April 22, 2026

Adams County Colorado
Attn: Community & Economic Development Department
4430 South Adams County Parkway
1st Floor, Suite W2000
Brighton, CO 80601

RE: United Power Stonehouse Substation Conditional Use Permit – RCU2025-00008 Submittal 3

Dear Adams County Community & Economic Development Department:

Ulteig on behalf of United Power, Inc. respectfully delivers this third submittal for the Stonehouse Substation Conditional Use Permit application RCU2025-00008.

Ulteig and United Power have reviewed and addressed the comments form Adams County, outside referral agencies and surrounding landowners regarding the second submittal – RCU2025-00008. Please see attached materials for reference.

United Power has retained Ulteig Operations LLC to assist with Land Use permitting. If you have any questions or require additional information, please contact me at 720-873-5876 or derek.holscher@ulteig.com.

Sincerely,

Derek Holscher

Derek Holscher – Project Manager, Ulteig

Community & Economic
Development Department
www.adcogov.org

ADAMS COUNTY
COLORADO

4430 South Adams County Parkway
1st Floor, Suite W2000
Brighton, CO 80601-8204
PHONE 720.523.6800
FAX 720.523.6998

Re-submittal Form

Case Name/ Number: Stonehouse Substation / RCU2025-00008

Case Manager: Greg Barnes

Re-submitted Items:

- [x] Development Plan/ Site Plan
- [ ] Plat
- [X] Parking/ Landscape Plan
- [ ] Engineering Documents
- [ ] Subdivision Improvements Agreement (Microsoft Word version)
- [X] Other: Response to Comments, Separate Engineering Review Application

*** All re-submittals must have this cover sheet and a cover letter addressing review comments.**

Please note the re-submittal review period is 21 days.

The cover letter must include the following information:

- Restate each comment that requires a response
- Provide a response below the comment with a description of the revisions
- Identify any additional changes made to the original document

For County Use Only:

Date Accepted:

Staff (accepting intake):

Resubmittal Active: Engineering; Planner; Right-of-Way; ~~Addressing; Building Safety; Neighborhood Services; Environmental; Parks; Attorney; Finance;~~ Plan Coordination

CUP Review Criteria Responses

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Criteria for Approval per Chapter 2-02-06-06 of the Adams County Development Standards and Regulations:

1. The conditional use is permitted in the applicable zone district.

Response: Per Chapter 11 – Definitions of the Adams County Development Standards & Regulations, the Stonehouse Substation is a Utility Substation and categorized as a Public Service (11-02-491) and also considered a Major Energy Facility (11-02-366). Per the Land Use Table in Chapter 3-07-01 of the same regulations, both a Utility Substation/Public Service and Major Energy Facility are authorized as a Conditional Use in the Agricultural 3 (A3) District.

2. The conditional use is consistent with the purposes of these standards and regulations.

Response: The purpose of Adams County's Development Standards and Regulations is to control and assist in the orderly, efficient, and integrated development of the County, in order to preserve the health, safety, and welfare of the public, in accordance with established County policies and plans. With the information provided in the written explanation above and associated Conditional Use Permit application materials, United Power believes that the Project is consistent with the purpose of the standards and regulations. In addition to these standards, United Power's electric facilities are designed, constructed, operated, and maintained to meet or exceed all applicable standards of design and performance set forth in the National Electrical Safety Code (NESC).

3. The conditional use will comply with the requirements of these standards and regulations including, but not limited to, all applicable performance standards.

Response: With the information provided in the written explanation above and associated Conditional Use Permit application materials, United Power believes that the Project will comply with the requirements of the standards and regulations, including applicable performance standards. If the County deems additional information is needed in order to meet compliance, United Power can provide that information upon request.

4. The conditional use is compatible with the surrounding area, harmonious with the character of the neighborhood, not detrimental to the immediate area, not detrimental to the future development of

the area, and not detrimental to the health, safety, or welfare of the inhabitants of the area and the County. In making this determination, the Planning Commission and the Board of County Commissioners shall find, at a minimum, that the conditional use will not result in excessive traffic generation, noise, vibration, dust, glare, heat, smoke, fumes, gas, odors, or inappropriate hours of operation.

Response: The south, east, and west sides of the substation property are bounded by the same A3 zone district as the substation property, with the north side bounded by the A2 zone district. There are residential homes on the east and south sides of the substation property; however, due to the location of the substation on United Power's property, the six closest residents are located anywhere from 700' to 2,300' from the substation perimeter. The proposed vinyl slats in the substation's chain link fence will provide screening for these residents.

Anticipated traffic with the project is limited to periodic maintenance and inspection vehicles, which is estimated to be between 5 and 10 vehicles/maintenance trucks annually, with specialized equipment if needed for any major repairs. No impacts are expected to the operational efficiency or safety of the local roadway network around the project. The construction of the substation could last up to 6 months and will involve mostly personal vehicle trips for construction workers of 10 to 12 trips per day. A staging area will be designated on site for truck traffic to deliver materials to the substation; these trips will be approximately 1 to 2 trips per week. To mitigate any potential impacts to local county roads, Traffic Control Plans will be prepared and followed during construction. Impacts to the public and traffic on county roads from construction vehicles and equipment will be temporary and are not expected to negatively impact the operational efficiency or safety of the roadway network in the County.

The proposed substation is compatible and harmonious with the character of the surrounding area and is necessary to support future development. The health, safety, and welfare of the inhabitants of the area are improved because of the availability of services afforded by an adequate and reliable power supply. There will be no fumes, vibration, or odor caused by the project. Dust resulting from the project would occur during the construction phase and will be minimized by utilizing best management practices. Post construction, the project will not generate any noise, vibration, glare, heat, smoke, fumes, gas, or odors, which have been addressed in the written explanation.

5. The conditional use permit has addressed all off-site impacts.

Response: Per the response provided in #4 above the project is not anticipated to have any off-site impacts. Post construction, the project will operate 24 hours a day as an unmanned facility with no utilities required including water, sanitary sewer, or gas. The facilities for the project will be designed, constructed, operated, and maintained to meet applicable standards of design and performance set forth in the National Electric Safety Code. There are no hazardous materials associated with the project beyond the following items:

- There is a battery back-up located inside the Electronic Equipment Enclosure (EEE) unit which has built-in containment and exhaust in case of an accidental release; no liquids would escape

the EEE unit. The transformers contain mineral oil, which is required for the operation of the equipment. The mineral oil is contained within the equipment and secondary containment is designed which will confine the entire volume of oil should a vessel failure occur. There are no poly-chlorinated biphenyls (PCBs) in the mineral oil or transformers. All equipment will be located within a fenced, secured facility.

- Spill control and prevention measures as well as procedures for contacting appropriate emergency offices and personnel are formulated and designed in accordance with federal, state, and local requirements.
- Construction, operation, and maintenance activities will also comply with applicable federal, state, and local laws and regulations regarding the use of hazardous substances. Construction activities will be performed using methods that prevent entrance or accidental spillage of solid matter, contaminants, debris, and other pollutants and wastes into flowing streams or dry watercourses, lakes, and underground water sources. Activities will follow environmental protection measures for the management of wastes to avoid and minimize effects from potential spills or other releases to the environment.

The substation is open air, no roofs, run off from the site will be minimal and ground under the substation will have perviousness for drainage into the ground. Additional engineering studies will be done and reviewed by Adams County to address any additional storm system facilities that are needed to capture storm water runoff and release into the drainage system in the County. The water table /aquifer system will not be impacted.

There should not be a negative impact on property values. There have been studies completed about property values in relation to electric substations, which have been supported by comparable market analysis examining appreciation rates, paired sales analysis, statistical descriptive measures, and statistical regressions. The results indicate there is no measurable market impact on property values.

The issue of EMF has been studied for more than 40 years by government and scientific institutions all over the world. The balance of scientific evidence indicates that exposure to EMF does not cause negative impacts. Per the Public Utilities Commission Rule 3206(e), proposed magnetic field levels of 150 mG (milliGauss) and below are deemed reasonable by rule and need not be mitigated to a lower level. The magnetic fields generated by the substation do not exceed the 150 mG magnetic field level at the substation fence, where the public has unrestricted access. The nearest residence to the substation is nearly 700' from the substation fence.

6. The site is suitable for the conditional use including adequate usable space, adequate access, and absence of environmental constraints.

Response: The parcel for the project, owned by United Power, is 46.766 acres in size and with the proposed substation footprint being approximately 2.5 acres, there is adequate usable space for the substation.

With Gun Club Road on the west side of the parcel and 132nd Avenue along the north side, there is adequate access in place for the substation. New access points will be established for the project, one off Gun Club Road and one off 132nd Avenue.

An environmental desktop habitat assessment and on-site survey were conducted for the project. Prior to the site visit, a desktop habitat assessment was completed to assess existing environmental features, generally limited to biological and aquatic resources within a 100-foot radius of the Project. An on-site survey was conducted, and the qualitative assessment consisted of visual observations considering/verifying site conditions identified during the desktop habitat assessment. For the biological resources considered, it was determined that suitable habitat is not likely present. Golden Eagle suitable habitat is potentially present in open grassland areas; however, according to Colorado Parks and Wildlife, there are no active, destroyed, inactive, undetermined, or unknown nest sites within 2,640 feet of the project. No golden eagles were observed during the on-site survey. Aquatic resources include wetlands, streams, lakes, rivers, springs, seeps, reservoirs, ponds, groundwater, riparian areas, and the fauna that reside within them. Aerial imagery and the National Wetlands Inventory were used during the desktop assessment and on-site survey to review the potential presence of aquatic resources near the Project. Two resources were identified with one being 0.6 miles north of the project boundary and the other 0.75 miles southeast of the project boundary; both of which will not be impacted by the project.

7. The site plan for the proposed conditional use will provide the most convenient and functional use of the lot including the parking scheme, traffic circulation, open space, fencing, screening, landscaping, signage, and lighting.

Response: The site plan was created with several things in mind including access, the required transmission line tap, setbacks, and surrounding residences which resulted in the most convenient and functional use of the parcel. There are no parking or traffic circulation requirements for the project and open space dedications are not required. The substation will be enclosed with a 7-foot chain link security fence with 3 strands of barbed wire on top and locked access gates; however, in order to provide screening of the substation, United Power is proposing to add vinyl slats to the chain link security fence that encompasses the substation equipment. Due to the lack of water availability, United Power will be applying for Administrative Relief from landscaping requirements of a Type C Bufferyard. There will be downcast lighting installed within the substation; however, this lighting is only used in emergency situations after dark.

8. Sewer, water, storm water drainage, fire protection, police protection, and roads are to be available and adequate to serve the needs of the conditional use as designed and proposed.

Response: The substation is an unmanned facility and will not require sewer or water services. Additional engineering studies will be done, if required, and reviewed by Adams County to address any storm water system facilities that are needed to capture storm water runoff and release into the County drainage system. Existing Adams County roads will provide access for parts of the construction phase and two new access roads will be constructed, one from Gun Club Road and one from 132nd Avenue to the substation property. Brighton Fire District has been contacted and made aware of the project and Adams County Sheriff District #7 services the project site.

Adams County Comments and United Power/Ulteig Responses

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Commenting Division: Planner Review 2nd Review
Name of Reviewer: Greg Barnes
Date: 01/02/2026
Email: gjbarnes@adcogov.org
Resubmittal Required

We would like for you to explore more opportunities for landscaping. The site is located within a portion of the county where landscaping relief is more difficult to justify. Have you explored native plants and xeriscaping?

Response: The subject parcel (parcel # 0156730300001) is located in the High Plains Level IV ecoregion, which receives low precipitation and is characterized by generally less arable sub-humid grassland and semiarid rangeland. It also is not located within any water district and does not have a readily accessible source of water. Additionally, the electrical substation will be an unmanned facility and not require water service. Due to the insufficient water availability at the proposed project site, implementation and maintenance of the county's landscaping standard are deemed impractical. The type-c landscape buffer yard details include a 15-foot minimum bufferyard width with 2 trees per 80 linear feet of the lot line and 6 foot high sight obscuring fence or wall located on the interior line of the bufferyard.

Ulteig, on behalf of United Power, consulted with a reclamation services company (H2 Enterprise) to see what trees would be able to survive after a year of trucking in a watering service. H2 Enterprises is a reputable and experienced reclamation services company headquartered in Keenesburg, CO and have successfully reclaimed over 2 million acres across 45 states. H2 Enterprise advised against adding landscaping at this site due to a lack of a viable water source on-site. Transporting water and relying on hand-watering would be both costly and inefficient. Additionally, hand-watering does not ensure consistent coverage, which could significantly reduce the likelihood of successful plant growth. H2 Enterprise recommended to not plant trees because trees would have a low chance of survival. From H2 Enterprise's experience, trucking in water to replenish trees would cause the roots of the trees to remain shallow and become dependent on a watering service. After a watering service concedes, any trees would likely die due to their reliance of shallow watering. In H2 Enterprise's experience, typically once a visual barrier is utilized, such as a fence, it reduces the need for a landscaped visual barrier.

United Power is proposing the installation of two fences around the entire substation yard; the inner fence will be an 8-foot chain link security fence with 1-foot of barbed wire on top and an outer 8-foot sight obscuring decorative wooden fence. Additionally, as an alternative, United Power intends to restore all disturbed surface areas to their pre-construction condition utilizing native materials and reseeding rather than implementing and maintaining ornamental landscaping in an area that does not traditionally support it. This will allow the landscape of the proposed project site to blend naturally with the physical conditions in the surrounding area, maintain the rural character and native vegetation. To provide further separation from the nearest residential home, the substation yard is setback from the eastern edge of Gun Club Road by 400 feet, putting it approximately 700 feet from the nearest residential home. Also, the subject parcel is currently used for agriculture dry-crop farming. Restoring all disturbed surface areas to their pre-construction state will maximize the future dry-crop farming. The continuous use of dry-crop farming will ensure that the remainder of the property surrounding the substation will be maintained.

For reference, we are including a series of maps/photos that show United Power's existing substations in the surrounding area and the lack of landscaping at each.

Commenting Division: ROW Review 2nd Review
Name of Reviewer: Thayeng Chang
Date: 12/23/2025
Email:
Resubmittal Required

ROW1: Revise the site plan to show the record boundary with dimensions, any existing easements, location of existing roads for access purposes, existing structures with tie dimensions to the record boundary.

Response: Record boundary with dimensions, existing easements, and roads are shown on attached site plan. The site is laid out on top of the ALTA survey that was prepared for the site.

ROW2: On the site plan, show the recorded information of the document providing right-of-way access to the site. Additionally, show all survey section corner information to help determine the location of the site boundary

Response: Recording information could not be found for the existing access off of Gun Club Rd. to the oil and gas well. United Power submitted a request to the County for permission to access Gun Club Rd. for the substation site, which was approved provided that the plans clearly show the access point merging with the existing oil and gas pad site entrance and the substation site design must not include access onto E 132nd Avenue. The attached site plan shows the Gun Club Rd. access point, an offshoot to access the oil and gas site, so both sites can be accessed off Gun Club. Rd. from the same spot, and the removal of the E. 132nd Avenue access point. The survey section corner information is included on the site plan. An additional drawing is included that shows the site plan laid on top of the ALTA survey that was prepared for the site, which also includes the survey section corner information. This drawing also depicts the correct property boundaries that follow the interior limits of the surrounding road ROW, which has been coordinated and confirmed with Ian Cortez.

ROW3: Pending engineering review, any storm water quality facilities or detention must be dedicated to the county by separate instrument.

Response: Noted. The facilities themselves will not be dedicated to the County but access to them for emergency maintenance will be dedicated via the County's standard easement document.

INFORMATIONAL
ROWx: Access is not permitted off Gun Club Road.

Response: United Power submitted a request to the County for permission to access Gun Club Rd. for the substation site, which was approved provided that the plans clearly show the access point merging with the existing oil and gas pad site entrance and the substation site design must not include access onto E 132nd Avenue (see attached plans). Chris Swainson with the Brighton Fire Rescue District reviewed this new access configuration and responded that he had no issues or comments on what is being proposed.

Commenting Division: Environmental Analyst Review 2nd Review
Name of Reviewer: Megan Grant
Date: 12/23/2025
Email:
Complete - The applicant has addressed all ENV comments from the first submittal. No additional ENV comments.

Commenting Division: Development Engineering Review 2nd Review
Name of Reviewer: Steve Krawczyk
Date: 12/23/2025
Email:
Resubmittal Required
Comments on cases RCU2025-00008 and PRE2024-00013 still have comments to be addressed and require the submittal of an EGR for the on-site grading:

ENG1: Comments will need to be addressed with RCU2025-00008. A traffic impact study is required with the zoning case. A Transportation Analysis from a professional engineer is required to determine the amount and/or distribution of traffic generated from a proposed development

Response: Staff's previous comment stated that "the applicant has completed a Trip Generation Analysis (TGA), signed and stamped by a Professional Engineer (P.E.) licensed in the State of Colorado. Using the ITE Trip Generation Manual, it is estimated that the proposed development will have vehicle trips per day of less than twenty (20), and no adverse traffic impacts are anticipated." For reference the TGA is attached with this resubmittal.

ENG2: Access for double frontage shall be taken from the local road (132nd Avenue) and is not permitted off Gun Club Road, which is a section line arterial. The applicant will be required to enter into a License agreement with the county for permitting and maintenance of 132nd Avenue between Adams County and United Power.

Response: United Power submitted a request to the County seeking permission to access the substation site from Gun Club Road. The request was approved with conditions: the plans must clearly show the access point connecting to the existing oil and gas pad entrance, and the substation design must not include access from E. 132nd Avenue (see attached plans). Staff also confirmed that the City and County of Denver owns the subdivision to the north; therefore, E. 132nd Avenue is not a public, County-maintained road. Consistent with this determination, the access and site plan were revised to eliminate any access from E. 132nd Avenue. Chris Swainson of the Brighton Fire Rescue District reviewed the revised access configuration and indicated he had no concerns or comments regarding the proposal.

ENG3: A full Engineering Review (EGR) to address drainage construction plans and public improvements will be required. These initial case comments are based solely upon the submitted preliminary application package. They are intended to make the applicant aware of regulatory requirements. Planning Engineering reserves the right to modify these initial comments or add appropriate additional comments based on a complete submittal of the EGR.

Response: Noted. United Power plans to submit for the full Engineering Review upon approval of this Conditional Use Permit.

ENG4: With the EGR, provide a Grading and Erosion Control Plan:

The following information is needed:

a. Cross sections for cut and fill areas for new ponds and staging areas.
b. Designs and details of any proposed retaining walls that exceed three feet in height, if proposed.
c. Provide more detail on the construction plans for the temporary stockpiling of topsoil. Provide silt fence/waddles at the base of all the soil stockpiles and along the bottom of the fill slopes.

d. Provide a detail for the concrete washout on the project site.

Response: Noted; however, a revised Preliminary Drainage Report and Plan have been included with this resubmittal.

Commenting Division: Planner Review
Name of Reviewer: Greg Barnes
Date: 05/20/2025
Email: gjbarnes@adcogov.org
Resubmittal Required

PLN01: When a conditional use permit is approved, an operator has one year to be issued building permits. If a building permit is not issued, then the conditional use permit expires (Section 2-02-09-09, Development Standards & Regulations). An extension of this approval may be granted by the Planning Commission through separate proceedings (Section 2-02-09-10). Based on your written explanation, you are planning start construction in 2028. Please take note of these two sections of our regulations, and plan accordingly.

This comment was provided with this round of comments, but were actually from the first round of comments; however, a response is being provided again.
Response: Noted, United Power will plan accordingly. Per meeting with Adams County, a building permit to construct fencing will establish use.

