are the levels measured in the borings at the times indicated. In pervious soils, the indicated levels may reflect the location of groundwater. In low permeability soils, the accurate determination of groundwater levels is not possible with short term observations.

BORING LOG DESCRIPTION/LEGEND

(page 2 of 3)

DESCRIPTIVE SOIL CLASSIFICATION

Soil description is based on the Unified Classification System as outlined in ASTM Designations D-2487 and D-2488. This classification is primarily based upon visual and apparent physical soil characteristics, comparison with other soil samples, and our experience with the soil. Additional laboratory testing may be conducted, if necessary to define in more detail pertinent soil characteristics. The Unified Soil Classification group symbol shown on the boring logs corresponds with the group names listed below. The description includes soil constituents, moisture conditions, color and any other appropriate descriptive terms.

Group Symbol	Group Name	Group Symbol	Group Name	Group Symbol	Group Name	Group Symbol	Group Name
GW	Well-Graded Gravel	SW	Well-Graded Sand	CL	Lean Clay	CH	Fat Clay
GP	Poorly-Graded Gravel	SP	Poorly-Graded Sand	ML	Silt	MH	Elastic Silt
GM	Silty Gravel	SM	Silty Sand	OL	Organic Clay Organic Silt	OH	Organic Clay Organic Silt
GC	Clayey Gravel	SC	Clayey Sand			PT	Peat

RELATIVE PROPORTIONS			GRAIN SIZE TERMINOLOGY	
Descriptive Term(s) (Of components also present in sample)	Sand and Gravel % of Dry Weight	Fines % of Dry Weight	Major Component of Sample	Size Range
Trace	<15	<5	Cobbles	12 in. to 3 in. (300mm to 75mm)
With	15-30	5-12	Gravel	3 in. to #4 sieve (75mm to 4.75mm)
Modifier	>30	>12	Sand	#4 to #200 sieve (4.75mm to 0.074mm)
			Silt or Clay	Passing #200 sieve (.074 mm)

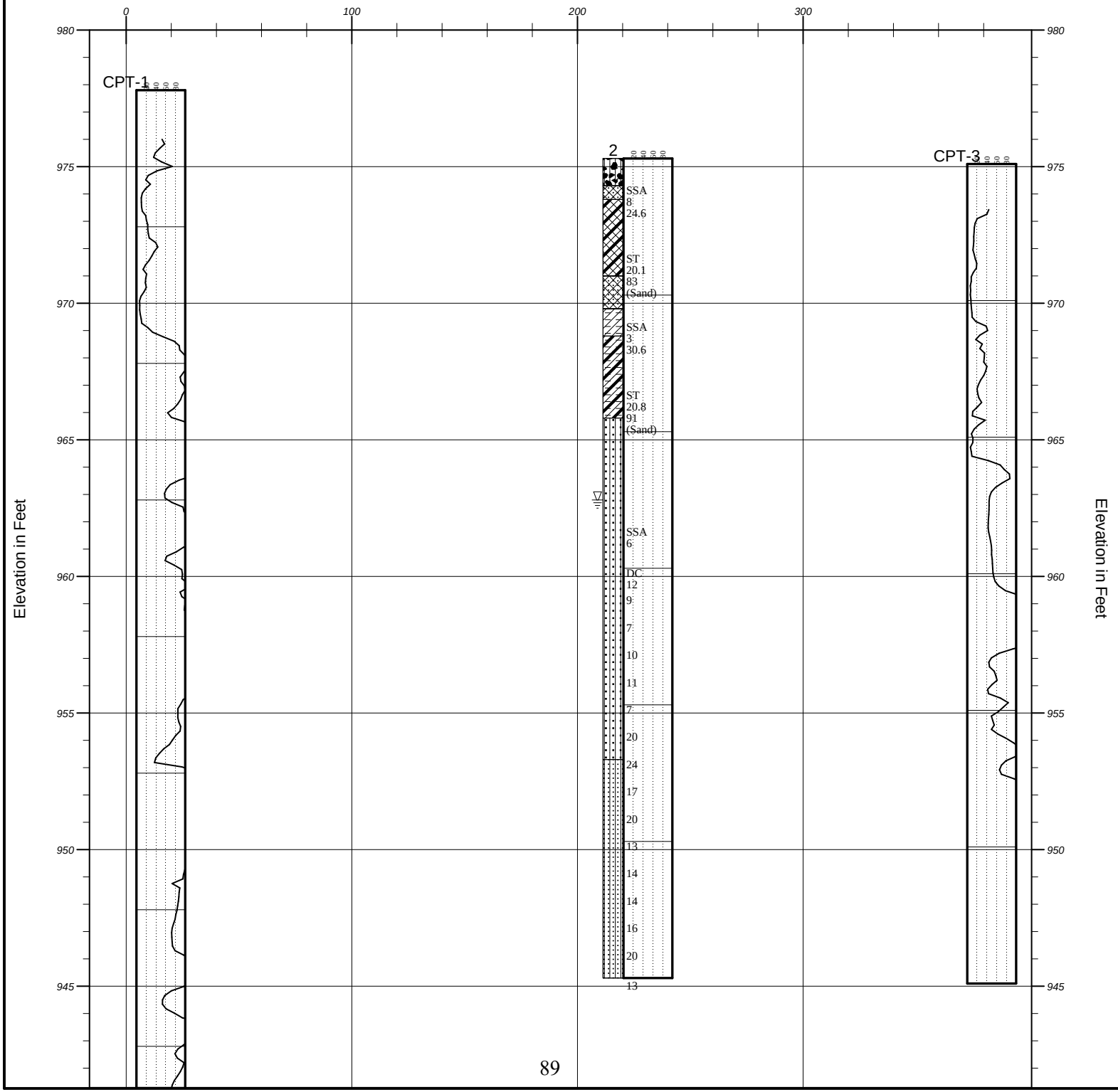
CONSISTENCY OF FINE-GRAINED SOILS			RELATIVE DENSITY OF COARSE-GRAINED SOILS	
Unconfined Compressive Strength, Qu, psf	Consistency	SPT, bpf	SPT, bpf	Relative Density
< 500	Very Soft	0-2	0-4	Very Loose
500-1,000	Soft	2-4	4-10	Loose
1,000-2,000	Medium Stiff	4-8	10-30	Medium Dense
2,000-4,000	Stiff	8-15	30-50	Dense
4,000-8,000	Very Stiff	15-30	50-80	Very Dense
8,000-16,000	Hard	30-100	80+	Extremely Dense
> 16,000	Very Hard	>100		

BORING LOG DESCRIPTION/LEGEND

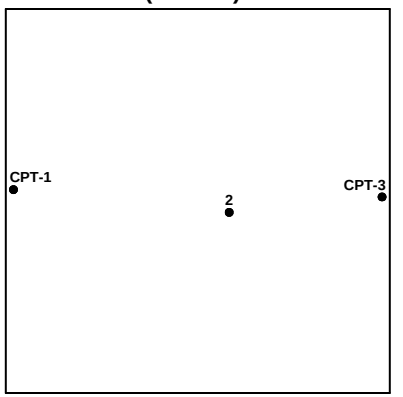
ABBREVIATIONS

COMMONLY USED ABBREVIATIONS	
ft. or ' - feet	elev. - Elevation
in. or " - inches	% - Percent
psf - pounds per square foot	No. - Number
plf - pound per lineal foot	TB - Test Boring
pcf - pounds per cubic feet	N - blow count (SPT, bpf)
kip - 1000 pounds	USCS - Unified Soil Classification System
ksf - 1000 pounds per square foot	LL - Liquid Limit
klf - 1000 pounds per lineal foot	PL - Plastic Limit
tsf - tons per square foot	PI - Plasticity Index
bpf - blows per foot (SPT, N)	

PROFILE OF BORINGS



Plan View (NORTH)



Profile of Borings Legend

Symbol	Description
Strata symbols	
	Crushed Rock or Gravel
	Sand Fill
	Lean to Fat Clay Fill
	Lean Clay Alluvium
	Lean to Fat Clay Alluvium
	Silty Sand
	Poorly Graded Sand With Silt
Misc. Symbols	
	Water table at completion

ALLENDER BUTZKE ENGINEERS, INC.

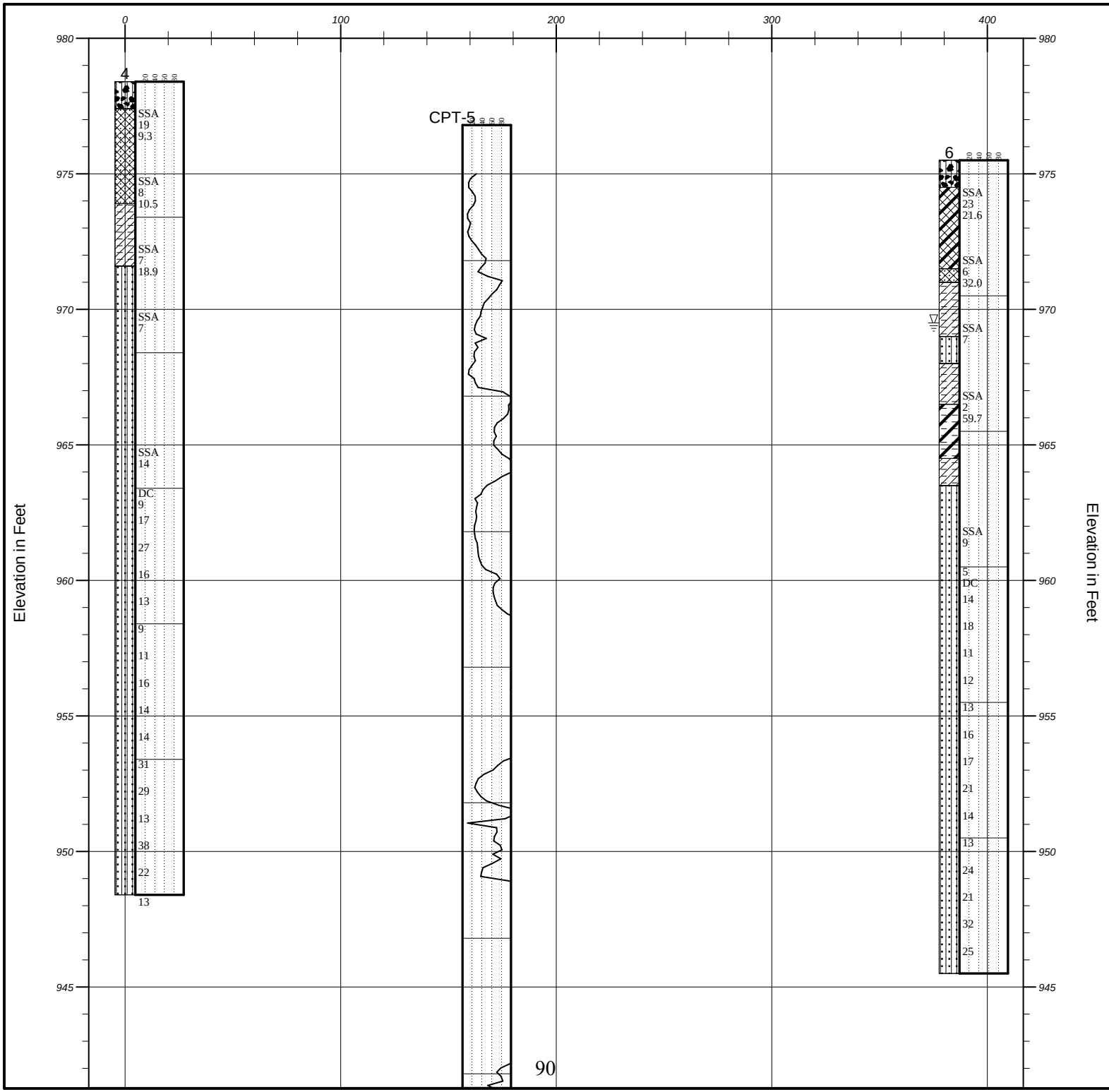
New Storage Facility
2401 River Road
Council Bluffs, Iowa

PN 221311

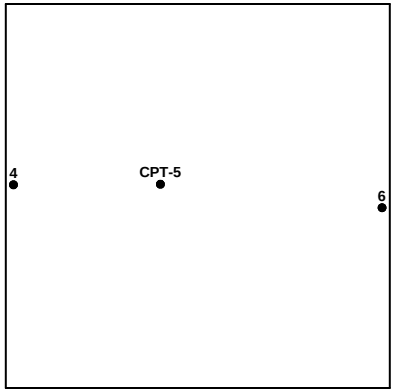
Vertical Scale: 1 inch = 5 feet

Plate A-1

PROFILE OF BORINGS



Plan View (NORTH)



Profile of Borings Legend

Symbol	Description
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	Sand Fill
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	Fat Clay Alluvium
Misc. Symbols	
	Water table at completion

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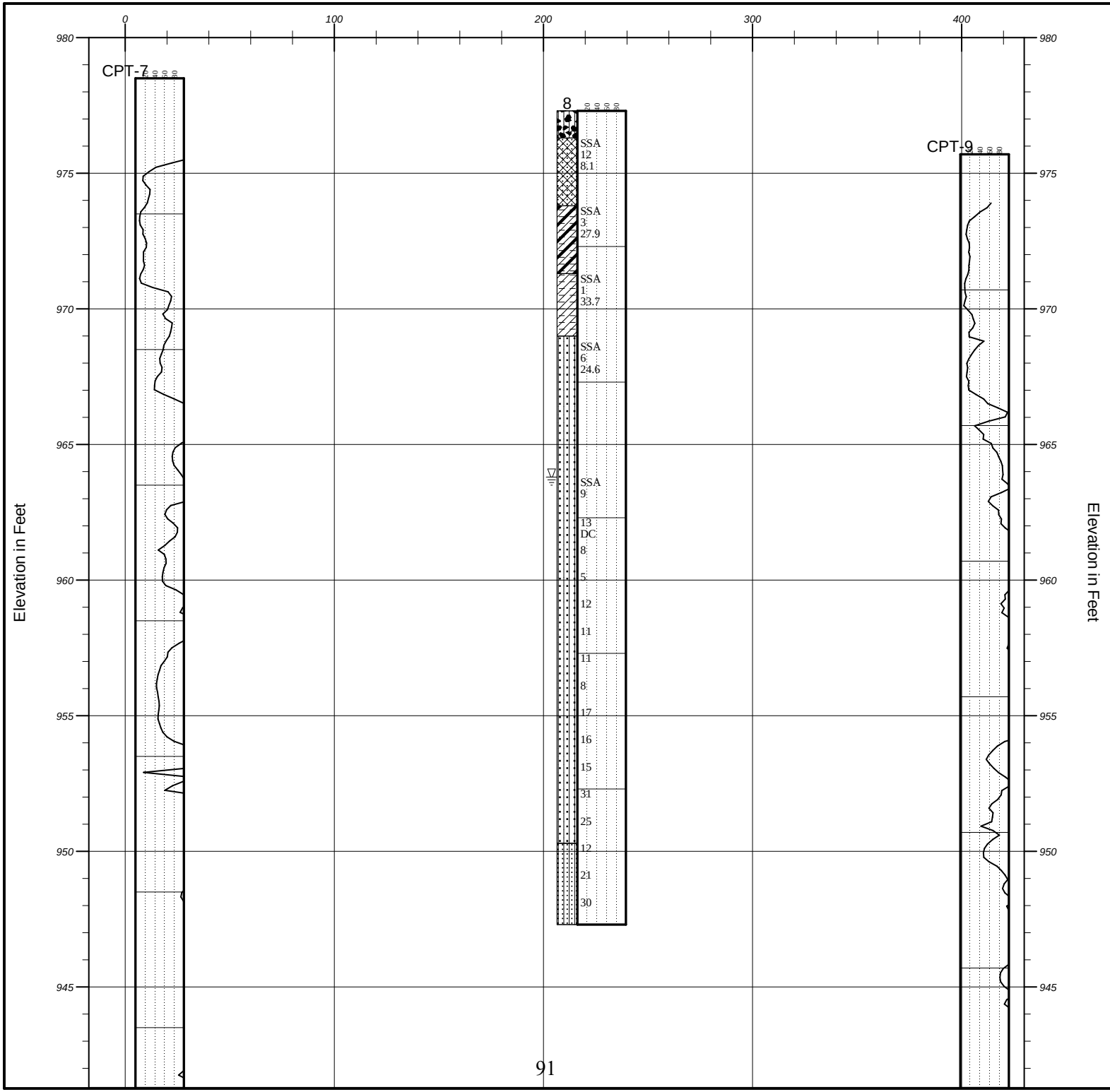
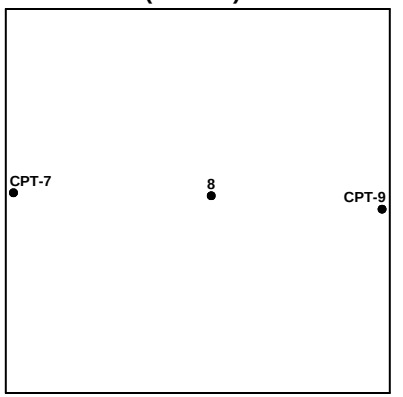
Plate

PROFILE OF BORINGS



Plan View (NORTH)



Profile of Borings Legend

Symbol	Description
Strata symbols	
	Crushed Rock or Gravel
	Sand Fill
	Lean to Fat Clay Alluvium
	Lean Clay Alluvium
	Silty Sand
	Poorly Graded Sand With Silt
Misc. Symbols	
	Water table at completion

ALLENDER BUTZKE ENGINEERS, INC.

New Storage Facility
2401 River Road
Council Bluffs, Iowa

PN 221311

Vertical Scale: 1 inch = 5 feet

Plate A-3

BORING LOG NO. 2

Project No.: 221311

Project: **New Storage Facility**
2401 River Road
Council Bluffs, Iowa

Client: **Heartland Cooperative**
2829 Westown Parkway, Suite 350
West Des Moines, IA 50266

Surface Elevation: **975.3'**
Datum: **IA RTN**

Date Drilled: **7/12/2022**
Drilling Depth, ft.: **30**

Drilling Method: **4" CFA**
Page: **1** of **1**

Elevation ft.	Depth ft.	Sample No.	Type	SPT bpf	Moisture Content, %	Dry Density pcf	Unconfined Compressive Strength psf	Material Description*	Graphic Log	USCS	Water Level	Depth / Elevation ft.
975	0							**CRUSHED LIMESTONE (12"+/-)**				1
		1	SSA	8	24.6			Dark brown silty fine sand, damp		SM		974.3
								Gray lean to fat clay, moist after 1.5'		CL-CH		
								FILL				
		2	ST		20.1	83	(Sand)	Sandy after 3.5'				
970	5							Brown silty fine sand, damp from 4.3' to 5.5'		SM		5.5
								Dark brown-gray very sandy lean clay, moist		CL		969.8
		3	SSA	3	30.6			Brown-gray lean to fat clay after 6.5'		CL-CH		
								COHESIVE ALLUVIUM				
		4	ST		20.8	91	(Sand)	Very sandy after 8.5'		CL		9.5
965	10							Brown-gray silty fine sand, moist		SM		965.8
								Saturated below depths of 12.5'			▽	
		5	SSA	6				Trace wood fragments near 13'				
960	15			12								
				9								
				7				Dark gray ater 17'				
				10								
				11				**GRANULAR ALLUVIUM**				
955	20			7								
				20								
		6	DC	24				Dark gray fine to medium sand, trace gravel after 22'		SP-SM		
				17								
				20								
950	25			13								
				14								
				14								
				16								
				20								30
945	30			13				End of Boring				945.3
940	35											

*The stratification lines represent the approximate boundary lines between material types: in-situ, the transition may be gradual.

Water Level Observation
Time: at completion _____ hrs. _____ days
Depth to water: **12.5** ft. ▽ _____ ft. ▼ _____ ft. ▼

ALLENDER BUTZKE ENGINEERS, INC.
Geotechnical | Environmental | Construction Q.C.

BORING LOG NO. 4

Project No.: 221311

Project: **New Storage Facility**
2401 River Road
Council Bluffs, Iowa

Client: **Heartland Cooperative**
2829 Westown Parkway, Suite 350
West Des Moines, IA 50266

Surface Elevation: **978.4'**
Datum: **IA RTN**

Date Drilled: **7/12/2022**
Drilling Depth, ft.: **30**

Drilling Method: **4" CFA**
Page: **1** of **1**

Elevation ft.	Depth ft.	Sample No.	Type	SPT bpf	Moisture Content, %	Dry Density pcf	Unconfined Compressive Strength psf	Material Description*	Graphic Log	USCS	Water Level	Depth / Elevation ft.
	0							**CRUSHED LIMESTONE (12"+/-)**				1
		1	SSA	19	9.3			Dark brown silty fine sand, damp		SM		977.4
								FILL				
975		2	SSA	8	10.5			Clayey fine sand after 3'		SC		4.5
	5							Dark brown sandy lean clay, moist		CL		973.9
		3	SSA	7	18.9			**COHESIVE ALLUVIUM**				6.8
970								Brown silty fine sand, moist		SM		971.6
		4	SSA	7								
	10							Clay seam near 11'				
965		5	SSA	14								
	15			9								
				17				Saturated below 16'				
				27								
960				16				**GRANULAR ALLUVIUM**				
				13								
	20			9								
				11								
		6	DC	16								
955				14								
				14								
	25			31								
				29								
				13								
950				38								
				22								
	30			13								30
								End of Boring				948.4
945												
	35											

*The stratification lines represent the approximate boundary lines between material types: in-situ, the transition may be gradual.

Water Level Observation

Time: at completion _____ hrs. _____ days

Depth to water: **CD6** ft. _____ ft. _____ ft.

ALLENDER BUTZKE ENGINEERS, INC.

Geotechnical | Environmental | Construction Q.C.

BORING LOG NO. 6

Project No.: 221311

Project: **New Storage Facility**
2401 River Road
Council Bluffs, Iowa

Client: **Heartland Cooperative**
2829 Westown Parkway, Suite 350
West Des Moines, IA 50266

Surface Elevation: **975.5'**
Datum: **IA RTN**

Date Drilled: **7/12/2022**
Drilling Depth, ft.: **30**

Drilling Method: **4" CFA**
Page: **1** of **1**

Elevation ft.	Depth ft.	Sample No.	Type	SPT bpf	Moisture Content, %	Dry Density pcf	Unconfined Compressive Strength psf	Material Description*	Graphic Log	USCS	Water Level	Depth / Elevation ft.
975	0							**CRUSHED LIMESTONE (12"+/-)**				1
		1	SSA	23	21.6			Gray sandy lean to fat clay, moist		CL-CH		974.5
								FILL				
		2	SSA	6	32.0			Dark brown fine sand from 4' to 4.5'				4.5
970	5							Dark brown to brown-gray lean clay, moist		CL		971
		3	SSA	7				Brown-gray silty fine sand from 6.5' to 7.5'		SM	▽	
								COHESIVE ALLUVIUM				
		4	SSA	2	59.7			Gray fat clay, moist after 9'		CH		
965	10							Very sandy lean clay after 11'		CL		12
								Gray silty fine sand, saturated		SM		963.5
		5	SSA	9								
960	15			5								
				14								
				18								
				11								
				12								
955	20			13				**GRANULAR ALLUVIUM**				
				16								
		6	DC	17								
				21								
				14								
950	25			13								
				24								
				21								
				32								
				25								
945	30							End of Boring				945.5
940	35											

*The stratification lines represent the approximate boundary lines between material types: in-situ, the transition may be gradual.

Water Level Observation
Time: at completion _____ hrs. _____ days
Depth to water: **6CW** ft. ▽ _____ ft. ▼ _____ ft. ▼

ALLENDER BUTZKE ENGINEERS, INC.
Geotechnical | Environmental | Construction Q.C.

BORING LOG NO. 8

Project No.: 221311

Project: **New Storage Facility**
2401 River Road
Council Bluffs, Iowa

Client: **Heartland Cooperative**
2829 Westown Parkway, Suite 350
West Des Moines, IA 50266

Surface Elevation: **977.3'**
Datum: **IA RTN**

Date Drilled: **7/12/2022**
Drilling Depth, ft.: **30**

Drilling Method: **4" CFA**
Page: **1** of **1**

Elevation ft.	Depth ft.	Sample No.	Type	SPT bpf	Moisture Content, %	Dry Density pcf	Unconfined Compressive Strength psf	Material Description*	Graphic Log	USCS	Water Level	Depth / Elevation ft.
	0							**CRUSHED LIMESTONE (12"+/-)**				1
975		1	SSA	12	8.1			Dark brown silty fine sand, moist **FILL**		SM		976.3 3.5
	5	2	SSA	3	27.9			Dark brown-gray lean to fat clay, very moist **COHESIVE ALLUVIUM**		CL-CH		973.8
970		3	SSA	1	33.7			Gray sandy lean clay after 6'		CL		8.3
	10	4	SSA	6	24.6			Brown silty fine sand, moist With interbedded clay seams after 10.5'		SM		969
965		5	SSA	9				Saturated after 13.5'			▽	
	15			13								
				8								
960				5								
				12				**GRANULAR ALLUVIUM**				
	20			11								
				11								
				8								
955		6	DC	17								
				16								
				15								
	25			31								
				25								
950				12				Gray fine to medium sand, trace gravel after 27'		SP-SM		
				21								
	30			30								30
								End of Boring				947.3
945												
	35											

*The stratification lines represent the approximate boundary lines between material types: in-situ, the transition may be gradual.

Water Level Observation

Time: at completion _____ hrs. _____ days

Depth to water: **13.5** ft. ▽ _____ ft. ▽ _____ ft. ▽

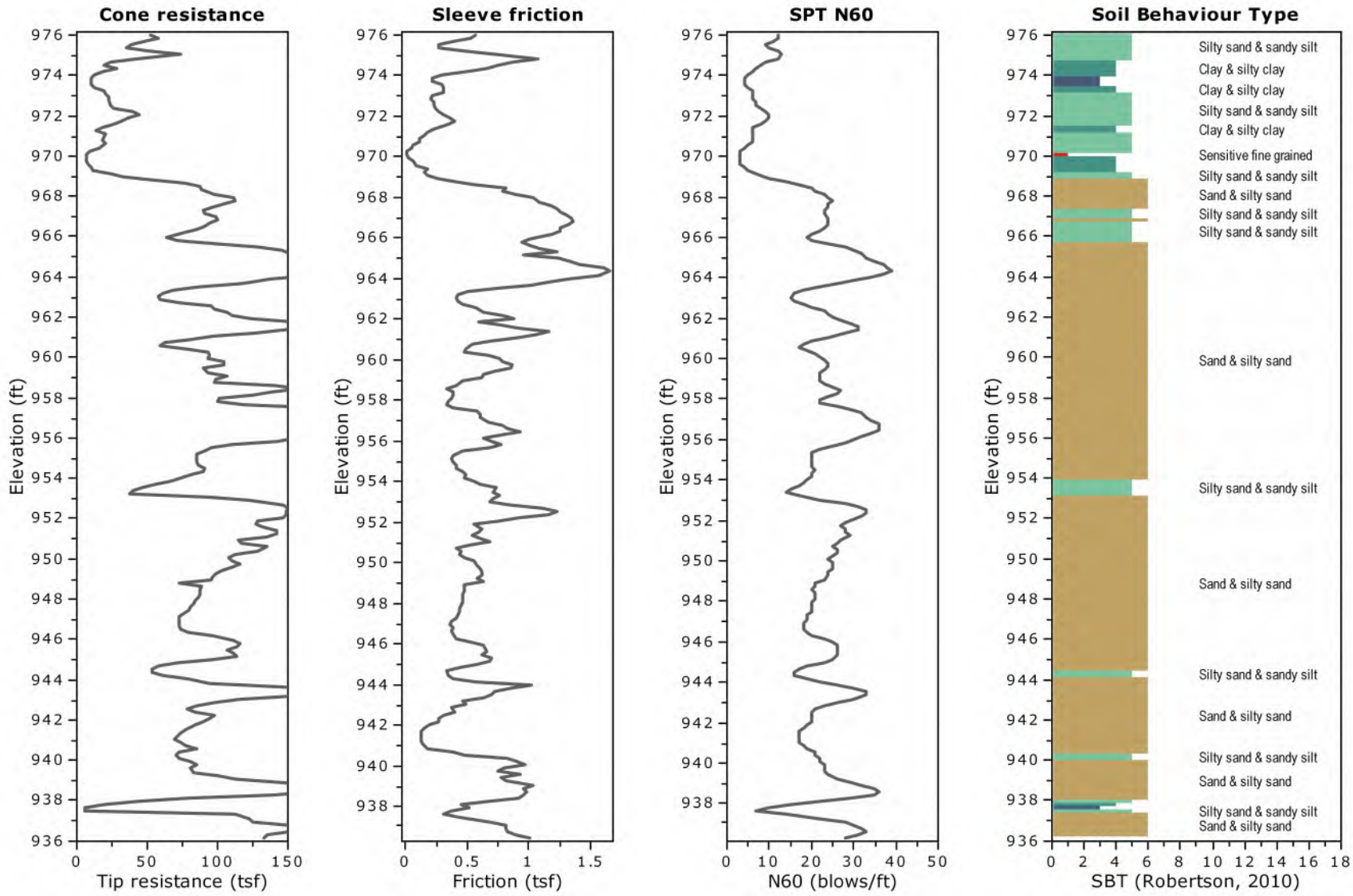
ALLENDER BUTZKE ENGINEERS, INC.

