DOUGLAS COUNTY
COLORADO

Location and Extent Staff Report

Date:	March 25, 2026
To:	Douglas County Planning Commission
From:	Trevor Bedford, AICP, Senior Planner TB Jeanette Bare, AICP, Current Planning Manager JB Steven E. Koster, AICP, Deputy Director of Community Development SK
Subject:	**495 Dawson Trails Boulevard CORE Battery Storage – Location and Extent**
Project File:	**LE2026-003**

Planning Commission Hearing: **April 6, 2026 @ 6:00 p.m.**

I. Executive Summary

CORE Electric Cooperative requests approval of a Location and Extent (L&E) for a battery energy storage system (BESS) at CORE's existing Citadel substation located on the west side of Yucca Hills Road, at its southern terminus. The applicant states that the project is necessary to increase the reliability of service in the area.

The property is approximately 10 acres and is zoned Agricultural One (A-1). The property is located within the Castle Rock Municipal Planning Area as identified by the 2040 Comprehensive Master Plan.

II. Application Information

A. Applicant

Brooks Kaufman
CORE Electric Cooperative
5496 N US Highway 85
Sedalia, CO 80135

B. Applicant's Representative

Derek Holscher
Ulteig Operations, LLC
5575 DTC Parkway #200
Greenwood Village, CO 80111

C. Request

The applicant requests approval of an L&E for the construction of the Citadel Battery Energy Storage System (BESS) on the western portion of CORE's existing Citadel Substation property.

D. Location

The project is located on the west side of Yucca Hills Road, at its southern terminus. The attached vicinity map, zoning map, and aerial map highlight site location and existing conditions.

E. Project Description

CORE proposes to construct a BESS at the existing Citadel substation located on the west side of Yucca Hills Road. The property is planned to be bisected by Dawson Trails Boulevard north to south in the future. After the construction of roadway, the BESS will be located on the west side of Dawson Trails Boulevard, and the existing substation will be on the east side of Dawson Trails Boulevard. The BESS will cover approximately 0.6 acres of the site and contain eight battery enclosures similar in size to a Conex container. Although the subject property is zoned A-1, it conforms to Large Rural Residential (LRR) as it is 10 acres in size. Both A-1 and LRR allow Utility Service Facilities, including Neighborhood Substations, as a use by right.

The BESS will be surrounded by a seven-foot tall chain link security fence, matching the fencing around the existing substation. Two detention ponds are proposed on site to capture any storm runoff.

Access to the site will initially be provided via a temporary access road from Yucca Hills Road along the northern property line. A portion of the proposed road will be located on the property to the north. CORE has discussed the project and the necessary easement with the adjacent property owner. CORE will be required to obtain the easement prior to construction of the access road. The site will be accessed via a driveway to Dawson Trails Boulevard after the roadway is completed.

Construction is anticipated to begin in the summer of 2026 with completion in the summer of 2027. During construction, approximately 6-10 vehicle trips are generally expected per day, with variations due to deliveries and construction scheduling. The applicant has indicated that the expected noise levels during construction will comply with noise regulations. CORE will implement erosion control measures to limit fugitive dust during construction.

The project is located within the Castle Rock Municipal Planning Area as identified by the Douglas County Comprehensive Master Plan 2040 (CMP) Section 2. The project is consistent with several goals, objectives, and policies. Goal 2-9 is to ensure development occurs concurrently with essential services and infrastructure. The proposed substation will provide essential services and infrastructure to existing and planned development in the area. Policy 2-16A.2 is to maintain open communication, build relationships, and address areas of mutual concern between the County and municipalities. This project has been referred to the Town of Castle Rock and is intended to support the reliability of infrastructure for both the Town and the County. Objective 5-1A is to review existing and projected development to ensure that it does not overwhelm existing services. The proposed substation provides additional capacity

to reliably serve existing and future customers. Additionally, the applicant has provided a discussion of several CMP objectives and policies in the attached narrative and community impact report.

III. CONTEXT

A. Background

The subject property is approximately 10 acres in size. It is currently occupied by CORE's Citadel substation on the eastern portion of the site, which was approved as a Location and Extent application in 2011. CORE has indicated that the BESS will help to balance the system during peak load times and demand changes.

Dawson Trails Boulevard is planned to bisect the property in the future. The proposed BESS will be located on the west side of Dawson Trails Boulevard. The property will remain as a single lot, bisected by the roadway. No subdivision application will be required.

B. Adjacent Land Uses and Zoning

Adjacent lands include residential, agricultural, railroad and planned development.

Zoning and Land Use

	Zoning	Land Use
North	Agricultural One	Single-Family Residential
South	Town of Castle Rock – Westfield Trade Center Planned Development	Vacant
East	Agricultural One	Railroad and Interstate 25
West	Agricultural One	Agriculture and Single-Family Residential

IV. PHYSICAL SITE CHARACTERISTICS

A. Site Characteristics and Constraints

The property generally slopes upwards to the west and has an existing electric substation on the eastern portion of the property.

B. Access

The BESS will initially be accessed via a temporary access roadway that will be partially located on the property to the north. After Dawson Trails Boulevard is constructed, the BESS will be accessed via a driveway connection to Dawson Trails Boulevard.

C. Drainage and Erosion

The applicant provided a preliminary drainage report for review. At the writing of this staff report, Public Works Engineering had not yet responded to the referral request.

Approval of any necessary plans and permits will be required prior to commencement of construction.

D. Floodplain

There is 100-year floodplain on the eastern portion of the property. The proposed BESS is located outside of the floodplain. The temporary access road will cross a portion of floodplain. The applicant will be required to obtain any necessary permits for improvements in the floodplain prior to construction.

V. PROVISION OF SERVICES

A. Schools

This is a nonresidential project that will not impact school services.

B. Fire Protection

Castle Rock Fire and Rescue Department (CRFD) provides fire and emergency services to the site. At the writing of this staff report, CRFD had not yet responded to the referral request. The applicant will be required to obtain any approvals or permits necessary from CRFD prior to commencement of construction.

C. Sheriff Services

The Douglas County Sheriff's Office (DCSO) will provide police protection to the site. At the writing of this staff report, responses had not been received from DCSO, E911, or the Office of Emergency Management.

D. Water and Sanitation

The project does not have any water and sanitation demands.

E. Utilities

Area utility providers were provided a referral on this application. AT&T and Xcel Energy responded with no conflicts. At the writing of this staff report, no response was received from AT&T, CenturyLink or Comcast.

F. Other Required Processes and Permits

In addition to the L&E approval, the following permits and other approvals may be required prior to commencement of construction:

- Engineering: Construction Drawings approval, GESC report and plans approval, approval of any other necessary plans and permits.
- Building Division: Building permits.
- Castle Rock Fire and Rescue Department: Any necessary permits.
- Obtain access easement for temporary access road.

VI. PUBLIC NOTICE AND INPUT

Courtesy notices of an application in progress were sent to adjacent property owners. At the preparation of the staff report, no members of the public had responded to courtesy notices. Any comments received will be provided prior to the hearing. Referral response requests were sent to required referral agencies on March 12, 2026. Referral responses are due at the conclusion of the referral period on March 26, 2026, or prior to the Planning Commission Hearing.

Referral agency responses received to date are attached to the staff report for reference. Responses received through the end of the referral period will be provided to the Planning Commission prior to the hearing and added to the project record.

VII. STAFF ASSESSMENT

Staff evaluated the application in accordance with Section 32 of the DCZR. Should the Planning Commission approve the L & E request, the applicant will be required to receive approval of all necessary permits prior to commencement of the project.

ATTACHMENTS **PAGE**

LAND USE APPLICATION

Please complete, sign, and date this application. Return it with the required items listed on the Submittal Checklist to planningsubmittals@douglas.co.us. Submittals may also be mailed or submitted in person to Planning Services. *NOTE: The Planning Commission or the Board of County Commissioners should not be contacted regarding an open application*.