PLN02: The site is located with the Airport Height and Airport Noise Overlay Districts. Please submit the FAA Obstruction Evaluation prior to being scheduled for hearings for this conditional use permit. Please resubmit with documentation that this has been done.

This comment was provided with this round of comments, but were actually from the first round of comments; however, a response is being provided again.
Response: An FAA Obstruction Evaluation Notice was submitted on 9/11/2025. The FAA conducted an aeronautical study (2025-ANM-5975-OE) and issued a Determination of No Hazard to Air Navigation on 10/14/2025. FAA Determination attached hereto.

PLN03: A type-C landscape buffer is required around the facility (Section 4-08-02-07-04). This type of bufferyard requires a fifteen (15) foot minimum bufferyard width with two (2) trees per eighty (80) linear feet of lot line and six (6) foot high sight obscuring fence or wall located on the interior line of the bufferyard. Please resubmit with landscape plans and fence elevations. If you are asking for relief from landscaping standards then please provide alternatives and justify why you cannot conform to our regulations. Staff strongly encourages that you provide some sort of alternative, rather than asking for no landscaping at all.

This comment was provided with this round of comments, but were actually from the first round of comments; however, a response is being provided again. In addition, please see the response to the first comment above.
Response: The subject parcel (parcel # 0156730300001) is not located within any water district and does not have a readily accessible source of water. Additionally, the electrical substation will be an unmanned facility and not require water service. Due to the insufficient water availability at the proposed project site, implementation and maintenance of the county's landscaping standard are deemed impractical. The type-c landscape buffer yard details include a 15-foot minimum bufferyard width with 2 trees per 80 linear feet of the lot line and 6 foot high sight obscuring fence or wall located on the interior line of the bufferyard. Ulteig on behalf of United Power, consulted with a reclamation services company (H2 Enterprise) to see what trees would be able to survive

after a year of trucking in a watering service. H2 Enterprises is a reputable and experienced reclamation services company headquartered in Keenesburg, CO and have successfully reclaimed over 2 million acres across 45 states. H2 Enterprise recommended to not plant trees because trees would have a low chance of survival. From H2 Enterprise's experience, trucking in water to replenish trees would cause the roots of the trees to remain shallow and become dependent on a watering service. After a watering service concedes, any trees would likely die due to their reliance of shallow watering. As an alternative, United Power intends to restore all disturbed surface areas to their pre-construction condition utilizing native materials and reseeding. This will allow the landscape of the proposed project site to blend naturally with the physical conditions in the surrounding area, maintain the rural character and native vegetation. Also, the subject parcel is currently used for agriculture dry-crop farming. Restoring all disturbed surface areas to their pre-construction state will maximize the future dry-crop farming. The continuous use of dry-crop farming will ensure that the remainder of the property surrounding the substation will be maintained. In addition, United Power is proposing the installation of two fences around the entire substation yard; the inner fence will be an 8-foot chain link security fence with 1-foot of barbed wire on top and an outer 8-foot sight obscuring decorative wooden fence.

PLN04: Will the chain link fence have inserts? Please describe in further detail. Staff prefers a solid screen wooden fence.

This comment was provided with this round of comments, but were actually from the first round of comments; however, a response is being provided again.
Response: United Power plans to install two fences. The inner fence will be an 8-foot chain link security fence with 1-foot of barbed wire on top. The outer fence will be an 8-foot decorative wooden fence. A Variance application for fence height was submitted on 11/11/2025 (PRA2025-00009 & VSP2025-00054).

PLN05: Separate variance applications are needed for any structures that exceed the maximum height of the zone district (35 feet). Variance applications can be found at: https://epermits.adcogov.org/submittal-checklists. Variances must be processed with a hearing prior to the conditional use permit.

This comment was provided with this round of comments, but were actually from the first round of comments; however, a response is being provided again.
Response: Variance applications for structures exceeding 35 feet in height were submitted on 11/11/2025 (PRA2025-00009 & VSP2025-00056 & VSP2025-00057). There included the 9-foot chain link security fence and the substation static masts.

Lumen: No reservation, please see the attached picture as the location of Lumen facilities. Lumen also recommends that locates are done for all facilities for your project to ensure safety and protection of all facilities.

Response: Noted. United Power will refer to the provided map of Lumen facilities. It is United Power's standard practice to have utility locates performed on site prior to any construction related activities begin.

Xcel Energy: The Right of Way and Permits Referral Desk at the Public Service Company of Colorado (PSCo) acknowledges receipt of the documents provided as part of the second submittal for the referenced application. We have reviewed the accompanying comments and confirm our agreement with the proposed plan of action.

Response: Noted.

Leovi Madera (private landowner):
Mr. Barnes,

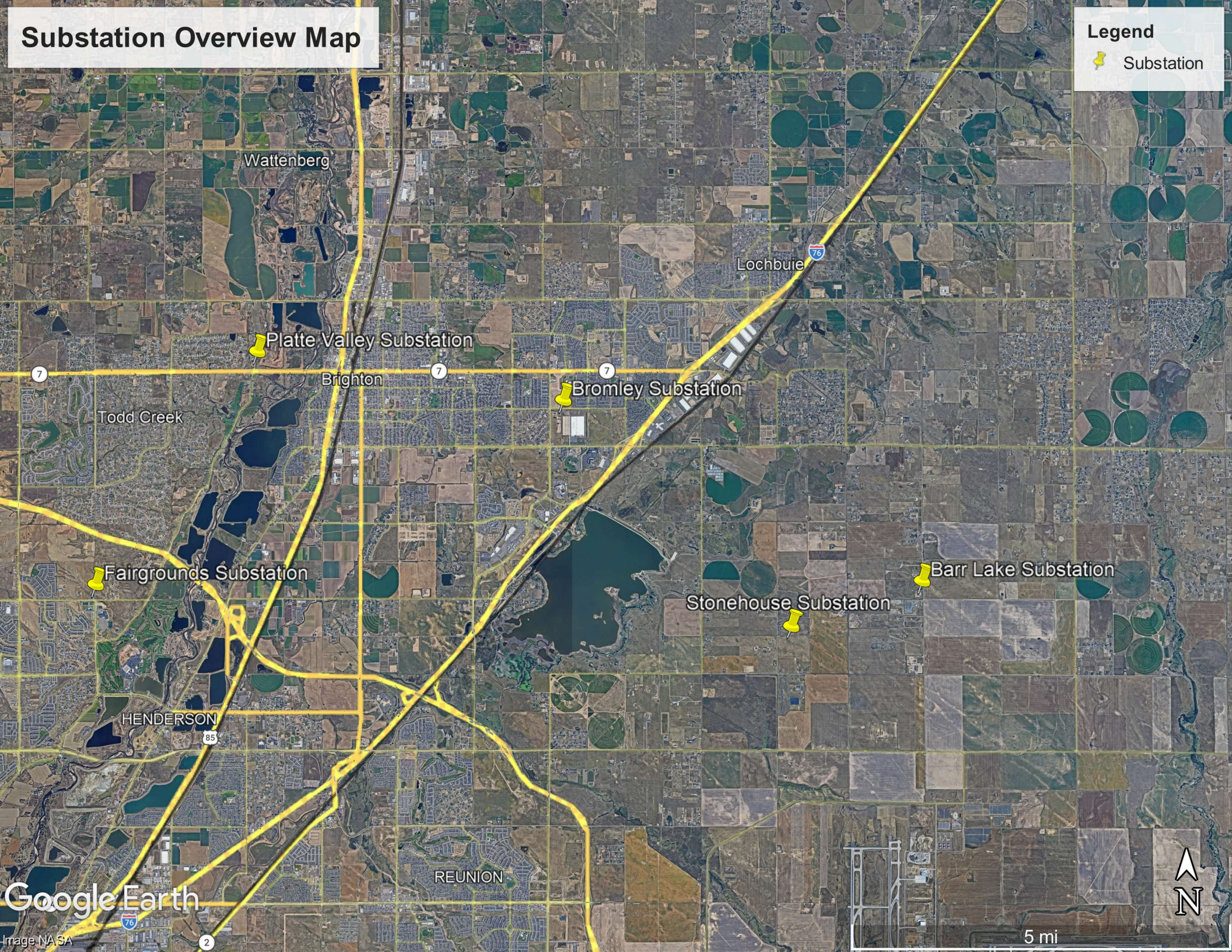
I don't think a substation should be built if they can't conform to the rules stipulated for an agriculture area. You along with all the commissioners do not take into account all of the dangers we have in our area including fracking, electrical lines that are already carrying a lot of voltage, Cherokee pipeline, and now this. That property gets a lot of standing water and is a danger to have all that electricity at the site. They submitted an application knowing there was more to come in terms of the changes to their application because they know Adams County and the commissioners only care about the money that comes along with these projects. It is a mute point to submit comments when they do no good in the interest of the community and residents because you don't care about us. You charge companies less than us residents for things like real estate taxes when you hire outside consultants to increase our taxes but fracking companies along with business aren't paying up to date rates. I hope your salary allows you to rest peacefully at night knowing all the harm you do to your residents.

Response: Noted. We responded to this landowner after the first round of comments, addressing the concerns they brought up, see attached Public Outreach responses. This utility is a use that is Conditionally allowed in an agricultural zoned area. The site will be designed to handle stormwater via the proposed detention pond and associated facilities. This property owned by United Power is assessed through the State.

Existing Substation Sites
Landscaping Comparisons

United Power has gathered maps and photos from 4 of their existing substation sites, within the vicinity of the proposed Stonehouse Substation, to demonstrate the on-site landscaping in order to help justify the absence of landscaping at the proposed Stonehouse Substation. This is a supplement to the response that was provided to address the landscaping comments from Couty staff.

1. Fairgrounds Substation – E. 136th Avenue & Yosemite Street
2. Bromley Substation – Southern Street & Tower Road
3. Platte Valley Substation – Riverdale Road & E. 160th Avenue (Highway 7)
4. Barr Lake Substation – E. 136th Avenue & Powhatan Road


Substation Overview Map
Legend
Substation
Wattenberg
Lochbuie
Platte Valley Substation
Brighton
Bromley Substation
Todd Creek
Fairgrounds Substation
Barr Lake Substation
Stonehouse Substation
HENDERSON
REUNION
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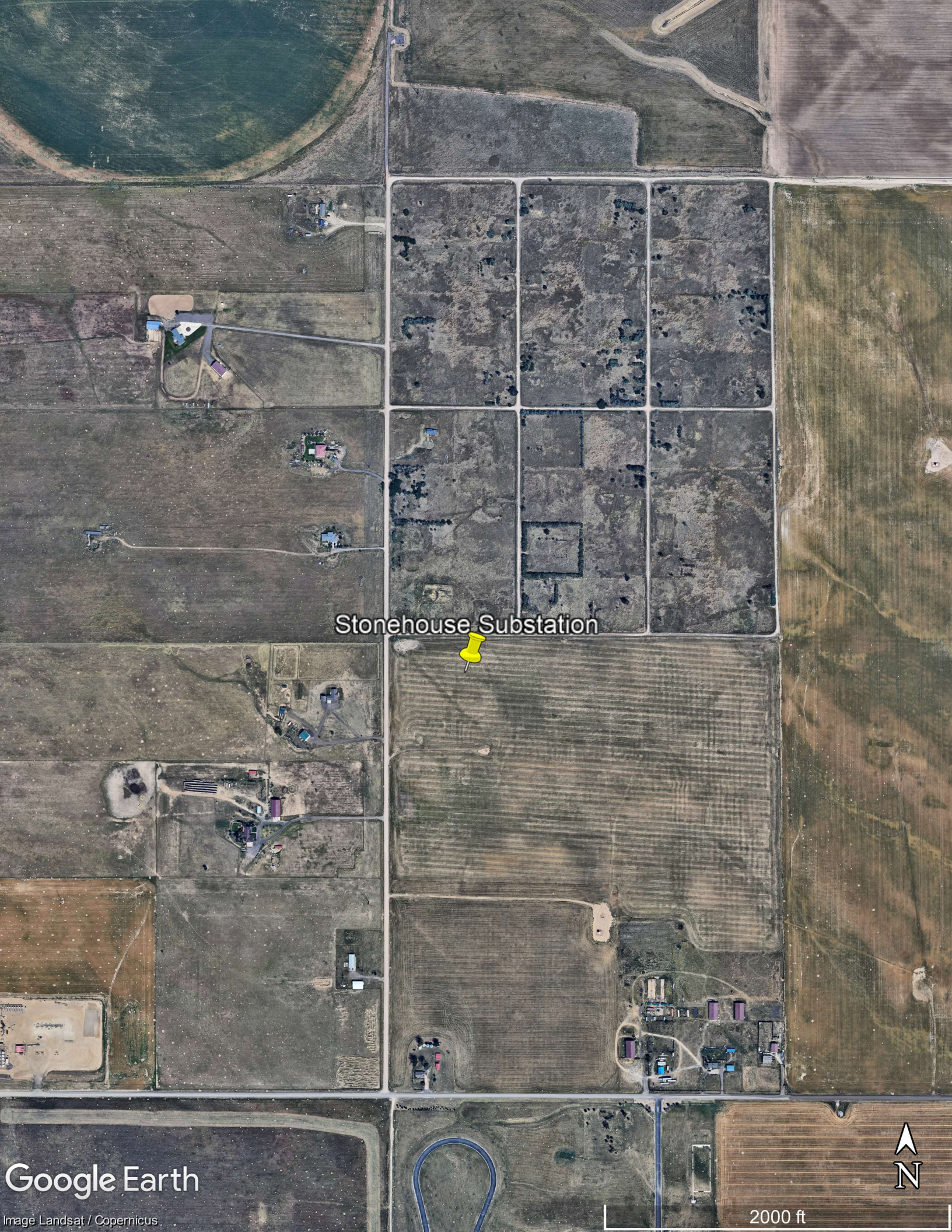
Stonehouse Substation
Google Earth
Image Landsat / Copernicus
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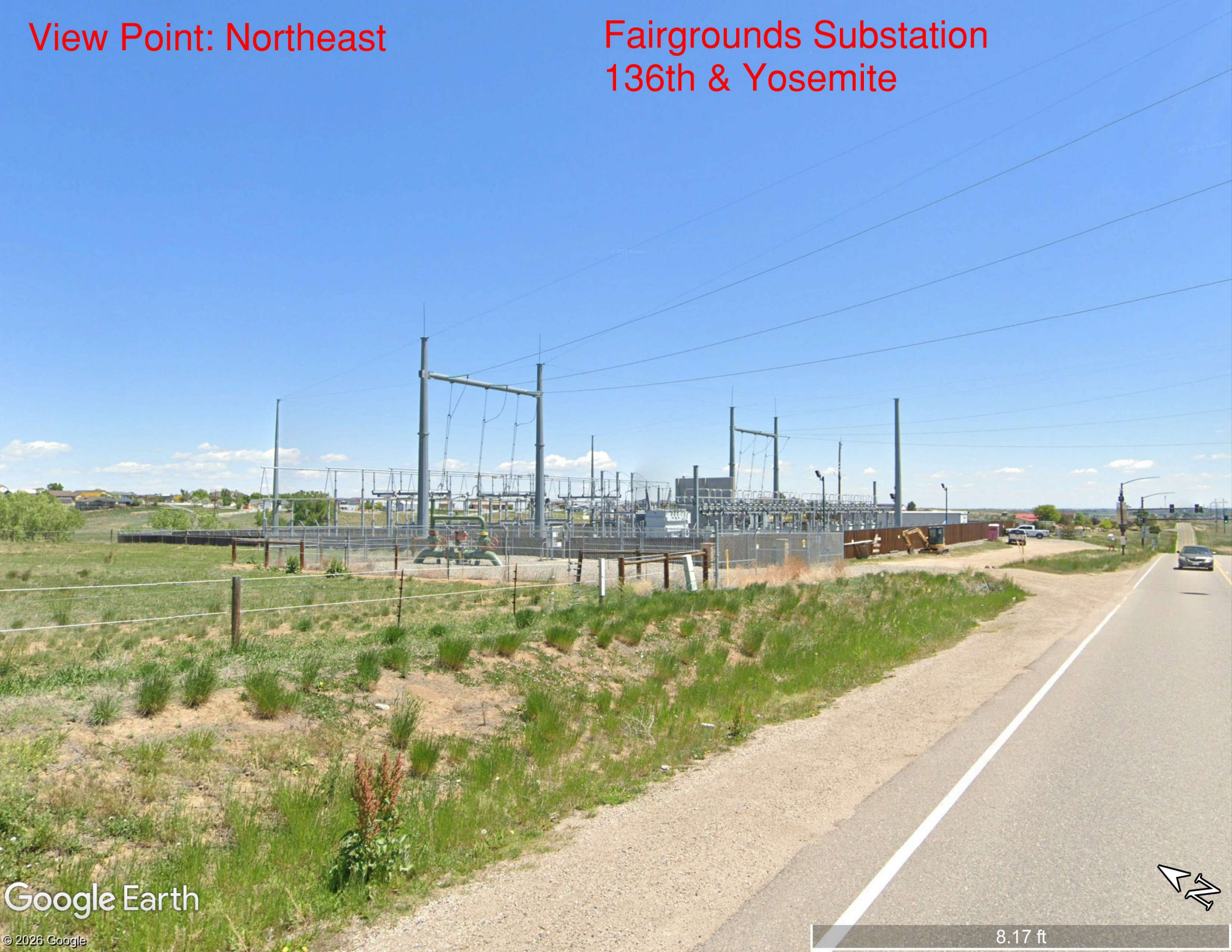
2000 ft

View Point: Easterly

Proposed Stonehouse Substation Site
132nd Ave & Gun Glub Rd


Fairgrounds Substation
E 136th Ave
E 136th Ave
E 136th Ave
Valentia St
Uster St
Meadowlark Pkwy
Meadowlark Pkwy
Yosemite St
Xanthia St
Tamarac Pl
E 134th Ave
Riverdale Rd
N
2000 ft
Google Earth
Image Landsat / Copernicus