Geotechnical | Environmental | Construction Q.C.

Allender Butzke Engineers
3660 109th Street
Urbandale, IA 50322
www.abengineers.com

Project: New Storage Facility
Location: Council Bluffs, Iowa

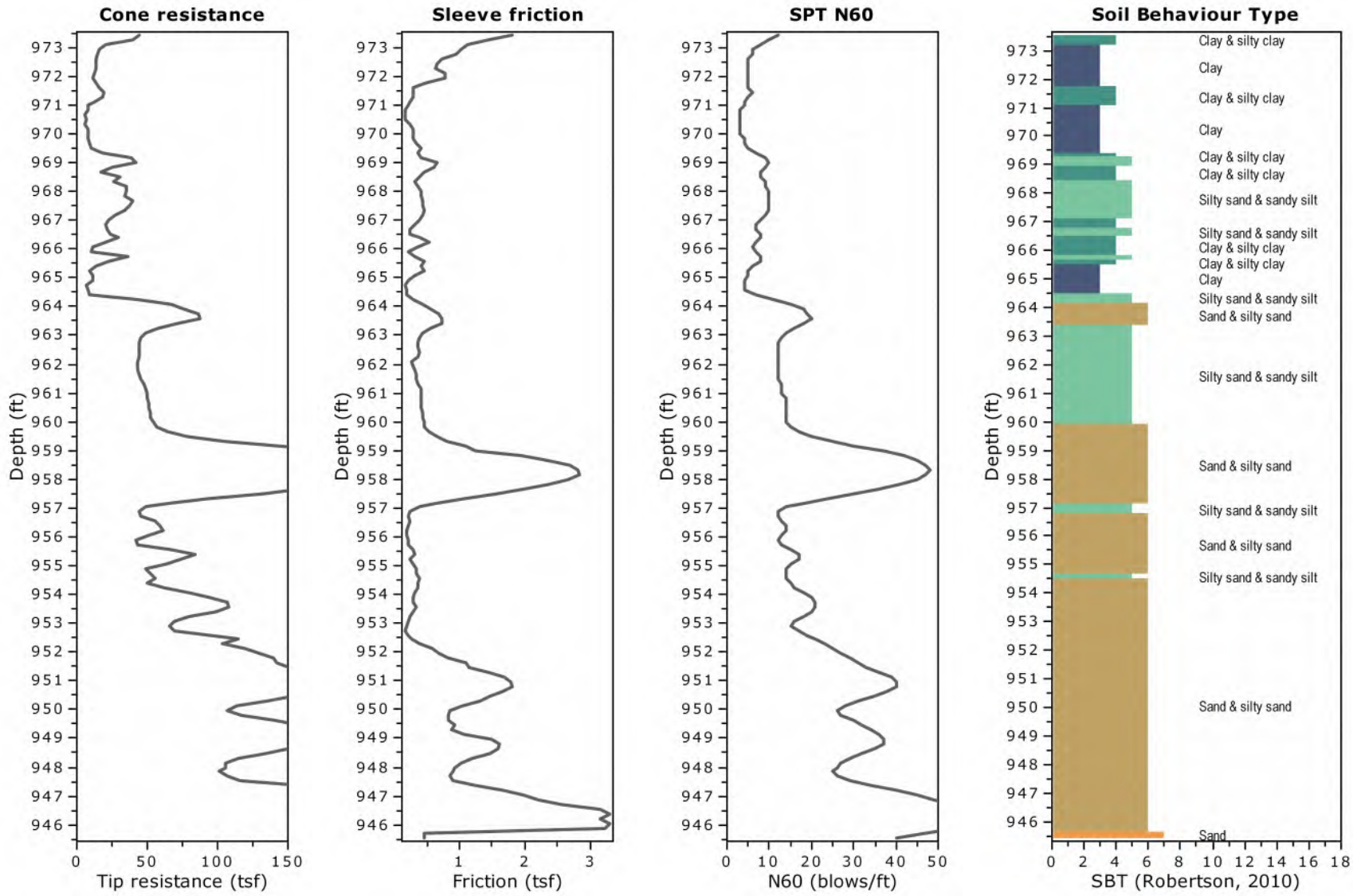
CPT: CPT-1
Total depth: 41.67 ft, Date: 7/15/2022
Surface Elevation: 977.80 ft
Coords: X:978238.80, Y:459574.20
Cone Type:
Cone Operator:



Allender Butzke Engineers
3660 109th Street
Urbandale, IA 50322
www.abengineers.com

Project: New Storage Facility
Location: Council Bluffs, Iowa

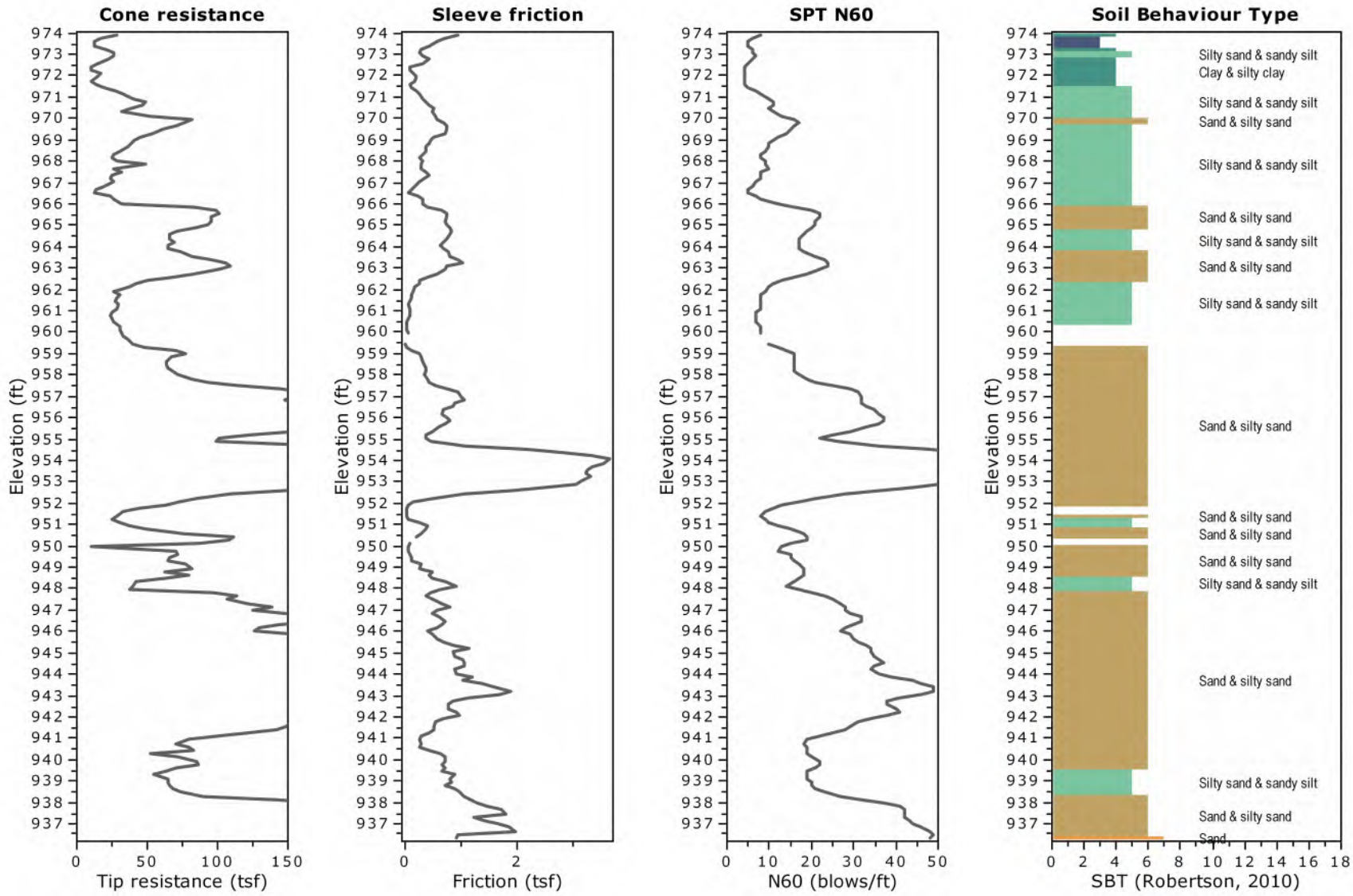
CPT: CPT-3
Total depth: 29.56 ft, Date: 7/15/2022
Surface Elevation: 975.10 ft
Coords: X:978606.90, Y:459566.90
Cone Type:
Cone Operator:



Allender Butzke Engineers
3660 109th Street
Urbandale, IA 50322
www.abengineers.com

Project: New Storage Facility
Location: Council Bluffs, Iowa

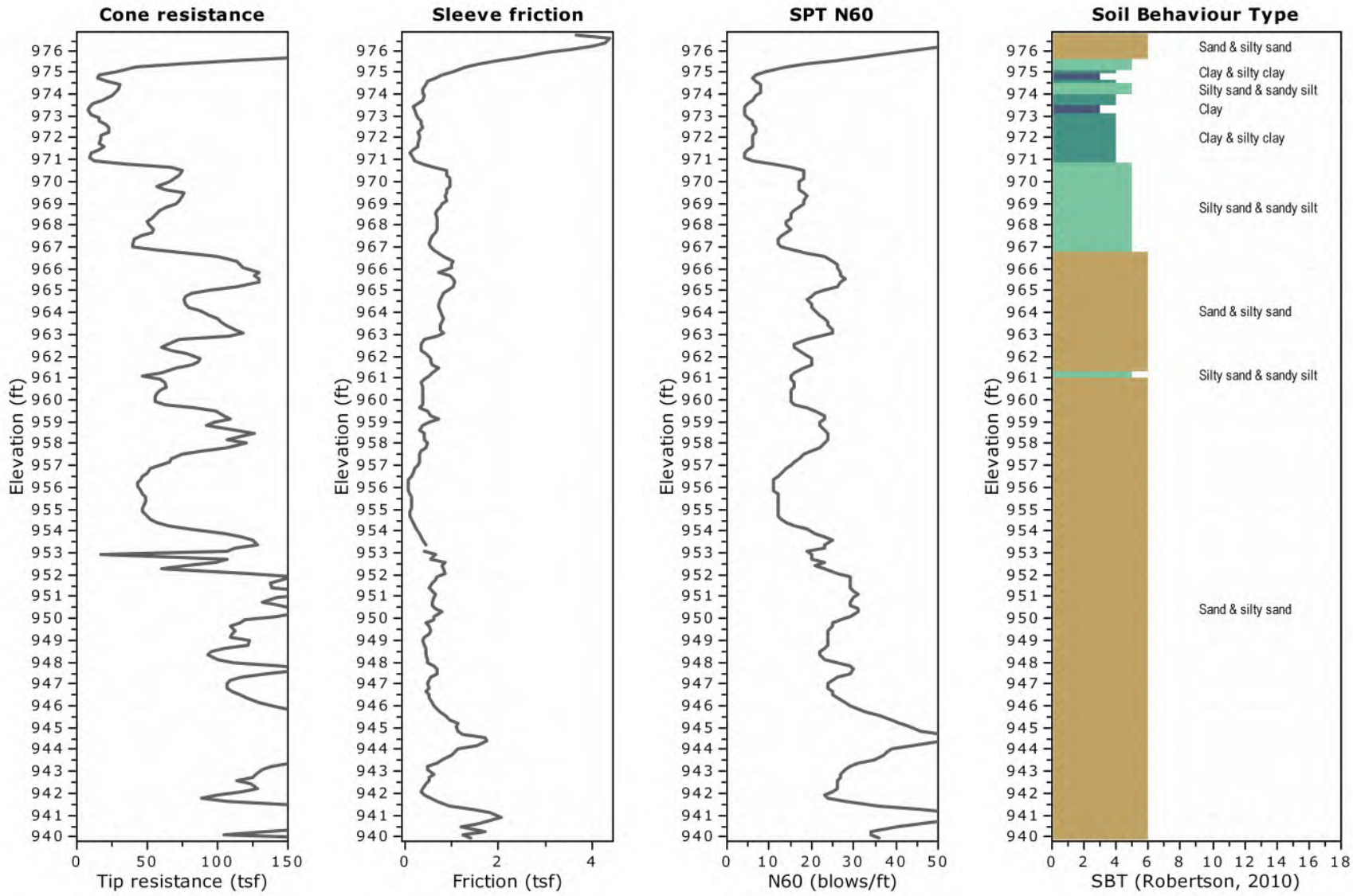
CPT: CPT-5
Total depth: 39.37 ft, Date: 7/15/2022
Surface Elevation: 975.70 ft
Coords: X:978379.30, Y:459428.00
Cone Type:
Cone Operator:



Allender Butzke Engineers
3660 109th Street
Urbandale, IA 50322
www.abengineers.com

Project: New Storage Facility
Location: Council Bluffs, Iowa

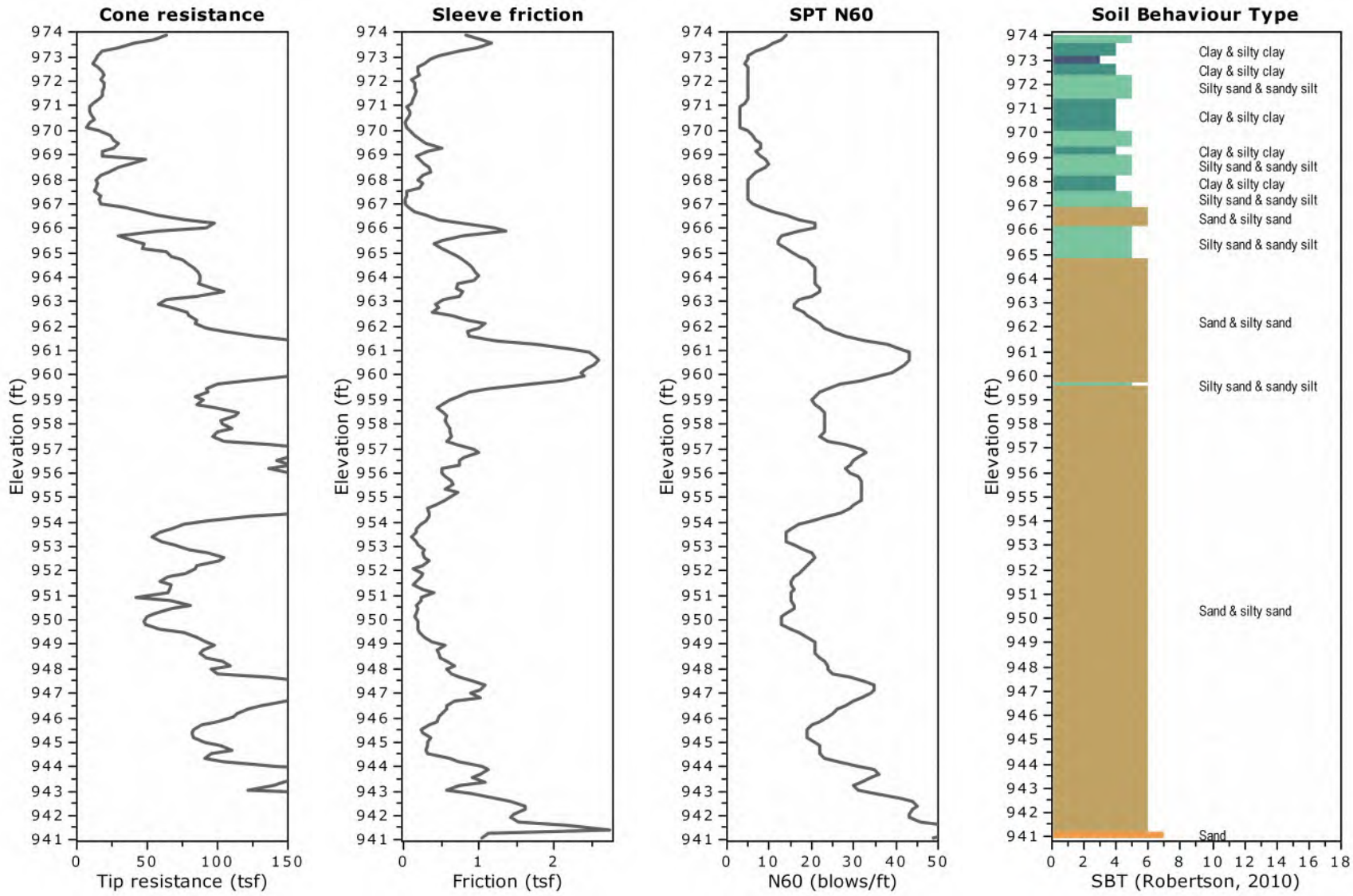
CPT: CPT-7
Total depth: 38.55 ft, Date: 7/15/2022
Surface Elevation: 978.50 ft
Coords: X:978228.10, Y:459199.80
Cone Type:
Cone Operator:



Allender Butzke Engineers
3660 109th Street
Urbandale, IA 50322
www.abengineers.com

Project: New Storage Facility
Location: Council Bluffs, Iowa

CPT: CPT-9
Total depth: 34.61 ft, Date: 7/15/2022
Surface Elevation: 975.70 ft
Coords: X:978622.20, Y:459182.30
Cone Type:
Cone Operator:



ALLENDER BUTZKE ENGINEERS INC.
3660 109th Street
Urbandale, IA 50322

New Storage Facility
Heartland Coop
Council Bluffs, IA

PN 221311

Site Plan

NOTES

Attachment 'I'

Drainage Study

For

City of Council Bluffs, IA

Heartland CO-OP Site Expansion
ABP Engineering

HGM Project No.: 105022

Prepared By:
HGM Associates Inc.
640 5th Avenue
Council Bluffs, Iowa 51501

September 2022

1. Site Characteristics

a. **Pre-Development Conditions.** The existing Heartland property consists of approximately 31-acres of an industrial site with multiple buildings, grain bins, grain storage piles and rail tracks.

Stormwater runoff from the site currently drains to several low spots and drainage ditches. It then flows to multiple outfall structures where runoff outlets into the Missouri River.

b. Post-Development Conditions. Proposed construction of 11 grain bins, 2 grain storage buildings, and conveyors with tower supports between the structures are planned on the existing site once all phases are completed. The proposed project adds a total permanent impervious area of 5.60 acres with the proposed structures being constructed in areas where grain was already being stored. See the attached site plan in the appendix for the proposed development.

c. Contributing Off-site Drainage. It is estimated that there is no contributing off-site drainage. The area surrounding consists of a levee, roadway, and drainage ditches preventing surrounding areas from draining towards the proposed site. Any development within the proposed site should not impact the current drainage patterns of the surrounding properties.

d. Floodways, Floodplains and Wetlands. According to the FEMA flood insurance rate map for Pottawattamie County, the proposed site is located within Zone X and listed as an area with reduced flood risk due to levee. (Map Item ID 19155C0560E).

According to the U.S. Fish and Wildlife Service National Wetlands Inventory, the proposed site development is not within any wetlands or other mapped areas.

2. Pre-Development Runoff Analysis

a. Watershed Areas. The pre-development watershed consists of one primary basin for drainage analysis purposes. The pre-development area collected in our site includes approximately 30.87 acres of runoff. These areas include approximately 10 acres of pervious open space with vegetative cover in fair to good condition. It also includes approximately 20.87 acres of impervious developed space with parking lots, roofs, and gravel roadways. The current run-off flows and exits the site through the River Road and Heartland outfall structures into the Missouri River.

b. Time of Concentration. The Tc value was determined to be 27.5 minutes for the longest watershed path. These included areas of sheet flow, shallow concentrated flow, and channel flow. A watershed length of 1063 feet was used for calculations.

c. Precipitation Method. The hydrologic data used for calculations came from rainfall Intensity Duration Frequency curves with design consideration for a 100-year storm event for a 24-hour storm duration. Rainfall precipitation amounts were used from the SUDAS design manual Section 2B-2.

d. **Rainfall Loss Method.** A Rational composite runoff coefficient C of 0.73 was calculated for the pre-developed site. This number is calculated as a percentage based on the different surfaces that cover the site.

e. **Runoff Model.** The Modified Rational Method for storm events was used to evaluate runoff and peak discharge. The Hydraflow Hydrographs Extension for Autodesk Civil 3D was used for calculating these values.

f. **Summary of Pre-Development Runoff.** A summary of pre-development runoff is included in Table 1. Hydrographs produced from Hydraflow for various storm events are included in the appendix.

Table 1. Hydrologic Runoff Summary

Size (Acres)	30.87
Predominant Land Use	Commercial
Watershed Length (Feet)	1063
Time of Concentration (Minutes)	27.5
Runoff Coefficient	0.73
Runoff (Q):	CFS
2-Year	52.72
5-Year	67.17
10-Year	79.26
25-Year	96.44
50-Year	110.08
100-Year	124.20

3. Post-Development Runoff Analysis

a. **Watershed Areas.** The post-development watershed consists of one primary basin for drainage analysis purposes. The post-development area collected in our site includes approximately 30.87 acres of runoff. These areas include approximately 9 acres of pervious open space with vegetative cover in fair to good condition. It also includes approximately 21.87 acres of impervious developed space with parking lots, roofs, and gravel roadways.

b. **Time of Concentration.** The Tc value was determined to be 27.5 minutes for the longest watershed path. These included areas of sheet flow, shallow concentrated flow, and channel flow. A watershed length of 1063 feet was used for calculations. The proposed development did not impact the longest watershed path resulting in the same Tc value as the pre-developed site.

c. **Precipitation Method.** The hydrologic data used for calculations came from rainfall Intensity Duration Frequency curves with design consideration for a 100-year storm event for a 24-hour storm duration. Rainfall precipitation amounts were used from the SUDAS design manual Section 2B-2.

d. Rainfall Loss Method. A Rational composite runoff coefficient C of 0.74 was applied to the post-developed site. This number is calculated as a percentage based on the different surfaces that cover the site. A slightly higher coefficient was used due to the increase in impervious area for the developed site.

e. Runoff Model. The Modified Rational Method for storm events was used to evaluate runoff and peak discharge. The Hydraflow Hydrographs Extension for Autodesk Civil 3D was used for calculating these values.

f. Summary of Post-Development Runoff. A summary of pre-development runoff is included in Table 2. Hydrographs produced from Hydraflow for various storm events are included in the appendix.

Table 2. Hydrologic Runoff Summary

Size (Acres)	30.87
Predominant Land Use	Commercial
Watershed Length (Feet)	1063
Time of Concentration (Minutes)	27.5
Runoff Coefficient	0.74
Runoff (Q):	CFS
2-Year	53.44
5-Year	68.09
10-Year	80.34
25-Year	97.76
50-Year	111.59
100-Year	125.90

4. Proposed Development Impacts

a. Stormwater Runoff. A pre and post development runoff analysis was conducted for the watershed area collected within the site. The proposed structures had no impact on the existing watershed area, so the same area was used for both sets of calculations. The largest change the proposed structures had on the runoff calculations was the addition of 5.6 acres of permanent impervious surfaces due to the roofs located on the structures. However, since most of the proposed structures will be built in graveled areas where grain was already being stored the total increase to the impervious area of the site is only 1.0 acre. This results in the composite runoff coefficient for the overall site only increasing from 0.73 up to 0.74. The location of the proposed structures also does not interfere with the current longest watershed path resulting at the same time of concentration for both scenarios.

Hydrographs were created for both the pre and post developed site to determine the difference in peak discharge of the storm water runoff. These were calculated for various storm events starting at 2-years and running at intervals up to a 100-year 24-hour storm event. Tables were put together showing the differences between the runoff for the pre

and post developed site at each calculated storm event. This resulted in a slight runoff increase of 0.72 cfs during a 2-year event and slowly rising to an increase of 1.7 cfs during a 100-year storm event. This equals approximately a 1.3% increase in the overall runoff across the site during the various storm events. Given the size of the site and the outfall structures already in place, this should result in a negligible impact on the current stormwater facilities to handle the expected rainfall runoff from the site. Calculations showing the hydrographs for each storm event can be found in the appendix.

b. Onsite Storage. During large storm events water may pool on the site at various low spots and ditches to minimal depths while the drainage works its way to one of the outlets to the Missouri River. During a flooding event along the Missouri River these outlets may be closed causing this water to be stored on site temporarily in these same low areas. The hatched areas shown on the site plan in the appendix represent these locations that could flood during a large storm event at depths of up to 3' if the drainage was not allowed to leave the site immediately. None of the proposed structures are located within these areas and should not have any impact on onsite flooding volumes during these events.

c. Water Quantity and Quality.

Several design considerations will also be included to address water quantity and quality. For water quantity all storm events shall be controlled to release at the pre-developed 5-year runoff rate with the ability to retain the 100-year 24-hour rain event in a gate closed situation. This will likely be done with the use of a detention pond and outlet structure located at one of the low points of the site. The pond could be sized to store the volume of runoff produced by a 100-year event and the outlet structure sized to reduce the outflow to a 5-year release rate. For water quality the first 1.25" of rainfall must be retained for 24 hours with a TSS reduction rate of 80%. This could also be achieved with the sizing and elevations of the detention pond. This could be done by having the outlet raised above the bottom of the pond providing storage for the first 1.25" event and allowing time for any sediments to settle out of the runoff.

5. **Summary.** Based on the finding of this analysis, the proposed developments to the site should have no impact on the current drainage patterns of the project site and surrounding areas. If any changes are made to the existing site or proposed development plan, a new analysis should be conducted to verify any potential impacts to the site drainage patterns. The attached appendix contains site plans and calculations that have been referenced throughout the report.

6. References.

a. Iowa Statewide Urban Design and Specifications (SUDAS) Design Manual, Chapter 2: Stormwater.