OFFICE USE ONLY
PROJECT TITLE:
PROJECT NUMBER: LE2026-003

PROJECT TYPE: Location & Extent

MARKETING NAME: CORE Electric Cooperative Citadel Substation Battery Energy Storage System

PRESUBMITTAL REVIEW PROJECT NUMBER: PS2025-183

PROJECT SITE:

Address: 890 Yucca Hills Road, Castle Rock, CO 80109

State Parcel Number(s): 2505-150-00-033

Subdivision/Block#/Lot# *(if platted)*: N/A

PROPERTY OWNER(S):

Name(s): CORE Electric Cooperative

Address: 5496 N. US Highway 85, Sedalia, CO 80135

Phone: 720-733-5493

Email: [redacted]

AUTHORIZED REPRESENTATIVE: *(Notarized Letter of Authorization is required from the property owner, unless the owner is acting as the representative)*

Name: Ulteig Operations, LLC - Derek Holscher

Address: 5575 DTC Parkway #200, Greenwood Village, CO 80111

Phone: 720-873-5876

Email: [redacted]

To the best of my knowledge, the information contained on this application is true and correct. I have received the County's information sheet regarding the *Preble's Meadow Jumping Mouse*.

_____ 2/17/2026

Applicant Signature Date

PREBLE'S MEADOW JUMPING MOUSE

What is the Preble's Meadow Jumping Mouse?
The Preble's Meadow Jumping Mouse is a rare mouse designated by the United States Fish and Wildlife Service as a "threatened species" under the Endangered Species Act. The federal threatened species designation prohibits the unlawful "take" of the Preble's Meadow Jumping Mouse or its habitat.

Where does the mouse live?
The Preble's Meadow Jumping Mouse lives primarily in heavily vegetated riparian habitats. In Douglas County, the mouse has been located in or near many drainages, including tributaries and the mainstream reaches of East and West Plum Creek. However, any stream reach or potential habitat within Douglas County may be subject to the requirements of the Endangered Species Act. The mouse has also been found in Boulder, Elbert, El Paso, Jefferson, and Larimer counties and in parts of Wyoming.

What activities may be considered a violation of the Endangered Species Act?
In its listing decision, the United States Fish and Wildlife Service identified activities that may result in violation of the Endangered Species Act to include:

1. Unauthorized or unpermitted collection, handling, harassing, or taking of the species;

2. Activities that directly or indirectly result in the actual death or injury death of the mouse, or that modify the known habitat of the species, thereby significantly modifying essential behavioral patterns (e.g., plowing, mowing, or cutting; conversion of wet meadow or riparian habitats to residential, commercial, industrial, recreational areas, or cropland; overgrazing; road and trail construction; water development or impoundment; mineral extraction or processing; off-highway vehicle use; and, hazardous material cleanup or bioremediation); and;

3. The application or discharge of agrichemicals or other pollutants and pesticides onto plants, soil, ground water, or other surfaces in violation of label directions or any use following Service notification that such use, application or discharge is likely to harm the species; would be evidence of unauthorized use, application or discharge.

How to determine if a proposed activity would violate the Endangered Species Act.
Any questions regarding whether an activity will impact the Preble's Meadow Jumping Mouse or its habitat should be directed to:

Field Office Supervisor
USFWS Colorado ES Field Office (MS 65412)
Denver Federal Center
PO Box 25486
Denver, CO 80225-0486
303-236-4773
ColoradoES@fws.gov

Where to find more information on the Preble's Meadow Jumping Mouse.
More information can be found at the US Fish and Wildlife Service website at:
https://ecos.fws.gov/ecp/species/4090

Any approval given by Douglas County does not obviate the need to comply with applicable federal, state, or local laws and/or regulations.

CORE Electric Cooperative Citadel Substation Battery Storage System Location and Extent Application Douglas County Zoning Resolution Section 32

Written Narrative & Location and Extent Report Douglas County, Colorado

March 2026

Prepared for:

Prepared by:

We listen. We solve.®

3203.01.1 Land Use Application Form

See Appendix A

3203.01.2 Written Narrative

Name of Applicant

CORE Electric Cooperative (CORE)
Brooks Kaufman – Manager, Lands and Rights-of-Way
5496 N. US Highway 85
Sedalia, CO 80135
bkaufman@core.coop
720-733-5493

Description of the Request

CORE is proposing to construct and operate their new Citadel Substation Battery Energy Storage System (BESS) in Douglas County, Colorado (Project). The Project address is 890 Yucca Hills Road, Castle Rock, CO 80109, where CORE's existing Citadel Substation resides and has been in operation for over 1 year. The Project will be located at the western end of the Citadel Substation property, which is a 10-acre parcel (2505-150-00-033) owned by CORE, which is currently zoned Agricultural One (A1); there are no plans to rezone the parcel.

The Project will tie into CORE's existing Citadel Substation, which then connects to their existing Wolfensberger to Citadel 115kV overhead transmission line. The footprint of the BESS yard is 26,754 sf or approximately 0.6 acres, which will be encompassed by a 7-foot chain link security fence with a 1-foot outrigger of barbed wire on top, the same type of security fence as the existing Citadel Substation. The proposed Dawson Trails Blvd. will bisect CORE's property, leaving the BESS on the west side of the road and the existing Citadel Substation on the east side of the road. At the time of this application, the road right-of-way for Dawson Trails Blvd. has not been deeded; however, the proposed alignment is shown on the Location & Extent Exhibits for reference. During the presubmittal meeting and subsequent Review Findings for the project (PS2025-183), it was determined that even though the proposed right-of-way for Dawson Trails Blvd. will effectively split the parcel, it will not be necessary for CORE to complete any subdivision or subdivision exemption process in the future. Specifications for the security fence and the proposed Dawson Trails Blvd. are included in Location & Extent Plan Exhibits; Appendix B.

The BESS will consist of eight (8) battery enclosures, which are approximately the size of a Conex box. Associated equipment will include HVAC, fire suppression, junction boxes, and a SCADA system.

The Project site will utilize two (2) different stormwater detention ponds, each with their own dedicated access. As part of this Location & Extent process, CORE will grant a Secondary Storm Drainage Easement to Douglas County for each detention pond access road for the purposes of maintenance and repair in the event of an emergency. The main access for the site will come off Dawson Trails Blvd. after it has been completely constructed; however, in the meantime and for construction purposes, a temporary access road will be constructed along the northern boundary of the parcel. The alignment for a portion

of this temporary access road will be on the adjacent property to the north (Nichols). CORE has met with the Nichols to discuss the overall project, as well as the temporary access, and they are willing to grant a temporary easement, which CORE will compensate them for.

CORE met on site with adjacent landowners Nichols and Chase on Wednesday February 11th, 2026, to discuss the project. CORE explained the need for the project and discussed the construction process and schedule. As part of the construction process, CORE will be acquiring a Temporary Access Easement across a portion of the Nichols property. As part of this process and after construction, CORE will remove an existing field fence along the northern boundary of the Nichols property and install a new one on the property line. CORE also shared a copy of their survey with the Nichols. Both landowners appreciated the opportunity to meet and the transparency of CORE to share details about the project.

Construction of the Project will begin in the summer of 2026 and be completed by summer of 2027.

BESS Construction
The BESS will be comprised of a series of containers that house batteries, battery racks, wiring and climate control systems. The batteries will be connected in parallel and grouped into battery modules that will be loaded into racks. The battery racks will be placed inside standard 20' containers. The BESS will also employ inverter containers with pad mount transformers. The internal rack design are generally between 8-10 racks and between 8-10 modules per rack. These containers can hold between 4-5 MWh of energy. The modules can be removed for warranty claims, cell balancing, or other preventative maintenance items throughout the life of the Project.