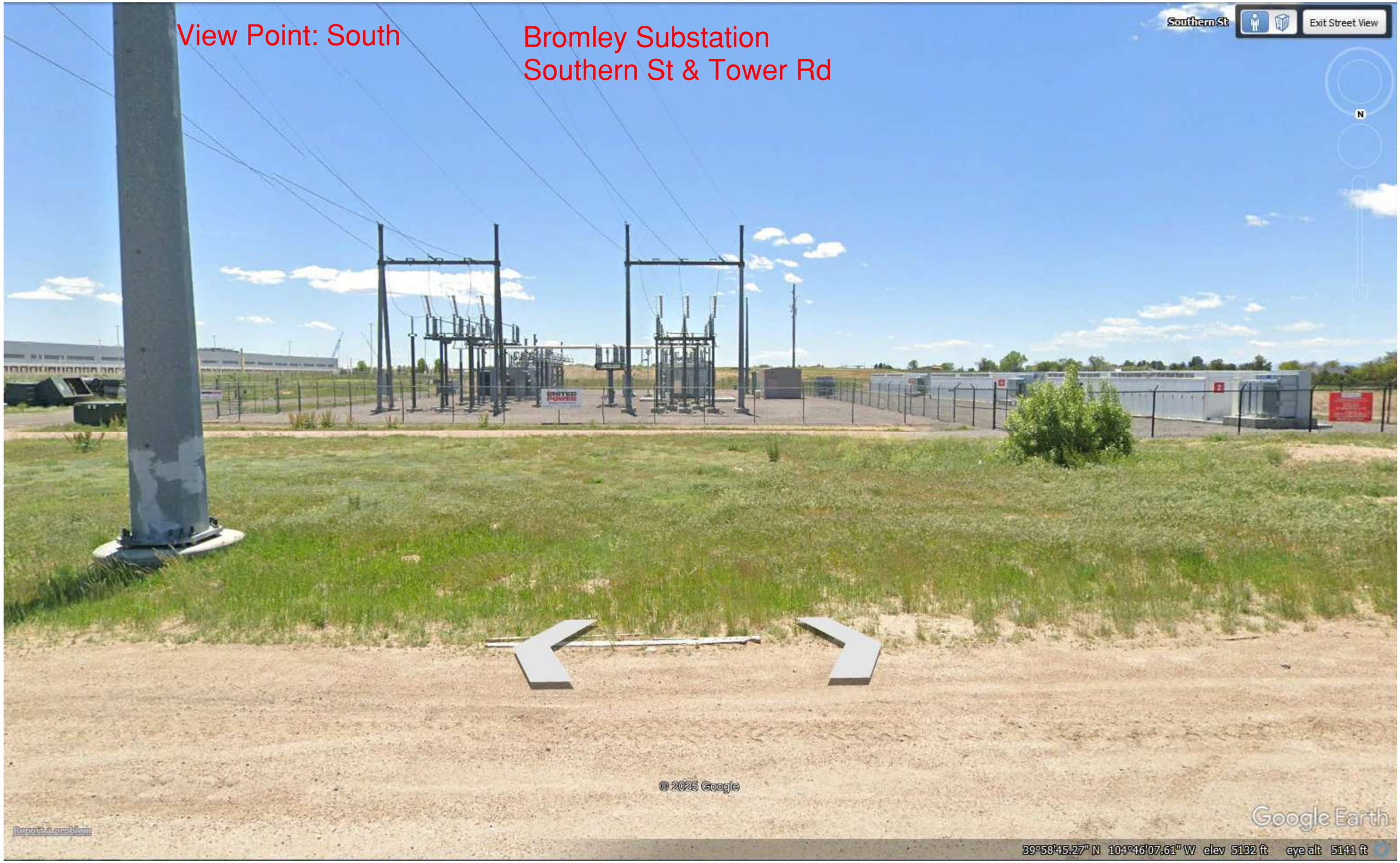

View Point: Northeast
Fairgrounds Substation
136th & Yosemite
Google Earth
© 2026 Google
8.17 ft


View Point: Northwest
Fairgrounds Substation
136th & Yosemite
Yosemite
Google Earth
© 2026 Google
7.19 ft


7
S 40th Ave
S 45th Ave
E 156th St
Southern S
Bromley Substation
Tower Rd
E Bromley Ln
N
Google Earth
Image Landsat / Copernicus
1000 ft

View Point: South

Bromley Substation
Southern St & Tower Rd

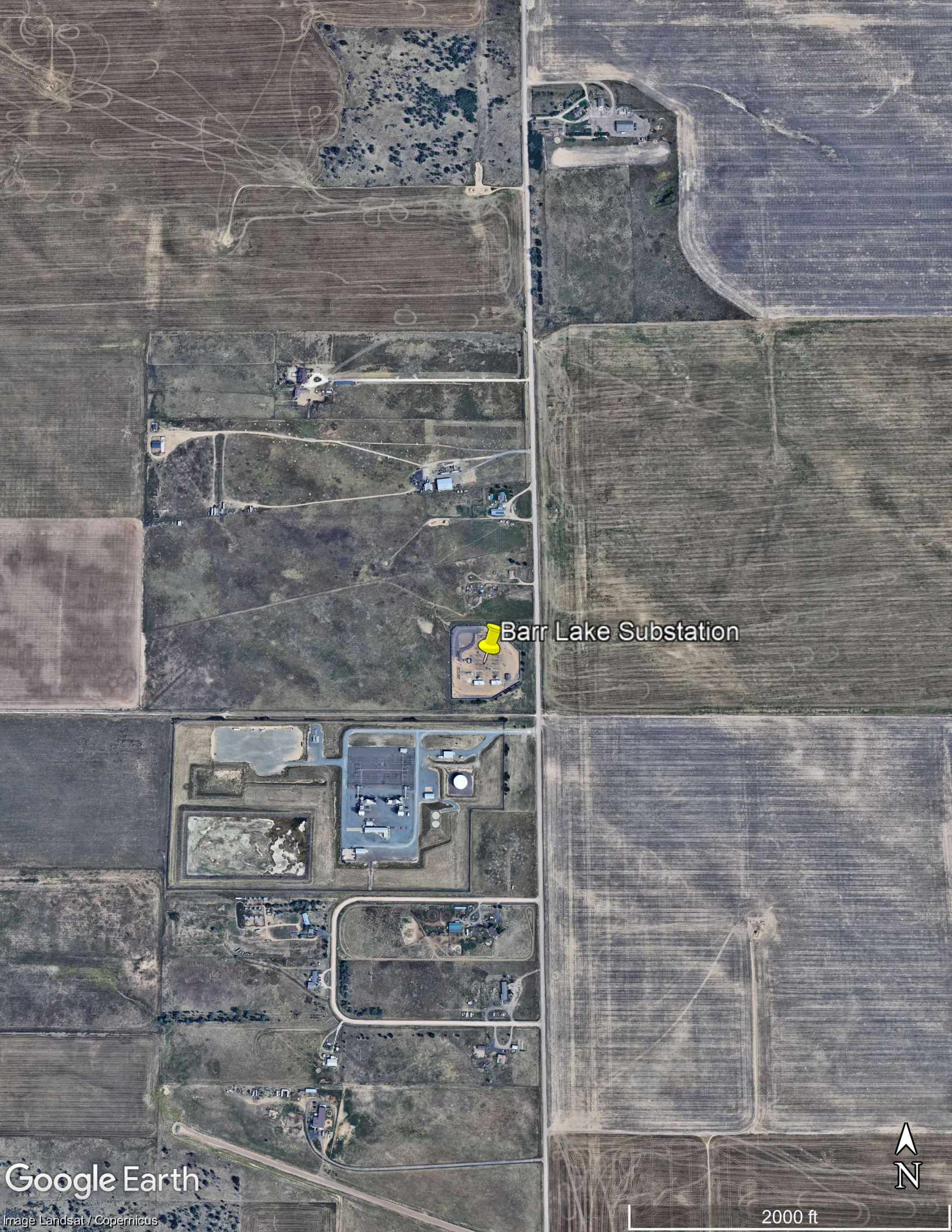


View Point: East

Bromley Substation
Southern St & Tower Rd


Paris Way
Newark St
Platte Valley Substation
7
160th Ave
7
Google Earth
Image NASA
N
1000 ft


View Point: North
Platte Valley Substation
Highway 7 & Riverdale
Google Earth
© 2026 Google
N
7.29 ft


Barr Lake Substation
Google Earth
Image Landsat / Copernicus
N
2000 ft

View Point: North

Barr Lake Substation
136th Ave & Powhaton Rd

View Point: West

Barr Lake Substation
136th Ave & Powhaton Rd

Brighton Fire Rescue District

Approval to Permit

Brighton Fire Rescue District

500 S. 4th Ave, 3rd Floor • Brighton, Colorado 80601
Telephone: (303) 659-4101 • Fax: (303) 659-4103 • Website: www.brightonfire.org.

TO: Adams County Building Department
ATTN: Permit Technicians

FROM: Chris Swaisnon
DATE: 3/26/2026

PROJECT: Conditional Use Permit number through Adams County is RCU2025-00008

DESCRIPTION: New Construction United power sub station

- BFRD fire district impact fee IS **NOT REQUIRED**
- Final inspection **WILL NOT BE REQUIRED** by BFRD
- OKAY TO PERMIT

	AS INFORMATION		AS REQUESTED		AS NOTED BELOW
X	APPROVAL TO PERMIT	X	APPROVED AS SUBMITTED		APPROVED AS NOTED BELOW
	DISAPPROVED AS NOTED		RESUBMITTAL REQUIRED		RETURNED FOR CORRECTIONS
	RETURNED AS NOTED BELOW				

REMARKS:

In addition to any requirements listed above, any structure constructed or moved into (e.g. house, garage, outbuilding, etc.) shall be provided with fire department access roads to within 150 ft of all portions of the first story of the building as measured by an approved route around the exterior of the building. If the public street does not provide this requirement than the driveway is considered a fire apparatus access road and shall be constructed to the following standards:

- Minimum 20 ft wide
- Designed and maintained to support the imposed loads of fire apparatus (e.g. 6 inches of Class 6 roadbase compacted, equivalent or better)
- All weather surface
- If the driveway exceeds 150 ft in length an approved area for turning around fire apparatus shall be provided. Please see attached sheet for two approved examples

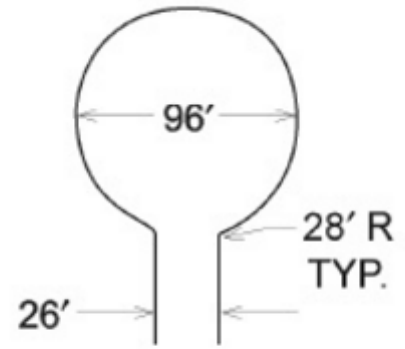
Please contact us with any questions! Thank you!

Chris Swainson
Brighton Fire Rescue District
500 S. 4th Ave – 3rd Floor
Brighton CO 80601
Office: 303.654.8041
Email: Cswainson@brightonfire.org

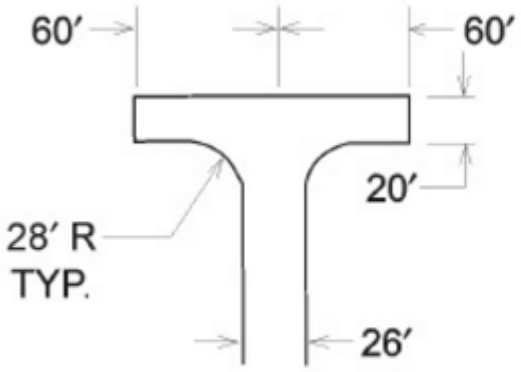
Brighton Fire Rescue District

500 S. 4th Ave, 3rd Floor • Brighton, Colorado 80601
Telephone: (303) 659-4101 • Fax: (303) 659-4103 • Website: www.brightonfire.org.

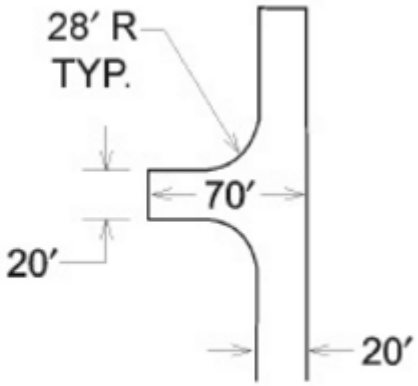
Acceptable Dead-end Turnarounds



96-FOOT DIAMETER
CUL-DE-SAC



120-FOOT HAMMERHEAD

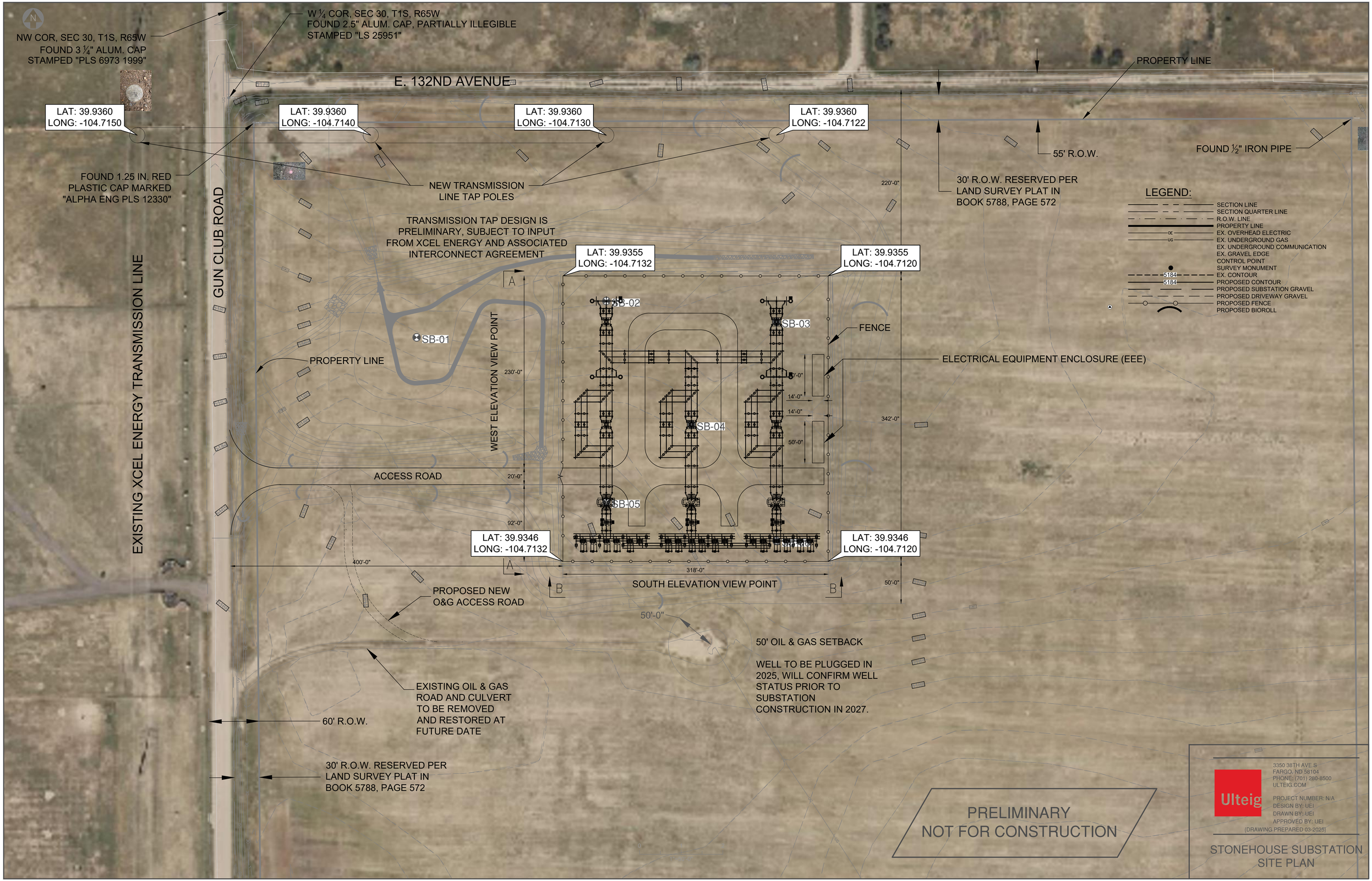


ACCEPTABLE ALTERNATIVE
TO 120-FOOT HAMMERHEAD

Site Plan

Revisions Made to Site Plan:

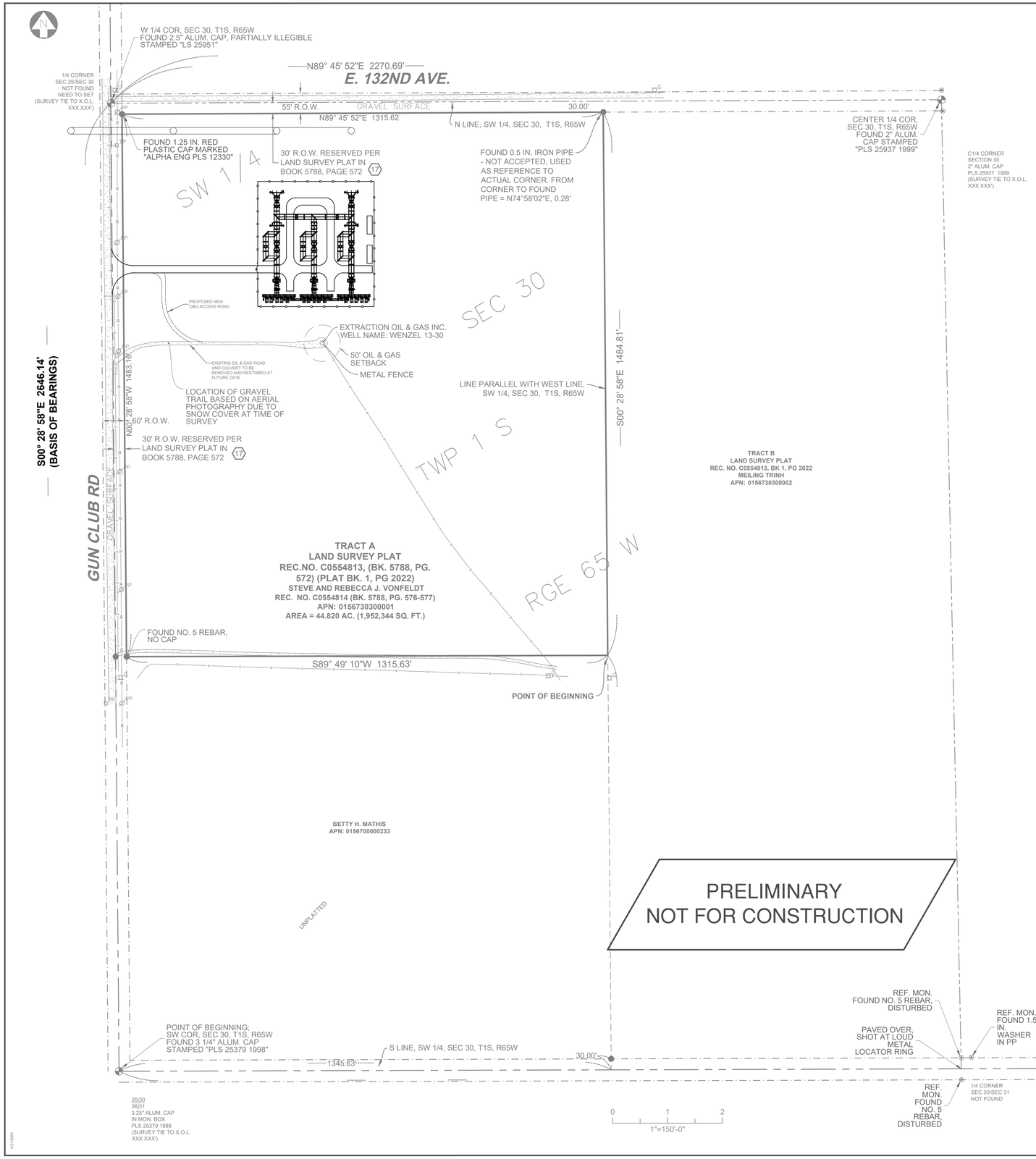
1. Record boundary with dimensions, existing easements, location of existing roads for access purposes, existing structures with tie dimensions to the record boundary were added to the Site Plan.
2. The recorded information of the document providing right-of-way access to the site was added to the Site Plan and ALTA Overview Plan.
3. All survey section corner information was added to the Site Plan to help determine the location of the site boundary.



Ulteig
3350 38TH AVE S
FARGO, ND 58104
PHONE: (701) 280-8500
ULTEIG.COM

PROJECT NUMBER: N/A
DESIGN BY: UEI
DRAWN BY: UEI
APPROVED BY: UEI
[DRAWING PREPARED 03-2025]

STONEHOUSE SUBSTATION SITE PLAN



DISCLAIMER:
THIS DOCUMENT IS TO BE USED FOR THE PURPOSES OF TAKING THE TEXT BELOW FROM AN ALTA/NSPS LAND TITLE SURVEY PLAT THAT ULTEIG SURVEY DID FOR UNITED POWER AND PLACING IT INTO A SITE PLAN. THIS PLAT WAS RECORDED IN THE OFFICE OF THE ADAMS COUNTY CLERK & RECORDER ON MAY, 8TH/ 2023 AT RECEPTION NO. 2023000025610. THE TEXT IN THE DOCUMENT BELOW IS NOT TO BE USED FOR ANY OTHER PURPOSE OTHER THAN WHAT IS DEFINED ABOVE. THE SURVEYOR, H. LAWRENCE SINCO, IS NOT LIABLE FOR ANY MATTERS RELATING TO THE USE OF THE TEXT BELOW ON ANY OTHER DOCUMENTS OTHER THAN THE RECORDED PLAT LISTED ABOVE.