7. Appendix.

Hydrograph Return Period Recap

Hyd. No.	Hydrograph type (origin)	Inflow hyd(s)	Peak Outflow (cfs)								Hydrograph Description
			1-yr	2-yr	3-yr	5-yr	10-yr	25-yr	50-yr	100-yr	
1	Mod. Rational	------	-------	52.72	-------	67.17	79.26	96.44	110.08	124.20	Existing
2	Mod. Rational	------	-------	53.44	-------	68.09	80.34	97.76	111.59	125.90	Proposed

Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	Mod. Rational	52.72	1	28	88,572	------	------	------	Existing
2	Mod. Rational	53.44	1	28	89,785	------	------	------	Proposed

Hydrograph Report

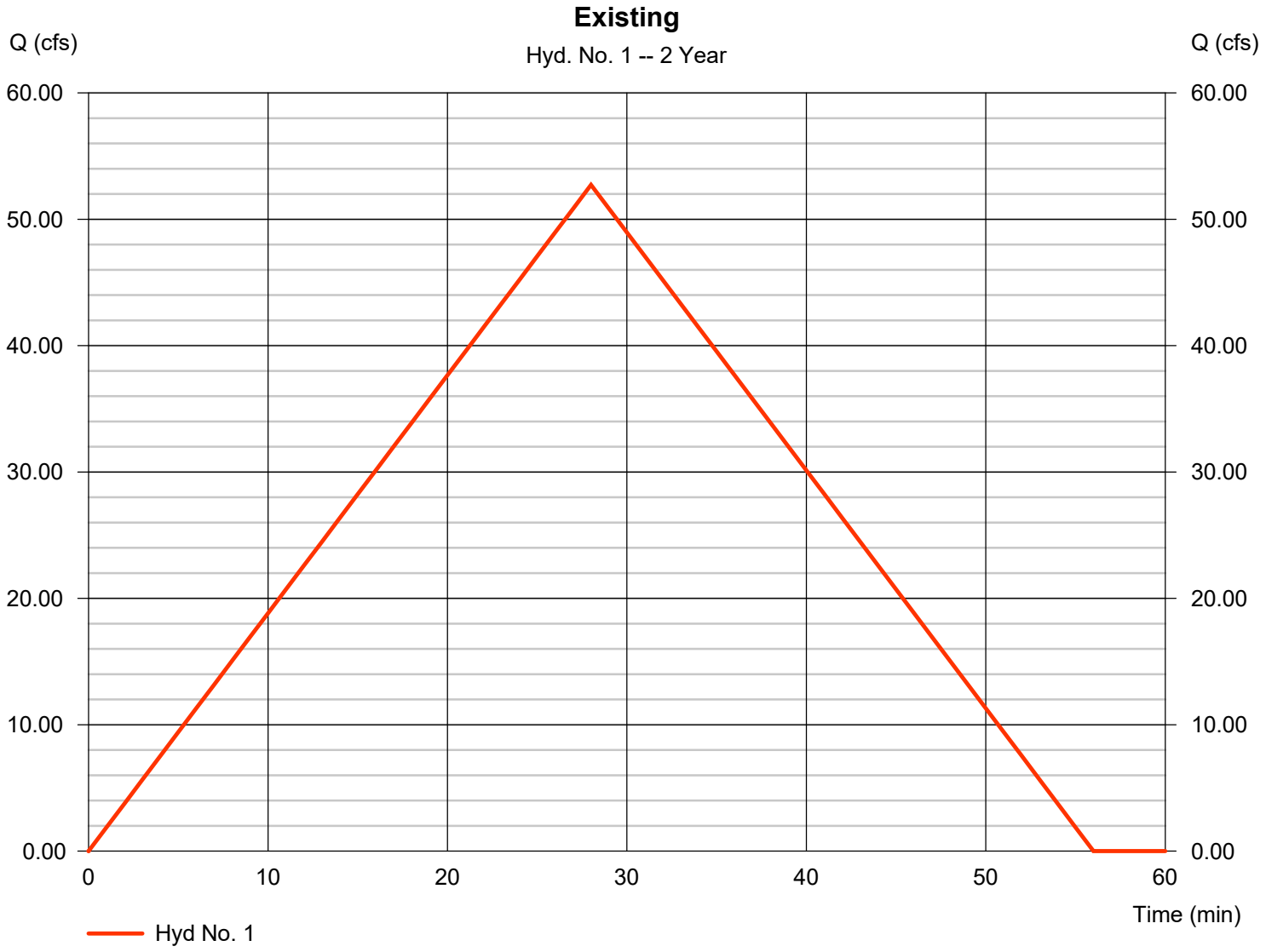
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020 Thursday, 05 / 12 / 2022

Hyd. No. 1

Existing

Hydrograph type	= Mod. Rational	Peak discharge	= 52.72 cfs
Storm frequency	= 2 yrs	Time to peak	= 28 min
Time interval	= 1 min	Hyd. volume	= 88,572 cuft
Drainage area	= 30.870 ac	Runoff coeff.	= 0.73*
Intensity	= 2.340 in/hr	Tc by TR55	= 28.00 min
IDF Curve	= CB.IDF	Storm duration	= 1.0 x Tc
Target Q	=n/a	Est. Req'd Storage	=n/a

* Composite (Area/C) = [(5.000 x 0.55) + (5.000 x 0.40) + (10.420 x 0.95) + (10.450 x 0.75)] / 30.870



TR55 Tc Worksheet

Hyd. No. 1

Existing

Description	A		B		C		Totals
Sheet Flow							
Manning's n-value	= 0.130		0.011		0.011		
Flow length (ft)	= 100.0		0.0		0.0		
Two-year 24-hr precip. (in)	= 2.20		0.00		0.00		
Land slope (%)	= 0.38		0.00		0.00		
Travel Time (min)	**= 20.48**	**+**	**0.00**	**+**	**0.00**	**=**	**20.48**
Shallow Concentrated Flow							
Flow length (ft)	= 585.00		0.00		0.00		
Watercourse slope (%)	= 1.25		0.00		0.00		
Surface description	= Unpaved		Paved		Paved		
Average velocity (ft/s)	=1.80		0.00		0.00		
Travel Time (min)	**= 5.40**	**+**	**0.00**	**+**	**0.00**	**=**	**5.40**
Channel Flow							
X sectional flow area (sqft)	= 75.00		0.00		0.00		
Wetted perimeter (ft)	= 24.10		0.00		0.00		
Channel slope (%)	= 0.36		0.00		0.00		
Manning's n-value	= 0.050		0.015		0.015		
Velocity (ft/s)	=3.83						
			0.00				
					0.00		
Flow length (ft)	({0})378.0		0.0		0.0		
Travel Time (min)	**= 1.65**	**+**	**0.00**	**+**	**0.00**	**=**	**1.65**

Total Travel Time, Tc ..... 28.00 min

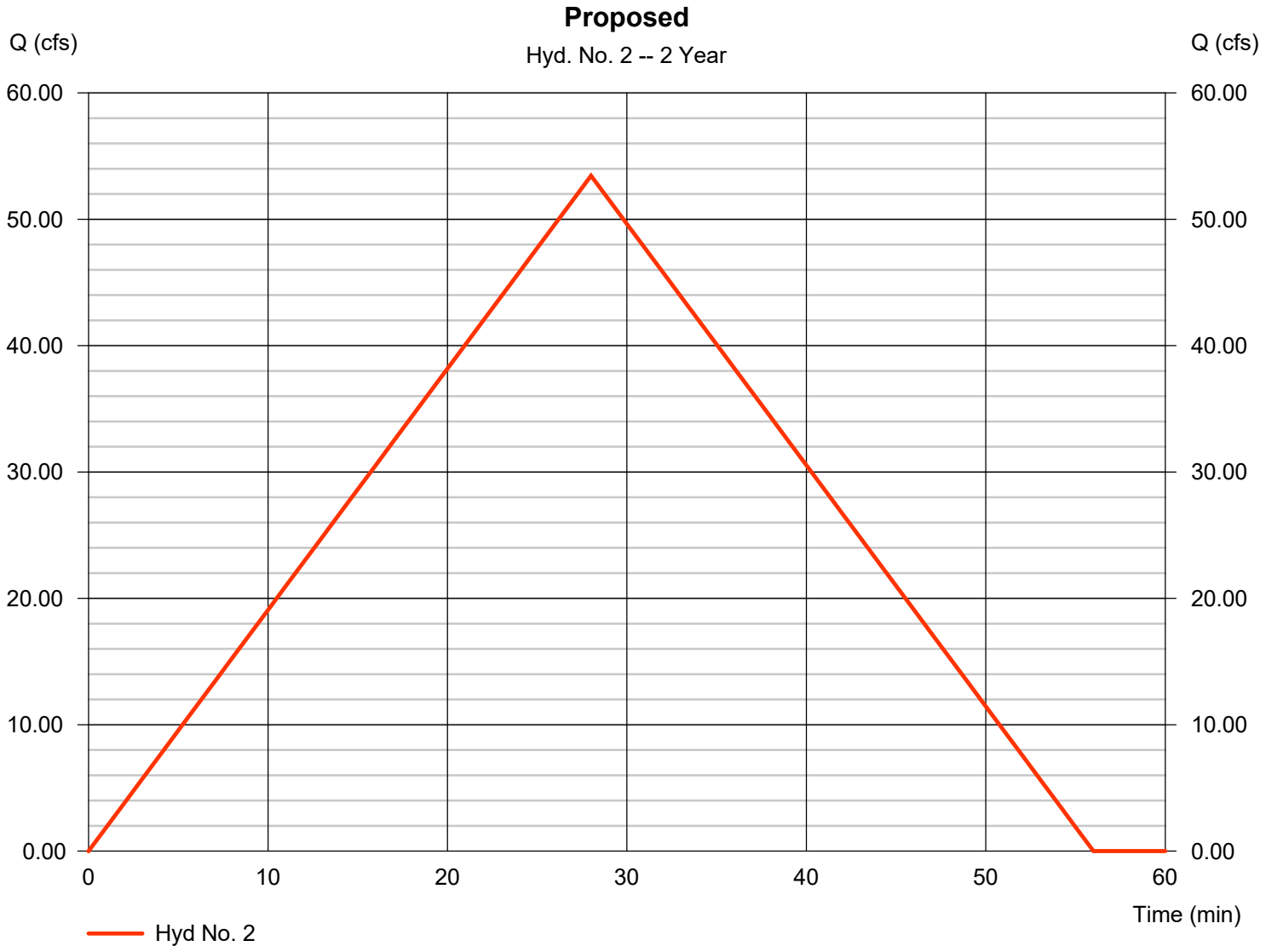
Hydrograph Report

Hyd. No. 2

Proposed

Hydrograph type	= Mod. Rational	Peak discharge	= 53.44 cfs
Storm frequency	= 2 yrs	Time to peak	= 28 min
Time interval	= 1 min	Hyd. volume	= 89,785 cuft
Drainage area	= 30.870 ac	Runoff coeff.	= 0.74*
Intensity	= 2.340 in/hr	Tc by TR55	= 28.00 min
IDF Curve	= CB.IDF	Storm duration	= 1.0 x Tc
Target Q	=n/a	Est. Req'd Storage	=n/a

* Composite (Area/C) = [(4.500 x 0.55) + (4.500 x 0.40) + (11.420 x 0.95) + (10.450 x 0.75)] / 30.870



TR55 Tc Worksheet

Hyd. No. 2

Proposed

Description	A		B		C		Totals
Sheet Flow							
Manning's n-value	= 0.130		0.011		0.011		
Flow length (ft)	= 100.0		0.0		0.0		
Two-year 24-hr precip. (in)	= 2.20		2.20		0.00		
Land slope (%)	= 0.38		0.00		0.00		
Travel Time (min)	**= 20.48**	**+**	**0.00**	**+**	**0.00**	**=**	**20.48**
Shallow Concentrated Flow							
Flow length (ft)	= 585.00		0.00		0.00		
Watercourse slope (%)	= 1.25		0.00		0.00		
Surface description	= Unpaved		Paved		Paved		
Average velocity (ft/s)	=1.80		0.00		0.00		
Travel Time (min)	**= 5.40**	**+**	**0.00**	**+**	**0.00**	**=**	**5.40**
Channel Flow							
X sectional flow area (sqft)	= 75.00		0.00		0.00		
Wetted perimeter (ft)	= 24.10		0.00		0.00		
Channel slope (%)	= 0.36		0.00		0.00		
Manning's n-value	= 0.050		0.015		0.015		
Velocity (ft/s)	=3.83						
			0.00				
					0.00		
Flow length (ft)	({0})378.0		0.0		0.0		
Travel Time (min)	**= 1.65**	**+**	**0.00**	**+**	**0.00**	**=**	**1.65**

Total Travel Time, Tc ..... 28.00 min

Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	Mod. Rational	67.17	1	28	112,842	------	------	------	Existing
2	Mod. Rational	68.09	1	28	114,388	------	------	------	Proposed

Hydrograph Report

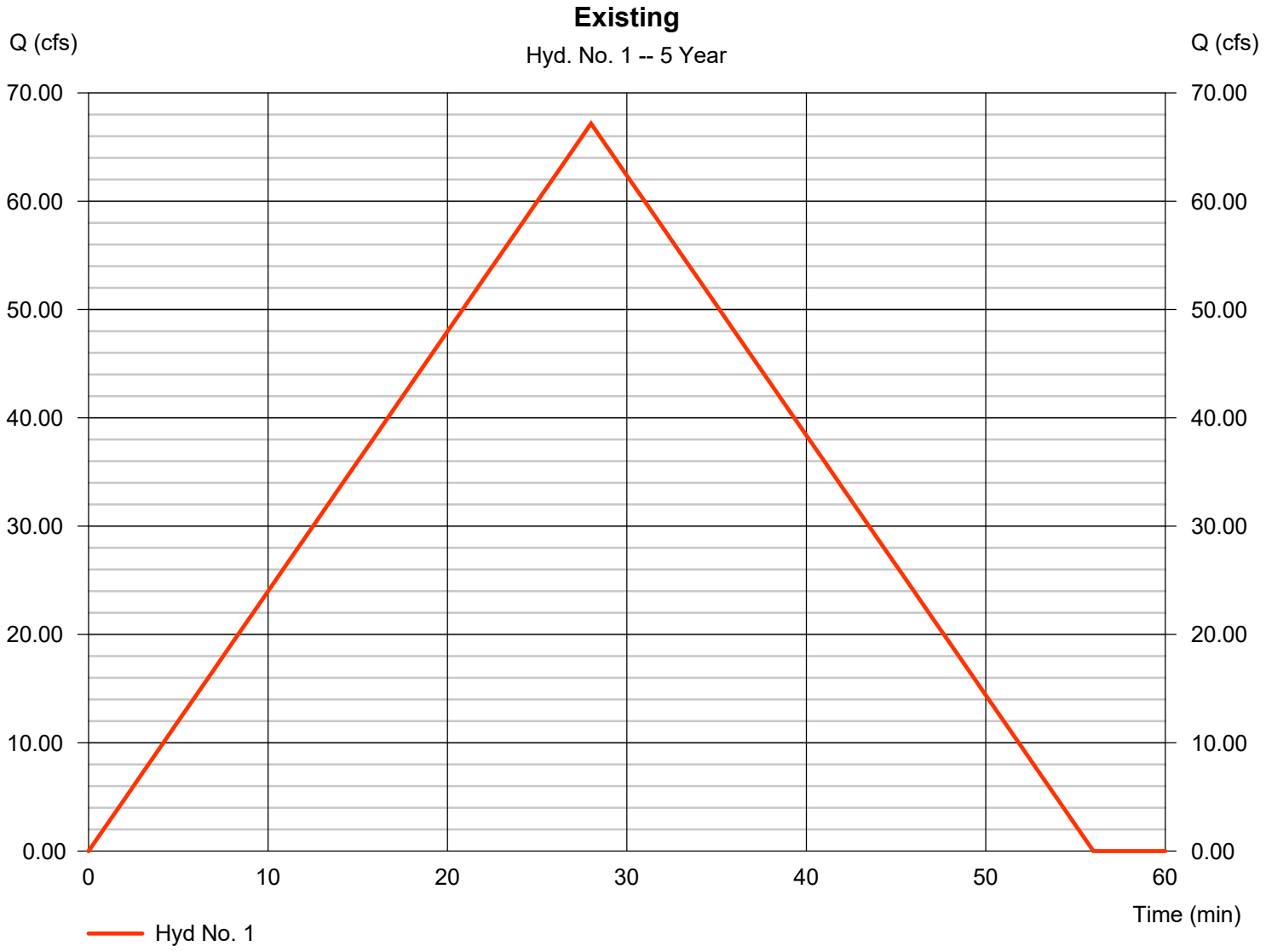
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020 Thursday, 05 / 12 / 2022

Hyd. No. 1

Existing

Hydrograph type	= Mod. Rational	Peak discharge	= 67.17 cfs
Storm frequency	= 5 yrs	Time to peak	= 28 min
Time interval	= 1 min	Hyd. volume	= 112,842 cuft
Drainage area	= 30.870 ac	Runoff coeff.	= 0.73*
Intensity	= 2.981 in/hr	Tc by TR55	= 28.00 min
IDF Curve	= CB.IDF	Storm duration	= 1.0 x Tc
Target Q	=n/a	Est. Req'd Storage	=n/a

* Composite (Area/C) = [(5.000 x 0.55) + (5.000 x 0.40) + (10.420 x 0.95) + (10.450 x 0.75)] / 30.870



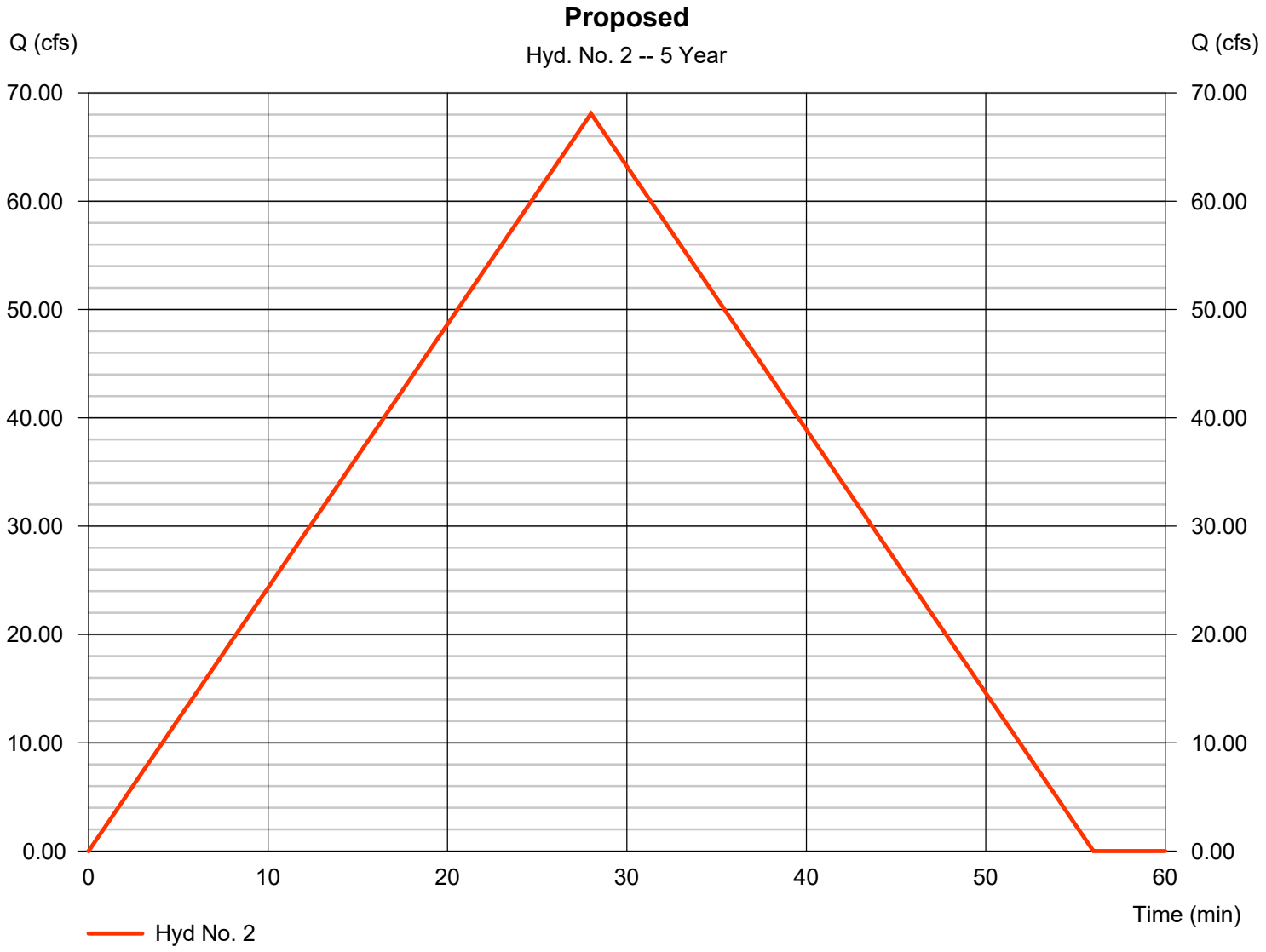
Hydrograph Report

Hyd. No. 2

Proposed

Hydrograph type	= Mod. Rational	Peak discharge	= 68.09 cfs
Storm frequency	= 5 yrs	Time to peak	= 28 min
Time interval	= 1 min	Hyd. volume	= 114,388 cuft
Drainage area	= 30.870 ac	Runoff coeff.	= 0.74*
Intensity	= 2.981 in/hr	Tc by TR55	= 28.00 min
IDF Curve	= CB.IDF	Storm duration	= 1.0 x Tc
Target Q	=n/a	Est. Req'd Storage	=n/a

* Composite (Area/C) = [(4.500 x 0.55) + (4.500 x 0.40) + (11.420 x 0.95) + (10.450 x 0.75)] / 30.870



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	Mod. Rational	79.26	1	28	133,152	------	------	------	Existing
2	Mod. Rational	80.34	1	28	134,976	------	------	------	Proposed

Hydrograph Report

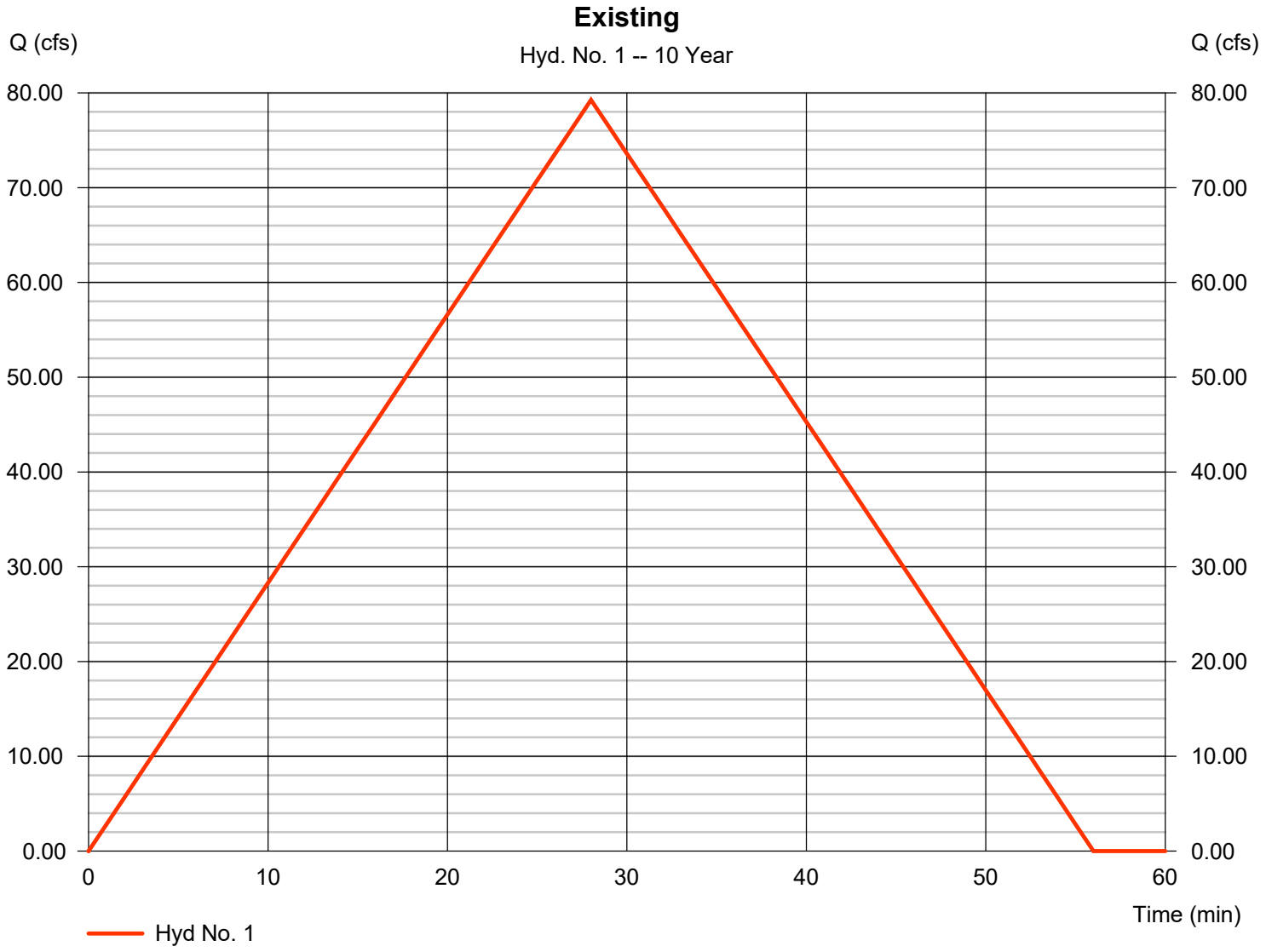
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020 Thursday, 05 / 12 / 2022

Hyd. No. 1

Existing

Hydrograph type	= Mod. Rational	Peak discharge	= 79.26 cfs
Storm frequency	= 10 yrs	Time to peak	= 28 min
Time interval	= 1 min	Hyd. volume	= 133,152 cuft
Drainage area	= 30.870 ac	Runoff coeff.	= 0.73*
Intensity	= 3.517 in/hr	Tc by TR55	= 28.00 min
IDF Curve	= CB.IDF	Storm duration	= 1.0 x Tc
Target Q	=n/a	Est. Req'd Storage	=n/a

* Composite (Area/C) = [(5.000 x 0.55) + (5.000 x 0.40) + (10.420 x 0.95) + (10.450 x 0.75)] / 30.870