Generally, multiple containers can fit behind one inverter and pad mount transformer that are used to convert between alternating and direct current and change the voltage to inverter operating levels. The container also has sensors, wiring, HVAC to cool the batteries and other miscellaneous equipment for effective and safe operation. The container is effectively, a shipping container/trailer that will serve to house the equipment. The container will be anchored to concrete slab foundations and removed at the end of the system life. The battery module and rack system in each container is designed to be simple to inspect, replace, and remove batteries during the BESS's life without destruction to property or equipment.

Purpose of the Improvements
The BESS will offset peak electric load time periods, keeping rates lower for CORE's customers by avoiding additional fees during peak loading. In this portion of CORE's service territory, there are a combination of long radial feeders, limited redundancy, increasing peak demand, and growing distributed generation. These conditions can result in voltage drop and power quality issues, high wholesale power costs during peak demand periods, reliability challenges during transmission outages or extreme weather, and expensive/time consuming infrastructure upgrades (new substations, reconductoring, or transmission expansion).

CORE's substations can often experience short duration peak loading that drives upstream demand charges and capacity obligations. The BESS can charge during off peak hours, discharge during peak loading windows, reduce substation peak demand, which results in a lower peak load profile and reduces wholesale procurement costs without the need to add new infrastructure.

Traditional solutions to overloads on distribution feeders include reconductoring, new voltage regulation equipment, or new substations—each with high capital costs. The BESS can provide targeted

capacity during peak conditions, relieve thermal and voltage constraints, and defer or eliminate the need for near term capital upgrades.

Long radial feeders can be susceptible to voltage drops during peak load and power quality complaints from CORE's members. Because BESS inverters respond in milliseconds, the system can inject or absorb real and reactive power, maintain voltage within acceptable limits, and improve overall feeder power quality.

CORE's members are often served by single source feeders with limited switching options. A BESS improves resiliency by supporting critical loads during outages, enables sectionalized service restoration, and assists with system recovery.

As CORE adds community solar or behind the meter generation, variability increases on distribution systems not originally designed for this type of power flow. The BESS allows CORE to capture excess local generation, deliver smooth intermittent output, and reduces back feed and voltage excursions.

Installing the BESS at the existing Citadel substation provides a cost effective, flexible solution to improve reliability, reduce peak power costs, defer infrastructure upgrades, and support future renewable integration—directly advancing CORE's mission to deliver reliable and affordable power to its members.

Summary of the Potential Impacts and Proposed Mitigation Measures

Grading, Erosion and Sediment Control

Ground disturbance during construction is expected to be minor. To avoid potential indirect impacts from construction related erosion and sediment movement, CORE will prepare a Grading, Erosion and Sediment Control (GESC) Report and Plan as outlined in Section 3 of the GESC Manual and adhere to the GESC permit issued by the Douglas County Engineering Division. CORE will also secure a Construction Stormwater Discharge Permit with the Colorado Department of Public Health & Environment (CDHPE) and adhere to the best management practices (BMPs) outlined in the Storm Water Management Plan (SWMP). These BMPs will include erosion control and revegetation measures.

Stormwater Management

In order to keep stormwater runoff from leaving the site, CORE is proposing to install two (2) different on site detention ponds, which will follow the Stormwater Quality recommendations as outlined in Chapter 14 of Douglas County's Storm Drainage Design and Technical Criteria Manual. Construction activities will be performed by methods that prevent entrance or accidental spillage of contaminants, debris, and other pollutants and wastes into underground water sources. Vegetation clearing for construction is anticipated to be minimal due to the dominant land cover of herbaceous growth. Measures will be implemented to minimize the spread of noxious weeds.

Noise

During construction, short term noise will occur from construction vehicles and equipment. Construction vehicles and equipment will be maintained in proper operating condition and equipped with the manufacturer's standard noise control devices (e.g., mufflers or engine enclosures) to limit this noise to the extent practicable. Post construction, any noise produced by the BESS shall not exceed the levels spelled out in Title 25, Article 12 (25-12-103) of the Colorado Revised Statutes, Maximum Permissible Noise Levels. The statute identifies that sound levels of noise radiating from a property line at a distance

of twenty five feet or more does not exceed the db(A) levels assigned for each zone between the hours of 7am to 7pm and 7pm to 7am.

Residential: 7am-7pm - 55 db(A), 7pm-7am – 50 db(A)
Commercial: 7am-7pm - 60 db(A), 7pm-7am – 55 db(A)
Light Industrial: 7am-7pm - 70 dB(A), 7pm-7am – 65 db(A)
Industrial: 7am-7pm - 80 dB(A), 7pm-7am – 75 db(A)

With the zoning for site being Agricultural, a particular zone has not been established per the statute. The Residential zone threshold is the most stringent in any defined zone and it is anticipated that the noise emitted for the BESS at a distance of 25 feet beyond the property line will adhere to or be below these levels.

Air Quality
Construction activities associated with the Project would temporarily generate less than significant amounts of particulate matter from soil disturbances and diesel-powered equipment, and less than significant amounts of carbon monoxide and the precursor pollutants to ozone formation from tailpipe emissions. Any air pollutants generated would be widely dispersed across the Project area, short term in duration, and minimized by the small scale of construction operations for the Project. Air pollutants also would be minimized through implementation of dust suppression and proper vehicle maintenance. Upon completion of earth disturbing activities, all disturbed areas will be revegetated or otherwise stabilized. Therefore, Project construction is not expected to contribute negatively to the air quality status in the area. There would be no long term air quality effects associated with routine operation and maintenance of the Project. CORE will implement erosion control BMPs to reduce fugitive dust released during construction.

Waste Management
Enclosed containment will be provided for all trash. All construction waste, including trash and litter, garbage, other solid waste, petroleum products, and other potentially hazardous materials, will be removed from the site and transported to a disposal facility authorized to accept such materials. There will be no significant amount of hazardous materials stored in the Project area. Construction, operation, and maintenance activities will comply with all applicable federal, state, and local laws and regulations regarding the use of hazardous substances. The only hazardous chemicals expected to be used on site are those found in diesel fuel, gasoline, coolant (ethylene glycol), and lubricants in machinery. Hazardous materials will not be drained onto the ground or into streams or drainage areas. In its contract with the construction contractor, CORE can specify that it will hold a required pre-construction meeting with the contractor to ensure all applicable laws and CORE's procedures are followed.

Spill Containment
During construction, on site personnel will handle any fuel or other fluid spills on the Project in accordance with appropriate state and federal spill reporting and response requirements. The Project construction contractor shall notify CORE of reportable spills so they can make appropriate notifications to regulatory authorities, as needed.

Fire Protection/Safety
CORE has developed situational awareness tools that provide fire warnings, watches and forecasts for their service territory. Most of these tools are driven by a geographic information system (GIS) that incorporates wildfire hazard potential maps generated by the U.S. Forest Service's Fire Modeling

Institute overlaid with spatial data representing resources and assets such as power lines, substations, and communities. Daily fire risk is also monitored through fire warnings and watches from the National Weather Service, near real time fire alerts from NASA FIRMS satellites, and social media notifications from fire and police agencies in CORE's service area.
CORE personnel can access this information to adapt CORE's daily operations, emergency preparedness and risk mitigation efforts to changes in fire conditions. It also allows CORE to conduct proactive and real time operations that reduce the risk of fire ignition by their equipment, facilities and activity. CORE System Operators log weather conditions and send pertinent information and warnings to all Operations personnel and contractors, and GIS republishes these map services to the daily operation map service. This situational awareness allows CORE to adapt daily operations, emergency preparedness, and risk mitigation efforts to changes in fire conditions.

BESS, a technology that uses batteries to store and distribute electrical energy, are systems commonly used in electricity grids, renewable energy setups, and even electric vehicles. BESS technologies are designed to meet and exceed qualification standards. These systems are tested and vetted, certified, and ultimately built to comply with the nation's leading safety standard. The U.S. battery energy storage industry uses a suite of important certifications and standards that guide the safe design, installation, and operation of battery energy storage facilities. These documents are regularly updated based on the advice, applied lessons, and research from leading safety experts, fire professionals, fire protection engineers, and scientists.