PROPERTY DESCRIPTION:

BEING MORE PARTICULARLY DESCRIBED AS FOLLOWS:

COMMENCING AT THE SOUTHWEST CORNER OF SAID SECTION 30, TOWNSHIP 1 SOUTH, RANGE 65 WEST, OF THE 6TH P.M., COUNTY OF ADAMS, STATE OF COLORADO;

1. THENCE NORTH 89°50'10" EAST, ALONG THE SOUTH LINE OF SAID SOUTHWEST ONE-QUARTER OF SECTION 30, A DISTANCE OF 1,345.63 FEET;
2. THENCE NORTH 00°28'58" WEST, BEING PARALLEL WITH THE WEST LINE OF SAID SOUTHWEST ONE-QUARTER OF SECTION 30, A DISTANCE OF 1,133.00 FEET TO THE POINT OF BEGINNING;
3. THENCE SOUTH 89°50'10" WEST, DEPARTING SAID PARALLEL LINE AND BEING PARALLEL WITH SAID SOUTH LINE OF THE SOUTHWEST ONE-QUARTER OF SECTION 30, A DISTANCE OF 1,315.63 FEET TO THE EAST RIGHT-OF-WAY LINE OF GUN CLUB MILE ROAD AS RESERVED ON A LAND SURVEY PLAT RECORDED IN THE ADAMS COUNTY CLERK AND RECORDER IN BOOK 1, PAGE 2022 (C0554813);
4. THENCE NORTH 00°28'58" WEST, ALONG SAID EAST RIGHT-OF-WAY LINE AND BEING PARALLEL WITH SAID WEST LINE OF THE SOUTHWEST ONE-QUARTER OF SECTION 30, A DISTANCE OF 1,483.16 FEET TO THE SOUTH RIGHT-OF-WAY LINE OF EAST 132ND AVE. AS RESERVED ON SAID LAND SURVEY PLAT;
5. THENCE NORTH 89°45'52" EAST, ALONG SAID SOUTH RIGHT-OF-WAY LINE AND BEING PARALLEL WITH THE NORTH LINE OF SAID SOUTHWEST ONE-QUARTER OF SECTION 30, A DISTANCE OF 1,315.62 FEET;
6. THENCE SOUTH 00°28'58" EAST, PARALLEL WITH SAID WEST LINE OF THE SOUTHWEST ONE-QUARTER OF SECTION 30, A DISTANCE OF 1,484.81 FEET TO THE POINT OF BEGINNING.

CONTAINING 44.820 ACRES (1,952,344 SQ. FT.) OF LAND

SCHEDULE B, PART II EXCEPTIONS:

(PER ABOVE REFERENCED TITLE COMMITMENT)

ITEMS 1 AND 2 - NOT SURVEY RELATED

3. ANY ENCROACHMENT, ENCUMBRANCE, VIOLATION, VARIATION, OR ADVERSE CIRCUMSTANCE AFFECTING THE TITLE THAT WOULD BE DISCLOSED BY AN ACCURATE AND COMPLETE LAND SURVEY OF THE LAND AND NOT SHOWN BY THE PUBLIC RECORDS. AS SHOWN HEREON, IF ANY.

ITEMS 4 THROUGH 8 - NOT SURVEY RELATED

9. RIGHT OF PROPRIETOR OF A VEIN OR LODE TO EXTRACT AND REMOVE HIS ORE THEREFROM SHOULD THE SAME BE FOUND TO PENETRATE OR INTERSECT THE PREMISES AS RESERVED IN UNITED STATES PATENT RECORDED APRIL 12, 1894 IN BOOK A67 AT PAGE 73. RIGHTS ARE NOT PLOTTABLE.
10. RIGHT OF WAY GRANTED TO PANHANDLE EASTERN PIPE LINE COMPANY, FOR PIPELINES, AND INCIDENTAL PURPOSES, BY INSTRUMENT RECORDED AUGUST 27, 1975, IN BOOK 2014 AT PAGE 73. NOTICE OF GENERAL DESCRIPTION OF AREA SERVED RECORDED JUNE 25, 1986 IN BOOK 3162 AT PAGE 961. EASEMENT IS BLANKET IN NATURE AND NOT PLOTTABLE.
11. EASEMENT GRANTED TO KOCH HYDROCARBON COMPANY, FOR PIPELINES, AND INCIDENTAL PURPOSES, BY INSTRUMENT RECORDED SEPTEMBER 29, 1983, IN BOOK 2795 AT PAGE 583. EASEMENT IS BLANKET IN NATURE AND NOT PLOTTABLE.
12. TERMS, CONDITIONS, PROVISIONS, BURDENS, OBLIGATIONS AND EASEMENTS AS SET FORTH AND GRANTED IN MINERAL DEED RECORDED MARCH 13, 1986 IN BOOK 3119 AT PAGE 957. EASEMENT IS BLANKET IN NATURE AND NOT PLOTTABLE.
13. MINERALS AS DEFINED AND DESCRIBED IN MINERAL DEED RECORDED MARCH 13, 1986 IN BOOK 3119 AT PAGE 957. EASEMENT IS BLANKET IN NATURE AND NOT PLOTTABLE.
14. MINERALS AS DEFINED AND DESCRIBED IN DEED RECORDED NOVEMBER 1, 1994 IN BOOK 4416 AT PAGE 267. DOES NOT AFFECT THE SURVEYED PROPERTY.
15. MINERALS AS DEFINED AND DESCRIBED IN DEED RECORDED DECEMBER 22, 1994 UNDER RECEPTION NO. C0040938. DOES NOT AFFECT THE SURVEYED PROPERTY.
16. RIGHT OF WAY GRANTED TO UNITED POWER, INC., FOR ELECTRIC FACILITIES, AND INCIDENTAL PURPOSES, BY INSTRUMENT RECORDED DECEMBER 03, 1991, IN BOOK 3842 AT PAGE 88. DOES NOT AFFECT THE SURVEYED PROPERTY.
17. EASEMENTS, CONDITIONS, COVENANTS, RESTRICTIONS, RESERVATIONS AND NOTES ON THE LAND SURVEY PLAT RECORDED JUNE 14, 1999 IN BOOK 5788 AT PAGE 572. AS SHOWN HEREON.

ITEMS 18 THROUGH 20 - NOT SURVEY RELATED

21. TERMS, CONDITIONS, PROVISIONS, BURDENS AND OBLIGATIONS AS SET FORTH IN RESOLUTION 2014-355 RECORDED DECEMBER 19, 2014 UNDER RECEPTION NO. 2014000089365. DOES NOT AFFECT SURVEYED PROPERTY.
22. TERMS, CONDITIONS, PROVISIONS, BURDENS, OBLIGATIONS AND EASEMENTS AS SET FORTH AND GRANTED IN RIGHT-OF-WAY GRANT RECORDED JANUARY 06, 2016 UNDER RECEPTION NO. 2016000001319. EASEMENT IS BLANKET IN NATURE AND NOT PLOTTABLE.

GENERAL SURVEY NOTES:

1. THIS SURVEY WAS MADE IN ACCORDANCE WITH LAWS AND/OR MINIMUM STANDARDS OF THE STATE OF COLORADO.
2. THE WORD "CERTIFY" OR "CERTIFICATION" AS SHOWN AND USED HEREON IS AN EXPRESSION OF PROFESSIONAL OPINION REGARDING THE FACTS OF THE SURVEY, AND DOE NOT CONSTITUTE A WARRANTY OR GUARANTY, EXPRESSED OR IMPLIED.
3. NOTICE: ACCORDING TO COLORADO LAW YOU MUST COMMENCE ANY LEGAL ACTION BASED UPON ANY DEFECT IN THIS SURVEY WITHIN THREE YEARS AFTER YOU FIRST DISCOVER SUCH DEFECT. IN NO EVENT MAY ANY ACTION BASED UPON ANY DEFECT IN THIS SURVEY BE COMMENCED MORE THAN TEN YEARS FROM THE DATE OF THE CERTIFICATION SHOWN HEREON.
4. THE BASIS OF BEARINGS FOR THIS SURVEY IS THE WEST LINE OF THE SOUTHWEST ONE-QUARTER OF SECTION 30, TOWNSHIP 1 SOUTH, RANGE 65 WEST, OF THE 6TH P.M. AND BEARS SOUTH 00° 28' 58" EAST AND IS BASED ON THE COLORADO STATE PLANE COORDINATE SYSTEM OF 1983, NORTH ZONE (C.R.S. 38-52-105 & 106) AS SHOWN HEREON.
5. DISTANCES AS SHOWN HEREON ARE IN U.S. SURVEY FEET, GROUND. THE COMBINED FACTOR USED TO OBTAIN GROUND DISTANCES IS 1.00027313.
6. THE ADDRESS OF SUBJECT PROPERTY IS NOT APPLICABLE BASED ON ABOVE REFERENCED TITLE COMMITMENT.
7. PER FEDERAL EMERGENCY MANAGEMENT AGENCY (FEMA) FLOOD INSURANCE RATE MAP NO. 08001C0365H WITH AN EFFECTIVE DATE OF MARCH 6, 2007, FOR ADAMS COUNTY, COLORADO, SUBJECT PROPERTY IS LOCATED WITHIN "OTHER AREA ZONE X" - AREAS DETERMINED TO BE OUTSIDE THE 0.2% ANNUAL CHANCE FLOODPLAIN.
8. SUBJECT PROPERTY HAS A GROSS LAND AREA OF 1,952,344 SQUARE FEET OR 44.820 ACRES, MORE OR LESS.
9. NO PARTY WALLS WERE OBSERVED ON SUBJECT PROPERTY DURING THE COURSE OF THIS SURVEY.
10. VISIBLE ABOVE GROUND UTILITIES HAVE BEEN FIELD LOCATED AS SHOWN. UNDERGROUND UTILITIES SHOWN HEREON ARE REPRESENTED BASED ON FIELD MARKINGS ESTABLISHED BY A PRIVATE UTILITY LOCATE PERFORMED BY UNDERGROUND CONSULTING SOLUTIONS (UCS). THE UNDERGROUND UTILITIES HAVE NOT BEEN PHYSICALLY LOCATED AS A PART OF THIS SURVEY. PRIOR TO EXCAVATION OR DIGGING, CONTACT COLORADO 811 AT 811 OR 800-922-1987.
11. NAMES AND PARCEL IDENTIFICATION NUMBERS OF ADJOINING OWNERS ARE SHOWN ON SURVEY.
12. IMPROVEMENTS AS NOTED ARE BASED ON RECTIFIED ORTHOPHOTOGRAPHY FROM THE NATIONAL AGRICULTURE IMAGERY PROGRAM (NAIP), ADAMS COUNTY, COLORADO, COLLECTED IN 2019, WITH A RESOLUTION OF 0.6 METERS.
13. THE FIELD WORK FOR THIS SURVEY WAS COMPLETED ON JANUARY 27, 2023. ALL VISIBLE IMPROVEMENTS WERE LOCATED, HOWEVER, DUE TO SNOW COVER SOME IMPROVEMENTS MAY NOT HAVE BEEN VISIBLE.
14. REVISION 1 NOTES - THE SURVEYOR WAS NOTIFIED THAT THE RIGHT-OF-WAY RESERVATION LANGUAGE SET FORTH IN THE AFOREMENTIONED TITLE COMMITMENT WAS INCONSISTENT WITH THE RIGHT-OF-WAY LANGUAGE DEPICTED ON THE AFOREMENTIONED RECORD LAND SURVEY PLAT ALONG EAST 132ND AVENUE AND GUN CLUB ROAD. FOLLOWING REVIEW AND AGREEMENT BY ALL AFFECTED PARTIES, IT WAS DETERMINED THAT THIS ALTA/NSPS LAND TITLE SURVEY SHALL BE REVISED TO SHOW THE WEST AND NORTH BOUNDARY LINES OF THE SUBJECT PARCEL AS COINCIDENT WITH, AND TERMINATING AT, THE ADJOINING PUBLIC ROAD RIGHT-OF-WAY. THIS REVISION INCLUDES A PROPERTY DESCRIPTION (THIS SHEET) AND A MODIFIED BOUNDARY DEPICTION, AS SHOWN ON SHEET 2.

14.1. THIS ALTA/NSPS LAND TITLE SURVEY PLAT SUPERSEDES THE PREVIOUSLY RECORDED ALTA/NSPS LAND TITLE SURVEY PLAT RECORDED IN THE OFFICE OF THE ADAMS COUNTY CLERK AND RECORDER AT RECEPTION NO. 2023000025610.

SURVEY OBSERVATIONS:

FOR THE BENEFIT OF THE PARTY REQUESTING THIS SURVEY (UNITED POWER, INC.), THE SURVEYOR NOTES THE FOLLOWING MATTER WHICH MAY AFFECT THE STATUS OF TITLE TO THE SUBJECT PROPERTY:

THERE EXISTS UTILITY LINES AND APPURTENANCES WITHIN THE SURVEYED PROPERTY THAT DO NOT APPEAR TO LIE WITHIN AN EASEMENT, AS SHOWN HEREON, AND THUS CREATES AN AREA OF CONCERN.

Ulteig
3350 38TH AVE S
FARGO, ND 58104
PHONE: (701) 280-8500
ULTEIG.COM

PROJECT NUMBER: N/A
DESIGN BY: UEI
DRAWN BY: UEI
APPROVED BY: UEI
{DRAWING PREPARED 03-2025}

STONEHOUSE SUBSTATION LAND SURVEY PLAN

Revised Drainage Report

We listen. We solve.®

Stonehouse Substation Build Drainage Report

PROJECT NAME
Stonehouse Substation Build

ULTEIG PROJECT NUMBER
24.00441

DEPARTMENT
Energy Solutions-Substation

PREPARED FOR
United Power

PREPARED BY
Marisol Velilla PE, Ulteig Engineers Inc.

ENGINEER OF RECORD
Marisol Velilla PE, Ulteig Engineers Inc.

REVISION HISTORY

Revision	Date	Description
A	10/7/25	Issue for Review
B	4/3/26	Issue for Approval

We listen. We solve.®

DRAINAGE CERTIFICATION:

Engineer's Statement

I Hereby attest that this report for the final drainage design of Stonehouse Substation was prepared by me, or under my direct supervision, in accordance with the provisions of the County Storm Drainage Design Criteria for their responsible parties thereof. I understand that the County does not assume liability for drainage facilities designed by others.

Registered Engineer

Marisol E Velilla

Name

Marisol E Velilla
2026.04.02
14:57:11-05'00'

Seal

Table of Contents

Limitations:
This report is for United Power use only and is not to be distributed or used by third parties outside of United Power without express permission of United Power. The scope of services performed during the preparation of this document may not be appropriate to satisfy the needs of other users, and any use or re-use of this document or of the findings, conclusions, or recommendations presented herein is at the sole risk of said user.

1. General Location and Description

1.1 Project Description:

The subject parcel for the Project (parcel # 0156730300001) does not currently have an address associated with it but is located at the southeast corner of 132nd Avenue and Gun Club Road. The subject parcel is a portion of SW1/4 of Section 30, Township 1 South, Range 65 West of the 6th Principal Meridian in unincorporated Adams County. The parcel has been used for agricultural purposes in the distant past but is currently vacant with no permanent or temporary structures. The Project will be constructed on a 46.766-acre parcel, zoned Agricultural 3 (A-3), and is owned by United Power. The footprint for the substation itself will be approximately 3 acres and utilize access to Gun Club Road; the remainder of the parcel will be left in its current condition. In order to provide power for the substation, a transmission line tap will be required, which will involve tapping the existing Public Service Company of Colorado (PSCo) Reunion-Barr Lake 230kV overhead transmission line. The PSCo transmission line is adjacent to the subject parcel and runs north-south along the west side of Gun Club Road. The Project site will be unmanned and will not require water/sewer services.

The project includes one driveway, swales, and a new detention basin to the west of the substation with an outlet structure and culverts. The site drains northwest, eventually leading to Mile High Lakes-Beebe Seep Canal.

1.2 Constraints

- Extensive substation pad (3 acres of gravel with no more than 1 percent slope)
- Diversion of run-on from adjacent properties
- Extended Detention Basin to comply with local requirements.
- Provide one access to the site from the existing county road.

To fulfill the constraints above, we used diversion berms and swales around the Substation pad to intercept sheet flow, prevent shallow concentrated flows and promote infiltration.

The conveyance swales and berms were designed to capture or block any run-off from outside the substation site and redirect it around the perimeter. All swales are trapezoidal with a 4:1 side slope and minimum 4-foot bottom.

The access road was designed to meet requirements for grade and alignment due to the heavy equipment it must accommodate. It will be surfaced with 12 inches of base material.

1.3 Permits

A Conditional Use Permit, which is case number RCU2025-00008.was submitted to the County on April 15th, 2025.See letter on Appendix E.

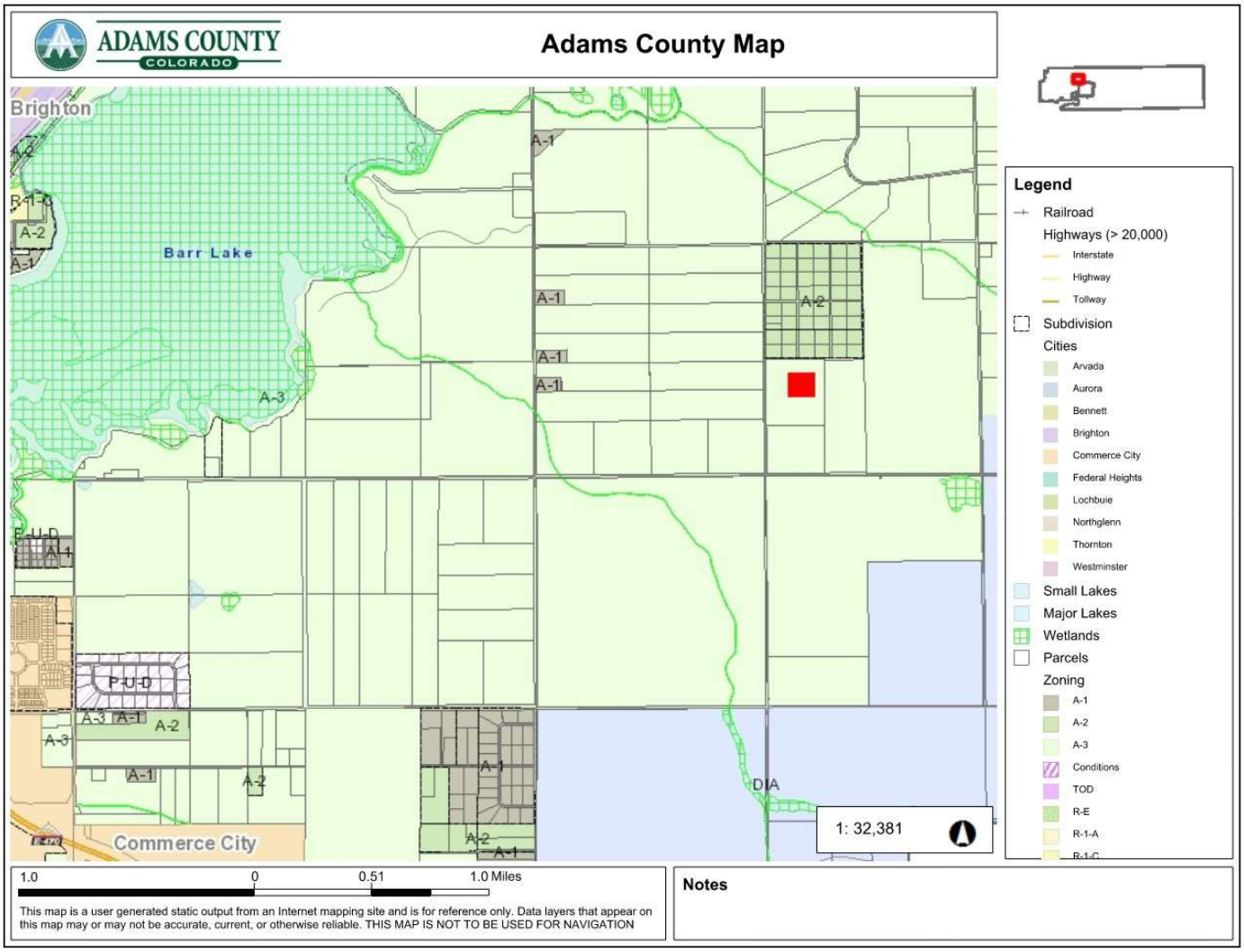


Figure 1: Site Location

1.4 Project Mapping

Ulteig Engineers provide an ALTA/NSPS Land title survey on May 5th of 2023. Topography was collected to 1' interval accuracy. All data was surveyed using the NAD83 Colorado State Planes, North Zone, US Foot horizontal datum.