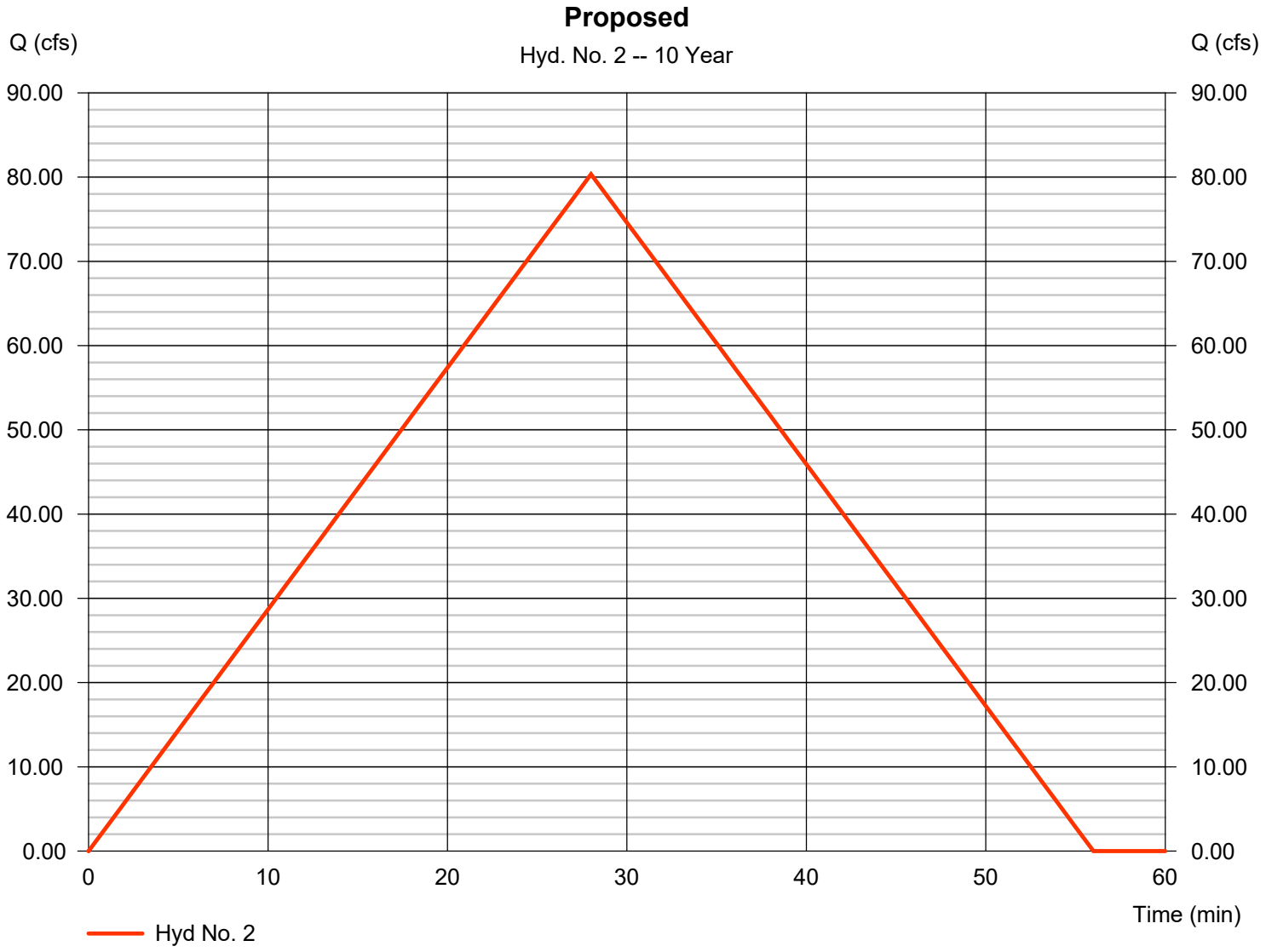
Hydrograph Report

Hyd. No. 2

Proposed

Hydrograph type	= Mod. Rational	Peak discharge	= 80.34 cfs
Storm frequency	= 10 yrs	Time to peak	= 28 min
Time interval	= 1 min	Hyd. volume	= 134,976 cuft
Drainage area	= 30.870 ac	Runoff coeff.	= 0.74*
Intensity	= 3.517 in/hr	Tc by TR55	= 28.00 min
IDF Curve	= CB.IDF	Storm duration	= 1.0 x Tc
Target Q	=n/a	Est. Req'd Storage	=n/a

* Composite (Area/C) = [(4.500 x 0.55) + (4.500 x 0.40) + (11.420 x 0.95) + (10.450 x 0.75)] / 30.870



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	Mod. Rational	96.44	1	28	162,018	------	------	------	Existing
2	Mod. Rational	97.76	1	28	164,237	------	------	------	Proposed

Hydrograph Report

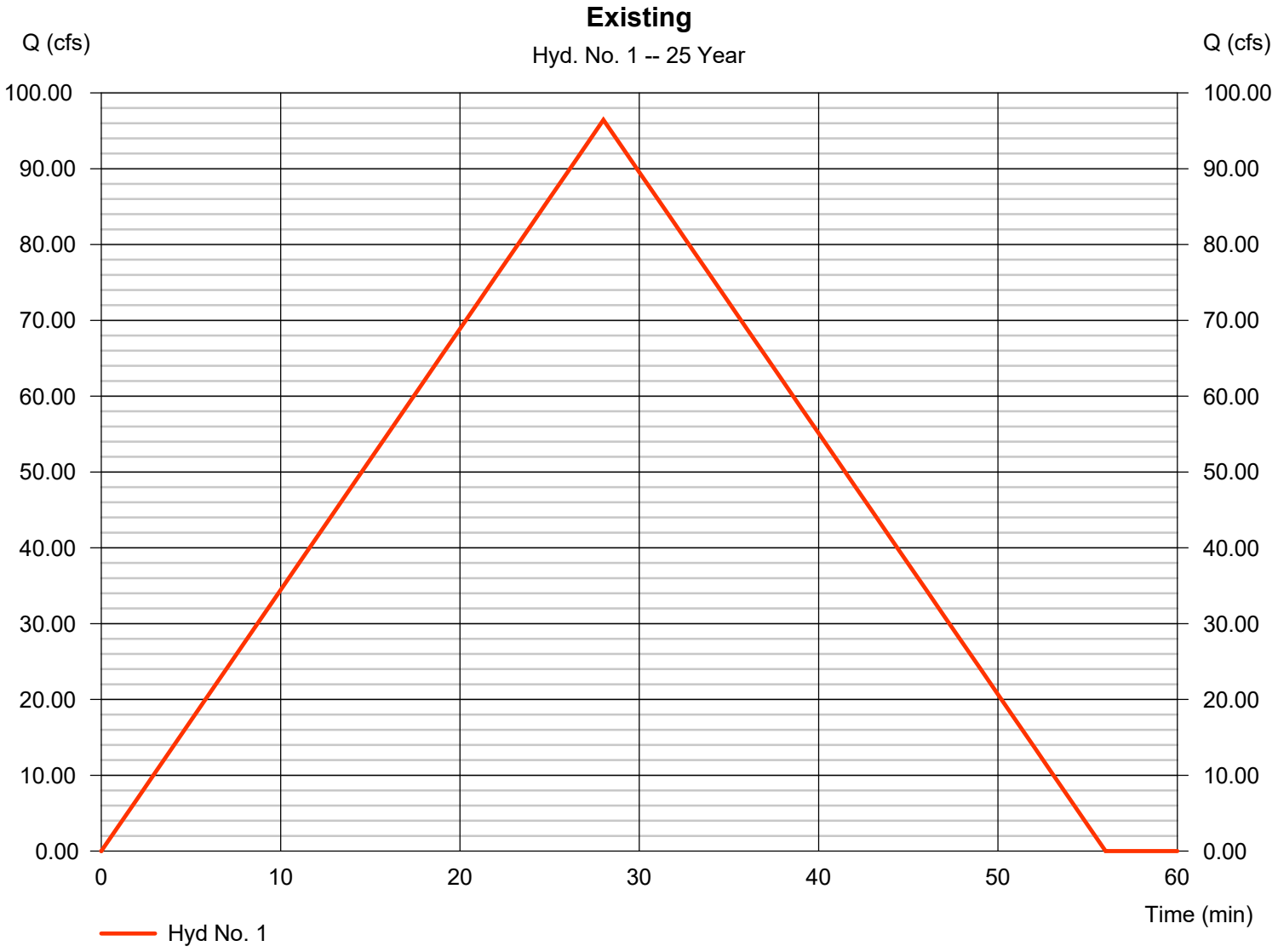
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020 Thursday, 05 / 12 / 2022

Hyd. No. 1

Existing

Hydrograph type	= Mod. Rational	Peak discharge	= 96.44 cfs
Storm frequency	= 25 yrs	Time to peak	= 28 min
Time interval	= 1 min	Hyd. volume	= 162,018 cuft
Drainage area	= 30.870 ac	Runoff coeff.	= 0.73*
Intensity	= 4.280 in/hr	Tc by TR55	= 28.00 min
IDF Curve	= CB.IDF	Storm duration	= 1.0 x Tc
Target Q	=n/a	Est. Req'd Storage	=n/a

* Composite (Area/C) = [(5.000 x 0.55) + (5.000 x 0.40) + (10.420 x 0.95) + (10.450 x 0.75)] / 30.870



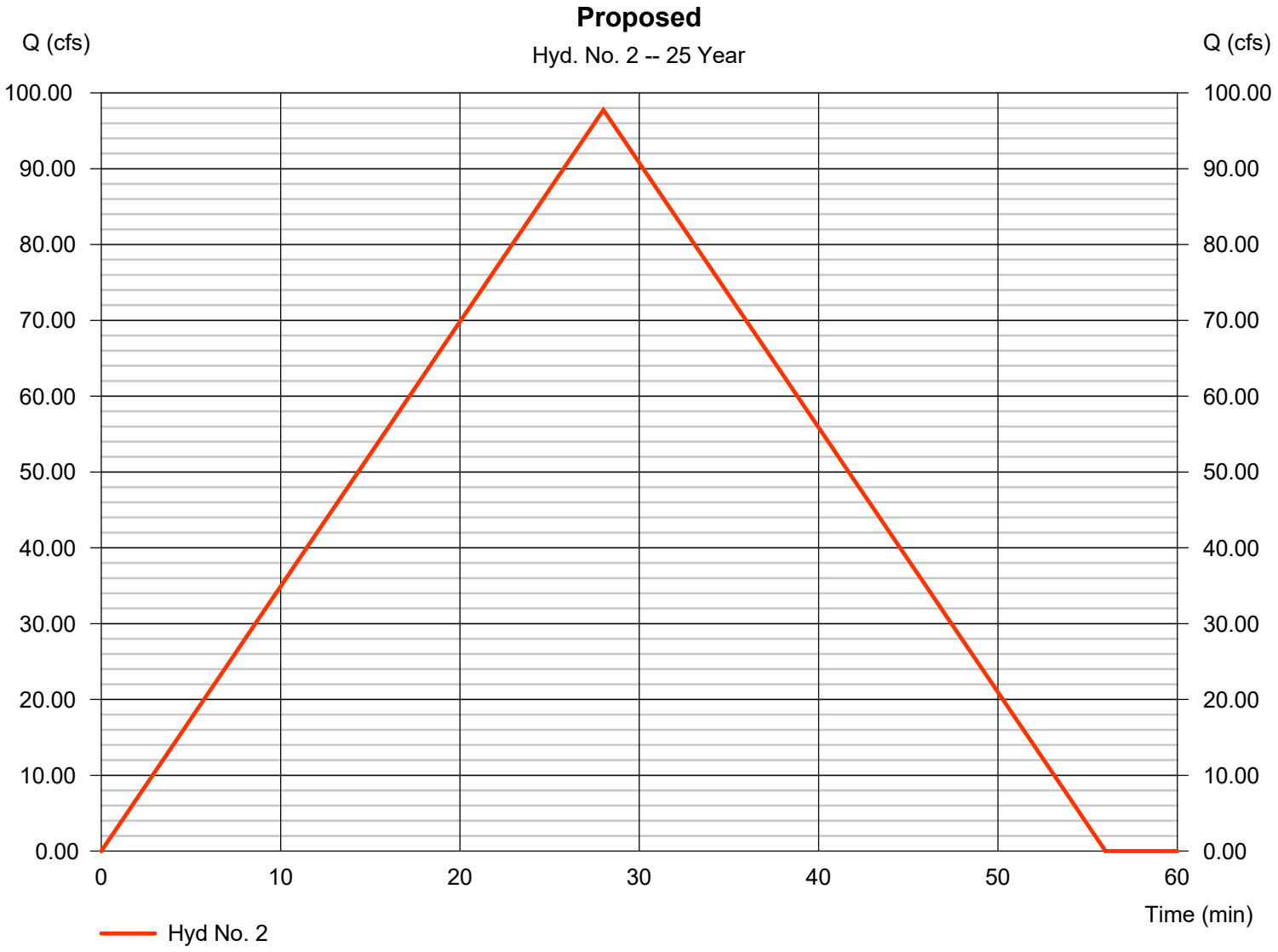
Hydrograph Report

Hyd. No. 2

Proposed

Hydrograph type	= Mod. Rational	Peak discharge	= 97.76 cfs
Storm frequency	= 25 yrs	Time to peak	= 28 min
Time interval	= 1 min	Hyd. volume	= 164,237 cuft
Drainage area	= 30.870 ac	Runoff coeff.	= 0.74*
Intensity	= 4.280 in/hr	Tc by TR55	= 28.00 min
IDF Curve	= CB.IDF	Storm duration	= 1.0 x Tc
Target Q	=n/a	Est. Req'd Storage	=n/a

* Composite (Area/C) = [(4.500 x 0.55) + (4.500 x 0.40) + (11.420 x 0.95) + (10.450 x 0.75)] / 30.870



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	Mod. Rational	110.08	1	28	184,936	------	------	------	Existing
2	Mod. Rational	111.59	1	28	187,469	------	------	------	Proposed

Hydrograph Report

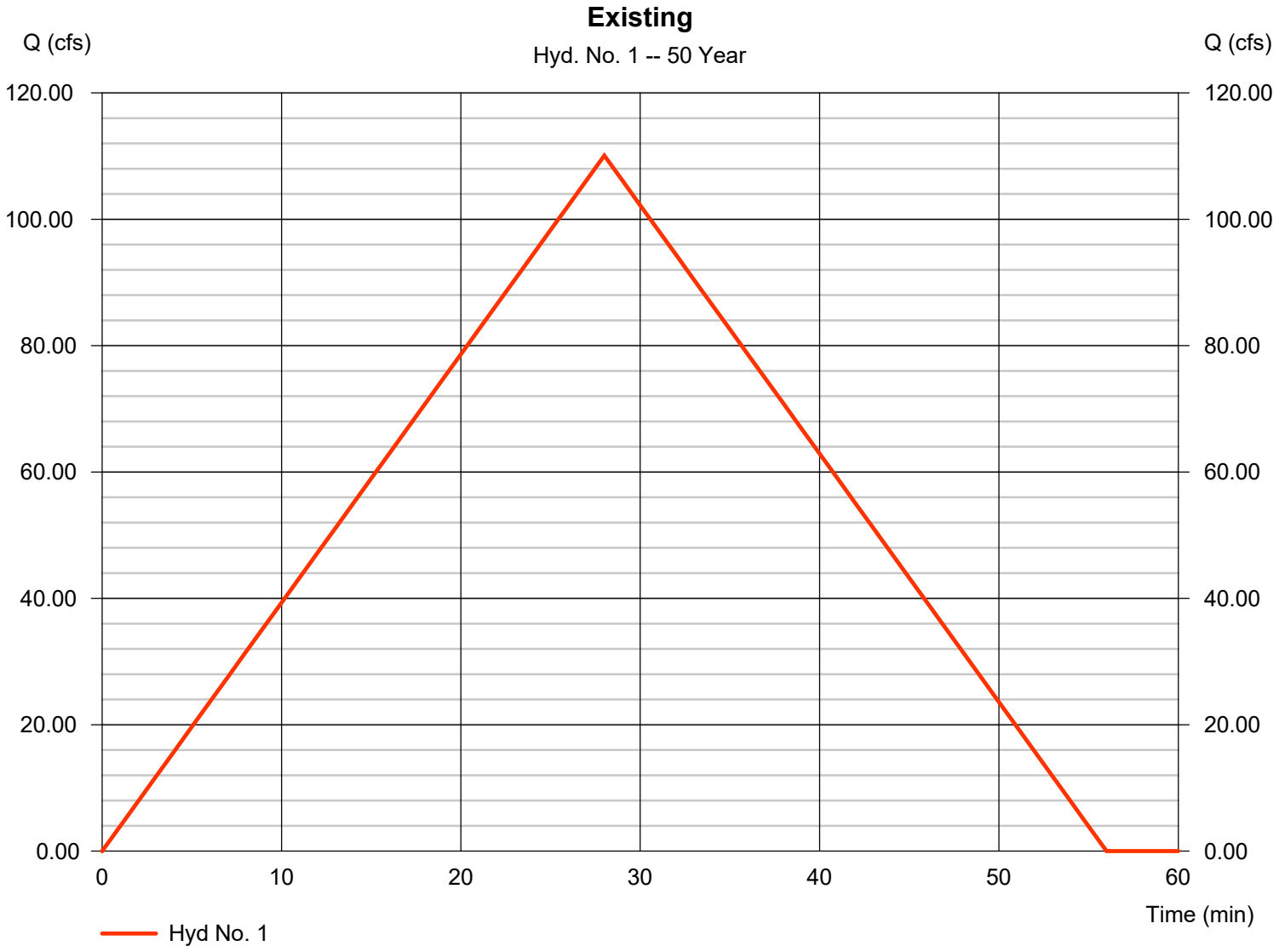
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020 Thursday, 05 / 12 / 2022

Hyd. No. 1

Existing

Hydrograph type	= Mod. Rational	Peak discharge	= 110.08 cfs
Storm frequency	= 50 yrs	Time to peak	= 28 min
Time interval	= 1 min	Hyd. volume	= 184,936 cuft
Drainage area	= 30.870 ac	Runoff coeff.	= 0.73*
Intensity	= 4.885 in/hr	Tc by TR55	= 28.00 min
IDF Curve	= CB.IDF	Storm duration	= 1.0 x Tc
Target Q	=n/a	Est. Req'd Storage	=n/a

* Composite (Area/C) = [(5.000 x 0.55) + (5.000 x 0.40) + (10.420 x 0.95) + (10.450 x 0.75)] / 30.870



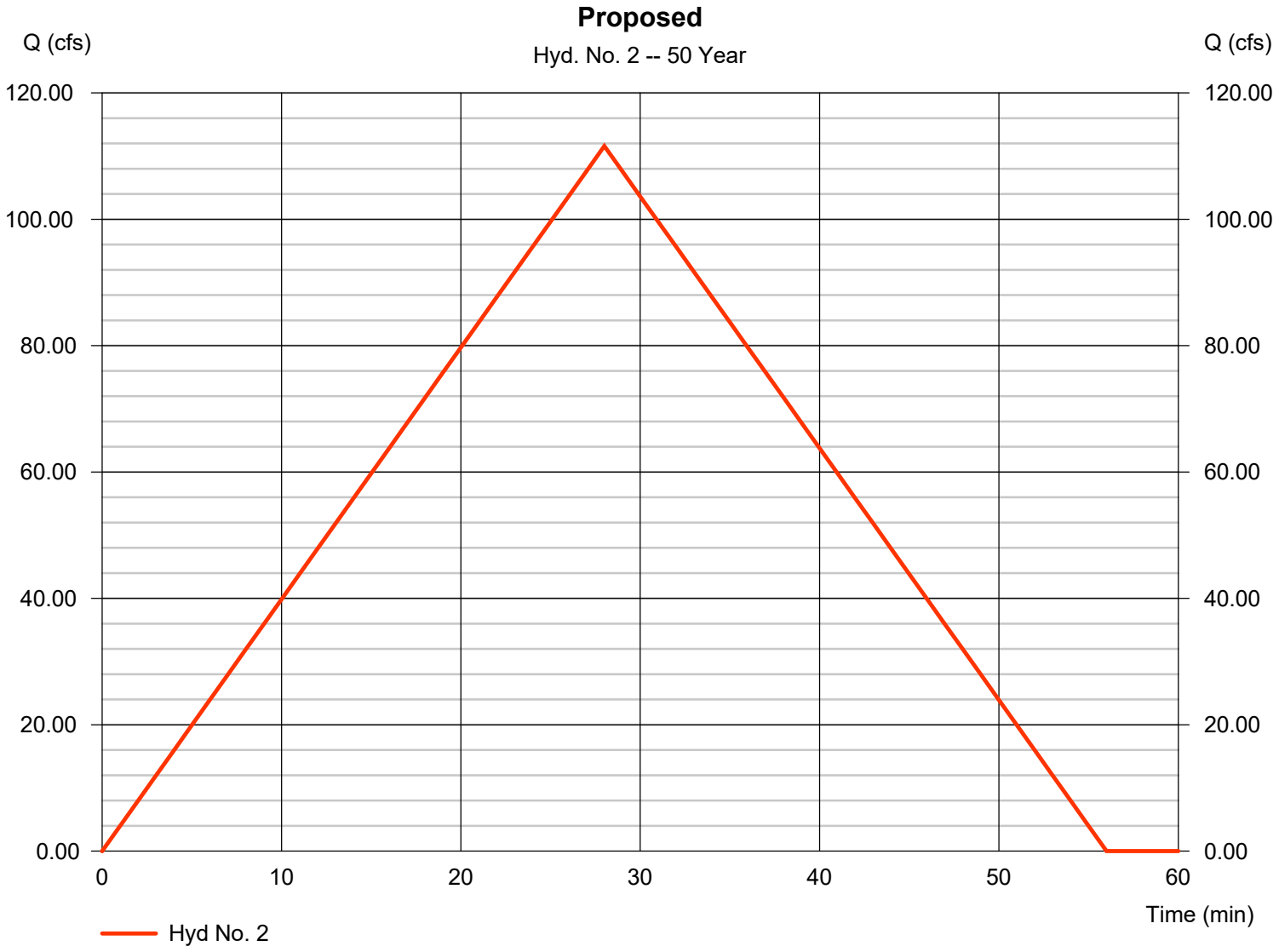
Hydrograph Report

Hyd. No. 2

Proposed

Hydrograph type	= Mod. Rational	Peak discharge	= 111.59 cfs
Storm frequency	= 50 yrs	Time to peak	= 28 min
Time interval	= 1 min	Hyd. volume	= 187,469 cuft
Drainage area	= 30.870 ac	Runoff coeff.	= 0.74*
Intensity	= 4.885 in/hr	Tc by TR55	= 28.00 min
IDF Curve	= CB.IDF	Storm duration	= 1.0 x Tc
Target Q	=n/a	Est. Req'd Storage	=n/a

* Composite (Area/C) = [(4.500 x 0.55) + (4.500 x 0.40) + (11.420 x 0.95) + (10.450 x 0.75)] / 30.870



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	Mod. Rational	124.20	1	28	208,655	------	------	------	Existing
2	Mod. Rational	125.90	1	28	211,514	------	------	------	Proposed

Hydrograph Report

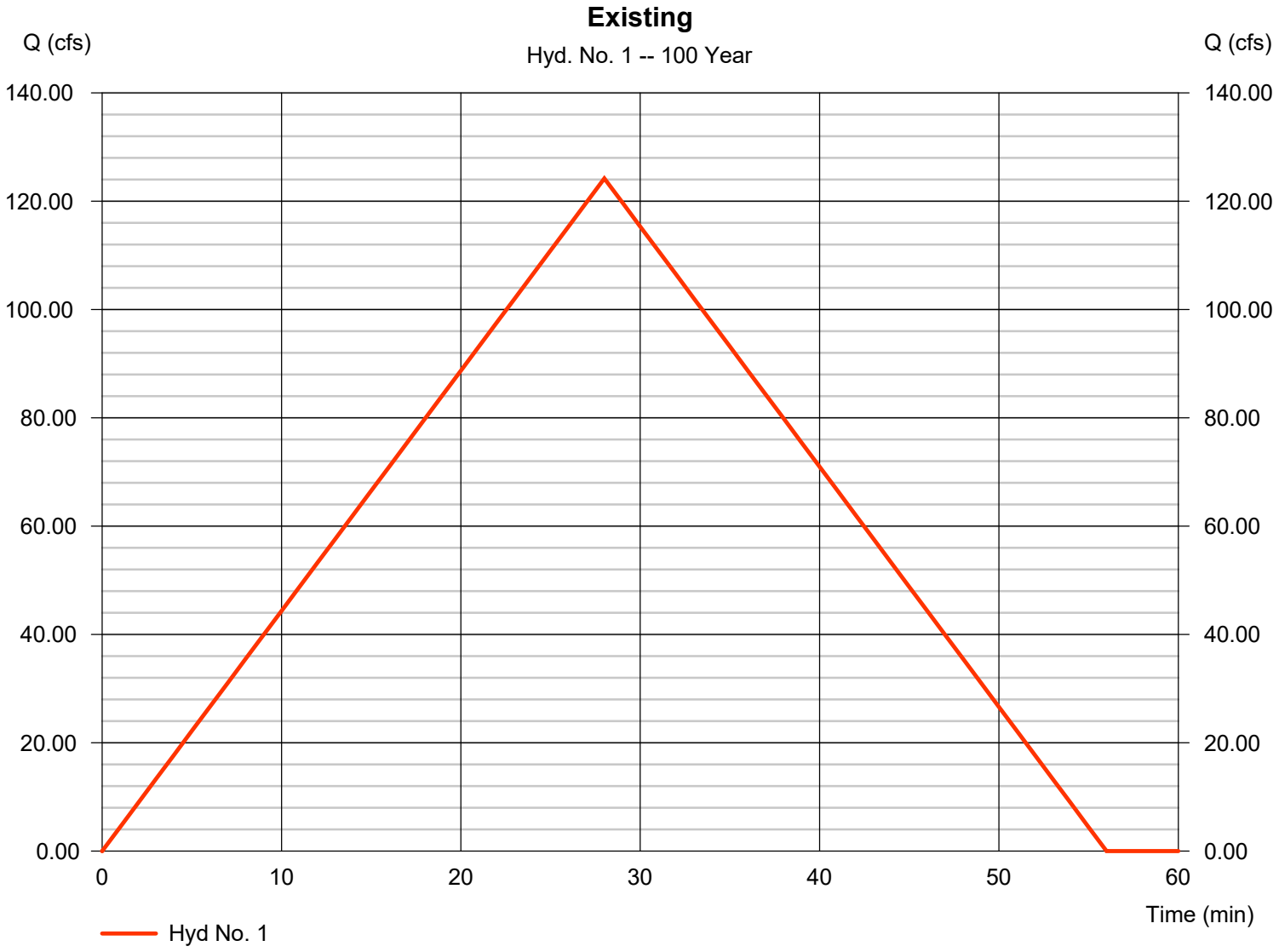
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020 Thursday, 05 / 12 / 2022

Hyd. No. 1

Existing

Hydrograph type	= Mod. Rational	Peak discharge	= 124.20 cfs
Storm frequency	= 100 yrs	Time to peak	= 28 min
Time interval	= 1 min	Hyd. volume	= 208,655 cuft
Drainage area	= 30.870 ac	Runoff coeff.	= 0.73*
Intensity	= 5.511 in/hr	Tc by TR55	= 28.00 min
IDF Curve	= CB.IDF	Storm duration	= 1.0 x Tc
Target Q	=n/a	Est. Req'd Storage	=n/a

* Composite (Area/C) = [(5.000 x 0.55) + (5.000 x 0.40) + (10.420 x 0.95) + (10.450 x 0.75)] / 30.870