The American Clean Power Association (ACP) has released a framework to enhance BESS safety, including compliance with standards like National Fire Protection Association (NFPA) 855 and better coordination with local fire departments. As the premier national standard for battery energy storage safety, NFPA 855 guides the collaboration between the battery energy storage industry and firefighters to maximize the safe and reliable performance of battery energy storage as critical grid infrastructure. NFPA 855 provides mandatory requirements for the design, installation, commissioning, operation, maintenance, and decommissioning of BESS facilities, distinguished by battery energy storage technology. NFPA 855 requires all battery energy storage systems be listed to UL 1973 and UL 9540. UL 1973 and UL 9540 are critical safety standards that ensure BESS operate reliably and securely. UL 1973 certifies the safety and performance of battery cells, modules, and packs, evaluating their ability to withstand thermal runaway, mechanical stress, and electrical faults. The UL 9540 certification builds on this by evaluating the entire BESS, verifying that it meets rigorous fire, electrical, and functional safety requirements. Together, these standards provide a robust framework that minimizes risks, protects facilities and communities, and instills confidence in the safety of BESS technology.

BESS fires are rare, 23 incidents in the last 10 years in the US, but can occur due to factors like thermal runaway, manufacturing defects, or improper system management. These incidents often involve lithium ion batteries, which are prone to overheating if damaged or improperly maintained. Historical data shows that many fire incidents involved older systems that lacked modern safety features. CORE's use of battery technology is evolving. Lithium iron phosphate (LiFePO4) batteries are increasingly popular for BESS due to their safety, durability, and environmental benefits. CORE plans to utilize lithium iron phosphate (LiFePO4) batteries at this site.

- Safety: LiFePO4 batteries are less prone to overheating and thermal runaway, making them ideal for large scale energy storage.
- Longevity: They have a longer cycle life compared to other lithium ion chemistries, which means they can be charged and discharged thousands of times without significant degradation.

- Environmental Impact: These batteries avoid the use of cobalt and nickel, making them more sustainable and ethically sourced.

Each battery is continuously monitored by an onsite system to automatically detect abnormal conditions and stop operations, if needed. An off site, 24-hour control room with trained technicians also constantly monitors each site and can remotely shut down the facility, if needed. All of the battery module designs included undergo rigorous industry testing and certification related to fire safety, in order to minimize the risk that a failure of any single battery cell or module spreads to adjacent batteries or other equipment. Each storage facility is equipped with its own air conditioning or cooling system to ensure it operates within the ideal temperature range. Coordination with first responders and fire officials can take place to safely extinguish any fire and dispose of any damaged materials in compliance with local, state and federal regulations.

County Services
The Project's impacts on County services are expected to be minor. Water for dust suppression during construction will be trucked to the site. The Project will not require a permanent water supply, gas supply, or sewage system. It is not expected that the Project will impact services provided by Douglas County's emergency service districts. Given the relatively small size of the crews needed for construction, no impacts on law enforcement or emergency medical services are anticipated. The potential use of local fire department services during construction or operation of the proposed facilities will have a negligible effect on the overall capability of responders to provide services as the Project would only need services in the unlikely event of an emergency.

Visual Quality
Glare from construction or maintenance vehicles may be visible from nearby roads, but the operation of these vehicles will be limited to the construction period and occasional inspections and maintenance work. Outdoor lights within the BESS yard will only be used as necessary for emergency and routine maintenance critical for worker safety. All lights will be cast downward towards the interior of the substation yard. Table 1 lists the ownership and zoning of the adjacent parcels.
Visual simulations of the BESS that illustrate the design and materials to be used are included in Appendix D. These simulations are not site specific but give the reviewer an idea of what the facilities will look like in the field.

Table 1: Adjacent Parcel Information

Parcel Number	Owner	Jurisdiction	Zoning	Current Use
2505-150-00-032	Christopher s. & Cali M. Nichols 880 Yucca Hills Road Castle Rock, CO 80109	Douglas County	A1	Residential
2505-150-00-028	Debra K. Chase 570 Yucca Hills Road Castle Rock, CO 80109	Douglas County	A1	Residential
2505-153-00-002	SDM Family Corporation 512 Wilcox Street Castle Rock, CO 80104	Town of Castle Rock	PD-Westfield Trade Center	Agricultural

2505-154-00-013	SDM Family Corporation 512 Wilcox Street Castle Rock, CO 80104	Town of Castle Rock	PD-Westfield Trade Center	Agricultural
2505-154-99-013	Dawson Trails Metro District #1 7555 E. Hampden Ave. #501 Denver, CO 80231	Town of Castle Rock	PD-Westfield Trade Center	Future Road ROW
2505-154-00-012	SDM Family Corporation 512 Wilcox Street Castle Rock, CO 80104	Town of Castle Rock	PD-Westfield Trade Center	Agricultural
2505-154-00-002	Burlington Northern Santa Fe PO Box 961089 Fort Worth, TX 76161	Douglas County	A1	Railroad
2505-151-00-004	Unknown – Hold Statement	Douglas County	A1	Yucca Hills Road

Compliance with the 2040 Comprehensive Master Plan

This Project is located within the Castle Rock Municipal Planning Area and is in compliance with the Goals, Objectives, and Policies of Section 2 and Section 5 of the Douglas County 2040 Comprehensive Master Plan (CMP), as described below.

Policy 2-5A.4 ***Use creative design and planning approaches to mitigate environmental and visual impacts on the natural terrain***

Visual simulations of the BESS yard that illustrate the design and materials to be used are included in Appendix D. The subject property was selected due to its proximity to an existing substation and the need for interconnection, as well as the specific topographic features of this site. The BESS will be constructed near the existing high point of the property; however, the footprint for the BESS will be 16 feet below the existing grade along the western side. This will minimize the profile and the lower topography will help reduce the visual impact of the Project. Any existing vegetation that can be kept and not disturbed during construction will be left on site. There are no environmental issues or constraints with the Project parcel.

Objective 2-6B ***Use design techniques and land use elements to provide compatibility between residential and nonresidential uses and create a sense of community identity.***

Land use compatibility is the principle of aiming for a harmonious community by ensuring that adjacent land uses do not cause unduly negative impacts. Factors that affect land use compatibility include considerations such as intensity and types of uses, patterns and context of surrounding land use, traffic patterns, noise levels, and many other variables. Mitigation strategies through design of the Project include the site's natural topography as a buffer, minimal post construction traffic, and the proximity to CORE's existing Citadel Substation. These natural and physical buffers provide security, visual screening of equipment, and a sound barrier to reduce impacts on surrounding properties.

Policy 2-6E.3 ***Locate and design intensive nonresidential land uses to minimize conflicts with residential developments, agricultural uses, wildlife areas, and environmentally or visually-sensitive areas.***

Douglas County is a successful and dynamic community that is experiencing growth and change in population, economy, and land uses as residents and businesses continue to move into the area. It has changed from a small rural county and grown into a mixed urban/nonurban county with a larger population. The Douglas County CMP helps guide development to appropriate areas of the county. Changes in technology such as artificial intelligence, electrification of vehicles and buildings, data centers, manufacturing, and remote work have changed demand and usage for vital services like electric utilities. For CORE to continue to effectively serve their customers, the Project will help balance the system during peak load times and during sudden demand changes. It will also serve as a bridge between variable generation and steady consumption. And lastly, BESS is a cost effective alternative to building new infrastructure such as substations. The location for this substation was specifically chosen to minimize potential conflicts with adjacent land uses and for its proximity to an existing substation. The design of the BESS has been thoughtfully undertaken to ensure compatibility with surrounding land uses.