1.5 Soil Types, Geological Features

Soil data was obtained from the National Resources Conversation Services (NRCS) Soil Survey Geographic database (SSURGO). The site is composed of soils with a hydrologic soil group rating of B. Specifically, the project site contains Type B Ascalon-Vona sandy loams. The soil resource report including the hydrplogic soil group map and from the USDA Natural Resources Conservation Service Soil Mapper in Appendix A.

Additionally, five soil borings were taken on 09-05-25 to further investigate on site conditions. These borings indicated Clayey Sand on boring 1 in the first 19 feet, confirming the Hydrologic Soil Group Rating of B soil from the NRCS.

In the detention basin design, we assumed the site to be 100% type B soils.

See geotechnical report by Terracon in Appendix A.

1.6 Flood History

The Project site is located on Panel 08001C0365H of the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM), The site is in FEMA Zone X. Zone X is defined as an area of minimal flood hazard. The FIRMette map is in Appendix B.

There is no known history of the project area experiencing flood related problems.

1.7 Groundwater Investigation:

"The boreholes were observed while drilling and shortly after completion of drilling for the presence and level of groundwater. Groundwater was not observed in the boreholes to the maximum depth explored of about 40'.

From page 4 of geotechnical report by Terracon N0 25255177

See geotechnical report by Terracon in Appendix A.

2. Drainage Area and Sub-Basins

The site is in South Platte River Basin

Watershed: Mile High Lakes-Beebe Seep Canal (101900030502) see Appendix C

The runoff from this parcel historically flows northwest with an average slope of 2 percent.

We use "E" to describe existing Conditions drainage areas or basins and "P" for Proposed.

2.1 Existing Conditions

This parcel has 2 sub basins that drain to 2 design points in the property. Design points A and B

The area draining to Design point B will not be changed in this project. See figure 2, section 8.

<u>Basin E 1- Draining to Design Point A</u>

Basin E1 consists of 37 acres of farmland inside the property, located in the northeast section of the site and flows traverse to the northwest area of the property. This basin receives run-on from more than 200 Acres of the adjacent southeast property. The offsite runoff was calculated with GeoHECHMS and is in the Appendix D. Only areas inside the property were used to compare existing and proposed runoff values as off-site upstream areas will not be impacted.

E1= 37Acres

5% impervious C5 = 0.03, C100 = 0.45

Tc = 56.08 min
Q_5 = 1.83 cfs, Q_{100} = 47.64 cfs.

Basin E2- Draining to Design point B

Basin 2 consists of 9.7 acres of farmland. This Basin will not be developed as part of this project.

E2 = 9.7 Acres.

5% impervious C5 = 0.03, C100 = 0.45

Tc = 31.28 min

Q5 = 0.69 cfs, Q100 = 18.08 cfs.

2.2 Proposed Conditions

The proposed grading design will include multiple aspects of construction such as grading earth work cut and fill, an entrance road connecting the substation to Gun Club Rd, security fence installation, and multiple drainage structures such as swales, culverts and a detention and WQCV basin to capture the runoff from the substation pad. In addition to the hydraulic grading construction there will be multiple concrete and steel electrical structures on the grading pad.

The proposed grading design will reduce the existing historical peak flows and improve the water quality.

See figure 3, Section 8.

The areas that drain to Design point A are:
P1

This basin has a surface area of 1.24 acres. The proposed conditions will include the southern side of the substation pad that runs southwest to a grass swale and a culvert under the driveway connected to the proposed trickle channel of the detention and WQCV basin.

The proposed substation pad soil structure will have 2 layers starting with a top surface of 6 inches of loose aggregate surface, over 6 inches Class 5 CDOT road base.

Area= 1.24 acres

60% impervious C5 = 0.49, C100 = 0.71

Tc = 18.82 min

Q5 = 1.76 cfs, Q100 = 4.81 cfs.
P2

This basin has a surface area 1.21-acre, the grading slope is 8:1 with 4-foot-wide swales to convey the runoff under the driveway to the EDB (Extended Detention Basin)

Area= 1.21 acres

20% impervious C5 = 0.15, C100 = 0.52

Tc = 14.21 min

Q5 = 0.60 cfs, Q100 = 3.96 cfs.

P3

This basin has a surface area of 1.4 acres. The proposed conditions will include the northern side of the substation pad that runs north-west and drains to a swale that becomes the trickly channel of the detention and WQCV basin

The proposed substation pad soil structure will have 2 layers starting with a top surface of 6 inches of loose aggregate surface, then 6 inches Class 5 CDOT road base.

Area= 1.4 acres

60% impervious C5 = 0.49, C100 = 0.71

Tc = 15.94 min

Q5 = 2.16 cfs, Q100 = 5.90 cfs.

P4

This basin has a surface area of 0.11 acres. This basin is part of the south driveway conveying the runoff through a grass swale to the trickly channel of the detention and WQCV

Area= 0.10 acres

20% impervious C5 = 0.15, C100 = 0.52

Tc = 11.54 min

Q5 = 0.05 cfs, Q100 = 0.36 cfs.

P5

Area P5 will receive the runoff from Areas P1-P5 through the culverts and swale.

This area has a surface area of 2.06 acres. The detention and WQCV basin were designed as an extended detention basin with full spectrum detention. See calculations Appendix D.

The outflow is located at the north-west side of the parcel (Design point A). The outlet pipe has a riprap basin designed with MHFD criteria.

Area= 2.06 Acres

25% impervious C5 = 0.19, C100 = 0.54

Tc = 15.53 Q5 = 1.24 cfs, Q100 = 6.76 cfs.

P6

This basin receives runoff from 30.99 Acres from the property and more than 200 Acres from outside the property.

The offsite runoff will be diverted by a wide swale at the east side of the Substation pad keeping similar existing drainage patterns.

For comparison purposes we used the area inside the property.

Area= 30.99 Acres

5% impervious C5 = 0.03, C100 = 0.45

Tc = 47.49 min

Q5 = 1.71 cfs, Q100 = 44.51.

2.3 Summary

The Stonehouse electrical substation project site design complies with Adams County Design.

The proposed design maintains the historical runoff direction while improving the water quality. The 5- & 100-year large storm events will be adequately captured by the proposed swales, drain tiles and detention pond.

Runoff peaks for the existing and developed conditions from the basins are summarized in Table 1 and 2 below.

Design point	Basin ID	Contributing Area (acres)	Basin % Imp.	T_c (min)	C_5	C_{100}	Runoff 5 Yrs. (cfs)	Runoff 100 Yrs. (cfs)
A	E1	37	5	56.08	0.03	0.45	0.83	47.64
B	E2	9.7	5	31.28	0.03	0.45	0.69	18.08

Table 1: Existing Conditions Basin Summary

Design point	Basin ID	Area (acres)	Basin % Imp.	T_c (min)	C_5	C_{100}	Runoff 5 Yrs. (cfs)	Release rate EURV. (cfs) with detention	Runoff 100 Yrs. (cfs)	Release rate 100 Yrs. (cfs) with detention
A	P1	1.24	60	18.82	0.49	0.71	1.76		4.81	NA
A	P2	1.21	20	14.21	0.15	0.52	0.6		3.96	NA
A	P3	1.4	60	15.94	0.49	0.71	2.16		5.9	NA
A	P4	0.1	20	11.54	0.15	0.52	0.05		0.36	NA
A	P5	2.06	25	15.53	0.19	0.54	1.24	**0.1**	6.76	**1**
A	P6	30.99	5	47.49	0.03	0.45	1.71	1.71	44.51	44.51
	Total	37						1.81		45.51
B		9.7	5	31.28	0.03	0.45	0.69		18.08	No change

Table 2: Proposed Conditions Basin Summary

See Table 5 for Design Point Summary.

3. Drainage Design Criteria

3.1 Regulations

The design criteria used for this study include the Mile High Flood District Drainage Criteria Manual. Various spreadsheets and design programs that were developed by MHFD were also used to aid in the design of the site drainage system.

3.2 Hydrology

3.2.1 Runoff calculations methods

We performed the Hydrologic analysis using the Rational Method. We use this method to compute flow rates at basin outlets and design points for small watersheds (less than 90 acres) and is based on the equation below. All tables, equations and recommended values are from MHFD Manual Volume 1 Chapter 6 unless noted.
Q = CiA

Where:

Q = peak discharge in cubic feet per second

C = runoff coefficient

i = rainfall intensity in inches per hour

A = basin area in acres

Time of concentration (Tc) is the approximate travel time for a droplet of water to travel to the basin outlet from the most hydraulically distant point in the basin and is used to determine rainfall intensity. Reference 2 lists the method for calculating Tc. The calculated Tc were bigger in most cases than the empirical TC used for the Denver region. We adopted the smaller as recommended.

We used NOAA Atlas 14 for the Rainfall intensity. The runoff coefficient, C, represents the integrated effects of infiltration, evaporation, retention, and interception, all of which affect the volume of runoff.

We calculated imperviousness based on the recommended values from Table 6-3 of Chp.6. of Volume 1

3.2.2 Design storm recurrence intervals

Design storm recurrence intervals used were 5-yr and 100-yr.

3.2.3 Design rainfall

We used the design rainfalls from NOAA Atlas 14

One hour point rainfall values for 5-yr. = 1.42 inches and for 100-yr. = 2.71 inches.

3.2.4 Detention Storage and release rate calculations methods

We used MHFD-Detention_v4.07 spread sheet to calculate the detentions and the release rate see section below.

3.3 Hydraulics

We performed hydraulic analysis of the site drainage features based on standards set in References 1 and 2. spread sheet was used for the pond routing.

The site will have an extended detention basin combined with full spectrum detention as the recommended approach. Full spectrum detention will reduce the flooding and stream degradation impacts associated with urban development by controlling peak flows in the stream for a range of events.

Water Quality Capture Volume (WQCV)

Excess Urban Runoff Volume (EURV)

The WQCV is a function of imperviousness and BMP drain time.

WQCV= a $(0.91I^3 - 1.191I^3 + 0.78I)$

EURV = $1.2i^{1.08}$

`

Table 3: Detention and WQCV Basin Storage Volume

Zone	Volume	Volume required	Volume Provided
1	WQCV	0.09 ac-ft.	0.091 ac-ft.
2	EURV	0.253 ac-ft.	0.256 ac-ft.
3	100-yr -zone 1&2	1.015 ac-ft.	1.015 ac-ft.

Table 4: Detention and WQCV Basin Outlet Summary

Tributary area 13.63 ac.	Peak inflow cfs.	Peak outflow cfs.	Peak depth ft.	Peak elevation ft.
5-year	3.9	0.1	2.46	5180.96
100-year	12.2	1	3.2	5181.70

4. Stormwater Conveyance

The site - as described in previous sections - drains to two points. They are labeled as design points A and B in the drawings and calculations.
We compared the existing and proposed runoff condition for each design point and for the summation of all points. The overall site, as indicated by the summation of design points, meets the release criteria.
We evaluated each Point to confirm runoff will not affect existing structures and that discharge locations are protected from erosion.

5. Drainage Facility Design

The drainage facilities design will:

- Accommodate the runoff from the proposed substation yards.
- Route the flows to the Detention Pond through swales and culverts to a detention and WQCV basin where the water will be released in a controlled manner.
- Grass swales and buried riprap were used to convey surface water as described below.

5.1 Swales

5.1. Grass Swales

We designed grass lined swales to divert water and the driveway ditches. The typical dimensions of the swales include 4:1 side and a 4 feet wide bottom. See Appendix D for East diversion swale calculations.

5.2 Buried Riprap

We designed buried riprap on the emergency spillway.

5.3 Summary

Flow rates under the existing and proposed conditions for the 5- and 100-year peak outflows at the design points for the project area shown in Table 5. The design points shown in Table 5 are at location where runoff is leaving the site.

Design Point	Basin		Peak outflows			
			Existing		Proposed	
	Existing	Proposed	Q_5 (cfs)	Q_{100} (cfs)	Q_5 (cfs)	Q_{100} (cfs)
A	E1	P1 to P6	1.83	47.64	1.81	45.51

Table 5: Design Point Summary

6. Water Quality Enhancement BMPs

6.1 Detention and WQCV Basin

As previously stated, we designed the detention basin to a full spectrum.

We designed the detention basin with more than 1 foot of freeboard and side slopes of 3:1 and the pond with an access road for regular maintenance as well as an emergency spillway lined with buried riprap to prevent overtopping of the berms. The storage volumes provided meet the required volume for an extended detention basin combined with full spectrum detention, as shown in Table 3. See Appendix D for Detention Basin Design Workbook.

6.2.1 Detention and WQCV Basin Outlet Structure

We designed the detention pond outlet to release the WQCV and EURV volumes in a controlled manner, while allowing the larger recurrence events to pass safely. The WQCV and EURV release rates are controlled through an orifice plate. The orifice diameters were calculated with the MHFD UD-Detention spreadsheet. The micro-pool is integral to the outlet structure and is larger than the 0.5% of the WQCV requirement.

6.2.2 Riprap Basin at the Outlet Structure

We designed this basin to protect from scour at the outlet of the 4 X 18-inch ARCH RCP.Riprap sizing and basin size was based on the MHFD Criteria Manual Volume 2 Section 3.2. See Appendix D.

6.2.3 Emergency Overflow Spillway

We designed the emergency overflow spillway to pass the 500-yr developed flow from the upstream watershed. The spillway contains a 4 feet wide buried riprap lining to prevent fill slope erosion in an overflow event. Soil riprap will be installed to a depth of 2 feet and will eventually re-vegetate to match the surrounding fill slopes.

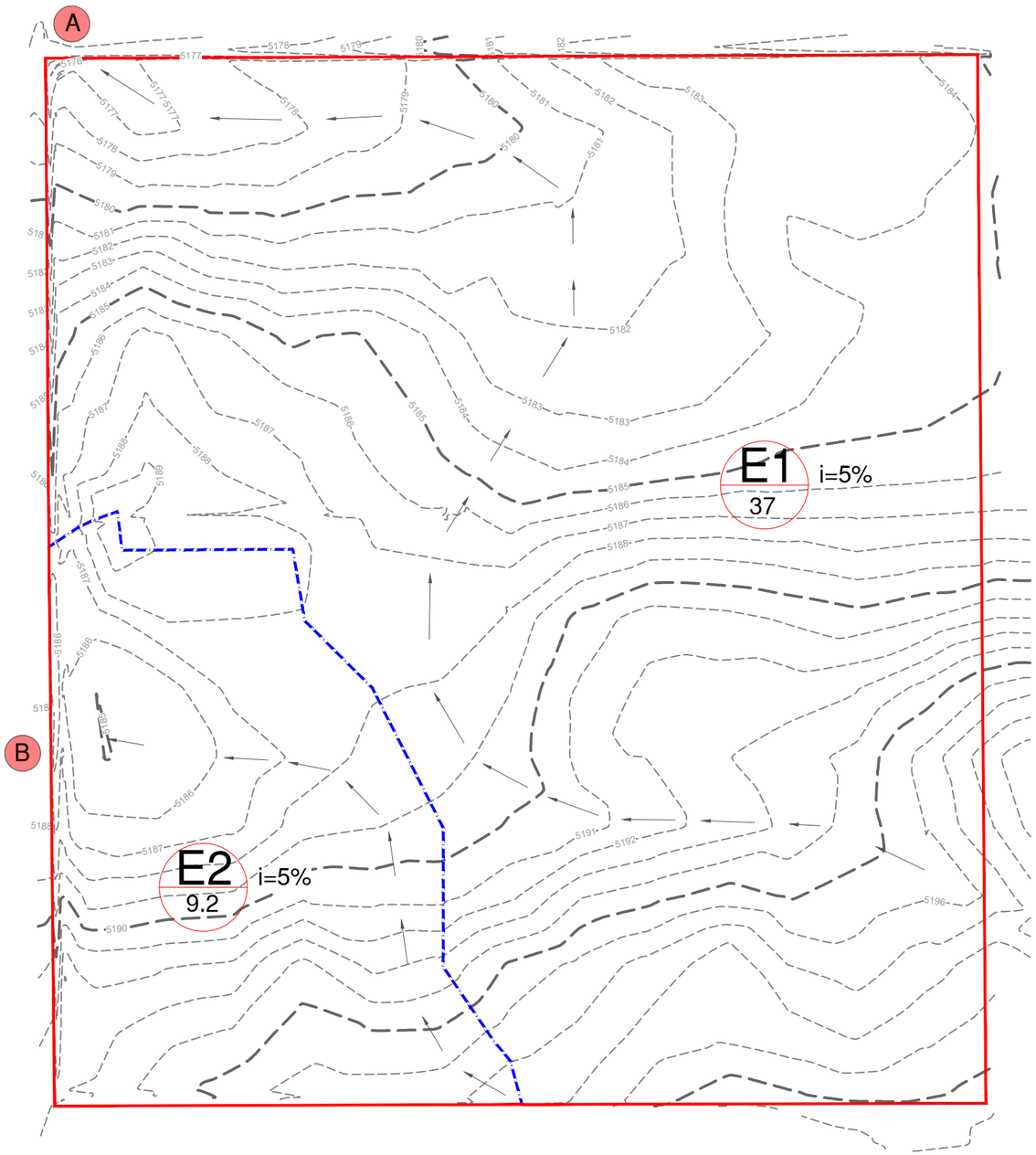
7. Conclusion and Level 1 Downstream Analysis

The Stonehouse substation drainage plan has been designed in accordance with the MHFD Design Criteria Manual Volume 1, 2 and 3

Design criteria dictated the drainage system address the 5 and 100-year runoff peaks and comply with the detention and WQCV requirements using an extended detention basin.

The overall runoff will be less, with better water quality than existing conditions consisting of farm runoff with no attenuation or treatment. No adverse impact is anticipated upstream or downstream of the proposed project.