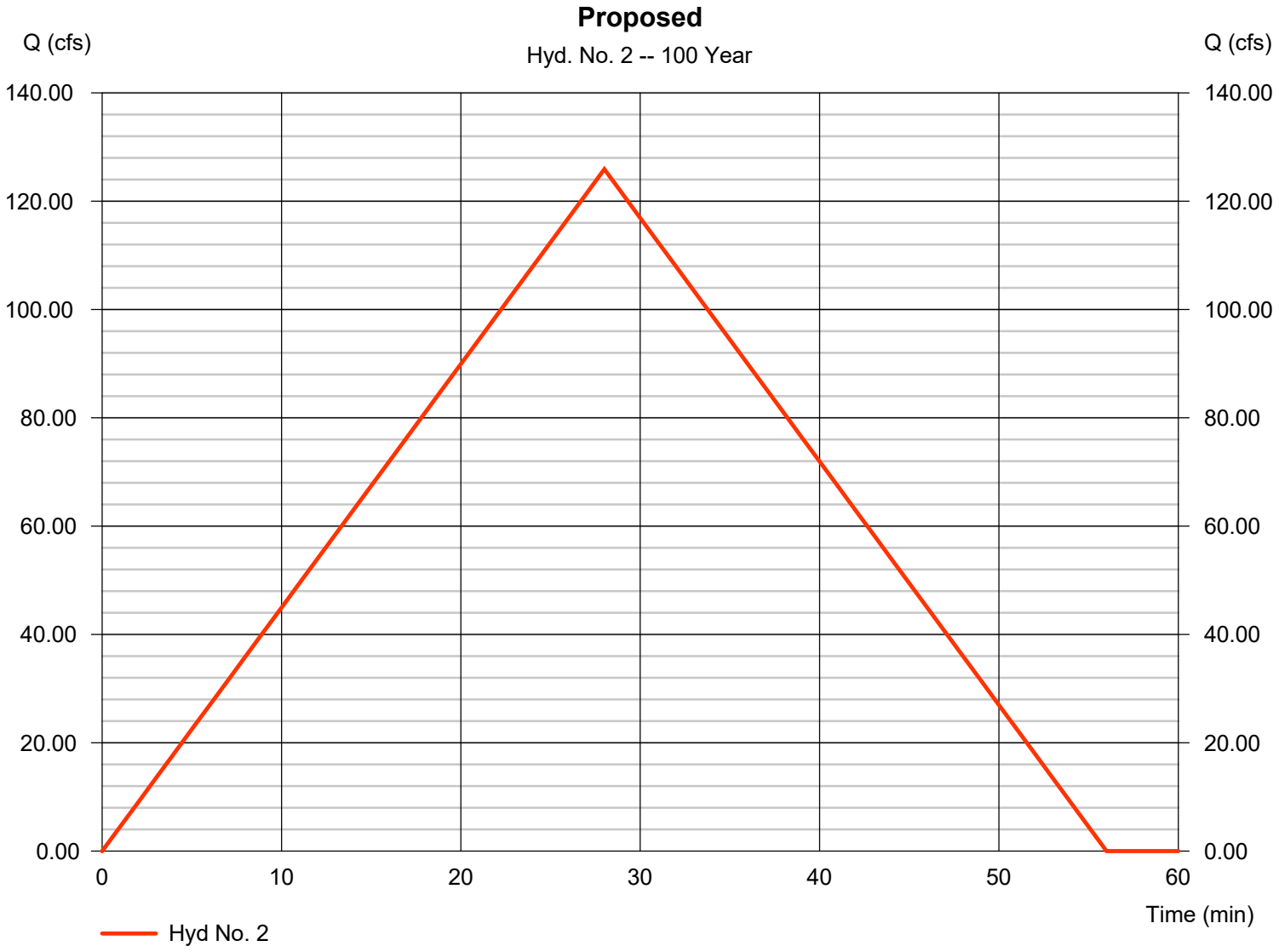
Hydrograph Report

Hyd. No. 2

Proposed

Hydrograph type	= Mod. Rational	Peak discharge	= 125.90 cfs
Storm frequency	= 100 yrs	Time to peak	= 28 min
Time interval	= 1 min	Hyd. volume	= 211,514 cuft
Drainage area	= 30.870 ac	Runoff coeff.	= 0.74*
Intensity	= 5.511 in/hr	Tc by TR55	= 28.00 min
IDF Curve	= CB.IDF	Storm duration	= 1.0 x Tc
Target Q	=n/a	Est. Req'd Storage	=n/a

* Composite (Area/C) = [(4.500 x 0.55) + (4.500 x 0.40) + (11.420 x 0.95) + (10.450 x 0.75)] / 30.870



Hydraflow Rainfall Report

Return Period (Yrs)	Intensity-Duration-Frequency Equation Coefficients (FHA)			
	B	D	E	(N/A)
1	22.9986	6.1000	0.6968	--------
2	24.8490	5.5000	0.6729	--------
3	0.0000	0.0000	0.0000	--------
5	27.4721	4.7000	0.6369	--------
10	28.5851	3.9000	0.6051	--------
25	29.9361	2.9000	0.5670	--------
50	29.8288	2.0000	0.5320	--------
100	30.7525	1.4000	0.5085	--------

File name: CB.IDF

Intensity = B / (Tc + D)^E

Return Period (Yrs)	Intensity Values (in/hr)											
	5 min	10	15	20	25	30	35	40	45	50	55	60
1	4.30	3.32	2.75	2.37	2.10	1.89	1.73	1.59	1.48	1.39	1.31	1.24
2	5.11	3.93	3.26	2.81	2.49	2.25	2.06	1.90	1.77	1.67	1.57	1.49
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	6.46	4.96	4.12	3.56	3.17	2.87	2.63	2.44	2.28	2.15	2.03	1.93
10	7.61	5.81	4.83	4.19	3.73	3.39	3.12	2.90	2.72	2.56	2.43	2.31
25	9.27	7.02	5.83	5.07	4.53	4.13	3.81	3.55	3.34	3.16	3.00	2.86
50	10.59	7.95	6.61	5.76	5.17	4.72	4.37	4.08	3.85	3.65	3.47	3.32
100	11.97	8.92	7.42	6.48	5.82	5.33	4.94	4.63	4.37	4.15	3.96	3.79

Tc = time in minutes. Values may exceed 60.

Precip. file name: Sample.pcp

Storm Distribution	Rainfall Precipitation Table (in)							
	1-yr	2-yr	3-yr	5-yr	10-yr	25-yr	50-yr	100-yr
SCS 24-hour	0.00	2.20	0.00	3.30	4.25	5.77	6.80	7.95
SCS 6-Hr	0.00	1.80	0.00	0.00	2.60	0.00	0.00	4.00
Huff-1st	0.00	1.55	0.00	2.75	4.00	5.38	6.50	8.00
Huff-2nd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-3rd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-4th	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-Indy	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Custom	0.00	1.75	0.00	2.80	3.90	5.25	6.00	7.10

hgm
ASSOCIATES INC.
640 FIFTH AVENUE COUNCIL BLUFFS, IA
PHONE: 712-323-0530

JNS	KMN	KMN	MAY '22
drawn	designed	approved	date

revision

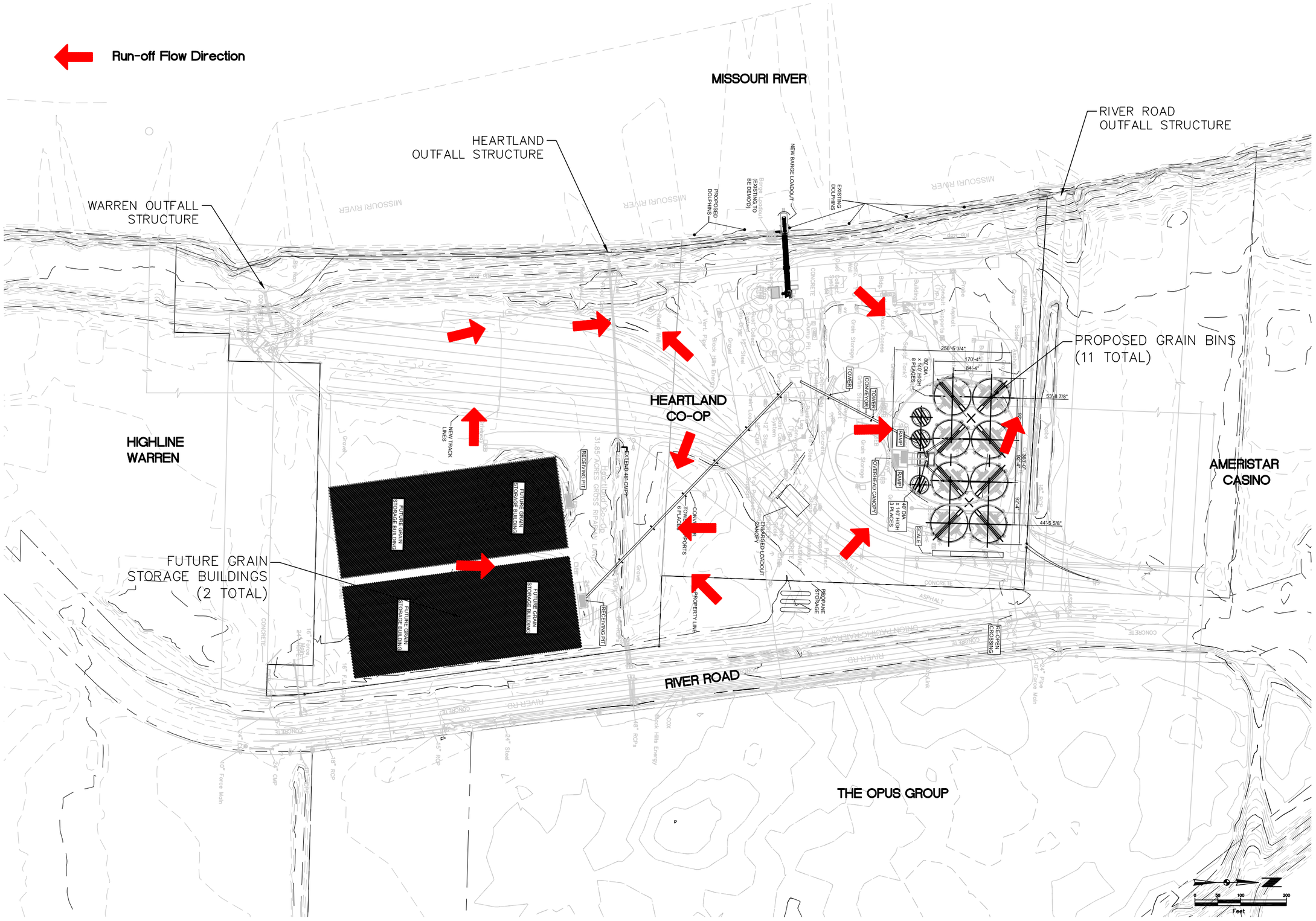
project HEARTLAND CO-OP DRAINAGE STUDY

client HEARTLAND CO-OP

sheet **EXISTING SITE**

project no.
105022

sheet
A.01



hgm ASSOCIATES INC.
640 FIFTH AVENUE COUNCIL BLUFFS, IA
PHONE: 712-323-0530

JNS	KMN	KMN	SEP '22
drawn	designed	approved	date

revision

project HEARTLAND CO-OP DRAINAGE STUDY

client HEARTLAND CO-OP

sheet **PROPOSED DEVELOPMENT**

project no. 105022

sheet **A.02**

AREAS WHERE FLOODING MAY OCCUR DURING A STORM EVENT

MISSOURI RIVER

HEARTLAND OUTFALL STRUCTURE

WARREN OUTFALL STRUCTURE

RIVER ROAD OUTFALL STRUCTURE

HEARTLAND CO-OP

HIGHLINE WARREN

AMERISTAR CASINO

RIVER ROAD

THE OPUS GROUP

FUTURE GRAIN STORAGE BUILDING

RECEIVING PIT

ENLARGED LOADOUT CANOPY

PROPANE STORAGE

RR OPEN CROSSING

NEW TRACK LINES

NEW BARGE LOADOUT

PROPOSED DOLPHINS

EXISTING DOLPHINS

Barge Loadout (EXISTING TO BE DEMO'D)

80' DIA x 140' HIGH 8 PLACES

OVERHEAD CANOPY

RAMP

40' DIA x 140' HIGH 3 PLACES

SCALE

256'-5 3/4"

170'-4"

84'-4"

38'-8 7/8"

92'-4"

368'-0"

92'-4"

44'-5 5/8"

0 50 100 200

Feet

this drawing is being made available by hgm associates inc. for use on this project in accordance with the hgm associates inc. agreement for professional services. hgm associates inc. assumes no liability for any use of this drawing on any other project except in accordance with the terms of the above agreement.

hgm ASSOCIATES INC.
640 FIFTH AVENUE COUNCIL BLUFFS, IA
PHONE: 712-323-0530

JNS	KMN	KMN
drawn	designed	approved
		MAY '22
		date
		revision

project HEARTLAND CO-OP DRAINAGE STUDY

client HEARTLAND CO-OP

sheet ONSITE FLOODING

project no. 105022

sheet A.03

Attachment 'J'

Midwest Mechanical
Industrial Service, LLC
P.O. Box 164
Logan, Iowa 51546
712-644-2711
Fax: 712-644-3073

9/19/22

Heartland Coop Council Bluffs operation terms:

Activity

Grain receiving - Heartland Coop will receive corn and beans via truck.

Grain Shipping - Heartland will ship grain from the Council Bluffs facility via truck, barge, and rail.

Hours of Operation

Hours of Operation will normally be 7a.m. - 4:30 p.m. with an exception for rail or barge loadout.

Occupancy

Number of persons on a normal day will be 10 persons.

Maximum number of persons expected to use the site at max capacity: (includes grain truck delivery drivers) 16.

Site Access

Site access will be through the North gate off River Road and will use the concrete driveway to access parking area.

Parking

Parking has been addressed in the areas of the drawing. This provides more than the required parking and includes handicap and visitor parking.

Signage

Signage is expected to be on a new concrete silo approximately 125’ in the air with a low lighted illumination.

There will be an estimated 10’ x 15’ sign at the entrance of the facility, elevated approximately 15’ above the driving surface.

Additional Note

Heartland is passionate about getting this project moving - not only to better serve its customer base, but to also better serve the City of Council Bluffs and Heartland Co-op neighbors.

The intention behind this project is to remove the outside piles which have historically been very dirty (dusty) to use. The smell of rotting grain has also been a significant issue in the past. With the approval of this project, Heartland will be installing equipment that will not allow dirt to pollute nearby businesses and vehicles with a coating of dust and debris. It will also provide a significant “face lift” to the area that will assist in attracting new riverfront businesses.

Attachment 'K'

hgm ASSOCIATES INC.

Date: 7/29/2022

To: David Hoylman, M.S., P.E.
Senior Design Engineer
ABP Engineering

From: Kyle Nelson, P.E.
Project Manager
HGM Associates Inc.

Subject: **Heartland Barge Loading**
IPL Technical Review
HGM Project No. 107722

Thank you for submitting your preliminary plans for a review of potential impacts to the Industrial Park Levee (IPL).

Attached you will find the preliminary review of the potential impacts of the proposed improvements near the IPL.

The findings in this report are based upon the review of the three drawings that were supplied numbered "21155-C-101, 21155-GA-101, and 21155-GA-201."

Please feel free to let me know if you have any questions.

Proposed Improvements

The apparent intent of this project is to restore barge loading capabilities for Heartland Co-op along the Missouri River. This project includes:

- Installation of a new barge loadout structure next to the existing one approximately at IPL Station 225+75 and
- Installation of a raised conveyor belt system from this structure to the existing silos with a support pier in between.

Area and Scope of Review

The review area is from the riverside edge of the IPL levee from Station 224+00 to approximately Station 229+00. The review area extends to the landside toe of the levee bank along this stretch.

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5022 SOUTH 114th STREET, SUITE 200, OMAHA NEBRASKA 68137, (402) 346-7559, FAX (402) 346-0224

This review includes impacts to the levee during construction, during continued use, and for anticipated routine maintenance.

This review does not evaluate the plans for the proposed improvements located outside of the levee area. This review does not evaluate the project's compliance with City, State, or Federal regulations. This review does not evaluate the structural design of any structures or required supports.

Review – Initial Construction/Design

The location of the proposed barge loadout structure piling appears to be inside the levee prism per drawing on Page 21155-C-101. The actual location of the levee prism should be shown on all section views to verify. Any excavations within these areas should be backfilled according to the specifications of the IPL O&M Manual.

The location of the proposed piling support structure for the overhead conveyor belt structure appears to be inside the levee prism per the drawing on Page 21155-GA-201. The actual location of the levee prism should be shown on all section views to verify. Any excavations within these areas should be backfilled according to the specifications of the IPL O&M Manual.

The modifications to the existing barge loading tower and silos appear to be outside the levee prism per the drawing on page 21155-GA-201. These modifications appear to connect the existing structures to the proposed improvements and look to require no modifications to the levee.

Review – Normal Use

The location of the barge loadout structures does not appear to impact the emergency access path along the top of the levee. A note should be added to the plans that the Contractor shall rebuild the existing cross-section of the levee to its original condition for any disturbed areas along the levee.

Review – Maintenance

The Owner shall report all observed issues with the proposed improvement to the other IPL Members. Routine inspections and maintenance shall be completed per the IPL Operations and Maintenance Manual.

Summary of Findings

Based upon my initial review of the three preliminary drawings provided by ABP, the improvements as proposed do not appear to have a negative impact on the integrity of the IPL.

Any deviation from the stated assumptions regarding materials, methods, and procedures shall be resubmitted to HGM for evaluation.

Recommendations

1. The Designers shall add requirements to the contract documents that any disturbance to the levee prism shall be backfilled and repaired per the IPL Operations and Maintenance Manual.
2. Construction observation shall be performed to monitor the Contractor's compliance with the provided plan set.

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3. Routine inspections and maintenance shall be completed per the IPL Operations and Maintenance Manual.
4. Underwater inspections of the proposed piling for the new barge loadout structure should be completed during the "Five Year IPL Inspection".

Final Submittal Requests

1. Include the full plan set of the proposed improvements to be reviewed.
2. What is the planned timeline for the construction of this project? Will it be during the typical low water season in the winter or during high water in the summer?
3. What specifications were used to design of the structures, piling, etc? From where are the revetment requirements based?
4. The location of the levee prism should be included in all sections. Levee prism slope extends infinitely past the toe of the bank. If penetrating the prism is intended, specs should be included for backfilling the disturbed area.
5. How is the proposed piers/piling installed? What will be done to minimize disturbance within the levee prism, and how will excavations be replaced?
6. Show the levee clear zone for flood fight access and that nothing is located within this area. A 16.5' minimum clearance height should be provided.
7. Where will equipment be positioned during construction? Will work within the water take place from the bank? If equipment and work is taking place on the levee, how will damage to the surface be prevented, and how will it be restored after construction?
8. Will any improvements be made to the existing dolphins?
9. If a high-water event occurs during construction, what plans will be in place to restore the levee integrity and allow flood fight access? An Emergency Action Plan should be prepared and provided.
10. Are there protections in place to prevent a barge from colliding with the proposed structure and causing damage to the levee?
11. A Geotechnical report should be provided for the project area. This should include specs for restoring all disturbed areas located within the levee.
12. What specs will be used for maintaining a quality assurance/quality control program for testing throughout construction?
13. Construction documents should include the requirement for As-Builts to be provided once construction is complete to update the levee records.
14. Additional details for the rip rap requirements and construction methods should be included. How will the rip rap be removed in the piling locations? How will the fabric beneath the rip rap be repaired in these excavation areas? Will work be completed under water or will the area be blocked off?

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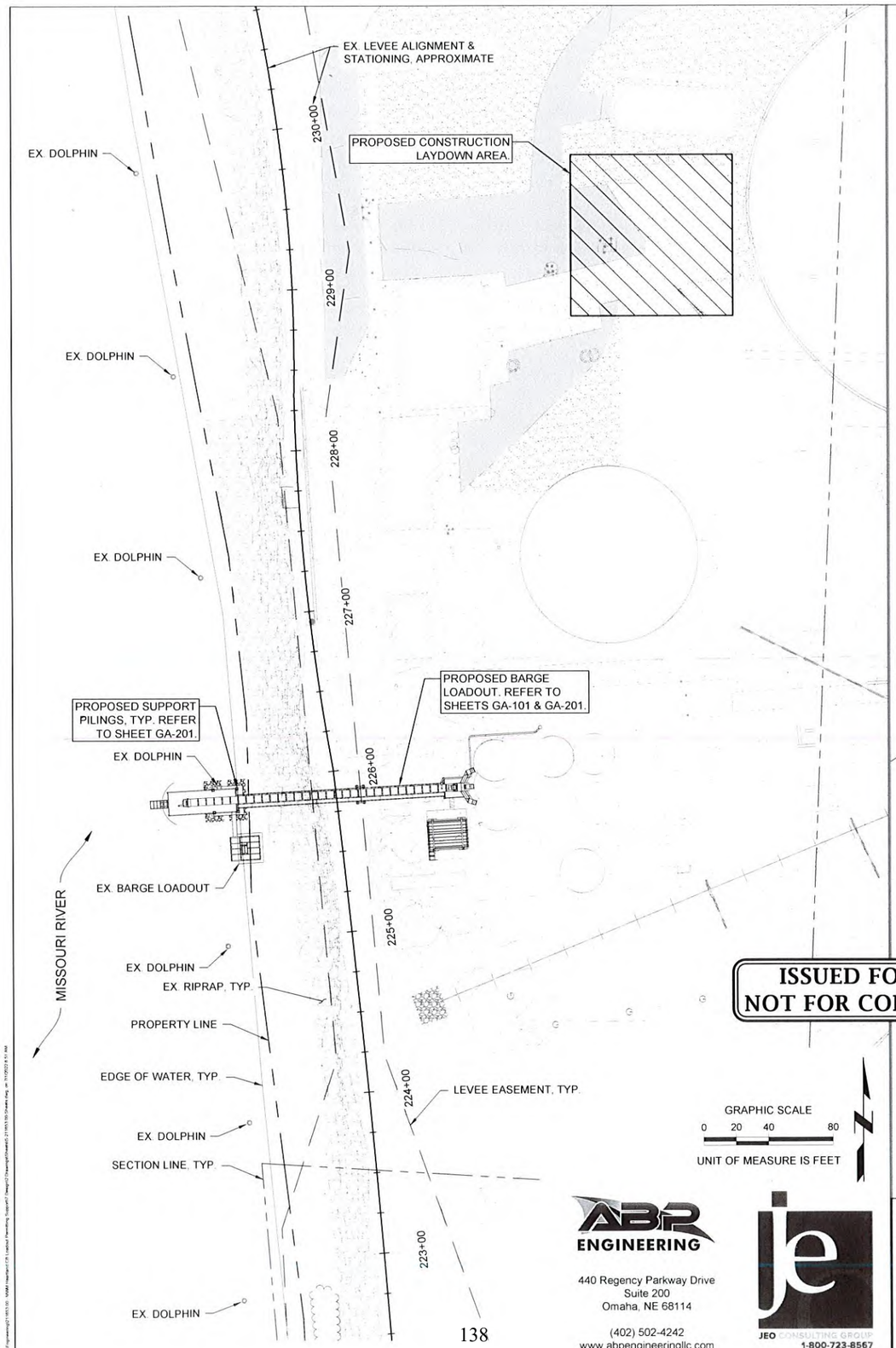
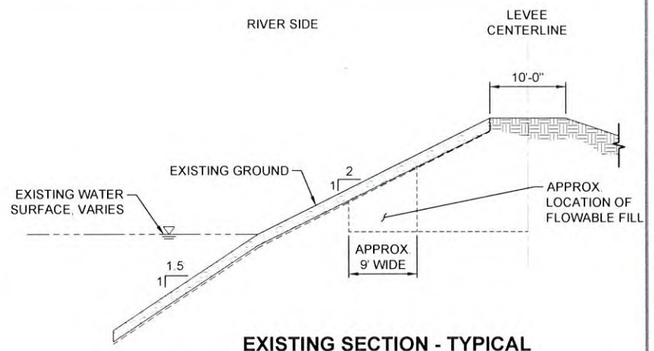
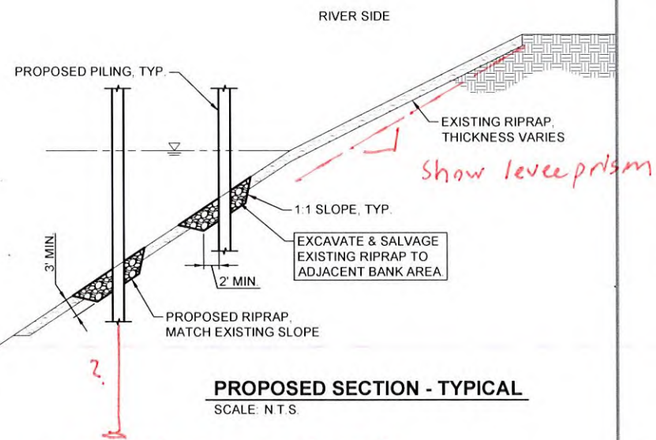




EXISTING SECTION - TYPICAL
SCALE: N.T.S.



PROPOSED SECTION - TYPICAL
SCALE: N.T.S.

ISSUED FOR REVIEW
NOT FOR CONSTRUCTION

How will this be protected?

HEARTLAND CO-OP

MISSOURI RIVER BNSP REVETMENT MAINTENANCE & RESTORATION

PART 1 - GENERAL

1.01 DEFINITION OF WORK

A. This project is in the vicinity of the federally constructed Missouri River Bank Stabilization and Navigation Project (BSNP) revetment. The revetment must be maintained and restored to previous as-built conditions by protecting existing stone where possible, removal of damaged stones, replacing damaged stones, and adding new stone in any areas of damage or displacement. Rehabilitation of revetments in this contract will use stone fill exclusively, with no underlying fill material. The quantity of stone for each site is intended to bring the structures to the lines and grades shown on the Drawings.

B. The term "revetment" applies to the type of stabilization structure that is constructed along the bank of the river roughly parallel to the current. Revetments typically are constructed of stone, though their original construction often incorporated pilings.

1.02 SUBMITTALS

A. Stone
1. Material and geologic formation identification and supporting tests
2. Location of material(s) source(s) with relevant site certifications
3. Gradation and soundness testing results

1.03 MEASUREMENT AND PAYMENT

A. Stone Revetment/Riprap
1. Method of Measurement and Pay Unit: By the ton for each respective type of stone placed. A load ticket including the ticket number, date, truck number, empty truck weight and gross weight is required for all stone measured.
2. Includes, but is not limited to, supplying, weighing, hauling, delivery, placing and fabric where required.

PART 2 - PRODUCTS

2.01 STONE

A. All riprap stone shall conform to all requirements of these specifications and approved by the Engineer.

B. Broken concrete rubble will not be allowed as an allowable substitute for stone.

C. Quarried Stone or Field Boulders
1. The stone shall consist of broken, field boulders or quarried stone meeting the quality requirements outlined in these specifications.
2. Neither the breadth nor the thickness of any piece of stone shall be less than one-third of its length.
3. Stone shall be reasonably well graded from coarse to fine. Quarry operation shall be controlled to produce a reasonable well graded stone of the required size; Engineer may require changes as necessary to produce the required product. Dirt and fines of less than 1/2-inch maximum cross section, accumulated from inter-ledge layers or from blasting or handling operations or breaking shall not exceed 5 percent by weight.
4. The stone shall be reasonably well graded between the following limits:

Limits of Stone Weight (Percent Lighter by Weight)	Weight in Pounds (lbs)		Appr. Size as Sphere Dia. (in)	
%	Maximum	Minimum	Maximum	Minimum
100	750	460	25	21
90		410		20
50	350	220	19	16
30		138		14
15	200	43	16	10

D. All tests shall be performed by Contractor or quarry's agent. The stone protection material shall meet the following test limits when tested as indicated.
1. Bulk Specific Gravity, Saturated surface dry basis, ASTM C127, not less than 2.40
2. Soundness in Magnesium Sulfate, ASTM C88, loss at 5 cycles not more than 12%

PART 3 - EXECUTION

3.01 RIPRAP STONE PLACEMENT

Engineering Fabric shall be placed under all Rip Rap

A. Stone shall be placed where shown on the Drawings or as directed by the Engineer.

B. Stone shall be placed in such manner as to produce a reasonably well-graded mass of rock with the minimum practicable percentage of voids. Riprap shall be placed to its full course thickness in one operation and in such manner as to avoid damage to the bedding material and to minimize segregation of the riprap. The finished riprap shall be free from objectionable pockets of small stones and clusters of larger stones.

C. Placing riprap stone in layers will not be permitted.

D. The stone shall be placed by skip or clamshell, rapid cast off barges by hand or machine, or by other methods approved by Engineer. Dumping of stone at the top of slopes and rolling or pushing into place will not be permitted. Maximum drop height shall be zero for stone placed above the water surface, and three feet above the final resting place for stone placed below the water surface.

E. A tolerance of plus or minus one-half foot will be allowed for the revetment grades shown on the Drawings. Variances to the side slopes shall be determined by the natural angle of repose of the stone, varying from 1V on 1.25-1.5H.

F. Rearranging of individual stone by mechanical equipment or by hand will be required to the extent necessary to obtain a well-graded distribution of stone sizes as specified above.

3.02 REVETMENT STONE PROTECTION AND REPLACEMENT, AS NECESSARY

A. Existing revetment (stone and piling) shall be protected during construction activities and shall only be modified if, and where, specifically identified to the lines and grades shown on the Drawings.