Policy 2-9A.1 ***Evaluate the capacity of existing services and facilities to support development.***
As described in the preceding paragraph, planning for adequate delivery of electric services is important for sustainable growth and development, which is also detailed in the Douglas County CMP. Planning is critical to create supportive infrastructure for sustainable development as opportunities are growing and the market in Douglas County continues to grow and evolve. CORE's power studies and planning for utility capacity utilizing appropriate technologies and equipment such as the Citadel Substation BESS are critical for supporting the community's continued development. This Project will readily interconnect with the existing power grid for support and development of the energy grid and provide value for existing and future development in Douglas County. Factors like the distance to viable points of interconnection, existing substation conditions, conditions of other existing grid equipment, and design investments will provide a safe and reliable grid. Upgrading and ensuring viability of existing civil and structural facilities in Douglas County, such as this Project, is paramount to providing continued support for the community.

Objective 5-1A ***Review existing and projected development to ensure that it does not overwhelm existing services.***
Additional capacity and ensuring grid stability requires new facilities to continue providing reliable electric services to existing customers and to meet future demand. The proposed BESS provides essential grid capacity to accommodate existing demand from current residences, businesses, public facilities, and forecasted growth in Douglas County and Castle Rock.

Policy 5-1A.2 ***Coordinate service needs with relevant special districts, authorities, and municipalities.***
CORE held a presubmittal meeting with Douglas County (PS2025-183) on August 21, 2025. It is CORE's intention that adequate public facilities are provided prior to or concurrent with development. CORE will further satisfy these criteria by working closely with County divisions to meet pertinent County standards and planning objectives. This Project will increase availability and reliability of electrical service, thereby providing a direct benefit to residential, commercial, and industrial development approved by Douglas County.

Policy 5-5A.1 ***Apply design standards to ensure compatibility.***
The proposed BESS is an unmanned electric utility facility with a security fence enclosing it, securing essential BESS equipment. Compatibility will be ensured by reclaiming with a native seed mix and disturbance mitigation in accordance with the approved GESC plan. Night sky compliant outdoor lighting fixtures would only be used during emergency situations by personnel, typically during outages. Any

exterior lighting would comply with County standards, including only illuminating exterior lighting while personnel are working on site and utilizing full cut off fixtures for night sky compliance. The BESS will not generate fumes, odors, or particulates. Visual simulations of the BESS components that illustrate the design and materials to be used are included in Appendix D.

Policy 5-5A.2 ***Recognize the technological, operational, maintenance, and safety constraints of these uses while balancing community desires to mitigate impacts to the natural and built environment.***
CORE, through design and materials, works to minimize visibility as much as is reasonably possible. While BESS can be inherently visible, the BESS will be partially screened by grade and topography. Views are already impacted by the existing substation and overhead transmission line. The visual impact will not be significantly changed.

Policy 5-5A.5 ***Encourage the joint use of utility corridors for new or upgraded major transmission lines.***
The BESS will be constructed adjacent to an existing substation and overhead transmission line corridor encumbered by their associated easements.

3203.01.3 Application Fee

The application fee of $325 and associated Engineering Review Fees will be paid by CORE at the time of filing, once the application has been accepted by Douglas County.

3203.01.4 Location and Extent Plan Exhibit (per Section 3205)

See Appendix B

3203.01.5 Location and Extent Report (per Section 3206)

3206.01 – Community Impact Report describing potential impacts to private and public interests and the project site, and how potential impacts are proposed to be mitigated.

The Project will have a positive impact on private and public interests in Douglas County and Town of Castle Rock. Installing the Project provides a cost effective, flexible solution to improve reliability, reduce peak power costs, defer infrastructure upgrades, and support future renewable integration—directly advancing CORE's mission to deliver reliable and affordable power to its members in this part of CORE's service territory. For further clarification, please see the Summary of the Potential Impacts and Proposed Mitigation Measures listed above. In addition, as described above, the Project is consistent with the 2040 Douglas County Comprehensive Master Plan.

The facility is strategically located adjacent to the CORE's existing Citadel Substation. To the east, the Project parcel borders a BNSF railroad, to the north and west borders are large parcel residential properties (one of which is used as a vacation rental) and on the south borders a large agricultural operation. Natural vegetation and grades outside the BESS security fence will be preserved, as practicable. Visual simulations of the BESS components that illustrate the design and materials to be used are included in Appendix D. Once operational, lighting at the BESS will be night sky compliant, downcast, and only used in an emergency, such as when there is an unplanned outage. Therefore, BESS

lighting will not create a glare or nuisance to surrounding properties. During operations, the Project will not generate fumes, odors, or particulates.

A presubmittal meeting with Douglas County (PS2025-183) was held on August 21, 2025 to introduce the Project and identify the approvals that would be needed prior to construction. CORE has incorporated the applicable County standards into the Project design.

3206.02 – Phase III Drainage Report in accordance with the requirements of the Douglas County Storm Drainage and Design and Technical Criteria Manual, as required, or as required by a condition of approval.

See Appendix C for the Preliminary Phase III Drainage Report

3206.03 – A narrative or traffic study describing the transportation network establishing the availability and adequacy of the system in accordance with the Douglas County Roadway Design and Construction Standards, as required.

See Appendix E for the Trip Generation Analysis Memo

3206.04 – A guarantee of public improvements, such as dedication of rights-of-way, sidewalk construction, and similar improvements, as required.

No public improvements are proposed as part of this Project.

3206.05 – Additional information may be requested by the staff as appropriate to the request, and information required above may be waived by the Planning Services Director, when deemed to be inappropriate.

Any additional information will be provided to Douglas County staff upon request.

3203.01.6 Any additional information as requested by staff needed to thoroughly review the impacts of the location and extent application.

This information will be provided to Douglas County staff upon request.

LAND USE APPLICATION

Please complete, sign, and date this application. Return it with the required items listed on the Submittal Checklist to planningsubmittals@douglas.co.us. Submittals may also be mailed or submitted in person to Planning Services. *NOTE: The Planning Commission or the Board of County Commissioners should not be contacted regarding an open application*.

OFFICE USE ONLY
PROJECT TITLE:
PROJECT NUMBER: LE2026-003

PROJECT TYPE: Location & Extent

MARKETING NAME: CORE Electric Cooperative Citadel Substation Battery Energy Storage System

PRESUBMITTAL REVIEW PROJECT NUMBER: PS2025-183

PROJECT SITE:

Address: 890 Yucca Hills Road, Castle Rock, CO 80109

State Parcel Number(s): 2505-150-00-033

Subdivision/Block#/Lot# *(if platted)*: N/A

PROPERTY OWNER(S):

Name(s): CORE Electric Cooperative

Address: 5496 N. US Highway 85, Sedalia, CO 80135

Phone: 720-733-5493

Email: bkaufman@core.coop

AUTHORIZED REPRESENTATIVE: *(Notarized Letter of Authorization is required from the property owner, unless the owner is acting as the representative)*

Name: Ulteig Operations, LLC - Derek Holscher

Address: 5575 DTC Parkway #200, Greenwood Village, CO 80111

Phone: 720-873-5876

Email: derek.holscher@ulteig.com

To the best of my knowledge, the information contained on this application is true and correct. I have received the County's information sheet regarding the *Preble's Meadow Jumping Mouse*.

_____ 2/17/2026

Applicant Signature Date

PREBLE'S MEADOW JUMPING MOUSE

What is the Preble's Meadow Jumping Mouse?
The Preble's Meadow Jumping Mouse is a rare mouse designated by the United States Fish and Wildlife Service as a "threatened species" under the Endangered Species Act. The federal threatened species designation prohibits the unlawful "take" of the Preble's Meadow Jumping Mouse or its habitat.

Where does the mouse live?
The Preble's Meadow Jumping Mouse lives primarily in heavily vegetated riparian habitats. In Douglas County, the mouse has been located in or near many drainages, including tributaries and the mainstream reaches of East and West Plum Creek. However, any stream reach or potential habitat within Douglas County may be subject to the requirements of the Endangered Species Act. The mouse has also been found in Boulder, Elbert, El Paso, Jefferson, and Larimer counties and in parts of Wyoming.