8. Figures



0 200 400
1"=200'-0"

LEGEND

- 1 / 1.92 — BASIN NUMBER; i=2% — % OF IMPERVIOUSNESS; 1.92 — AREA IN ACRES
- B — DESIGN POINT
- FLOW DIRECTION
- BASIN BOUNDARY
- PROPERTY LINE

NOTE:
SEE STONEHOUSE DRAINAGE ANALYSIS FOR OFF PROPERTY RUNOFF

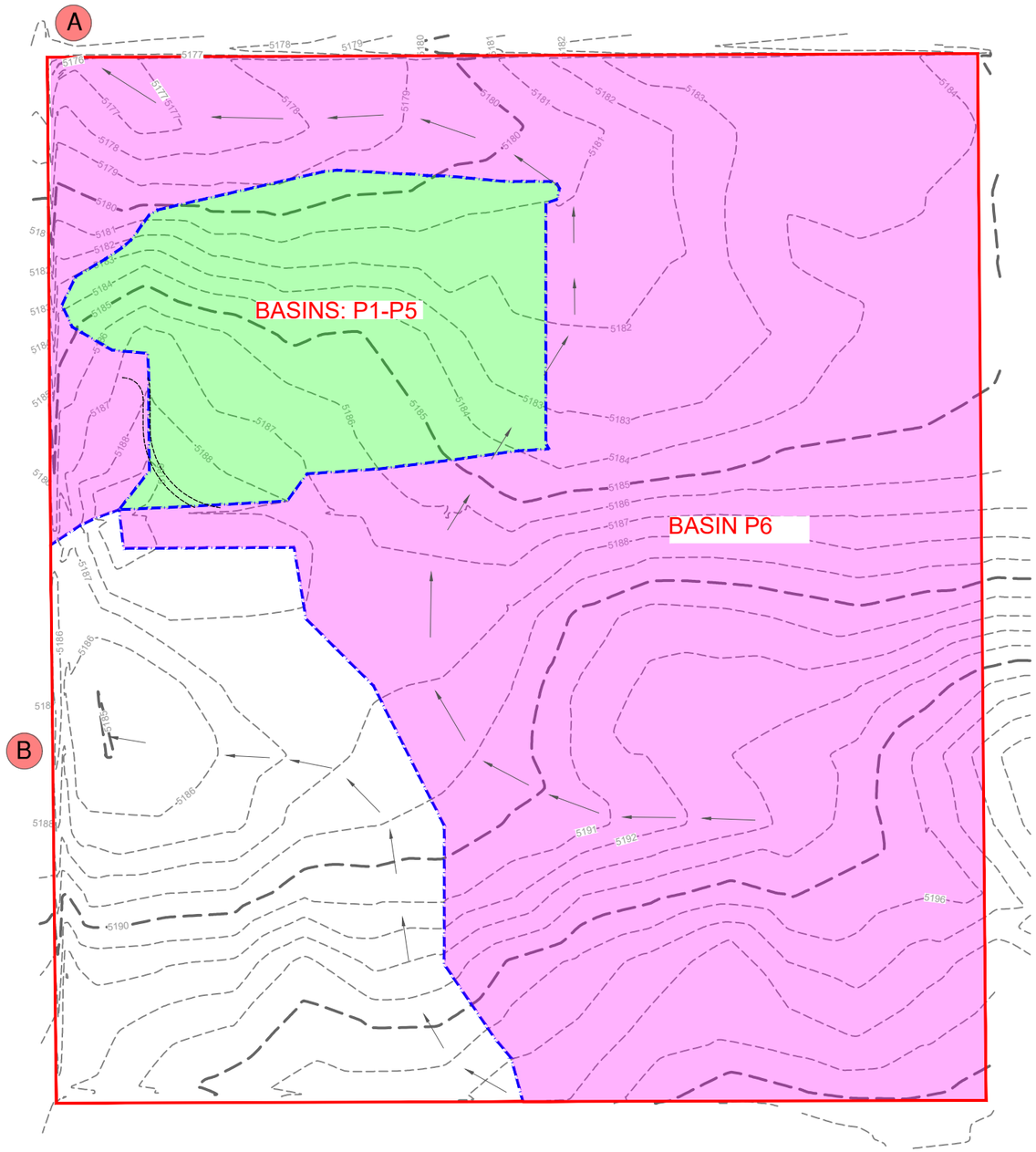
Ulteig
3350 38TH AVE S
FARGO, ND 58104
PHONE: (701) 280-8500
ULTEIG.COM

PROJECT NUMBER: 24.00441
DESIGN BY: UEI-MEV
DRAWN BY: UEI-CJK
APPROVED BY: UEI-MEV
{DRAWING PREPARED 10-06-2025}

STONEHOUSE SUBSTATION
EXISTING DRAINAGE EXHIBIT

10/6/2025

Figure 3 – Proposed Conditions



0 200 400

1"=200'-0"

LEGEND

- B — DESIGN POINT
- FLOW DIRECTION
- BASIN BOUNDARY
- PROPERTY LINE
- BASINS 1-5
- BASIN 6

NOTE:
SEE STONEHOUSE DRAINAGE ANALYSIS FOR OFF PROPERTY RUNOFF

Ulteig
3350 38TH AVE S
FARGO, ND 58104
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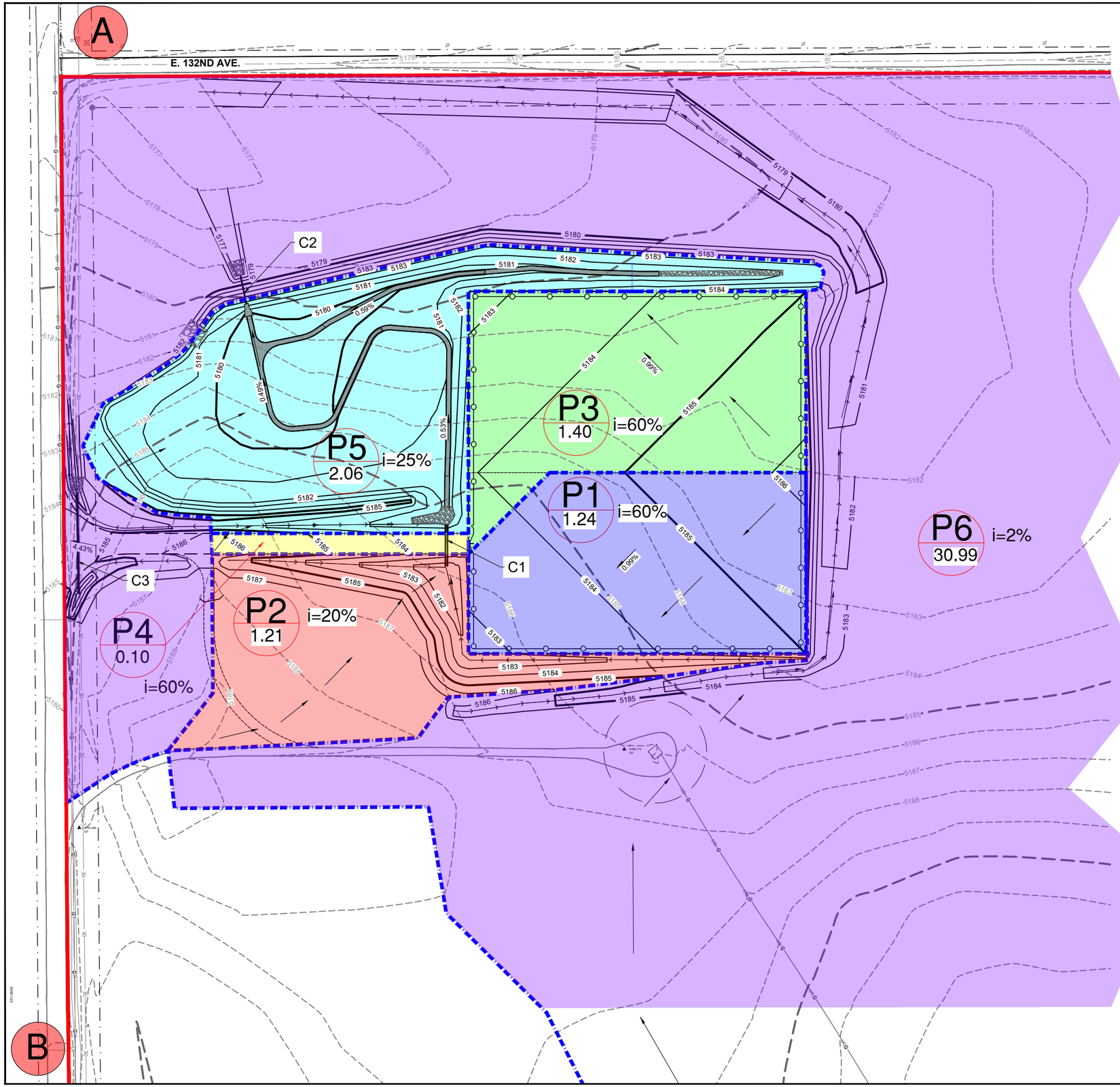
PROJECT NUMBER: 24.00441
DESIGN BY: UEI-MEV
DRAWN BY: UEI-CJK
APPROVED BY: UEI-MEV
{DRAWING PREPARED 03-09-2026}

STONEHOUSE SUBSTATION
PROPOSED DRAINAGE EXHIBIT



0 100 200

1"=100'-0"

LEGEND

- 1 / 1.92 — BASIN NUMBER; i=2% — % OF IMPERVIOUSNESS; AREA IN ACRES
- B — DESIGN POINT
- FLOW DIRECTION
- BASIN BOUNDARY
- PROPERTY LINE
- BASIN 1
- BASIN 2
- BASIN 3
- BASIN 4
- BASIN 5P
- BASIN 6
- C1 — CULVERT NUMBER 1

BASIN 7:

THIS BASIN IS RECEIVING WATER FROM 30.99 ACRES FROM THE PROPERTY AND 200+ OFF PROPERTY. THE RUNOFF WILL BE DIVERTED BY A WIDE SWALE AT THE EAST SIDE OF THE SUBSTATION PAD THROUGH (4) 14X23 RCP ARCH CULVERTS. A DRAINAGE ANALYSIS WAS CONDUCTED TO SIZE THE CULVERTS, SEE ATTACHED CALCULATIONS ON APPENDIX D. FOR COMPARISON PURPOSES WE USED THE AREA INSIDE THE PROPERTY
5% IMPERVIOUS, C5=0.03, C100=045
TC=47.49 MIN
Q5=1.71 CFS, Q100=44.51 CFS.

NOTE:

SEE STONEHOUSE DRAINAGE ANALYSIS FOR OFF PROPERTY RUNOFF

3350 38TH AVE S
FARGO, ND 58104
PHONE: (701) 280-8500
ULTEIG.COM

PROJECT NUMBER: 24.00441
DESIGN BY: UEI-MEV
DRAWN BY: UEI-CJK
APPROVED BY: UEI-MEV
{DRAWING PREPARED 03-09-2026}

STONEHOUSE SUBSTATION PROPOSED DRAINAGE EXHIBIT

9. Appendices

APPENDIX A – USDA soils data and Geotechnical Report

Site Location

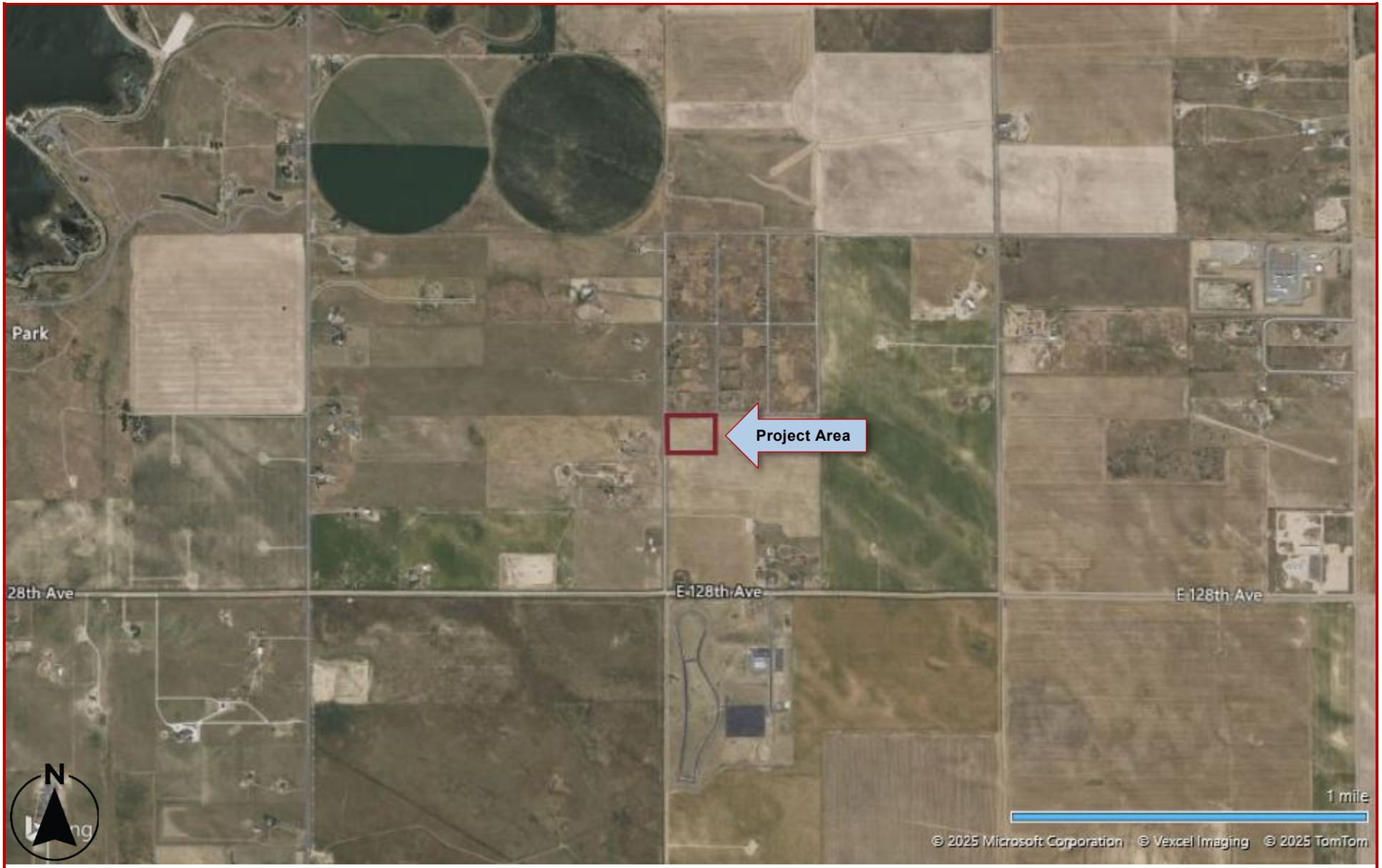


DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES

MAP PROVIDED BY MICROSOFT BING MAPS

Exploration Plan with Aerial Image

DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES

MAP PROVIDED BY MICROSOFT BING MAPS

Exploration Plan with Project Overlay

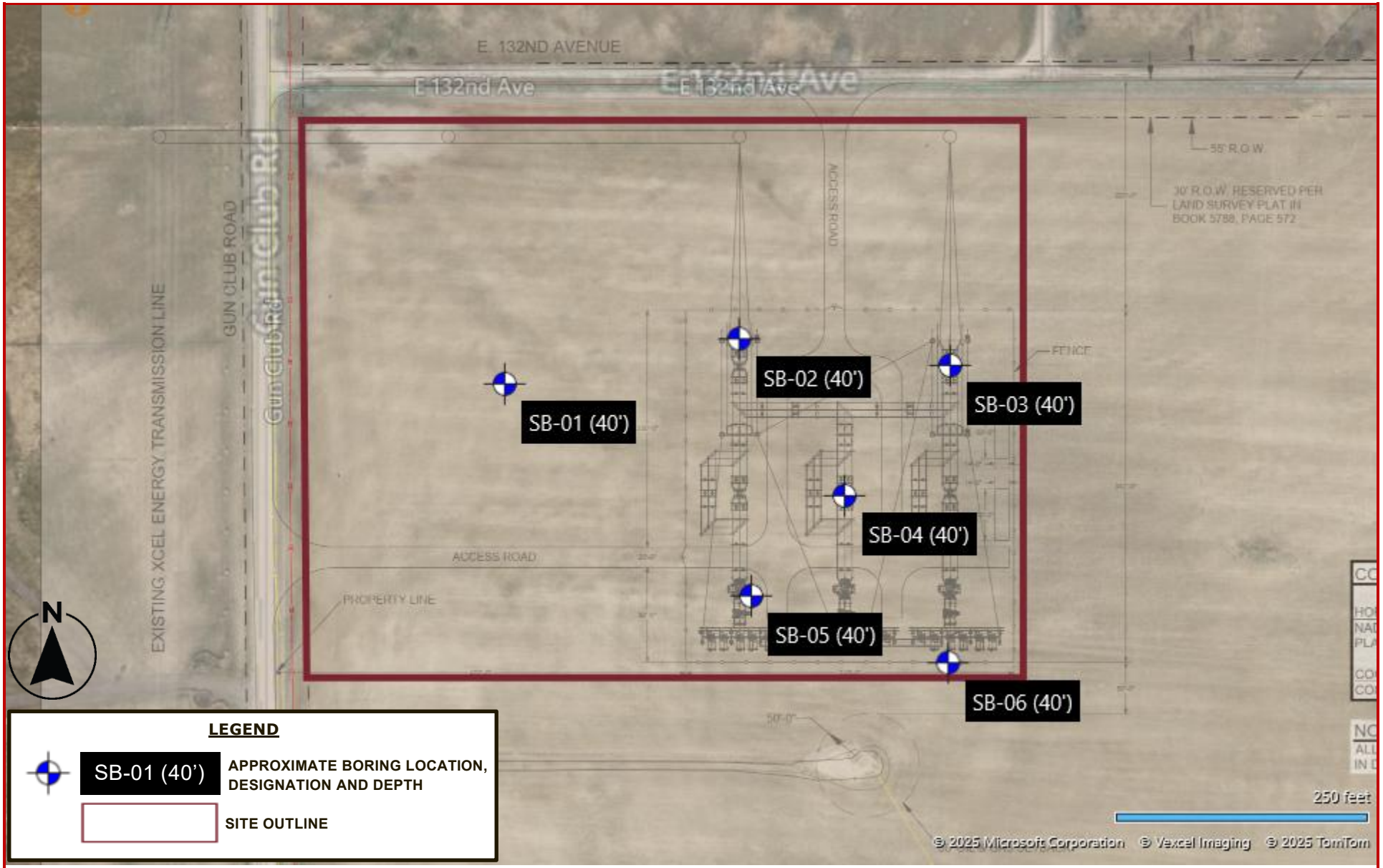


DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES

MAP PROVIDED BY MICROSOFT BING MAPS

Stonehouse Substation

Southeast of E 132nd Avenue and Gun Club Road, Commerce City, CO,USA

Terracon Project No. 25255177

Latitude: 39.9353° Longitude: -104.7138°

Boring No. SB-01

Terracon

10625 W I70 Frontage Rd N, Ste. 3

Wheat Ridge, CO 80033-1729

Surface Elevation:

5181(Ft) +/-

Graphic Log	Lithology Depth (Ft.)	Material Description	Depth (Ft.)	Elevation (Ft.)	Sample Type	Recovery (In.)	Field Test Results
	0.58	**TOPSOIL** ,about 7 inches		5180.4			
		CLAYEY SAND (SC) , fine to coarse grained, brown, very loose to medium dense					2-3
							4-6
			5				
			10				8-7
			15				7-12
	19			5162.0			
		SANDY LEAN CLAY (CL) , brown, very stiff to hard	20				11-17
			25				12-25
			30				10-13
	34			5147.0			
		SANDSTONE , brown, fine to coarse, hard, weak cementation	35				50/7''
							50/8''
		Boring Terminated at 40 Ft					

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes

Elevation Reference: Approximate ground surface elevation obtained using Mapbox.
Location Reference:

Water Level Observations

Groundwater not encountered while drilling

Abandonment Method

Boring backfilled with auger cuttings upon completion.