B. Where existing revetment stone is damaged or displaced by construction activity, that material shall be removed, cleaned of loose soils, and placed back onto the revetment at a location in the project area approved by the Engineer. Removed material shall be replaced with new stone meeting the material requirements outlined previously.

ABR ENGINEERING
440 Regency Parkway Drive
Suite 200
Omaha, NE 68114
(402) 502-4242
www.abpengineeringllc.com

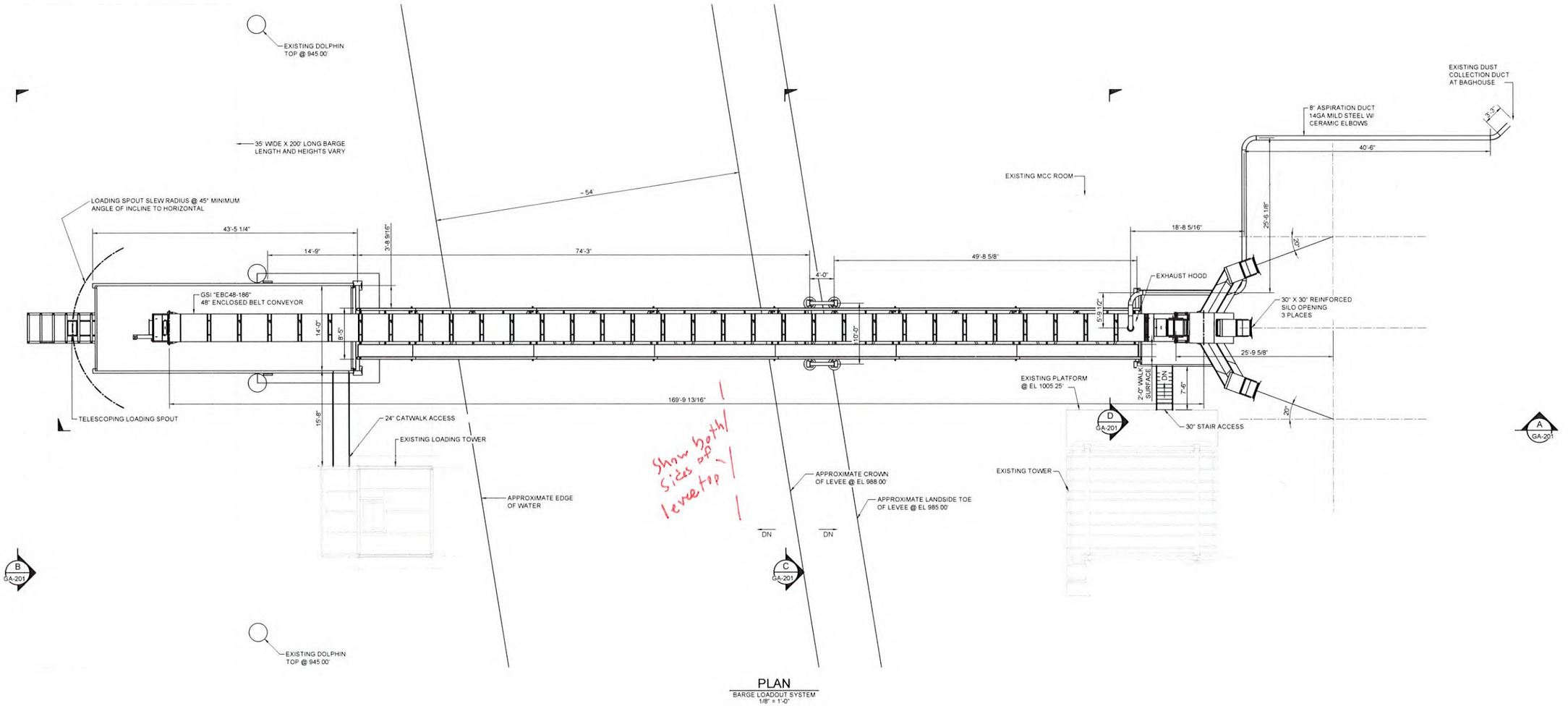
JEO CONSULTING GROUP
1-800-723-8567

△	REVISION DESCRIPTION	BY	CHK'D	DATE
A	ISSUED FOR REVIEW	JJS	MDB	6/29/22

CLIENT JOB NO.	21155
DRAWING DATE	7/1/2022
DRAFTER	T. WESTFALL (JEO)
PROJECT DESIGNER	J. STINE (JEO)
PROJECT ENGINEER	J. STINE (JEO)
SCALE	AS SHOWN

HEARTLAND CO-OP
COUNCIL BLUFFS, IOWA
HEARTLAND GRAIN FACILITY
BARGE LOADOUT

DRAWING NUMBER: 21155-C-101
REV: A



Show both sides of levee top

PLAN
BARGE LOADOUT SYSTEM
1/8" = 1'-0"

PRELIMINARY
NOT FOR CONSTRUCTION

REFERENCE DRAWINGS

1 21155-GA-201

ABR ENGINEERING

I hereby certify that this engineering document was prepared by me or under my direct personal supervision and that I am a duly licensed Professional Engineer under the laws of the State of Iowa.

(Signature) (Date)

Printed or typed name

My license renewal date is December 31

Pages or sheets covered by this seal: 21155-GA-101

△	REVISION DESCRIPTION	BY:	CHK'D:	DATE:
A	ISSUED FOR REVIEW	KJC	DH	12/23/21
B	ISSUED FOR REVIEW, PLAN VIEW	KJC	DH	03/09/22

CLIENT JOB NO: 21155
DRAWING DATE: 12/23/21
DRAFTER: K. CIECIOR
PROJECT DESIGNER: K. CIECIOR
PROJECT ENGINEER: HOYLMAN/HAASE
SCALE: 1/8" = 1'-0"

HEARTLAND COOP
COUNCIL BLUFFS, IOWA
HEARTLAND GRAIN FACILITY
BARGE LOADOUT
PLAN VIEW

DEPARTMENT: N/A
DRAWING NUMBER: 21155-GA-101
REV: B

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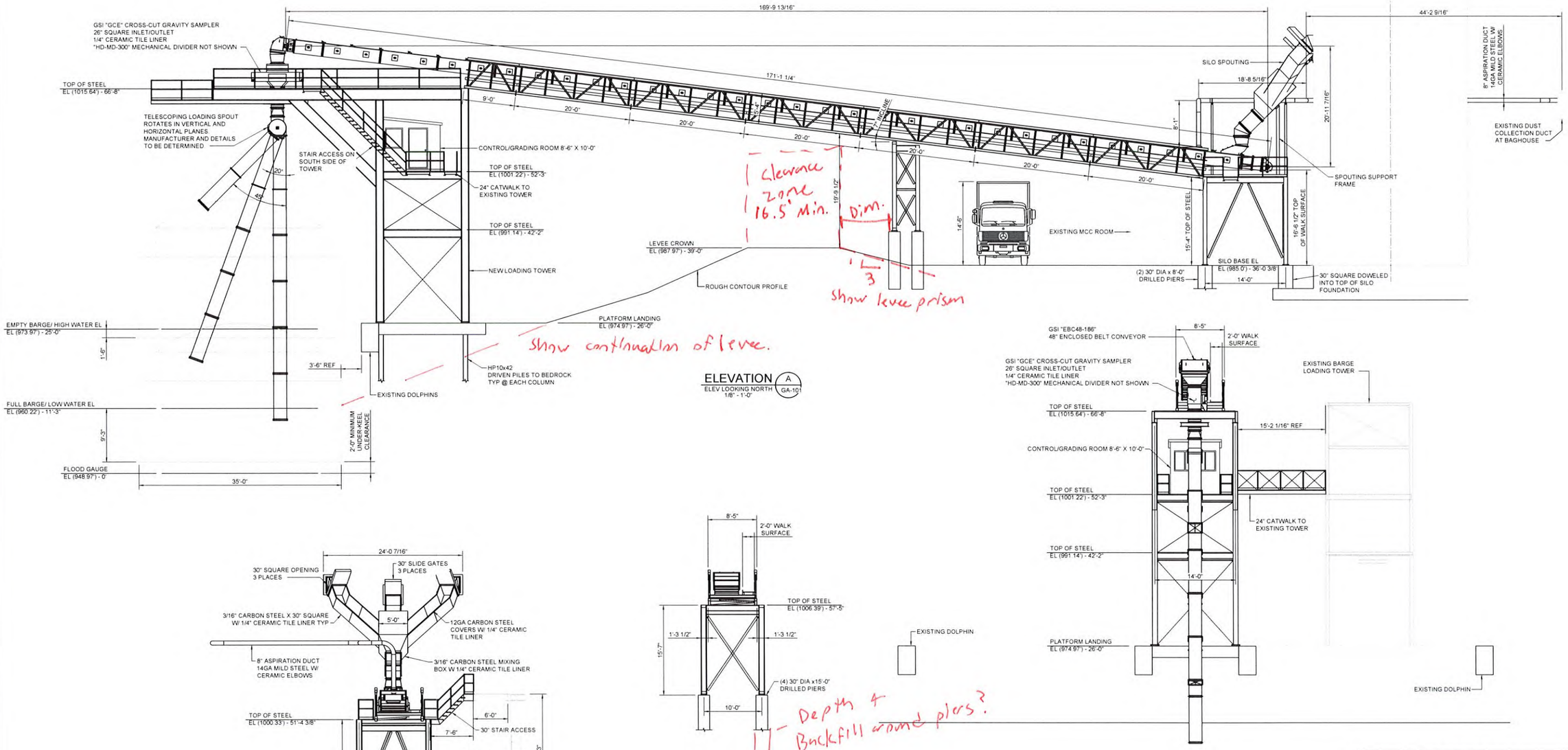

PRELIMINARY
NOT FOR CONSTRUCTION

ABR ENGINEERING

REFERENCE DRAWINGS

1 21155-GA-101

I hereby certify that this engineering document was prepared by me or under my direct personal supervision and that I am a duly licensed Professional Engineer under the laws of the State of Iowa.

(Signature) (Date)

Printed or typed name:

My license renewal date is December 31:

Pages or sheets covered by this seal: 21155-GA-201

△	REVISION DESCRIPTION	BY:	CHK'D:	DATE:
A	ISSUED FOR REVIEW	KJC	DH	12/23/21
B	ISSUED FOR REVIEW, UPDATED	KJC	DH	03/09/22

CLIENT JOB NO: 21155
DRAWING DATE: 12/23/21
DRAFTER: K. CIECIOR
PROJECT DESIGNER: K. CIECIOR
PROJECT ENGINEER: HOYLMAN/HAASE
SCALE: 1/8" = 1'-0"

HEARTLAND COOP
COUNCIL BLUFFS, IOWA
HEARTLAND GRAIN FACILITY
BARGE LOADOUT
ELEVATION VIEWS

DEPARTMENT: N/A
DRAWING NUMBER: 21155-GA-201
REV: B

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HEARTLAND GRAIN FACILITY

RECEIVING AND STORAGE - BARGE LOADOUT

COUNCIL BLUFFS, IOWA

ISSUED FOR REVIEW

DWG. NO.	DESCRIPTION	REVISION	REVISION DATE
21155-G-100	COVER SHEET	A	09-16-2022
21155-GA-101	GENERAL ARRANGEMENT PLAN	C	09-16-2022
21155-GA-201	ELEVATION VIEWS	C	09-16-2022
21155-C-101	MISSOURI RIVER BNSP REVETMENT (JEO)	C	09-16-2022
22015-GA-104	SITE PLAN	B	09-16-2022

NOT FINAL PRELIMINARY SUBJECT TO CHANGE

I hereby certify that this engineering document was prepared by me or under my direct personal supervision and that I am a duly licensed Professional Engineer under the laws of the State of Iowa.

(Signature) (Date)

Printed or typed name *** ENGINEER PRINTED NAME ***

License Number *** NUMBER ***

My license renewal date is December 31, *** YEAR ***

Pages or sheets covered by this seal: 21155-G-100, 21155-GA-101, 21155-GA-201 22015-GA-104

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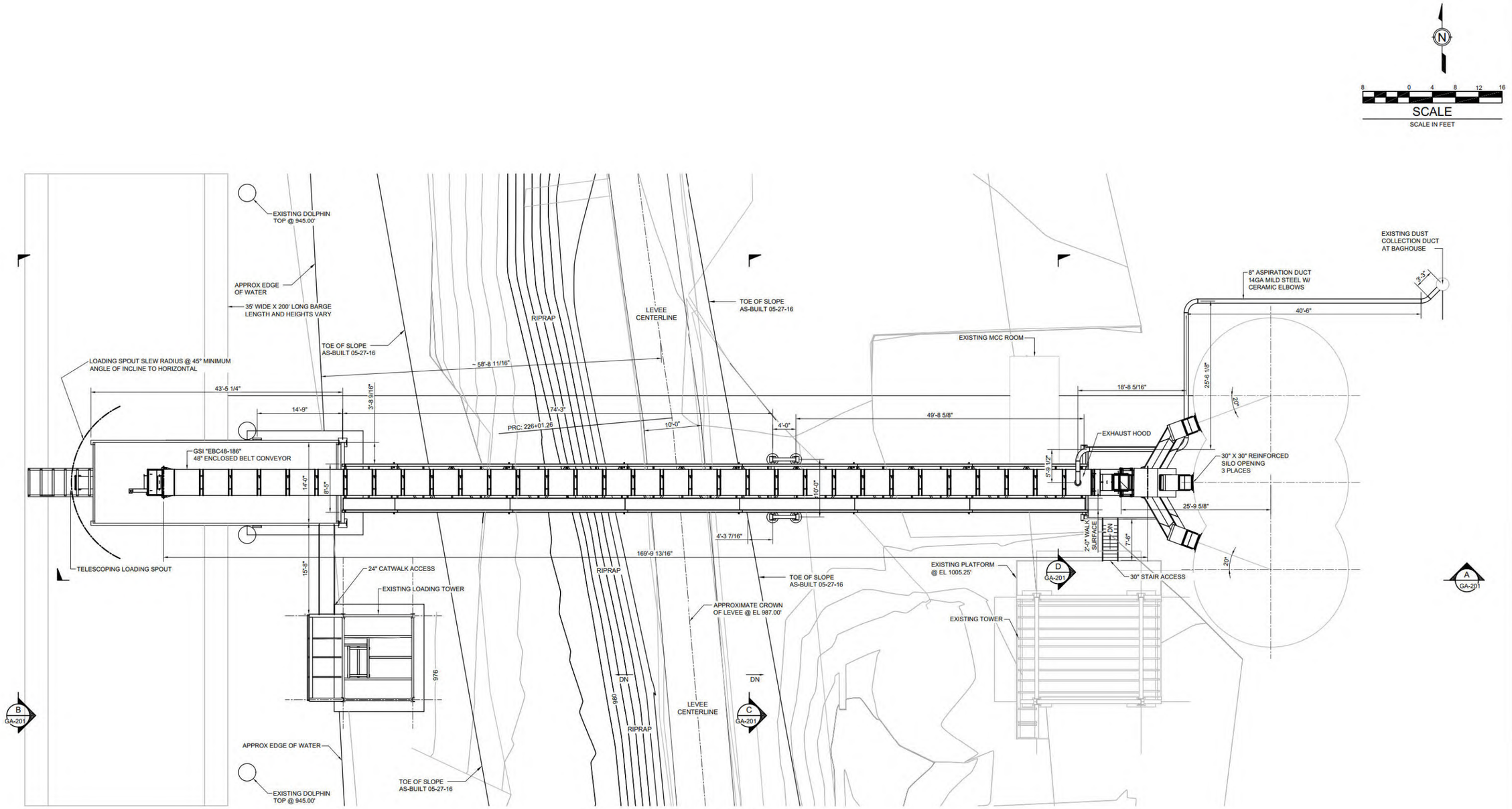
440 Regency Parkway Drive
Suite 200
Omaha, NE 68114
(402) 502-4242
www.abpengineeringllc.com

△	REVISION DESCRIPTION	BY:	CHK'D:	DATE:
A	ISSUED FOR REVIEW	KC	DH	09-16-2022

ABP PROJ NO: N/A
DRAFTER: ---
PROJECT DESIGNER: K. CIECIOR
PROJECT ENGINEER: D. HOYLMAN
SCALE: NONE

HEARTLAND CO-OP
COUNCIL BLUFFS, IOWA
HEARTLAND GRAIN FACILITY
COVER SHEET

DEPARTMENT: N/A
DRAWING NUMBER: 21155-G-100
REV: A



PLAN
BARGE LOADOUT SYSTEM
1/8" = 1'-0"

PRELIMINARY
NOT FOR CONSTRUCTION

REFERENCE DRAWINGS

21155-G-100	COVER SHEET
21155-GA-101	GENERAL ARRANGEMENT PLAN
21155-GA-201	ELEVATION VIEWS
21155-C-101	MISSOURI RIVER BNSP REVETMENT (JEO ENGINEERING)
22015-GA-104	SITE PLAN

GENERAL NOTES

1. OWNER SHALL PROVIDE PERIODIC INSPECTION AND OBSERVATION SERVICES BY DESIGN ENGINEER.
2. OWNER SHALL PROVIDE THIRD-PARTY MATERIAL TESTING SERVICES.
3. DISTURBANCES TO LEVEE PRISM SHALL BE BACKFILLED AND REPAIRED PER THE INDUSTRIAL PARK LEVEE OPERATIONS AND MAINTENANCE MANUAL.
4. CONTRACTOR SHALL PREPARE AND DELIVER AS-BUILT DRAWINGS AT THE CONCLUSION OF CONSTRUCTION ACTIVITIES.

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B	ISSUED FOR REVIEW, UPDATED	KJC	DH	03/09/22
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CLIENT JOB NO.:	21155
DRAWING DATE:	12/23/21
DRAFTER:	K. CIECIOR
PROJECT DESIGNER:	K. CIECIOR
PROJECT ENGINEER:	HOYLMAN/HAASE
SCALE:	1/8" = 1'-0"

HEARTLAND COOP
COUNCIL BLUFFS, IOWA
HEARTLAND GRAIN FACILITY
BARGE LOADOUT
PLAN VIEW

DEPARTMENT:	DRAWING NUMBER:	REV:
N/A	21155-GA-101	C

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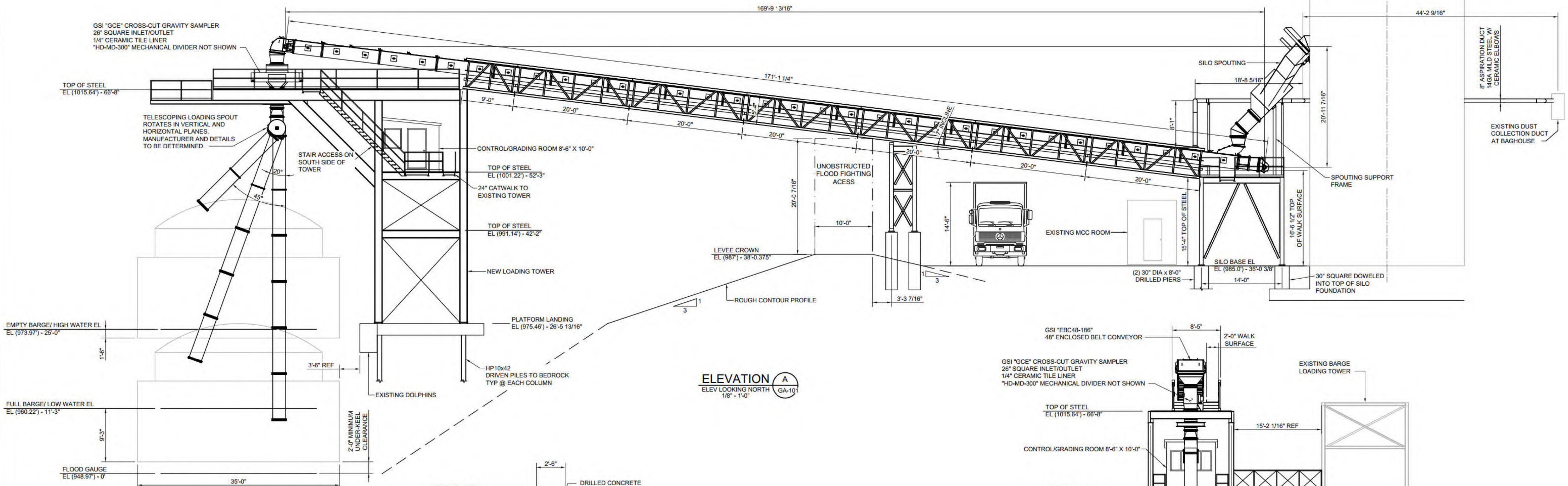
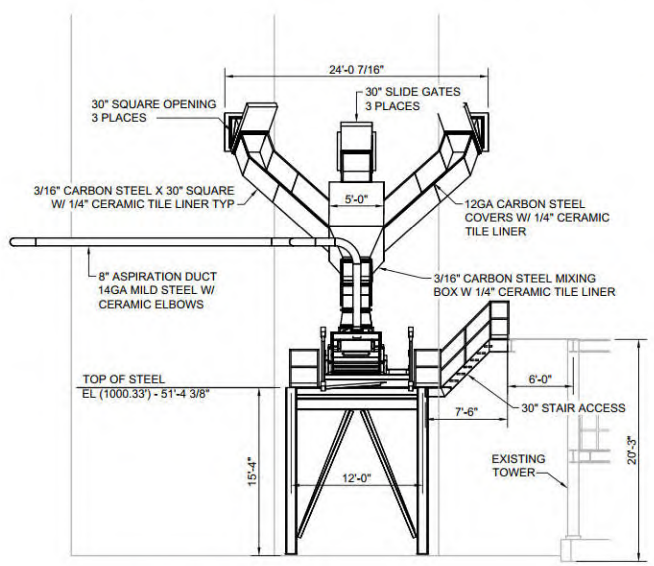
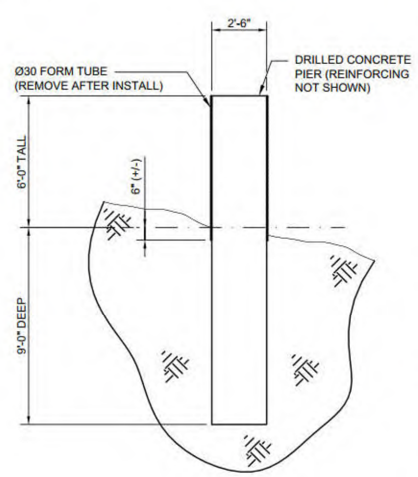


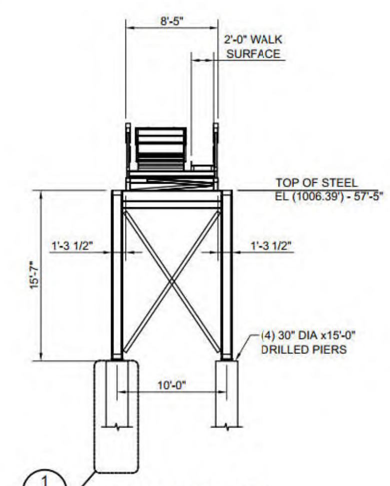
ELEVATION (A / GA-101)
ELEV LOOKING NORTH
1/8" - 1'-0"



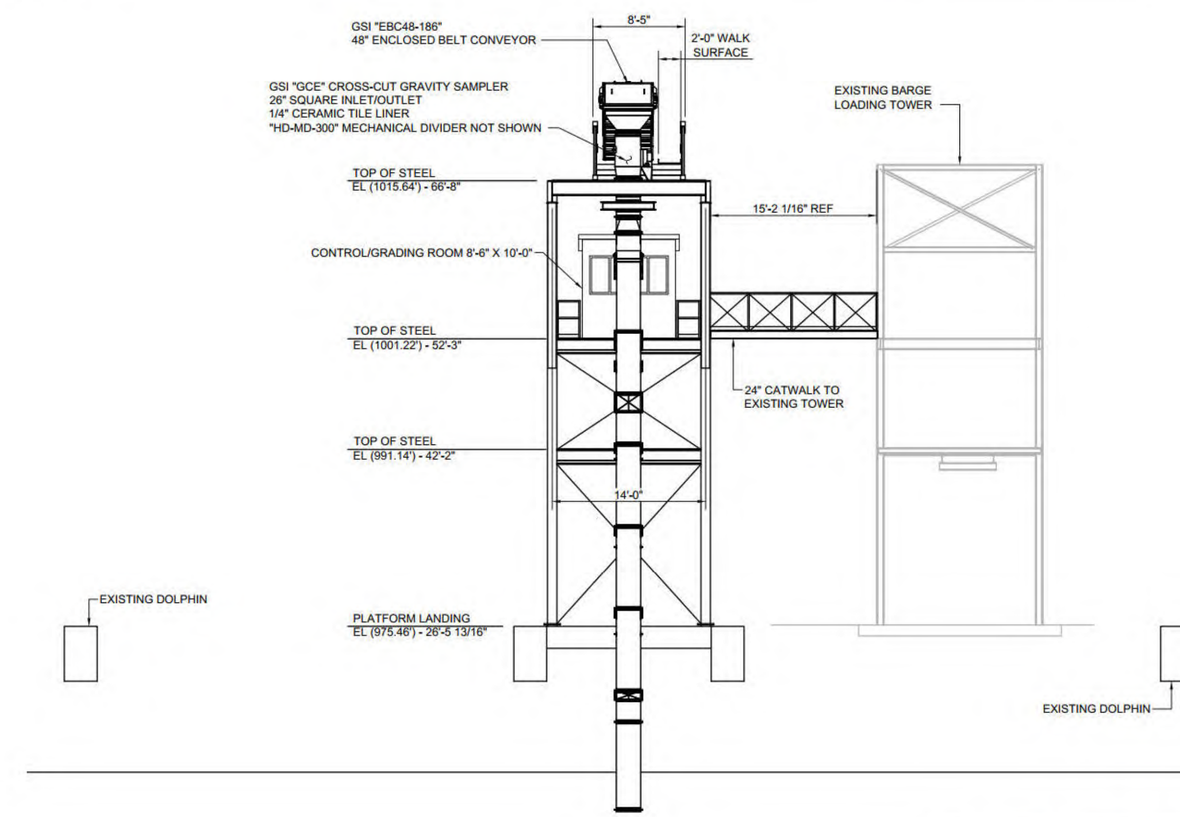
ELEVATION (D / GA-101)
ELEV LOOKING EAST
1/8" - 1'-0"



DETAIL (1 / GA-201)
1/4" = 1'-0"
LEVEE PIERS



ELEVATION (C / GA-101)
ELEV LOOKING EAST
1/8" - 1'-0"



ELEVATION (B / GA-101)
ELEV LOOKING EAST
1/8" - 1'-0"

PRELIMINARY
NOT FOR CONSTRUCTION

REFERENCE DRAWINGS

21155-G-100	COVER SHEET
21155-GA-101	GENERAL ARRANGEMENT PLAN
21155-GA-201	ELEVATION VIEWS
21155-C-101	MISSOURI RIVER BNSP REVETMENT (JEO ENGINEERING)
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CLIENT JOB NO.:	21155
DRAWING DATE:	12/23/21
DRAFTER:	K. CIECIOR
PROJECT DESIGNER:	K. CIECIOR
PROJECT ENGINEER:	HOYLMAN/HAASE
SCALE:	1/8" = 1'-0"