What activities may be considered a violation of the Endangered Species Act?
In its listing decision, the United States Fish and Wildlife Service identified activities that may result in violation of the Endangered Species Act to include:

1. Unauthorized or unpermitted collection, handling, harassing, or taking of the species;

2. Activities that directly or indirectly result in the actual death or injury death of the mouse, or that modify the known habitat of the species, thereby significantly modifying essential behavioral patterns (e.g., plowing, mowing, or cutting; conversion of wet meadow or riparian habitats to residential, commercial, industrial, recreational areas, or cropland; overgrazing; road and trail construction; water development or impoundment; mineral extraction or processing; off-highway vehicle use; and, hazardous material cleanup or bioremediation); and;

3. The application or discharge of agrichemicals or other pollutants and pesticides onto plants, soil, ground water, or other surfaces in violation of label directions or any use following Service notification that such use, application or discharge is likely to harm the species; would be evidence of unauthorized use, application or discharge.

How to determine if a proposed activity would violate the Endangered Species Act.
Any questions regarding whether an activity will impact the Preble's Meadow Jumping Mouse or its habitat should be directed to:

Field Office Supervisor
USFWS Colorado ES Field Office (MS 65412)
Denver Federal Center
PO Box 25486
Denver, CO 80225-0486
303-236-4773
ColoradoES@fws.gov

Where to find more information on the Preble's Meadow Jumping Mouse.
More information can be found at the US Fish and Wildlife Service website at:
https://ecos.fws.gov/ecp/species/4090

Any approval given by Douglas County does not obviate the need to comply with applicable federal, state, or local laws and/or regulations.

CORE ELECTRIC COOPERATIVE

LOCATION AND EXTENT

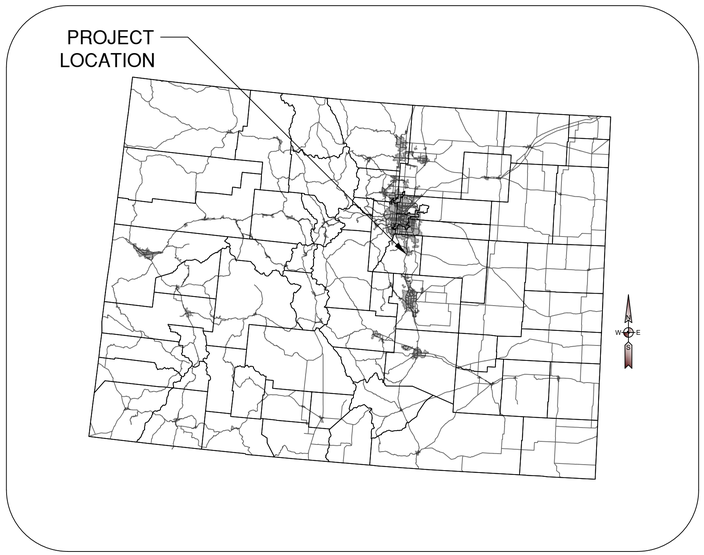
CITADEL BATTERY ENERGY STORAGE SYSTEM (BESS)

890 YUCCA HILLS ROAD, CASTLE ROCK, CO 80109

NE 1/4 SECTION 15, TOWNSHIP 8 SOUTH, RANGE 67 WEST,

OF THE SIXTH PRINCIPAL MERIDIAN, TOWN OF CASTLE ROCK,

COUNTY OF DOUGLAS, STATE OF COLORADO



STATE MAP

VICINITY MAP

0 750 1500 3000

DRAWING INDEX:

DRAWING NO	DRAWING TITLE	REVISION
CIT-G-100	COVER SHEET AND INDEX	A
CIT-C-200	OVERALL SITE PLAN	A
CIT-C-201	TEMPORARY ROAD OVERALL SITE PLAN	A
CIT-C-300	TESLA PLAN VIEW	A
CIT-C-400	FENCE SECTIONS 1	A
CIT-C-401	FENCE SECTIONS 2	A
CIT-C-500	FENCE DETAIL 1	A
CIT-C-501	FENCE DETAIL 2	A

PROJECT OWNER/DEVELOPER

CORE ELECTRIC COOPERATIVE

5496 N. US HWY 85

SEDALIA, CO 80123

BROOKS KAUFMAN

LANDS & RIGHTS OF WAY DIRECTOR

(720) 733-5493

CIVIL ENGINEER

ULTEIG ENGINEERS, INC.

3350 38TH AVE S

FARGO, NORTH DAKOTA 58104

KEVIN KNOTT

(701) 280-8540

ELECTRICAL ENGINEER

ULTEIG ENGINEERS, INC.

3350 38TH AVE SOUTH

FARGO, NORTH DAKOTA 58104

CHUCK MATHSON

(701) 280-8500

GEOTECHNICAL ENGINEER

ANS GEO

4405 SOUTH CLINTON AVENUE

SOUTH PLAINFIELD, NEW JERSEY 07080

VATSAL A. SHAH P.E., PH. D

(908) 754-8383

SURVEYOR

PRECISION SURVEY & MAPPING, INC.

9025 E. KENYON AVE., SUITE 150

DENVER, CO 80237

CHRISTOPHER P. JULIANA, P.L.S

(303) 753-9799

CITADEL BESS
PROJECT

DOUGLAS COUNTY, COLORADO

REV.	DATE	DESCRIPTION	BY
A	02/23/2026	ISSUE FOR COUNTY REVIEW	KJK
----	----	----	----
----	----	----	----
----	----	----	----

NAD83 COLORADO STATE PLANES,
CENTRAL ZONE, US FOOT

THIS DRAWING IS
PRELIMINARY AND IS
NOT TO BE USED FOR
CONSTRUCTION.
FOR REVIEW
PURPOSES ONLY.

Ulteig

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

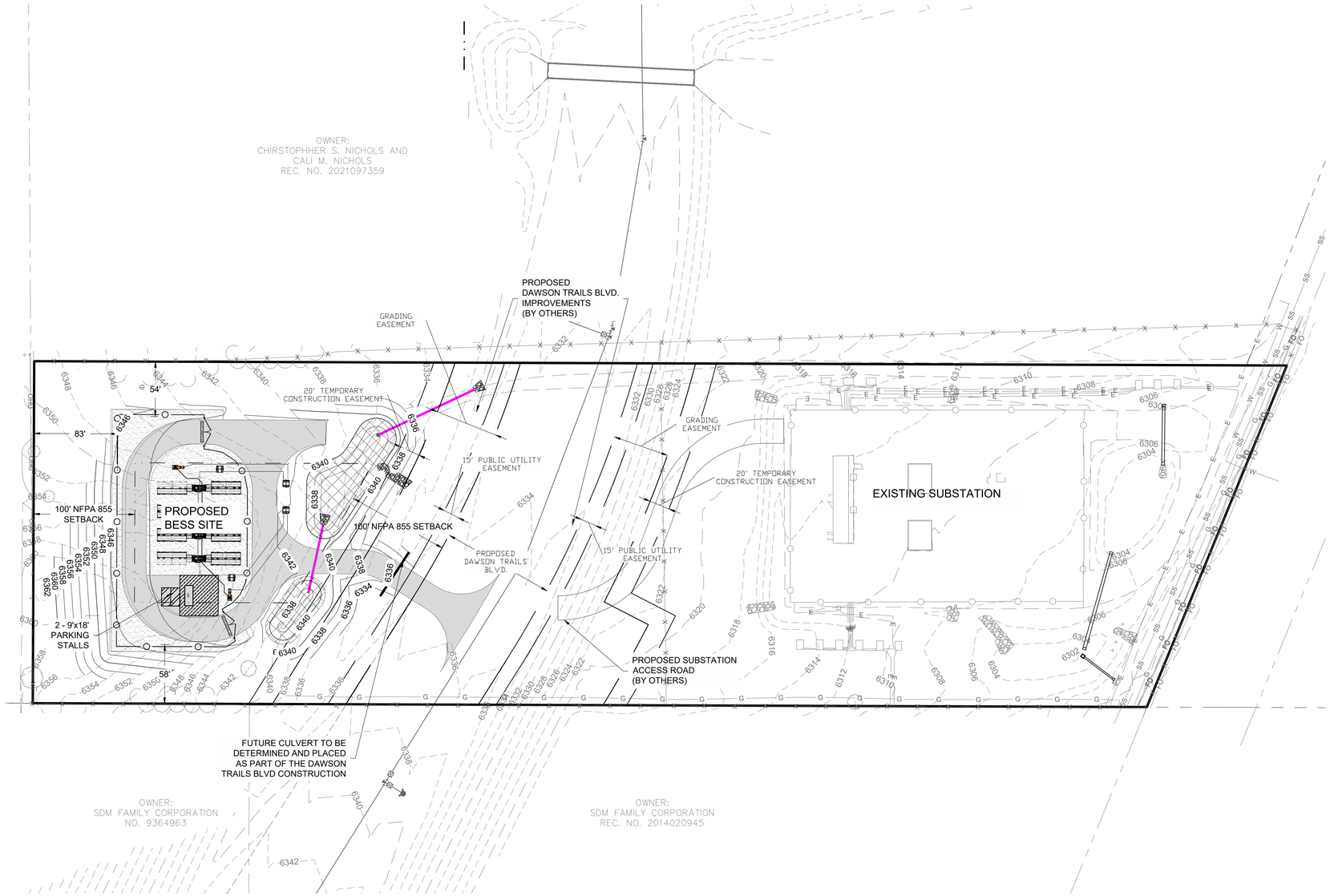
PROJECT NUMBER: 25.01369
DESIGN BY: L. MOFFITT
DRAWN BY: L. MOFFITT
APPROVED BY: K. KNOTT