Drill Rig
422/Mobile B-57

Hammer Type
Automatic

Driller
Terracon

Logged By
KT

Boring Started
09/05/2025

Boring Completed
09/05/2025

Stonehouse Substation
Southeast of E 132nd Avenue and Gun Club Road, Commerce City, CO,USA
Terracon Project No. 25255177

Latitude: 39.9354° Longitude: -104.7130°

Boring No. SB-02

10625 W I70 Frontage Rd N, Ste. 3
Wheat Ridge, CO 80033-1729

Surface Elevation:
5180.4(Ft) +/-

Graphic Log	Lithology Depth (Ft.)	Material Description	Depth (Ft.)	Elevation (Ft.)	Sample Type	Recovery (In.)	Field Test Results
		TOPSOIL ,about 30 inches					
	2.5	**CLAYEY SAND (SC)** , fine to coarse grained, brown, loose to medium dense		5177.9			4-6
							3-12
			5				
							7-11
			10				
	14			5166.4			
		SANDY LEAN CLAY (CL) , brown, very stiff	15				11-12
							11-14
			20				
							11-14
			25				
							8-13
			30				
							6-10
			35				
	39			5141.4			
		SANDSTONE , brown, fine to coarse, hard, weak cementation					50/9''
		Boring Terminated at 40 Ft					

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes
Elevation Reference: Approximate ground surface elevation obtained using Mapbox.
Location Reference:

Water Level Observations
Groundwater not encountered while drilling

Abandonment Method
Boring backfilled with auger cuttings upon completion.

Drill Rig
422/Mobile B-57

Hammer Type
Automatic

Driller
Terracon

Logged By
KT

Boring Started
09/05/2025

Boring Completed
09/05/2025

Stonehouse Substation
Southeast of E 132nd Avenue and Gun Club Road, Commerce City, CO,USA
Terracon Project No. 25255177

Latitude: 39.9354° Longitude: -104.7122°

Boring No. SB-03

Terracon
10625 W I70 Frontage Rd N, Ste. 3
Wheat Ridge, CO 80033-1729

Surface Elevation:
5181.3(Ft) +/-

Graphic Log	Lithology Depth (Ft.)	Material Description	Depth (Ft.)	Elevation (Ft.)	Sample Type	Recovery (In.)	Field Test Results
		TOPSOIL ,about 32 inches					
	2.66	**SANDY LEAN CLAY (CL)** , brown, loose to medium dense		5178.6			6-7
							8-9
			5				
							8-10
			10				
							8-13
			15				
							7-15
			20				
							10-17
			25				
							10-17
			30				
	34.5			5146.8			11-26
		CLAYSTONE, gray to brown, medium hard	35				
							50/10''
		Boring Terminated at 40 Ft					

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes
Elevation Reference: Approximate ground surface elevation obtained using Mapbox.
Location Reference:

Water Level Observations
Groundwater not encountered while drilling

Abandonment Method
Boring backfilled with auger cuttings upon completion.

Drill Rig
422/Mobile B-57

Hammer Type
Automatic

Driller
Terracon

Logged By
KT

Boring Started
09/05/2025

Boring Completed
09/05/2025

Stonehouse Substation
Southeast of E 132nd Avenue and Gun Club Road, Commerce City, CO,USA
Terracon Project No. 25255177

Latitude: 39.9350° Longitude: -104.7126°

Boring No. SB-04

10625 W I70 Frontage Rd N, Ste. 3
Wheat Ridge, CO 80033-1729

Surface Elevation:
5183.3(Ft) +/-

Graphic Log	Lithology Depth (Ft.)	Material Description	Depth (Ft.)	Elevation (Ft.)	Sample Type	Recovery (In.)	Field Test Results
	0.5	**TOPSOIL** ,about 6 inches		5182.8			
		SANDY LEAN CLAY (CL) , brown, stiff					5-7
	4			5179.3			
		CLAYEY SAND (SC) , fine to coarse grained, brown, medium dense	5				7-8
	9			5174.3			
		SANDY LEAN CLAY (CL) , brown, very stiff	10				8-12
			15				10-18
			20				12-14
			25				9-17
			30				10-14
	34			5149.3			
		CLAYSTONE, gray, firm to medium hard	35				12-20
							16-23
		Boring Terminated at 40 Ft					

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes
Elevation Reference: Approximate ground surface elevation obtained using Mapbox.
Location Reference:

Water Level Observations
Groundwater not encountered while drilling

Abandonment Method
Boring backfilled with auger cuttings upon completion.

Drill Rig
1047/CME-55

Hammer Type
Automatic

Driller
Terracon

Logged By
KT

Boring Started
09/05/2025

Boring Completed
09/05/2025

Stonehouse Substation
Southeast of E 132nd Avenue and Gun Club Road, Commerce City, CO,USA
Terracon Project No. 25255177

Latitude: 39.9347° Longitude: -104.7129°

Boring No. SB-05

Terracon
10625 W I70 Frontage Rd N, Ste. 3
Wheat Ridge, CO 80033-1729

Surface Elevation:
5185.7(Ft) +/-

Graphic Log	Lithology Depth (Ft.)	Material Description	Depth (Ft.)	Elevation (Ft.)	Sample Type	Recovery (In.)	Field Test Results
	0.5	**TOPSOIL** ,about 6 inches		5185.2			
		CLAYEY SAND (SC) , fine to coarse grained, brown, loose					5-8
	4			5181.7			
		SILT (ML) , trace sand, with clay, brown, stiff	5				5-7
			10				5-7
	14			5171.7			
		SANDY LEAN CLAY (CL) , brown, very stiff	15				8-12
			20				11-18
			25				10-19
			30				10-13
	34			5151.7			
		CLAYSTONE, gray, firm to medium hard	35				10-16
							15-28
		Boring Terminated at 40 Ft					

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes
Elevation Reference: Approximate ground surface elevation obtained using Mapbox.
Location Reference:

Water Level Observations
Groundwater not encountered while drilling

Abandonment Method
Boring backfilled with auger cuttings upon completion.

Drill Rig
1047/CME-55

Hammer Type
Automatic

Driller
Terracon

Logged By
PA

Boring Started
09/05/2025

Boring Completed
09/05/2025

Stonehouse Substation
Southeast of E 132nd Avenue and Gun Club Road, Commerce City, CO,USA
Terracon Project No. 25255177

Latitude: 39.9346° Longitude: -104.7122°

Boring No. SB-06

10625 W I70 Frontage Rd N, Ste. 3
Wheat Ridge, CO 80033-1729

Surface Elevation:
5183.7(Ft) +/-

Graphic Log	Lithology Depth (Ft.)	Material Description	Depth (Ft.)	Elevation (Ft.)	Sample Type	Recovery (In.)	Field Test Results
	0.5	**TOPSOIL** ,about 6 inches		5183.2			
		CLAYEY SAND (SC) , fine to coarse grained, brown, very loose to loose					4-4
							2-2
			5				
	9			5174.7			
		SANDY LEAN CLAY (CL) , brown, stiff to very stiff	10				10-11
			15				8-10
			20				12-15
	24			5159.7			
		CLAYEY SAND (SC) , fine to coarse grained, brown, medium dense	25				8-12
	29			5154.7			
		CLAYSTONE, gray, medium hard	30				15-24
			35				16-30
							12-26
		Boring Terminated at 40 Ft					

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes
Elevation Reference: Approximate ground surface elevation obtained using Mapbox.
Location Reference:

Water Level Observations
Groundwater not encountered while drilling

Abandonment Method
Boring backfilled with auger cuttings upon completion.

Drill Rig
1047/CME-55

Hammer Type
Automatic

Driller
Terracon

Logged By
Tiffani Robinson

Boring Started
09/05/2025

Boring Completed
09/05/2025

United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Adams County Area, Parts of Adams and Denver Counties, Colorado

Stonehouse

June 30, 2025

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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Contents

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map

Map Scale: 1:1,670 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 20 40 80 120

Feet: 0 50 100 200 300

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 13N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Adams County Area, Parts of Adams and Denver Counties, Colorado
Survey Area Data: Version 21, Aug 29, 2024

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Mar 1, 2023—Sep 1, 2023

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background

MAP LEGEND

MAP INFORMATION

imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
AvC	Ascalon-Vona sandy loams, 1 to 5 percent slopes	10.0	100.0%
Totals for Area of Interest		**10.0**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Adams County Area, Parts of Adams and Denver Counties, Colorado

AvC—Ascalon-Vona sandy loams, 1 to 5 percent slopes

Map Unit Setting

National map unit symbol: 2xst1
Elevation: 4,750 to 5,560 feet
Mean annual precipitation: 13 to 17 inches
Mean annual air temperature: 50 to 54 degrees F
Frost-free period: 135 to 160 days
Farmland classification: Prime farmland if irrigated and the product of I (soil erodibility) x C (climate factor) does not exceed 60

Map Unit Composition

Ascalon and similar soils: 45 percent
Vona and similar soils: 35 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Ascalon

Setting

Landform: Interfluves
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Wind-reworked alluvium and/or calcareous sandy eolian deposits

Typical profile

Ap - 0 to 10 inches: sandy loam
Bt - 10 to 15 inches: sandy clay loam
Btk - 15 to 21 inches: sandy loam
Bk1 - 21 to 35 inches: sandy loam
Bk2 - 35 to 80 inches: sandy loam

Properties and qualities

Slope: 1 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 10 percent
Maximum salinity: Nonsaline to very slightly saline (0.1 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Moderate (about 6.6 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: B
Ecological site: R067BY024CO - Sandy Plains

Hydric soil rating: No

Description of Vona

Setting

Landform: Interfluves
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Eolian sands

Typical profile

Ap - 0 to 9 inches: sandy loam
Bt - 9 to 22 inches: sandy loam
Bk1 - 22 to 27 inches: sandy loam
Bk2 - 27 to 39 inches: sandy loam
Bk3 - 39 to 80 inches: loamy sand

Properties and qualities

Slope: 3 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent
Gypsum, maximum content: 2 percent
Maximum salinity: Nonsaline to very slightly saline (0.1 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 3.0
Available water supply, 0 to 60 inches: Moderate (about 6.3 inches)

Interpretive groups

Land capability classification (irrigated): 4e
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: A
Ecological site: R067BY024CO - Sandy Plains
Hydric soil rating: No

Minor Components

Vona, loamy sand surface

Percent of map unit: 10 percent
Landform: Interfluves
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R067BY024CO - Sandy Plains
Hydric soil rating: No

Ascalon, loamy sand surface

Percent of map unit: 10 percent
Landform: Interfluves

Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R067BY024CO - Sandy Plains
Hydric soil rating: No

Soil Information for All Uses

Soil Properties and Qualities

The Soil Properties and Qualities section includes various soil properties and qualities displayed as thematic maps with a summary table for the soil map units in the selected area of interest. A single value or rating for each map unit is generated by aggregating the interpretive ratings of individual map unit components. This aggregation process is defined for each property or quality.

Soil Qualities and Features

Soil qualities are behavior and performance attributes that are not directly measured, but are inferred from observations of dynamic conditions and from soil properties. Example soil qualities include natural drainage, and frost action. Soil features are attributes that are not directly part of the soil. Example soil features include slope and depth to restrictive layer. These features can greatly impact the use and management of the soil.

Hydrologic Soil Group (Stonehouse)

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

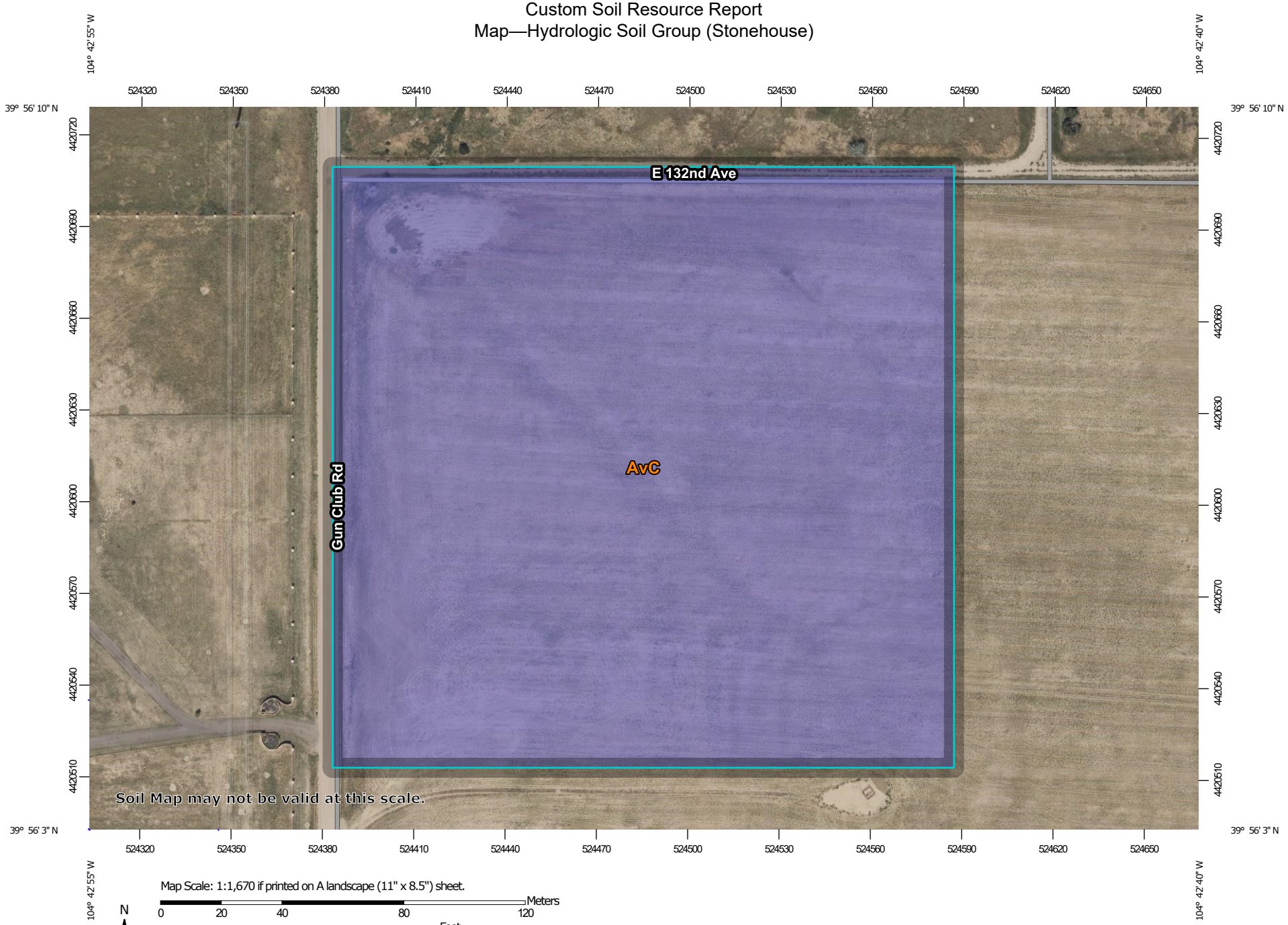
Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Custom Soil Resource Report
Map—Hydrologic Soil Group (Stonehouse)



Map Scale: 1:1,670 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 20 40 80 120

Feet: 0 50 100 200 300

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 13N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils

Soil Rating Polygons
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Lines
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Points
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Adams County Area, Parts of Adams and Denver Counties, Colorado
Survey Area Data: Version 21, Aug 29, 2024

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Mar 1, 2023—Sep 1, 2023

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background

MAP LEGEND

MAP INFORMATION

imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Table—Hydrologic Soil Group (Stonehouse)

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
AvC	Ascalon-Vona sandy loams, 1 to 5 percent slopes	B	10.0	100.0%
Totals for Area of Interest			**10.0**	**100.0%**

Rating Options—Hydrologic Soil Group (Stonehouse)

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

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APPENDIX B – FIRMette and Wetlands

National Flood Hazard Layer FIRMette

FEMA

104°43'7"W 39°56'22"N

Feet

0 250 500 1,000 1,500 2,000

1:6,000

104°42'30"W 39°55'54"N

Basemap Imagery Source: USGS National Map 2023

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 Cross Sections with 1% Annual Chance
- 17.5 Water Surface Elevation
- Coastal Transect
- Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 6/30/2025 at 8:13 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

U.S. Fish and Wildlife Service
National Wetlands Inventory

Stonehouse

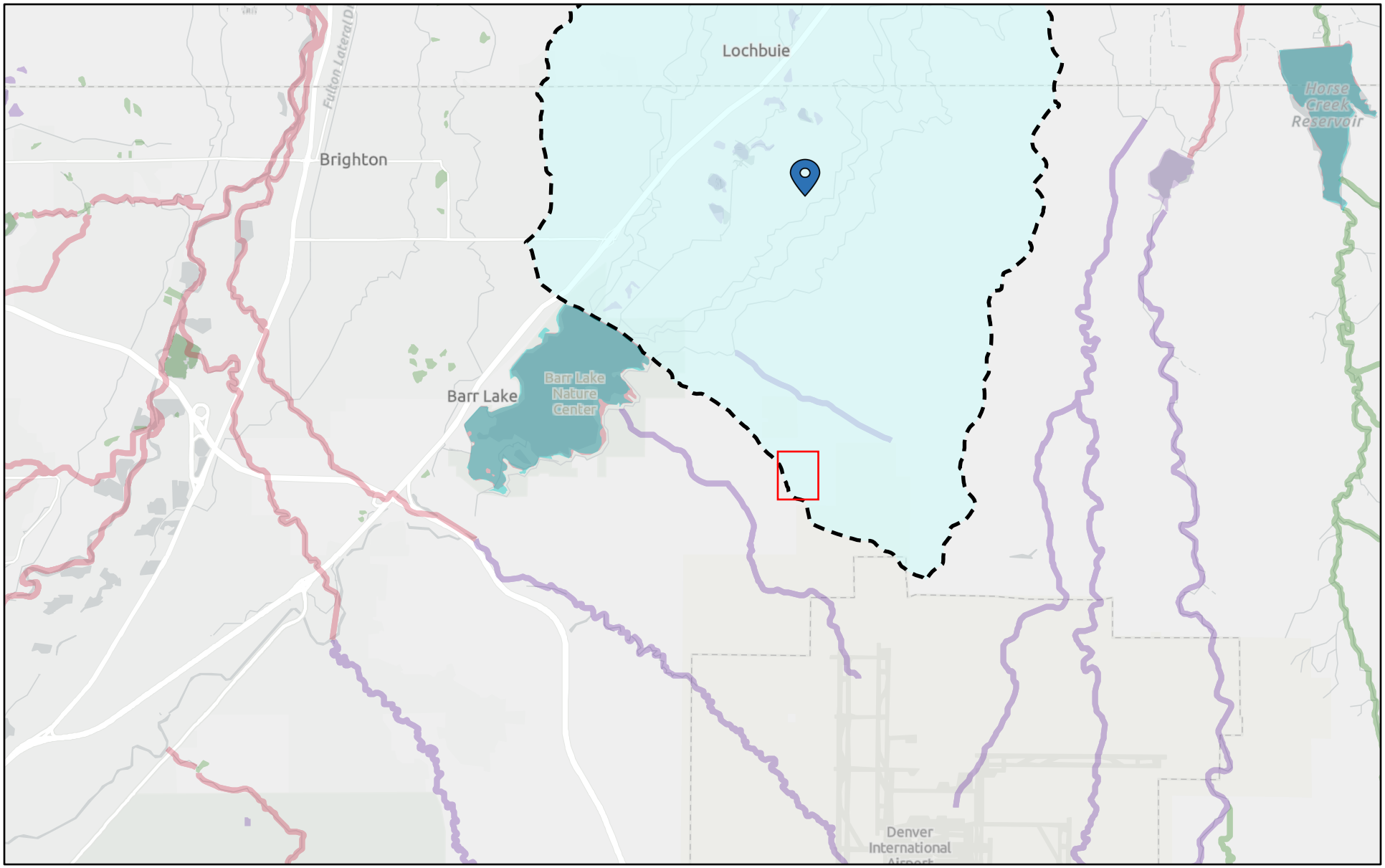
June 30, 2025

Wetlands

- Estuarine and Marine Deepwater
- Estuarine and Marine Wetland
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Lake
- Other
- Riverine