HEARTLAND COOP
COUNCIL BLUFFS, IOWA

HEARTLAND GRAIN FACILITY
BARGE LOADOUT
ELEVATION VIEWS

DEPARTMENT:	DRAWING NUMBER:	REV:
N/A	21155-GA-201	C

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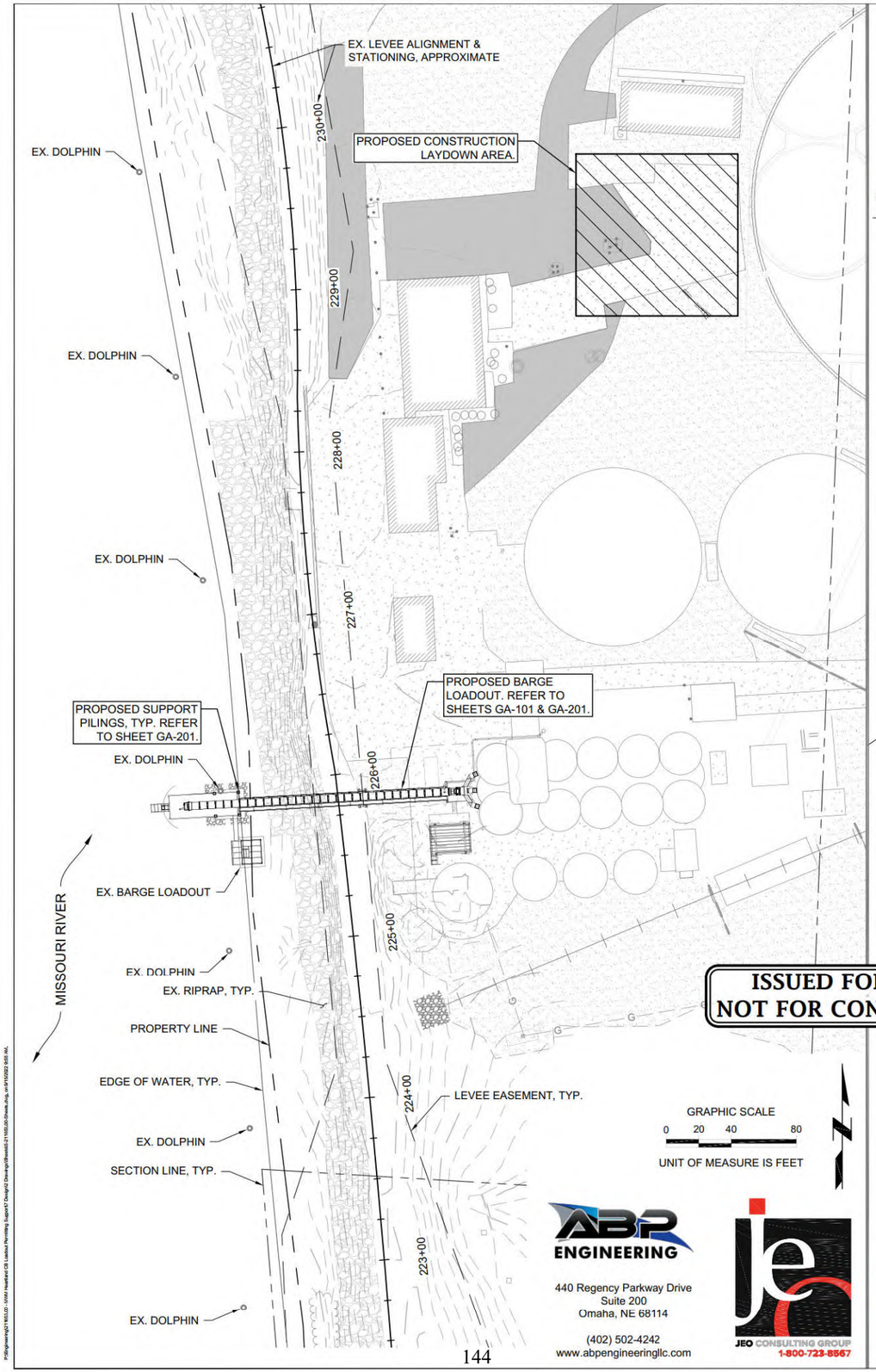
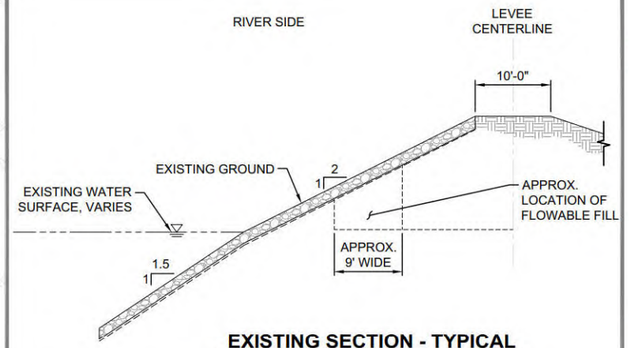
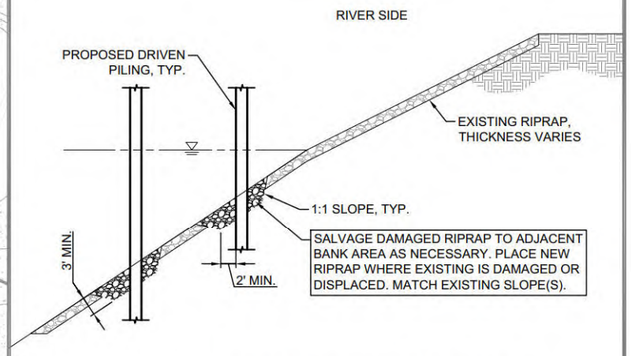




EXISTING SECTION - TYPICAL
SCALE: N.T.S.



PROPOSED SECTION - TYPICAL
SCALE: N.T.S.

ISSUED FOR REVIEW
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HEARTLAND CO-OP

MISSOURI RIVER BNSP REVETMENT MAINTENANCE & RESTORATION

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30		138		14
15	200	43	16	10

D. All tests shall be performed by Contractor or quarry's agent. The stone protection material shall meet the following test limits when tested as indicated.
1. Bulk Specific Gravity, Saturated surface dry basis, ASTM C127, not less than 2.40
2. Soundness in Magnesium Sulfate, ASTM C88, loss at 5 cycles not more than 12%

PART 3 - EXECUTION

3.01 RIPRAP STONE PLACEMENT

A. Stone shall be placed with Engineer present to inspect conditions and completed work as shown on the Drawings or as directed by the Engineer.

B. Stone shall be placed in such manner as to produce a reasonably well-graded mass of rock with the minimum practicable percentage of voids. Riprap shall be placed to its full course thickness in one operation and in such manner as to avoid damage to the bedding material and to minimize segregation of the riprap. The finished riprap shall be free from objectionable pockets of small stones and clusters of larger stones.

C. Placing riprap stone in layers will not be permitted.

D. The stone shall be placed by skip or clamshell, rapid cast off barges by hand or machine, or by other methods approved by Engineer. Dumping of stone at the top of slopes and rolling or pushing into place will not be permitted. Maximum drop height shall be zero for stone placed above the water surface, and three feet above the final resting place for stone placed below the water surface.

E. A tolerance of plus or minus one-half foot will be allowed for the revetment grades shown on the Drawings. Variances to the side slopes shall be determined by the natural angle of repose of the stone, varying from 1V on 1.25-1.5H.

F. Rearranging of individual stone by mechanical equipment or by hand will be required to the extent necessary to obtain a well-graded distribution of stone sizes as specified above.

3.02 REVETMENT STONE PROTECTION AND REPLACEMENT, AS NECESSARY

A. Existing revetment (stone and piling) shall be protected during construction activities and shall only be modified if, and where, specifically identified to the lines and grades shown on the Drawings.

B. Where existing revetment stone is damaged or displaced by construction activity, that material shall be removed and placed back onto the revetment at a location in the project area approved by the Engineer. Damaged material shall be supplemented with a greater than or equal volume of new stone meeting the material requirements outlined previously.

3.03 SITE PROTECTION AND DOCUMENTATION

A. Contractor shall provide as-built drawings at the conclusion of construction activities.

B. Contractor shall ensure that no heavy equipment sits on or traverses the levee.

△	REVISION DESCRIPTION	BY:	CHK'D:	DATE:
A	ISSUED FOR REVIEW	JJS	MDB	6/29/22
B	RESTORATION CLARIFICATION	JJS	MDB	9/8/22
C	ISSUED FOR REVIEW, UPDATED	JJS	MDB	9/16/22

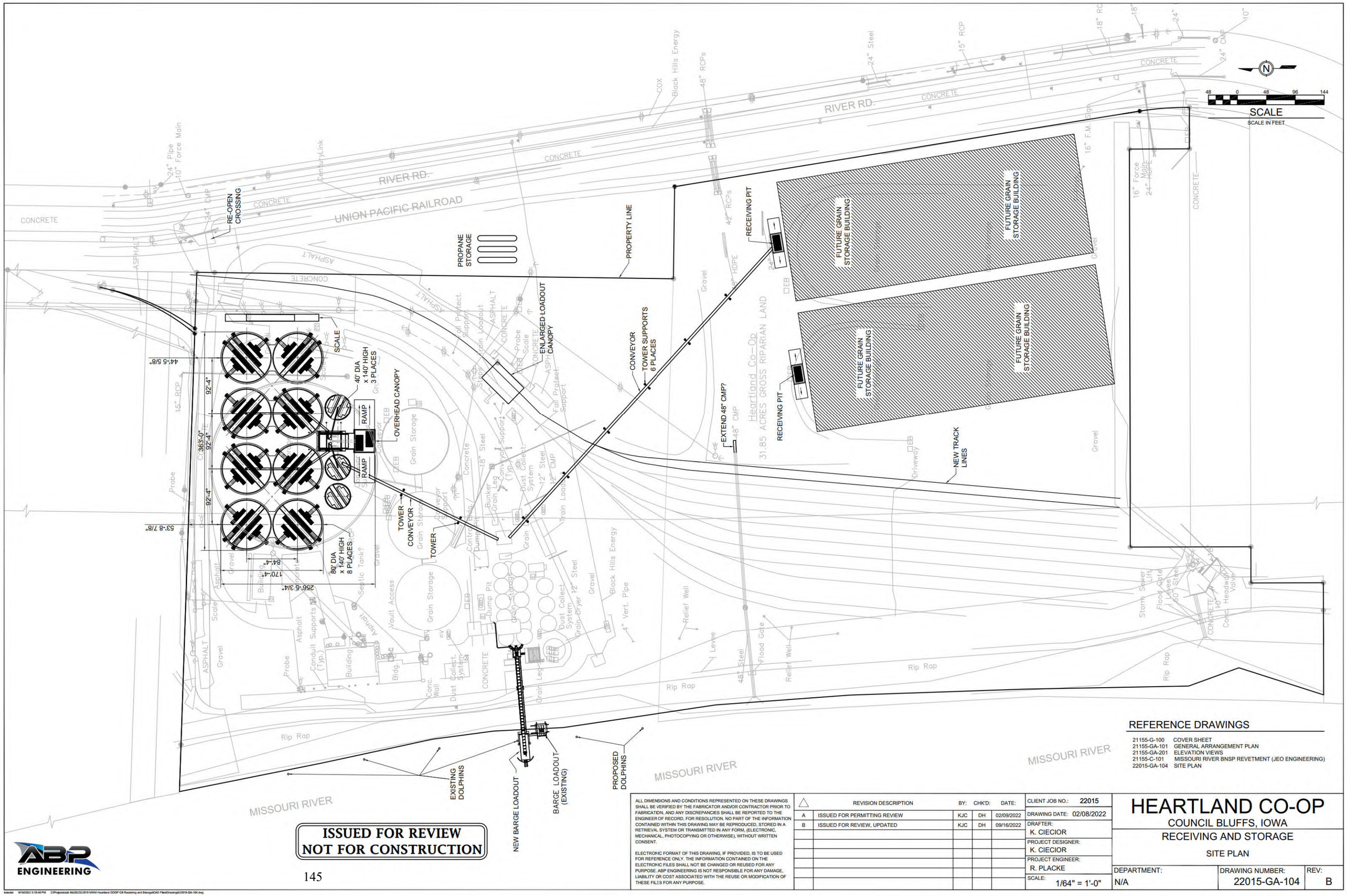
CLIENT JOB NO.: 21155
DRAWING DATE: 9/15/2022
DRAFTER: T. WESTFALL (JEO)
PROJECT DESIGNER: J. STINE (JEO)
PROJECT ENGINEER: J. STINE (JEO)
SCALE: AS SHOWN

HEARTLAND CO-OP
COUNCIL BLUFFS, IOWA
HEARTLAND GRAIN FACILITY
BARGE LOADOUT

DRAWING NUMBER: 21155-C-101
REV: C

ABP ENGINEERING
440 Regency Parkway Drive
Suite 200
Omaha, NE 68114
(402) 502-4242
www.abpengineeringllc.com

JEO CONSULTING GROUP
1-800-723-8567



REFERENCE DRAWINGS

21155-G-100	COVER SHEET
21155-GA-101	GENERAL ARRANGEMENT PLAN
21155-GA-201	ELEVATION VIEWS
21155-C-101	MISSOURI RIVER BNSP REVETMENT (JEO ENGINEERING)
22015-GA-104	SITE PLAN

ISSUED FOR REVIEW
NOT FOR CONSTRUCTION

ABR ENGINEERING

△	REVISION DESCRIPTION	BY:	CHK'D:	DATE:
A	ISSUED FOR PERMITTING REVIEW	KJC	DH	02/09/2022
B	ISSUED FOR REVIEW, UPDATED	KJC	DH	09/16/2022

CLIENT JOB NO.:	22015
DRAWING DATE:	02/08/2022
DRAFTER:	K. CIECIOR
PROJECT DESIGNER:	K. CIECIOR
PROJECT ENGINEER:	R. PLACKE
SCALE:	1/64" = 1'-0"

HEARTLAND CO-OP

COUNCIL BLUFFS, IOWA

RECEIVING AND STORAGE

SITE PLAN

DEPARTMENT:	DRAWING NUMBER:	REV:
N/A	22015-GA-104	B

HEARTLAND CO-OP®

R – Issued for Review

ABP ENGINEERING

ABP Engineering LLC
440 Regency Parkway Drive, Suite 200
Omaha, Nebraska 68114

HEARTLAND COOP – COUNCIL BLUFFS, IA

BARGE LOADOUT

CONSTRUCTION EMERGENCY ACTION PLAN

DATE	ORIGINATING ENG	QUALIFIED CHECKER	ENG PRJ MANAGER
2022/09/16	D. HOYLMAN	R. PLACKE	D. HOYLMAN

NUMBER

21155-C-S01

Background

Heartland Coop intends to restore barge loadout capability at its grain terminal located at 2401 S. 37th St. in Council Bluffs. The project will entail construction of a loading structure on the left bank of the Missouri River and a conveyor across the Industrial Park Levee (IPL) at river mile 614.32. These improvements will require installation of driven piles on the water side of the IPL and drilled piers on the land side. This Emergency Action Plan applies to all construction activities that may impact operation and maintenance of the IPL.

General arrangement drawings and a site plan of the project and surrounding area are included in Attachment 1.

Construction Schedule

Construction is expected to begin on or about November 1, 2022. It is expected to be complete by March 31, 2023.

Material and Equipment Staging Plan

Equipment and materials shall be brought onsite and staged as indicated on the plan view in Appendix A. When in use, heavy equipment shall be set up outside the levee toe on the land side. Idle materials and equipment shall be staged in the lot next to the maintenance shed.

Temporary Soils Stockpile Areas

The nature of work to be performed will not require large-scale excavation. Thus, no stockpile areas will be necessary.

Sheeting and Shoring Plans

Not applicable.

Construction Equipment

Cranes of various sizes, telescopic forklifts, skid steers, and pickup trucks are expected to be onsite during construction.

Levee Settlement Monitoring Program

Areas of the levee to be traversed during the project shall be surveyed and photographed prior to the commencement of construction activities. The survey and photographs shall be repeated when construction has concluded.

Dewatering and Well Abandonment Plans

Not applicable.

Site Restoration Plan

Areas found to have settled or been compacted in the post-construction survey shall be backfilled using approved fill to pre-construction conditions, within surveying tolerances. These areas shall be reseeded with an approved seed blend.

Emergency Procedures

Daily Monitoring

The water level of the Missouri River shall be monitored daily by the General Contractor. The extended forecast of future river levels shall also be monitored.

Monitoring Agencies

The river level shall be monitored through USGS and National Weather Service websites for River Gage – 06610000 Missouri River at Omaha, Nebraska.

- https://water.weather.gov/ahps2/hydrograph.php?wfo=oax&gage=omhn1
- https://waterdata.usgs.gov/ne/nwis/uv/?site_no=06610000&amp

Ceasing Construction

Construction operations shall cease in the event the river levels are within 5 feet of the published flood stage of 29 feet (Elevation 977.0 feet). The 100-year flood elevation at this location is 981.0 feet. The City of Council Bluffs and the USACE representatives shall be notified prior to resumption of construction.

The river level for cessation of pile driving and revetment repair activities may be established significantly below 29 feet.

Equipment and Materials Removal

All equipment, construction materials, and stockpiled soils shall be removed in the event of high water and relocated to the staging area during high water events.

Emergency Backfilling

If seepage is observed in any excavation, emergency backfilling shall be commenced. The rate of emergency backfilling shall exceed the rate of the rising river. Soil shall be used as emergency backfill.

Emergency Contacts

Contractor
tbd

City of Council Bluffs
Jeff Krist, P.E.
Council Bluffs Public Works Department
209 Pearl Street
Council Bluffs, Iowa 51503
Phone: 712.890.5296 (office)
Email: jkrist@councilbluffs-ia.gov

Jeremy Noel; Operations Manager
Phone: 712.328.4641 (office)
Phone: 402.968.7301 (mobile)
Email: jnoel@councilbluffs-ia.gov

Dennis Dofner; Manager of Streets and Sewers
Phone: 712.890.5408 (office)
Phone: 402.650.1941 (mobile)
Email: ddofner@councilbluffs-ia.gov

ABP Engineering
David Hoylman, M.S., P.E.; Senior Design Engineer
440 Regency Parkway Drive
Suite 200
Omaha, Nebraska 68114
Phone: 402.502.4242 (office)
Phone: 531.301.2793 (mobile)
Email: dhoylman@abpengineeringllc.com

JEO Consulting Group
Michael Bash, P.E., C.P.M.
Phone: 402.474.8761 (office)
Phone: 402.440.4544 (mobile)

USACE – Omaha District

Matthew Krajewski
Readiness Branch Chief
Phone: 402-995-2448
Email: matthew.s.krajewski@usace.army.mil

Emergency Management Office (24-hour)
Phone: 402.995.2448
Email: cenwo-eoc@usace.army.mil

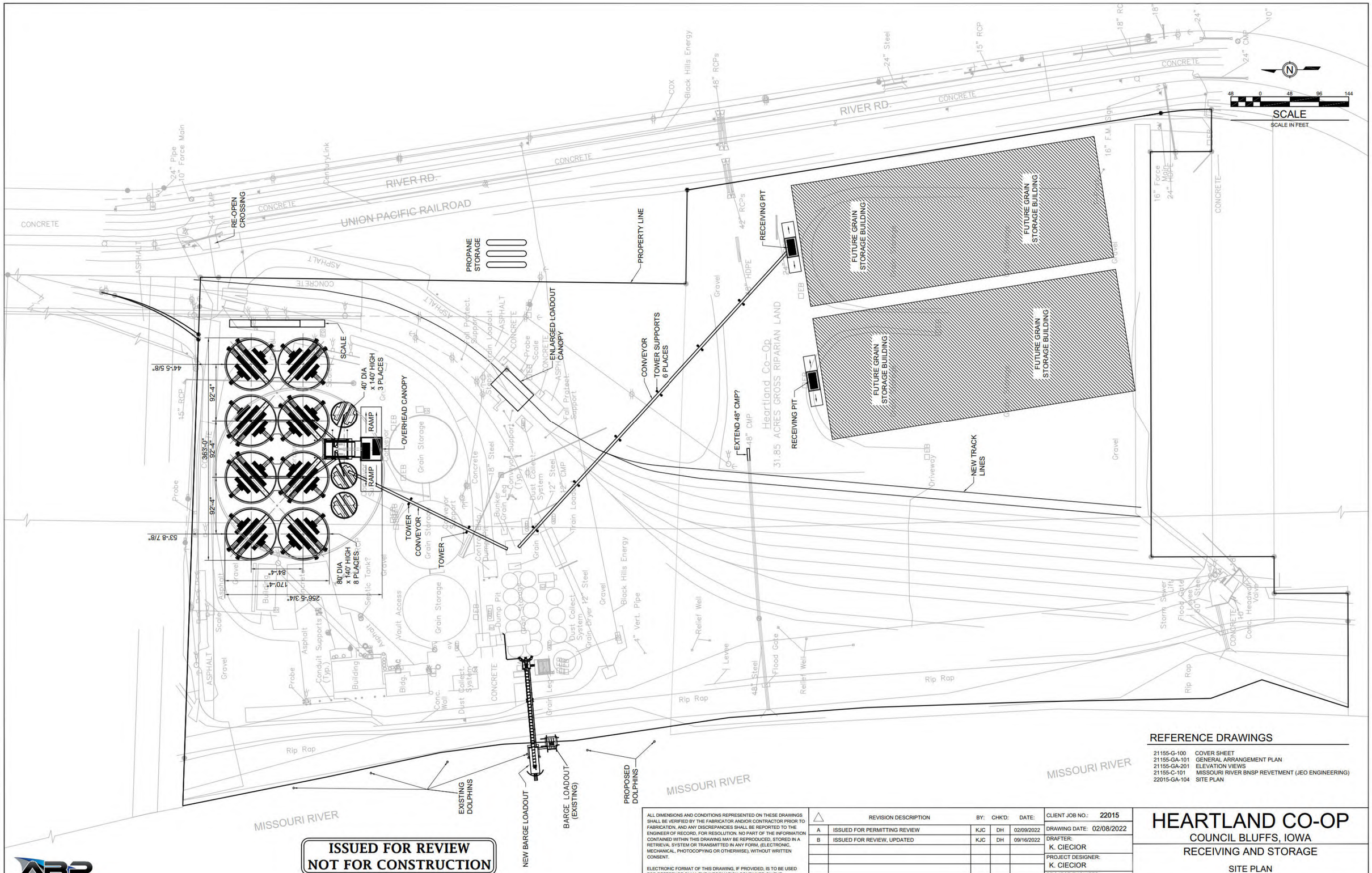
APPENDIX A

Material and Equipment Staging Plan


NEBRASKA AVENUE
PROPOSED MATERIAL AND EQUIPMENT ROUTE
RIVER ROAD
PROPOSED CONSTRUCTION LAYDOWN AREA
MISSOURI RIVER
HEARTLAND COOP
COUNCIL BLUFFS LOADOUT
MATERIAL & EQUIPMENT STAGING PLAN
PROPOSED EQUIPMENT SET-UP AREA
PROPOSED LOADOUT STRUCTURE
Google Earth
100 m
Camera: 1,160 m 41°14'20"N 95°54'28"W 296 m

ATTACHMENT 1

Site Plan and General Arrangements



REFERENCE DRAWINGS

21155-G-100	COVER SHEET
21155-GA-101	GENERAL ARRANGEMENT PLAN
21155-GA-201	ELEVATION VIEWS
21155-C-101	MISSOURI RIVER BNSP REVETMENT (JEO ENGINEERING)
22015-GA-104	SITE PLAN

ISSUED FOR REVIEW
NOT FOR CONSTRUCTION

ABR ENGINEERING

△	REVISION DESCRIPTION	BY:	CHK'D:	DATE:
A	ISSUED FOR PERMITTING REVIEW	KJC	DH	02/09/2022
B	ISSUED FOR REVIEW, UPDATED	KJC	DH	09/16/2022

CLIENT JOB NO.:	22015
DRAWING DATE:	02/08/2022
DRAFTER:	K. CIECIOR
PROJECT DESIGNER:	K. CIECIOR
PROJECT ENGINEER:	R. PLACKE
SCALE:	1/64" = 1'-0"

HEARTLAND CO-OP

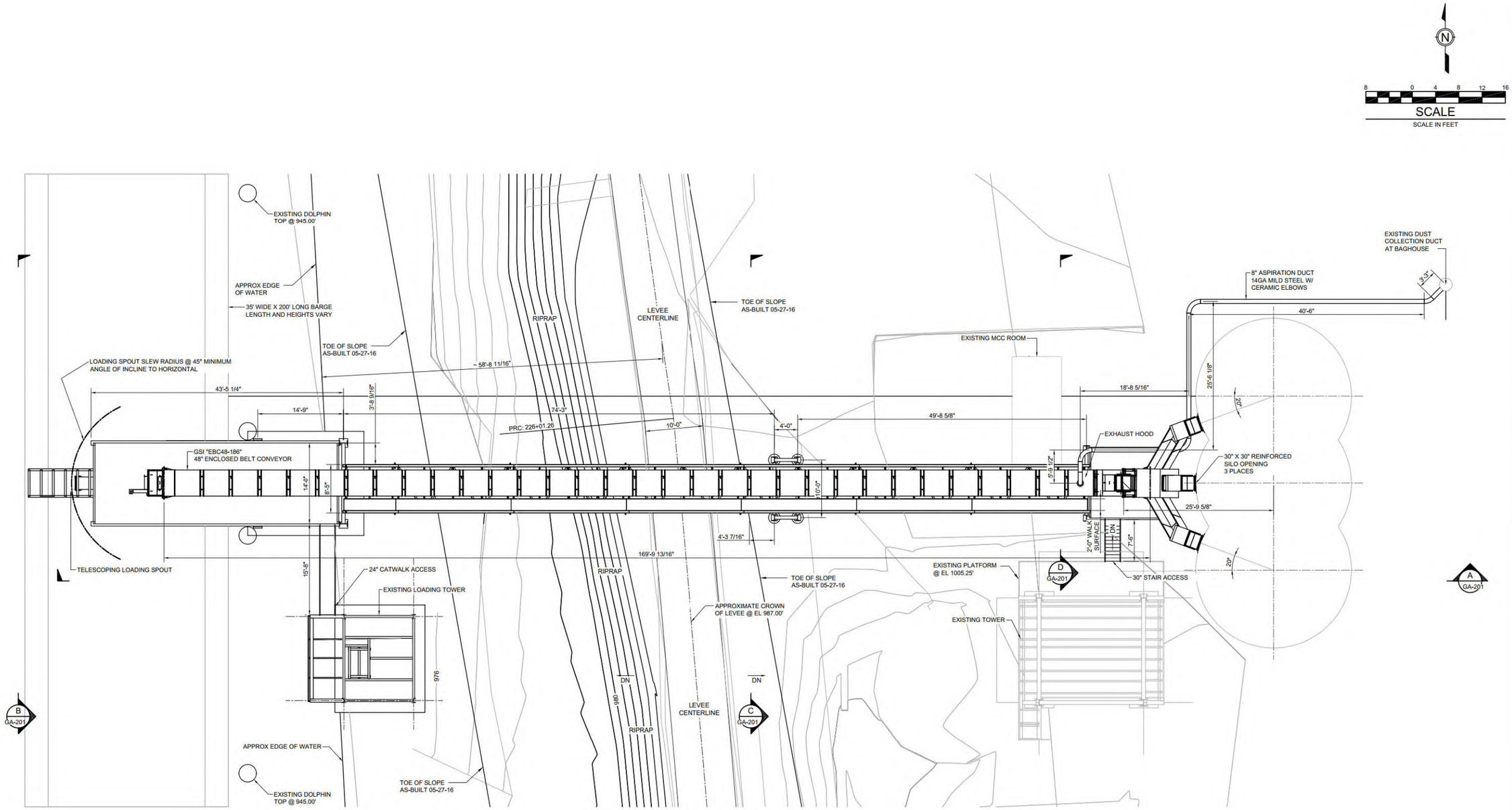
COUNCIL BLUFFS, IOWA

RECEIVING AND STORAGE

SITE PLAN

DEPARTMENT:	DRAWING NUMBER:	REV:
N/A	22015-GA-104	B

kciecior 9/16/2022 3:16:48 PM Z:\Projects\Job #s\2022\2015 MWM Heartland COOP CB Receiving and Storage\CAD Files\Drawings\22015-GA-104.dwg



PLAN
BARGE LOADOUT SYSTEM
1/8" = 1'-0"

PRELIMINARY
NOT FOR CONSTRUCTION

REFERENCE DRAWINGS

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21155-GA-201	ELEVATION VIEWS
21155-C-101	MISSOURI RIVER BNSP REVETMENT (JEO ENGINEERING)
22015-GA-104	SITE PLAN

GENERAL NOTES

1. OWNER SHALL PROVIDE PERIODIC INSPECTION AND OBSERVATION SERVICES BY DESIGN ENGINEER.
2. OWNER SHALL PROVIDE THIRD-PARTY MATERIAL TESTING SERVICES.
3. DISTURBANCES TO LEVEE PRISM SHALL BE BACKFILLED AND REPAIRED PER THE INDUSTRIAL PARK LEVEE OPERATIONS AND MAINTENANCE MANUAL.
4. CONTRACTOR SHALL PREPARE AND DELIVER AS-BUILT DRAWINGS AT THE CONCLUSION OF CONSTRUCTION ACTIVITIES.