COVER SHEET

DRAWING NUMBER: CIT-C-100

REVISION: A

G:\2025\25.01369 - CIVIL\01 - DRAWINGS\PLAN PRODUCTION\PERMITTING PLANS\25.01369_CIT_C01-COVER SHEET.DWG



LEGEND

- PROJECT BOUNDARY
- 100' NFPA 855 SETBACK
- ADJACENT PROPERTY LINES
- EXISTING TREELINE
- EXISTING DECIDUOUS TREE
- EXISTING BUSH
- EXISTING FENCE
- EXISTING UTILITY POLE
- EXISTING GUY WIRE
- EXISTING GAS LINE
- EXISTING ELECTRIC LINE
- EXISTING WATER LINE
- EXISTING SANITARY SEWER
- EXISTING FIBER OPTIC
- EXISTING OVERHEAD UTILITY LINE
- EXISTING GRAVEL ROAD
- EXISTING RIPRAP
- PROPOSED RIPRAP
- PROPOSED BESS YARD ROCK
- PROPOSED ACCESS ROAD
- PROPOSED STORMWATER BASIN
- PROPOSED 18" CULVERT
- FUTURE CULVERT FOR DAWSON TRAILS BLVD
- PROPOSED DRAINAGE STRUCTURE
- PROPOSED CHAINLINK FENCE
- PROPOSED 28' SWING GATE
- PROPOSED TESLA MEGAPACK 2XL
- PROPOSED AUX SWITCHBOARD
- PROPOSED METER & DISCONNECT CABINET
- PROPOSED TESLA REQUIRED O&M BUILDING, STORAGE CLEARANCE AREA, AND PARKING ZONE

NOTES:

1. EQUIPMENT FOUNDATIONS ARE SHOWN FOR REFERENCE ONLY, REFER TO THE STRUCTURAL DRAWINGS FOR SPECIFIC FOUNDATION LOCATIONS AND DETAILS.
2. CONTOURS SHOWN ARE TO FINISHED GRADE.

CITADEL BESS PROJECT

DOUGLAS COUNTY, COLORADO

REV.	DATE	DESCRIPTION	BY
A	02/23/2026	ISSUE FOR COUNTY REVIEW	KJK
----	----	----	----
----	----	----	----
----	----	----	----

N
W E
S

0 30 60 120

NAD83 COLORADO STATE PLANES, CENTRAL ZONE, US FOOT

THIS DRAWING IS PRELIMINARY AND IS NOT TO BE USED FOR CONSTRUCTION. FOR REVIEW PURPOSES ONLY.

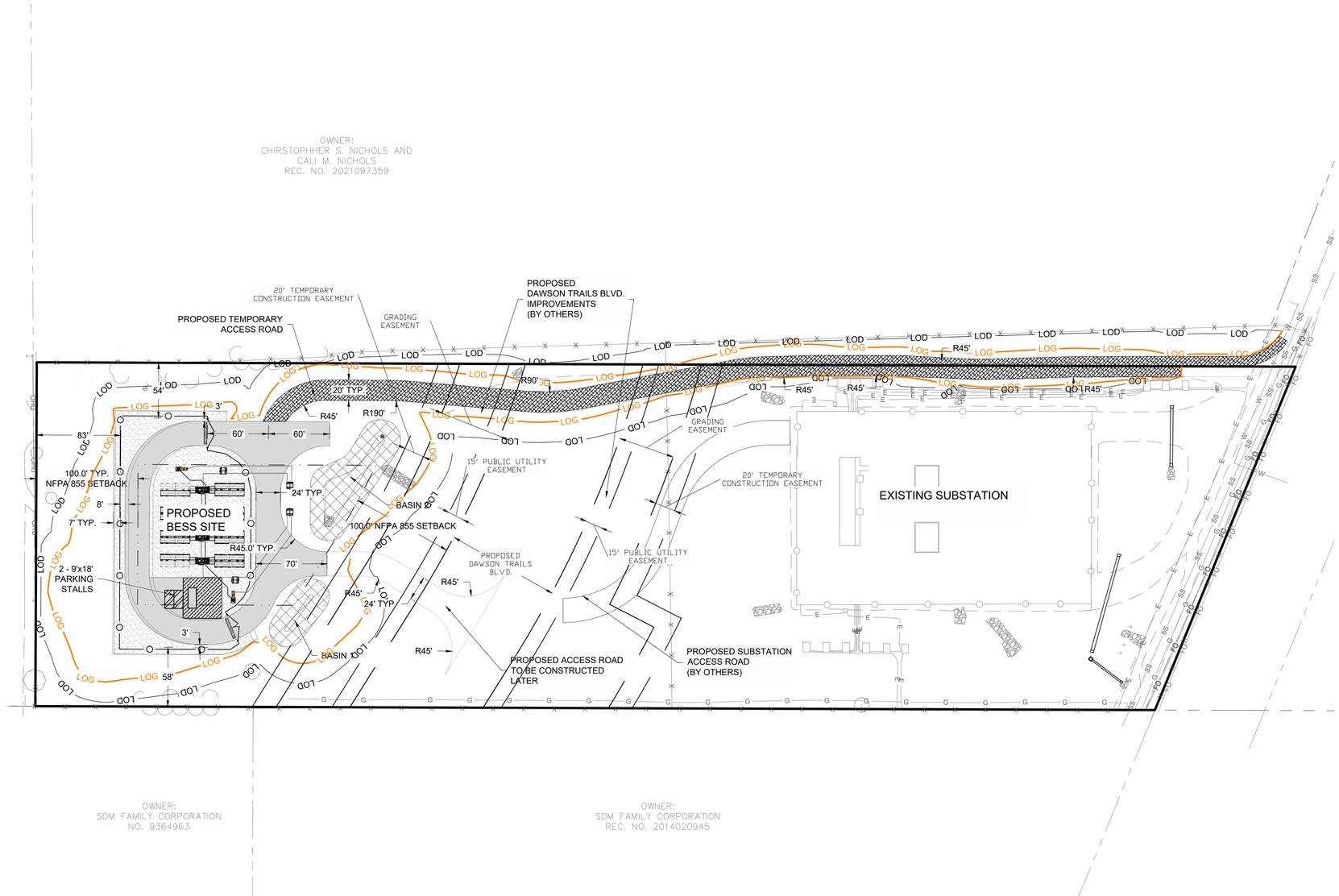
Ulteig
3350 38TH AVE S
FARGO, ND 58104
PHONE: (701) 280-8500
ULTEIG.COM