APPENDIX C – Watershed

Stone House Watershed



9/19/2025

1:144,448

0 0.75 1.5 3 mi

0 1.5 3 6 km

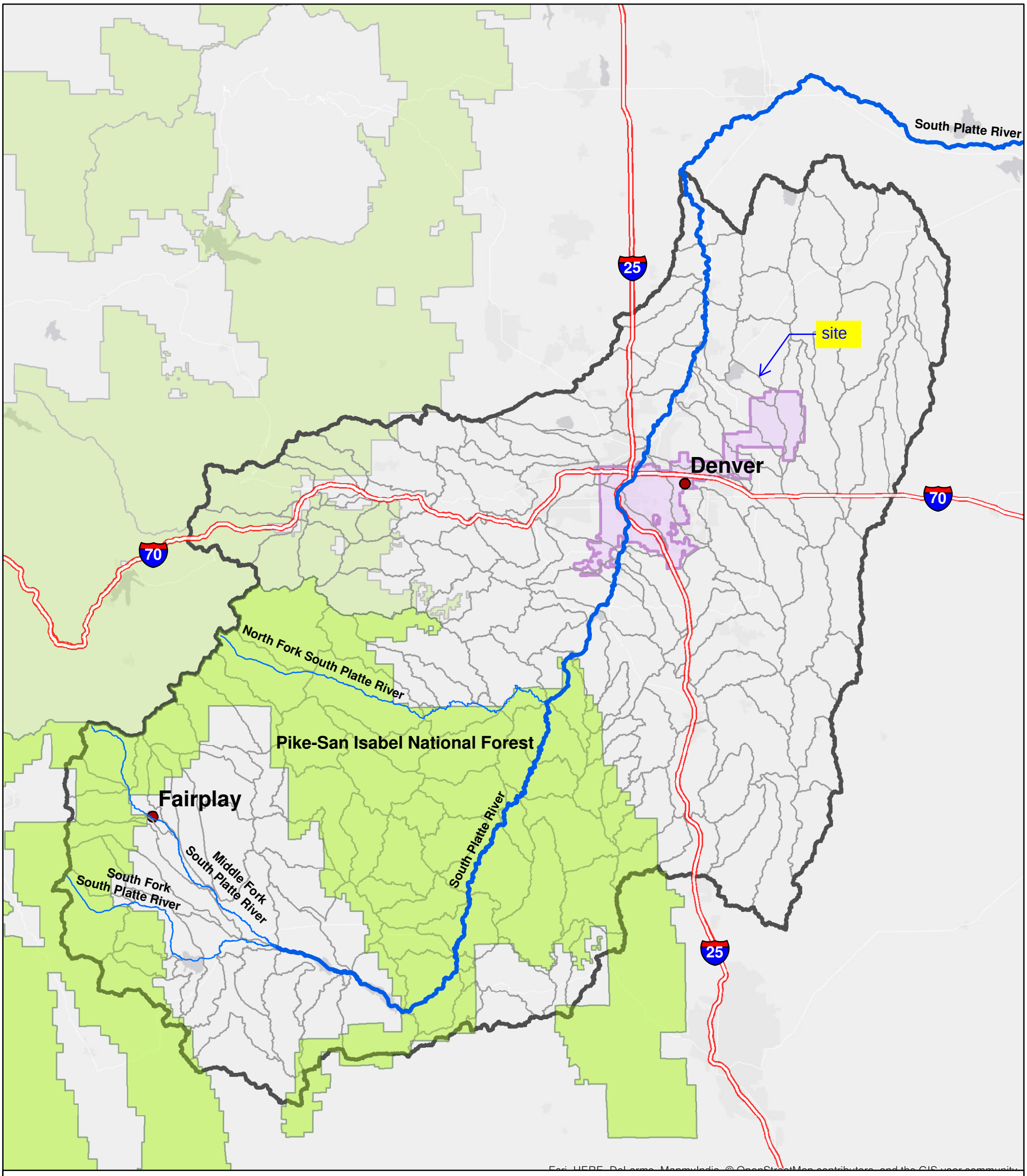
Waterbody: Good

Waterbody: Impaired

Waterbody: Condition Unknown

Potential Harmful Algal Blooms (HABs)

South Platte River Urban Waters Partnership



Cities
Rivers / Streams
South Platte River
Interstates
USFS land
Pike - San Isabel National Forest
Watershed Boundaries (HUC12)
SPRUWP Boundary
City Boundary

0 10 20 Miles
0 10 20 Kilometers

Date: September 8, 2014

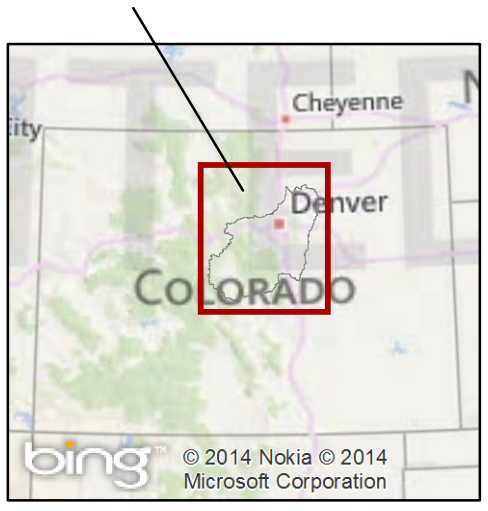
Map Projection: Albers Projection, Meters, NAD83

Data Sources:

Cities and City Boundaries - Navteq (2013)
Rivers / Streams - NHD Plus (2012)
Interstates - Navteq (2011)
USFS lands - U.S. Forest Service (2012)
South Platte River Urban Waters Partnership (SPRUWP) Boundary - SPRUWP 2014;
HUC12 Watershed Boundary - National Resources Conservation Service (2010);
Imagery - ESRI Web Service (2014).

N

Area Enlarged



APPENDIX D – Calculations

1. Existing Conditions Rational Method
2. Proposed Conditions Rational Method
3. Hydraulic Analysis for diversion swale design.
4. Culvert Analysis and outlet protection determination
5. Trickle channel check
6. Detention basin design.

EXISTING CONDITIONS

Calculation of Peak Runoff using Rational Method

Calculation of Peak Runoff using Rational Method

Designer: M Velilla
Company: Ulteig
Date: 9/29/2025
Project: Stonehouse EC
Location: Adams County Co

MHFD-Rational, Version 3.00 (August 2025)

Cells of this color are for required user-input
Cells of this color are for optional override values

$$t_i = \frac{0.395(1.1 - C_5)\sqrt{L_i}}{S_i^{0.33}}$$

$$t_t = \frac{L_t}{60K\sqrt{S_t}} = \frac{L_t}{60V_t}$$

Computed $t_c = t_i + t_t$

Regional $t_c = (26 - 17i) + \frac{L_t}{60(14i + 9)\sqrt{S_t}}$

$t_{c\ minimum} = 5$ (urban)
$t_{c\ minimum} = 10$ (non-urban)

Selected $t_c = \max\{t_{minimum}, \min(\text{Computed } t_c, \text{Regional } t_c)\}$

Provide input for area, soil type, and imperviousness on the Runoff Coeffs worksheet.

Subcatchment Name	Area (ac)	NRCS Hydrologic Soil Group(s)	Imperviousness	Runoff Coefficient, C							Overland (Initial) Flow Time					Channelized (Travel) Flow Time						
				WQE & 2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	500-yr	Overland Flow Length L_i (ft)	U/S Elevation (ft) (Optional)	D/S Elevation (ft) (Optional)	Overland Flow Slope S_i (ft/ft)	Overland Flow Time t_i (min)	Channelized Flow Length L_t (ft)	U/S Elevation (ft) (Optional)	D/S Elevation (ft) (Optional)	Channelized Flow Slope S_t (ft/ft)	NRCS Conveyance Factor K	Channelized Flow Velocity V_t (ft/sec)	Channelized Flow Time t_t (min)
E1	37.00	B	5.0%	0.03	0.03	0.10	0.28	0.36	0.45	0.55	500.00			0.011	41.75	1800.00			0.010	5	0.50	60.00
E2	9.70	B	5.0%	0.03	0.03	0.10	0.28	0.36	0.45	0.55	500.00			0.014	38.55	422.00			0.014	5	0.59	11.89

Calculation of Peak Runoff using Rational Method

Designer:
Company:
Date:
Project:
Location:

Select MHFD location for NOAA Atlas 14 Rainfall Depths from the pulldown list OR enter your own depths obtained from the NOAA website (click this link)

	WQE	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	500-yr
1-hour rainfall depth, P1 (in) =	0.60	1.00	1.42	1.68	1.69	2.35	2.71	3.14

	a	b	c
Rainfall Intensity Equation Coefficients =	28.50	10.00	0.786

$$I(in/hr) = \frac{a * P_1}{(b + t_c)^c}$$

$$Q(cfs) = CIA$$

Subcatchment Name	Time of Concentration				Rainfall Intensity, I (in/hr)								Peak Flow, Q (cfs)							
	Computed t_c (min)	Regional t_c (min)	Selected t_c (min)	**(Optional)** Override t_c (min)	WQE	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	500-yr	WQE	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	500-yr
E1	101.75	56.08	56.08		0.63	1.06	1.50	1.78	1.79	2.49	2.87	3.32	0.59	0.98	1.83	6.40	18.54	32.72	47.64	68.10
E2	50.44	31.28	31.28		0.92	1.53	2.17	2.57	2.59	3.60	4.15	4.81	0.22	0.37	0.69	2.43	7.04	12.42	18.08	25.84

PROPOSED CONDITIONS

Calculation of Peak Runoff using Rational Method

Calculation of Peak Runoff using Rational Method

Designer: M Velilla
Company: Ulteig
Date: 3/31/2026
Project: Stonehouse
Location: Adams County

MHFD-Rational, Version 3.00 (August 2025)

Cells of this color are for required user-input
Cells of this color are for optional override values

$$t_i = \frac{0.395(1.1 - C_5)\sqrt{L_i}}{S_i^{0.33}}$$

$$t_t = \frac{L_t}{60K\sqrt{S_t}} = \frac{L_t}{60V_t}$$

Computed $t_c = t_i + t_t$

Regional $t_c = (26 - 17i) + \frac{L_t}{60(14i + 9)\sqrt{S_t}}$

$t_{c\ minimum}$ = 5 (urban)
$t_{c\ minimum}$ = 10 (non-urban)

Selected $t_c = \max\{t_{minimum}, \min(\text{Computed } t_c, \text{Regional } t_c)\}$

Provide input for area, soil type, and imperviousness on the Runoff Coeffs worksheet.

Subcatchment Name	Area (ac)	NRCS Hydrologic Soil Group(s)	Imperviousness	Runoff Coefficient, C							Overland (Initial) Flow Time					Channelized (Travel) Flow Time						
				WQE & 2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	500-yr	Overland Flow Length L_i (ft)	U/S Elevation (ft) (Optional)	D/S Elevation (ft) (Optional)	Overland Flow Slope S_i (ft/ft)	Overland Flow Time t_i (min)	Channelized Flow Length L_t (ft)	U/S Elevation (ft) (Optional)	D/S Elevation (ft) (Optional)	Channelized Flow Slope S_t (ft/ft)	NRCS Conveyance Factor K	Channelized Flow Velocity V_t (ft/sec)	Channelized Flow Time t_t (min)
1	1.24	B	60.0%	0.46	0.49	0.54	0.63	0.66	0.71	0.76	250.00			0.010	17.37	244.00			0.006	7	0.54	7.50
2	1.21	B	20.0%	0.13	0.15	0.22	0.37	0.44	0.52	0.61	154.00			0.035	14.10	20.00			0.020	20	2.83	0.12
3	1.40	B	60.0%	0.46	0.49	0.54	0.63	0.66	0.71	0.76	268.00			0.010	17.98	20.00			0.020	20	2.83	0.12
4	0.11	B	20.0%	0.13	0.15	0.22	0.37	0.44	0.52	0.61	25.50			0.024	6.50	212.00			0.010	7	0.70	5.05
5p	2.06	B	25.0%	0.17	0.19	0.26	0.41	0.47	0.54	0.63	178.00			0.030	15.26	80.00			0.060	20	4.90	0.27
6	30.99	B	5.0%	0.03	0.03	0.10	0.28	0.36	0.45	0.55	500.00			0.010	43.08	1300.00			0.010	5	0.50	43.33

Calculation of Peak Runoff using Rational Method

Designer:
Company:
Date:
Project:
Location:

Select MHFD location for NOAA Atlas 14 Rainfall Depths from the pulldown list OR enter your own depths obtained from the NOAA website (click this link)

	WQE	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	500-yr
1-hour rainfall depth, P1 (in) =	0.60	1.00	1.42	1.68		2.35	2.71	

	a	b	c
Rainfall Intensity Equation Coefficients =	28.50	10.00	0.786

$$I(in/hr) = \frac{a * P_1}{(b + t_c)^c}$$

$$Q(cfs) = CIA$$

Subcatchment Name	Time of Concentration				Rainfall Intensity, I (in/hr)								Peak Flow, Q (cfs)							
	Computed t_c (min)	Regional t_c (min)	Selected t_c (min)	**(Optional)** Override t_c (min)	WQE	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	500-yr	WQE	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	500-yr
1	24.87	18.82	18.82		1.22	2.03	2.88	3.41		4.77	5.50		0.69	1.16	1.76	2.29		3.92	4.81	
2	14.21	22.80	14.21		1.40	2.33	3.31	3.91		5.47	6.31		0.22	0.36	0.60	1.03		2.91	3.96	
3	18.10	15.94	15.94		1.32	2.21	3.13	3.71		5.18	5.98		0.85	1.42	2.16	2.81		4.81	5.90	
4	11.54	25.59	11.54		1.53	2.55	3.62	4.29		6.00	6.92		0.02	0.03	0.05	0.09		0.26	0.36	
5p	15.53	22.19	15.53		1.34	2.23	3.17	3.75		5.25	6.05		0.46	0.76	1.24	2.00		5.05	6.76	
6	86.41	47.49	47.49		0.71	1.18	1.68	1.98		2.77	3.20		0.55	0.92	1.71	5.98		30.58	44.51	

Hydraulic Analysis Report

Channel Analysis: Channel Analysis South to North

Notes:

Input Parameters

Channel Type: Trapezoidal

Side Slope 1 (Z1): 4.0000 ft/ft

Side Slope 2 (Z2): 4.0000 ft/ft

Channel Width 25.00 ft

Longitudinal Slope: 0.0074 ft/ft

Manning's n: 0.0449

Flow 60.9700 cfs

Result Parameters

Depth 0.8842 ft

Area of Flow 25.2324 ft^2

Wetted Perimeter 32.2913 ft

Hydraulic Radius 0.7814 ft

Average Velocity 2.4163 ft/s

Top Width 32.0736 ft

Froude Number: 0.4801

Critical Depth 0.5524 ft

Critical Velocity 4.0560 ft/s

Critical Slope: 0.0370 ft/ft

Critical Top Width 29.42 ft

Calculated Max Shear Stress 0.4083 lb/ft^2

Calculated Avg Shear Stress 0.3608 lb/ft^2

Channel Lining Analysis: Channel Lining Design AnalysisSouthtoNorth

Notes:

Lining Input Parameters

Channel Lining Type: Vegetation

Specific Weight of Water: 62.4 lb/ft^3

Height of Vegetation: 0.333 ft

Vegetation Condition is good

Growth Form of Vegetation is mixed

Cf: 0.75

See HEC-15, Table 4.5 (default: 0.75 for Good cover factor and Mixed growth form)

soil is noncohesive

D75: 2.54 mm

Safety Factor: 1

Lining Results

Cn: 0.165205

Permissible Soil Shear Stress: 0.04 lb/ft^2

Mean Boundary Shear Stress: 0.118233 lb/ft^2

Maximum Shear Stress on the Channel Bottom: 0.313031 lb/ft^2

Manning's n: 0.0826623

Soil Grain Roughness: 0.0177136

Effective Shear Stress: 0.00293192 lb/ft^2

Permissible Shear Stress on Vegetation: 3.48435 lb/ft^2

This value is compared with the maximum shear stress times the safety factor to determine lining stability

This value is compared with the maximum shear stress times the safety factor to determine lining stability

Channel bottom is stable

Channel Lining Stability Results 2

The channel is stable

Channel Summary

Channel Analysis: Channel AnalysisWestoEast

Notes:

Input Parameters

Channel Type: Trapezoidal

Side Slope 1 (Z1): 4.0000 ft/ft

Side Slope 2 (Z2): 4.0000 ft/ft

Channel Width 10.00 ft

Longitudinal Slope: 0.0094 ft/ft

Manning's n: 0.0531

Flow 25.9400 cfs

Result Parameters

Depth 0.8940 ft

Area of Flow 12.1364 ft^2

Wetted Perimeter 17.3719 ft

Hydraulic Radius 0.6986 ft

Average Velocity 2.1374 ft/s

Top Width 17.1517 ft

Froude Number: 0.4478

Critical Depth 0.5493 ft

Critical Velocity 3.8714 ft/s

Critical Slope: 0.0537 ft/ft

Critical Top Width 14.39 ft

Calculated Max Shear Stress 0.5244 lb/ft^2

Calculated Avg Shear Stress 0.4098 lb/ft^2

Channel Lining Analysis: Channel Lining Design AnalysisWesttoEast

Notes:

Lining Input Parameters

Channel Lining Type: Vegetation

Specific Weight of Water: 62.4 lb/ft^3

Height of Vegetation: 0.333 ft

Vegetation Condition is good

Growth Form of Vegetation is mixed

Cf: 0.75

See HEC-15, Table 4.5 (default: 0.75 for Good cover factor and Mixed growth form)

soil is noncohesive

D75: 2.54 mm

Safety Factor: 1

Lining Results

Cn: 0.165205

Permissible Soil Shear Stress: 0.04 lb/ft^2

Mean Boundary Shear Stress: 0.0463943 lb/ft^2

Maximum Shear Stress on the Channel Bottom: 0.220512 lb/ft^2

Manning's n: 0.120176

Soil Grain Roughness: 0.0177136

Effective Shear Stress: 0.000977188 lb/ft^2

Permissible Shear Stress on Vegetation: 7.36446 lb/ft^2

This value is compared with the maximum shear stress times the safety factor to determine lining stability

This value is compared with the maximum shear stress times the safety factor to determine lining stability

Channel bottom is stable

Channel Lining Stability Results 2

The channel is stable

Stone House Drainage Analysis Using GeoHECHMS

Prepared by:
Ulteig Engineers, Inc.

July 29, 2025

Contents