ABP ENGINEERING
440 Regency Parkway Drive
Suite 200
Omaha, NE 68114
(402) 502-4242
www.abpengineeringllc.com

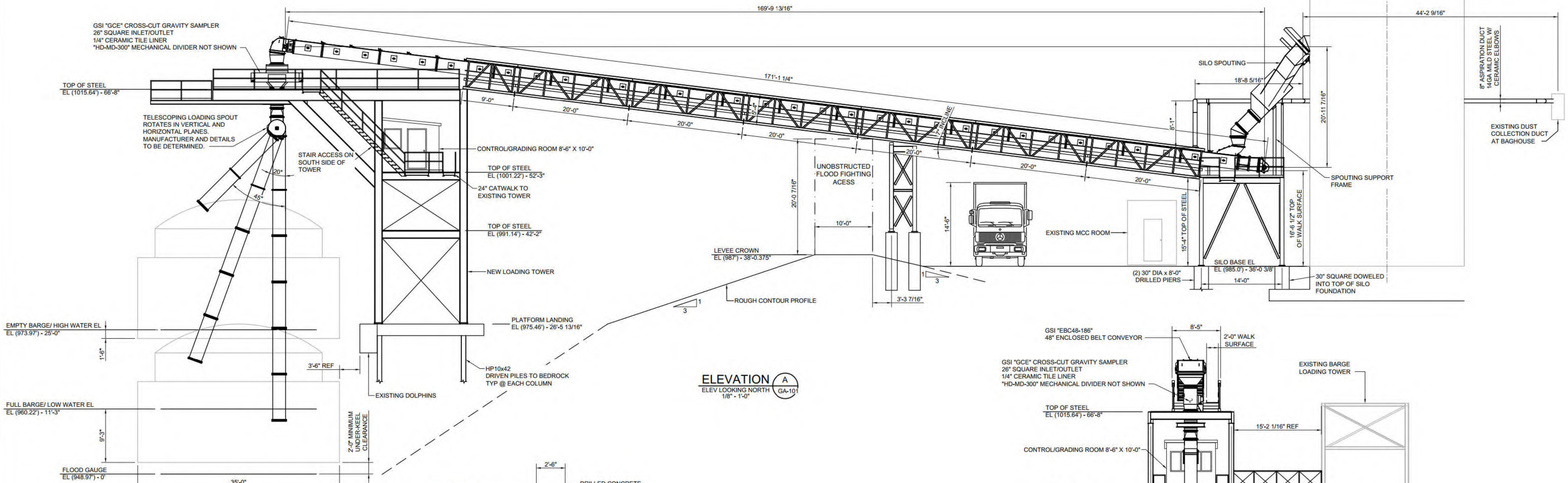
△	REVISION DESCRIPTION	BY:	CHK'D:	DATE:
A	ISSUED FOR REVIEW	KJC	DH	12/23/21
B	ISSUED FOR REVIEW, UPDATED	KJC	DH	03/09/22
C	ISSUED FOR REVIEW, UPDATED	KJC	DH	09/16/22

CLIENT JOB NO.:	21155
DRAWING DATE:	12/23/21
DRAFTER:	K. CIECIOR
PROJECT DESIGNER:	K. CIECIOR
PROJECT ENGINEER:	HOYLMAN/HAASE
SCALE:	1/8" = 1'-0"

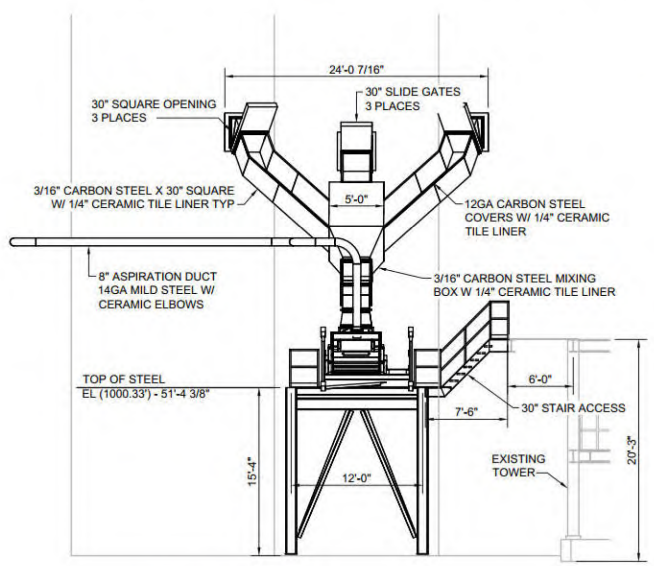
HEARTLAND COOP
COUNCIL BLUFFS, IOWA
HEARTLAND GRAIN FACILITY
BARGE LOADOUT
PLAN VIEW

DEPARTMENT:	DRAWING NUMBER:	REV:
N/A	21155-GA-101	C

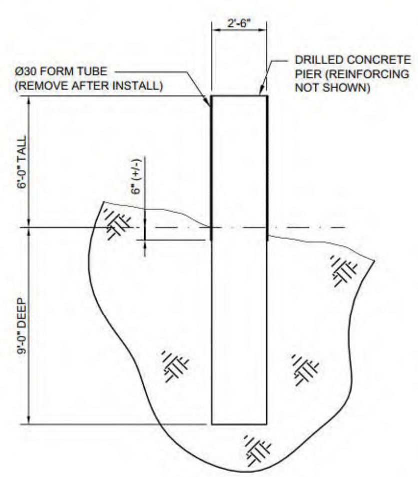
Z:\Projects\Job #s\2021\21155 MWM Heartland CB Loadout\CAD Files\21155 - PLANT 3D\Orthos\DWGs\PLAN.dwg



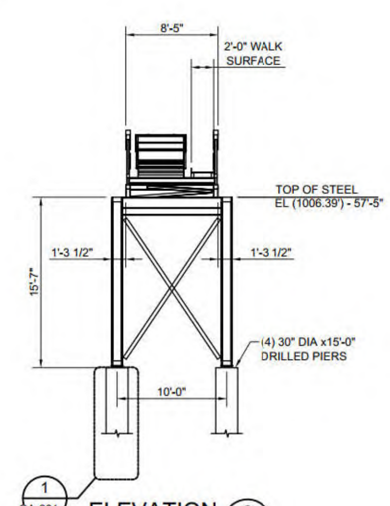
ELEVATION (A)
ELEV LOOKING NORTH
1/8" - 1'-0"
GA-101



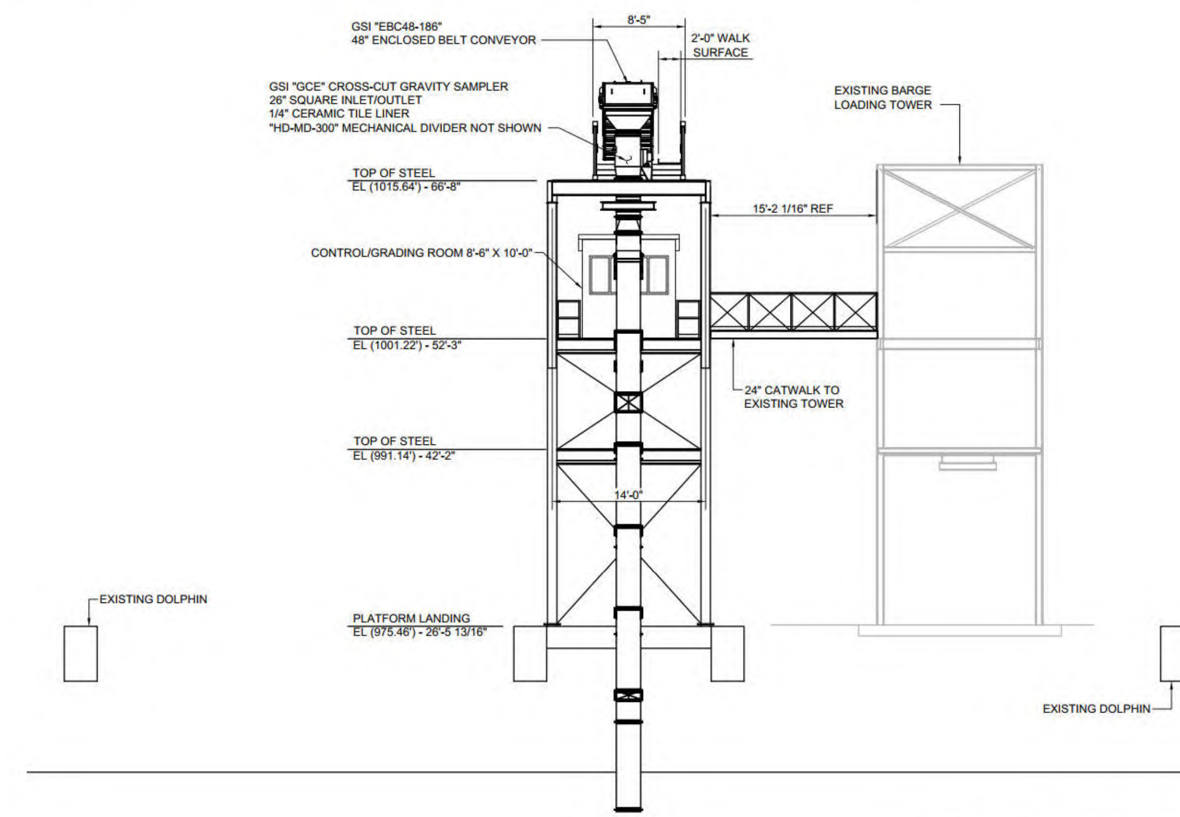
ELEVATION (D)
ELEV LOOKING EAST
1/8" - 1'-0"
GA-101



DETAIL (1)
1/4" = 1'-0"
LEVEE PIERS
GA-201



ELEVATION (C)
ELEV LOOKING EAST
1/8" - 1'-0"
GA-101



ELEVATION (B)
ELEV LOOKING EAST
1/8" - 1'-0"
GA-101

PRELIMINARY
NOT FOR CONSTRUCTION

REFERENCE DRAWINGS

21155-G-100	COVER SHEET
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A	ISSUED FOR REVIEW	KJC	DH	12/23/21
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C	ISSUED FOR REVIEW, UPDATED	KJC	DH	09/16/22

CLIENT JOB NO.: 21155
DRAWING DATE: 12/23/21
DRAFTER: K. CIECIOR
PROJECT DESIGNER: K. CIECIOR
PROJECT ENGINEER: HOYLMAN/HAASE
SCALE: 1/8" = 1'-0"

HEARTLAND COOP
COUNCIL BLUFFS, IOWA

HEARTLAND GRAIN FACILITY
BARGE LOADOUT
ELEVATION VIEWS

DEPARTMENT: N/A
DRAWING NUMBER: 21155-GA-201
REV: C

Z:\Projects\Job #s\2021\21155 MWM Heartland CB Loadout\CAD Files\21155 – PLANT 3D\Orthos\DWGs\ELEVATION LOOKING NORTH.dwg

Attachment 'N'

October 10, 2022

Courtney Harter
Community Development Director
City of Council Bluffs
City Hall
209 Pearl Street
Council Bluffs, IA 51503

Dear Ms. Harter,

Ameristar Casino & Hotel (Ameristar), being a long-standing and proud member of the Council Bluffs community, is deeply concerned about the significant expansion being proposed by Heartland Co-op (Heartland) at the Zoning Board of Adjustment hearing on October 18. We strongly believe their proposed expansion could negatively impact our ability to compete against new and existing casino gaming options in Nebraska, resulting in lower gaming and tax revenues and an unsatisfactory customer experience. We respectfully request that you and your team recommend to the Zoning Board of Adjustment that Heartland's expansion plans be denied without further consideration.

For nearly 30 years, Ameristar and Council Bluffs have maintained an important partnership, resulting in countless entertainment experiences, job opportunities, and significant financial support for many good causes. In just 2021 alone, Ameristar's community investment was more than $48 million, including $36.6 million to the State of Iowa, $5.7 million to the Iowa West Foundation, and $1.6 million to the City of Council Bluffs, plus an additional $2 million in property taxes. Our property currently employs 550 team members, with 241 residing in Council Bluffs. We are actively hiring for 67 open positions and hope to fill them with many qualified individuals located in our community.

We believe it's critically important to our present and future success that we continue to provide our patrons and team members with a first-class experience. We are operating in a hypercompetitive market with casino gaming available in Carter Lake, Lincoln, and soon in Omaha. Maintaining Ameristar's current level of investment in the area is dependent upon our ability to offer a differentiated experience that patrons choose to seek out: notably our exceptional customer service and the convenience of visiting and revisiting our property.

Unfortunately, Heartland's proposed expansion is the antithesis of the business environment necessary to compete in the market. The addition of silos and buildings – which greatly exceed the maximum building height allowed in an I-2 District – along with new equipment, expanded internal roadways, and loading of barges would exacerbate the negative impact we're facing from out-of-state competition.

As you are aware, Ameristar, Heartland, and I-29 can all be accessed via the Nebraska Avenue and River Road intersection. An expansion of Heartland's proposed scale would undoubtedly generate severe traffic impacts, particularly the vast number of large trucks it would presumably take to continually fill a barge(s). This could result in patrons being unable to easily access our property due to a long queue of trucks on a single lane road for an undue amount of time, creating an unresolvable situation that they may choose to easily avoid by taking their business to a Nebraska casino. Traffic impacts could be even further exacerbated by the nearby railroad crossing on River Road.

We are also troubled by the potential noise impacts from a greatly expanded site and its hours of operation. Should the site be primarily operated during daylight hours, our patrons and team members may be unnecessarily disturbed by the sound of barges maneuvering adjacent to our property, additional equipment running, and the truck traffic described herein. Should the site be primarily operated during nighttime hours, our overnight guests and those at the Hampton Inn and Holiday Inn & Suites may not enjoy a peaceful rest, once again negatively impacting revenue should they not return.

Great care should be taken to attract and keep entertainment dollars in Council Bluffs and Iowa. Our Nebraska competitors are investing hundreds of millions into their properties, casino floors, and upscale non-gaming amenities to entice patrons back across the Missouri River. We have been pleased to continue reinvesting millions of dollars in Ameristar over the years to solidify our market position, including the recent addition of our industry-leading sportsbook. Regrettably, we would be at a competitive disadvantage moving forward if Heartland's proposed expansion advances.

Thank you for your consideration of our comments and concerns, and we would welcome the opportunity to further discuss them with you and your staff in greater detail. As always, we look forward to continuing to work with key stakeholders and the broader community in support of Council Bluffs.

Sincerely,

Paul Czak
VP & General Manager
Ameristar Casino & Hotel Council Bluffs

November 9, 2022

Mr. Christopher Gibbons
Planning Manager
Community Development Department
City of Council Bluffs

Subject: Heartland Coop Conditional Use Permit – Application Amendments
ABP Project 22090

Dear Mr. Gibbons,

As suggested by your email (attached) dated October 19, ABP Engineering (ABP) wishes to amend the application for a Conditional Use Permit (CUP) filed on behalf of Heartland Coop (Heartland) on September 20. It is our hope that these amendments will resolve concerns voiced by the Council Bluffs Zoning Board of Adjustment (ZBA) at its October 18 meeting. Please incorporate the following amendments for consideration by the ZBA at its November 15 meeting.

Traffic Study

At the request of Paul Czak, Vice President and General Manager at Ameristar Casino (Ameristar), Council Bluffs Public Works prepared an order-of-magnitude construction cost estimate (attached) for an additional traffic lane on Nebraska Avenue from the Interstate 29 overpass to the southbound I-29 ramp. This would allow traffic into Ameristar Casino to be separated from that onto I-29 and would theoretically lessen congestion at the intersection of Nebraska Avenue and River Road. In comments accompanying the estimate, Matt Cox, Council Bluffs Director of Public Works, confirmed that the project would provide a limited measure of relief, but that the River Road rail crossing is the principal source of disruption to vehicular traffic at the intersection.

In view of Heartland's forecasted throughout, it is ABP's observation that the proposed improvements at Heartland will not significantly increase truck traffic at the intersection; Heartland does not anticipate volumes to exceed the previous owner's five-year high.

River Road property owners Heartland, Ameristar, Highline Warren, and The Opus Group have discussed congestion at the intersection and agree that the City should evaluate reopening River Road from the south. This would provide access unimpeded by the rail crossing for much River Road truck traffic.

Hours of Operation

Throughout most of the year, normal hours of operation will be 7:00 AM to 4:30 PM. Extended hours are necessary during the fall harvest season and other periods of peak throughput, and these will be 7:00 AM to 10:00 PM. Union Pacific Railroad solely determines their operations

schedule, and these operations can occur at any time, day, or night. The railroad's schedule may result in the need to load trains at any hour.

Rail Operations

Historically the site has handled about one train per week, and these trains have comprised 114 cars. This traffic is expected to remain about level.

Truck Queueing

The site plan (attached) has been revised to illustrate the infrequent occurrence of dense truck queueing onsite, with none parked on public roadways. The proposed improvements are being designed to minimize the number of trucks in queue; long wait times encourage truckers to utilize competing facilities. Under normal conditions, Heartland estimates that 10 minutes will elapse between the moment a truck enters the site and the moment it departs. In this time the truck will be weighed in, unloaded, and weighed out.

Noise and Dust Control

The surrounding area will benefit from improved noise and dust control as a result of the proposed improvements. Grain drying fans for the silos at the north end of the site will be elevated well above fans that service the ground pile that is being eliminated. Neighbors will thus experience less noise from this area. Fans for the hoop buildings will be similar in number and flow to those in use at the ground piles being replaced there. Noise from this area will be about the same as it is currently. The site will of course comply Chapter 4.50 of the Council Bluffs Municipal Code, *Noise Control*.

Eliminating the ground piles will reduce the volume of airborne particles by confining most grain handling operations to enclosed spaces, and conveyors used to transfer grain about the site will be fully enclosed upon completion of the final project phase. Replacing rock and dirt roadways with paving will nearly eliminate road dust from circulating traffic.

Sincerely,

David Hoylman

David Hoylman, M.S., P.E.
Senior Design Engineer, Mechanical

Attachments: Email
Nebraska Avenue Widening Construction Cost Estimate
Site Plan

David Hoylman

From: Christopher Gibbons <cgibbons@councilbluffs-ia.gov>
Sent: Wednesday, October 19, 2022 8:51 AM
To: Jeff Allen; David Hoylman
Cc: Graham Jura; Moises Monrroy Castillo
Subject: RE: Heartland Co-op Staff Report Discussion

Follow Up Flag: Follow up
Flag Status: Flagged

All,

Good morning. As you are aware, the Council Bluffs Zoning Board of Adjustment continued the public hearing for Heartland Co-op's conditional use permit request until their November 15, 2022 meeting. The Board requested Heartland provide the following information to the City so that it can be reviewed and discussed as part of the continued public hearing:

1. Traffic study that takes into consideration full build-out of the plant site and the associated traffic demands (e.g. trucks and rail);
2. Clarification on the hours of operation for the plant
3. Data on how long it takes to load/unload the trucks, and how/where the trucks will be que'd onsite so that it does not disrupt traffic flow along River Road. *I recommend updating your site plan to show a paved area where trucks can que on-site who are waiting to be loaded/unloaded.*
4. Data on rail traffic to service the plant site (e.g., # of rail cars and the frequency/timing of when those railcars will visit the site)
5. Clarify how Heartland Co-op will handle noise and dust levels at their plant site.

Please address the above comments and then provide City staff with the appropriate studies/documentation no later than Monday, November 7th.

Sincerely,

Christopher N. Gibbons, AICP
Planning Manager
Community Development Department
City of Council Bluffs
209 Pearl Street
Council Bluffs, IA 51503
Office: 712-890-5358

Visit Council Bluffs Online

Public Works

N

1 inch = 94 feet

0 0.02 0.04 0.08 mi

Disclaimer

This map is prepared and compiled from City documents, plans and other publicrecords data. Users of this map are hereby notified that the City expressely denies any and all responsibilities for errors, if any, in the information contained on this map of the misuse of the same by the user or anyone else. The user should verify the accuracy of information /data contained on this map before using it. The City assumes no legal responsibility for the information contained on this map.

City of Council Bluffs Public Works
Ameristar Lane Addition
Concept Estimate
11/7/2022

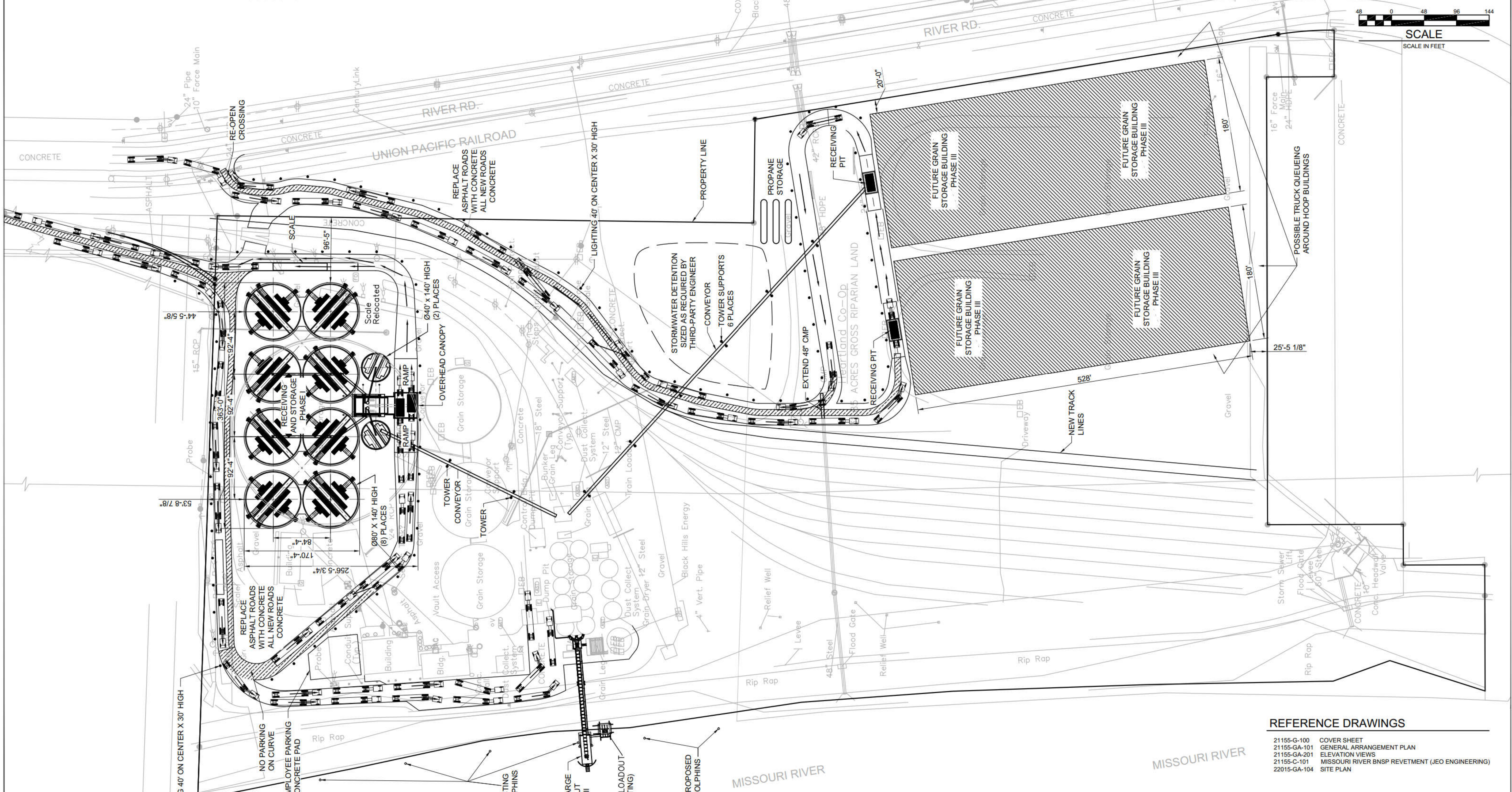
Item	Code	Description	Est. Quantity	Unit	Unit Price	Amount
Division I: General						
1-1		Traffic Control	1	LS	$3,000.00	$3,000.00
1-2		Conventional Seeding and Fertilizing	0.1	AC	$10,000.00	$1,000.00
1-3		Remove and Relocate Light Pole	3	EA	$10,000.00	$30,000.00
1-4		Sawcut Existing Pavement Edge	625	LF	$7.00	$4,375.00
1-5		Remove Pavement	420	SY	$12.00	$5,040.00
1-6		Striping	625	LF	$6.00	$3,750.00
					Subtotal Division I:	$47,165.00
Division II: Pavement and Appurtenances						
2-1		Roadway Excavation, Class 10	1	LS	$3,500.00	$3,500.00
2-2		8" Non-Reinforced PCC Pavement	833	SY	$85.00	$70,805.00
2-3		Concrete Washout	1	LS	$1,000.00	$1,000.00
					Subtotal Division II:	$75,305.00
					Subtotal All Divisions:	$122,470.00
					20% Contingency:	$24,494.00
					Total Cost:	$146,964.00

GENERAL NOTES

1. SILO CONFIGURATION UNDER CONSIDERATION WOULD INCREASE TRUCK QUEUEING CAPACITY.

LEGEND

(hatched pattern) PASSENGER AND EMERGENCY VEHICLES.



REFERENCE DRAWINGS

21155-G-100	COVER SHEET
21155-GA-101	GENERAL ARRANGEMENT PLAN
21155-GA-201	ELEVATION VIEWS
21155-C-101	MISSOURI RIVER BNSP REVETMENT (JEO ENGINEERING)
22015-GA-104	SITE PLAN

ISSUED FOR REVIEW
NOT FOR CONSTRUCTION

ABP ENGINEERING

△	REVISION DESCRIPTION	BY:	CHK'D:	DATE:
A	ISSUED FOR PERMITTING REVIEW	KJC	DH	02/09/2022
B	ISSUED FOR REVIEW, UPDATED	KJC	DH	09/16/2022
C	ISSUED FOR REVIEW, UPDATED	KJC	DH	09/20/2022
D	ISSUED FOR REVIEW, UPDATED W/ TRUCK-TRAILERS	KJC	DH	11/09/2022

CLIENT JOB NO.: 22015
DRAWING DATE: 02/08/2022
DRAFTER: K. CIECIOR
PROJECT DESIGNER: K. CIECIOR
PROJECT ENGINEER: R. PLACKE
SCALE: 1/64" = 1'-0"

HEARTLAND CO-OP
COUNCIL BLUFFS, IOWA
RECEIVING AND STORAGE
SITE PLAN

DEPARTMENT: N/A
DRAWING NUMBER: 22015-GA-104
REV: D

kciecior 11/9/2022 3:17:01 PM Z:\Projects\Job #s\2022\22015 MWM Heartland COOP CB Receiving and Storage\CAD Files\Drawings\22015-GA-104.dwg