PROJECT NUMBER: 25.01369
DESIGN BY: L. MOFFITT
DRAWN BY: L. MOFFITT
APPROVED BY: K. KNOTT

OVERALL SITE PLAN

DRAWING NUMBER: CIT-C-200
REVISION: A

G:\2025\25.01369_CIVIL\01_DRAWINGS\PLAN PRODUCTION\PERMITTING PLANSET\25.01369_CIT_OSP.DWG



LEGEND

- PROJECT BOUNDARY
- 100' NFPA 855 SETBACK
- ADJACENT PROPERTY LINES
- EXISTING TREELINE
- EXISTING DECIDUOUS TREE
- EXISTING BUSH
- EXISTING FENCE
- EXISTING UTILITY POLE
- EXISTING GUY WIRE
- EXISTING GAS LINE
- EXISTING ELECTRIC LINE
- EXISTING WATER LINE
- EXISTING SANITARY SEWER
- EXISTING FIBER OPTIC
- EXISTING OVERHEAD UTILITY LINE
- EXISTING GRAVEL ROAD
- EXISTING RIPRAP
- PROPOSED RIPRAP
- PROPOSED BESS YARD ROCK
- PROPOSED ACCESS ROAD
- PROPOSED TEMPORARY ROAD
- PROPOSED FUTURE ACCESS ROAD
- PROPOSED STORMWATER BASIN
- PROPOSED DRAINAGE STRUCTURE
- PROPOSED CHAINLINK FENCE
- PROPOSED 28' SWING GATE
- PROPOSED TESLA MEGAPACK 2XL
- PROPOSED AUX SWITCHBOARD
- PROPOSED METER & DISCONNECT CABINET
- PROPOSED TESLA REQUIRED O&M BUILDING, STORAGE CLEARANCE AREA, AND PARKING ZONE

NOTES:

1. EQUIPMENT FOUNDATIONS ARE SHOWN FOR REFERENCE ONLY, REFER TO THE STRUCTURAL DRAWINGS FOR SPECIFIC FOUNDATION LOCATIONS AND DETAILS.

N
W E
S

0 30 60 120

NAD83 COLORADO STATE PLANES, CENTRAL ZONE, US FOOT

CITADEL BESS PROJECT

DOUGLAS COUNTY, COLORADO

REV.	DATE	DESCRIPTION	BY
A	02/23/2026	ISSUE FOR COUNTY REVIEW	KJK

THIS DRAWING IS PRELIMINARY AND IS NOT TO BE USED FOR CONSTRUCTION. FOR REVIEW PURPOSES ONLY.

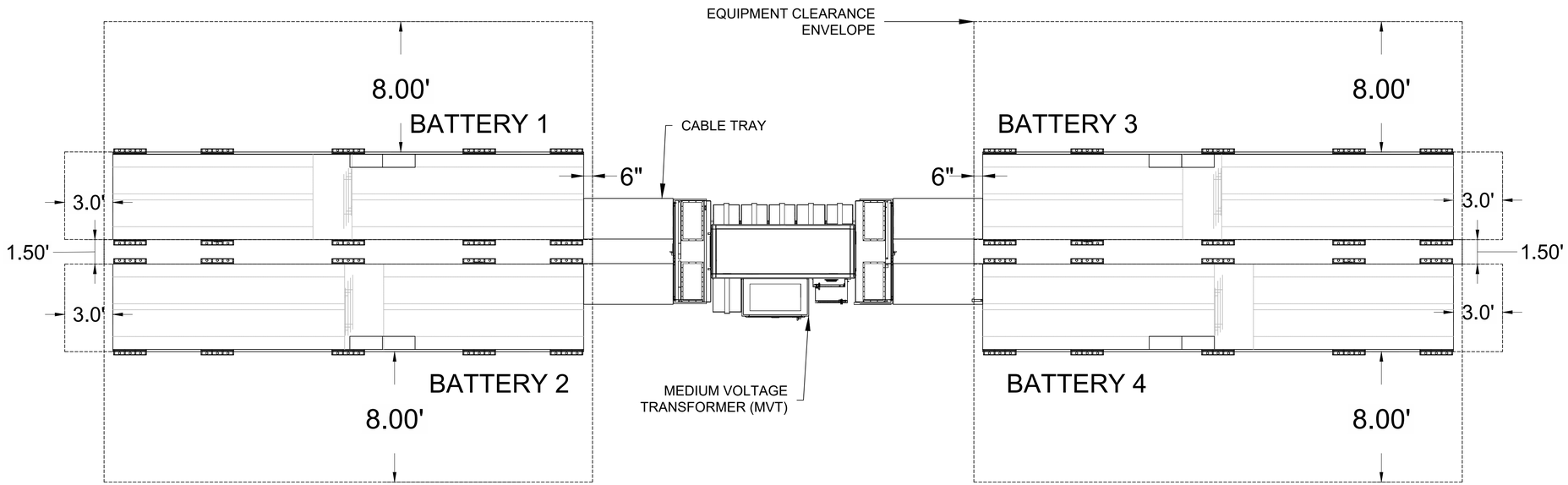
Ulteig
3350 38TH AVE S
FARGO, ND 58104
PHONE: (701) 280-8500
ULTEIG.COM

PROJECT NUMBER: 25.01369
DESIGN BY: L. MOFFITT
DRAWN BY: L. MOFFITT
APPROVED BY: K. KNOTT

TEMPORARY ROAD OVERALL SITE PLAN

DRAWING NUMBER: CIT-C-201
REVISION: A

D:\2025\25.01369_CITADEL\01 DRAWINGS\PLAN PRODUCTION\PERMITTING PLANS\25.01369_CIT_OSP_TEMP ROAD.DWG



1 TYPICAL EQUIPMENT BLOCK - PLAN VIEW

NOT TO SCALE

LAYOUT NOTES:

1. CABLE TRAY ASSUMED AS 24" OPEN CABLE TRAY - PART NUMBER 24A09-24-240. THE 20FT CABLE TRAY SHALL BE CUT INTO FOUR EQUAL SECTIONS OF 5FT EACH.
2. FOR CABLE TRAY DETAILS SEE DRAWING 20260116-US-WA-GREE-IFC-BESSL-E4-101-R0.
3. FOR DETAILED COMMUNICATION INFORMATION SEE PLANT SCADA SET (BY OTHERS).
4. CONDUITS TO BE 12" AWAY FROM GEOPIERS. SEE STRUCTURAL PACKAGE FOR DETAILS. DUE TO ROUTING CONTRAINTS, MAINTAINING A FULL 12" OFFSET FOR SOME OF THE OUTGOING 8" CONDUITS MAY NOT BE FEASIBLE. A 4" OFFSET WILL BE APPLIED TO WHERE REQUIRED TO PROVIDE THE MAXIMUM PRACTICAL CLEARANCE. CONTRACTOR SHALL VERIFY FINAL ROUTING IN THE FIELD AND COORDINATE AS NEEDED TO AVOID INTERFERENCES WITH ADJACENT SYSTEMS AND EQUIPMENT.

CITADEL BESS PROJECT

DOUGLAS COUNTY, COLORADO

REV.	DATE	DESCRIPTION	BY
A	02/23/2026	ISSUE FOR COUNTY REVIEW	KJK

LEGEND

- EQUIPMENT CLEARANCE ENVELOPE
- TESLA WIRE-WAY
- EQUIPMENT FOUNDATION PAD

NAD83 COLORADO STATE PLANES, CENTRAL ZONE, US FOOT

THIS DRAWING IS PRELIMINARY AND IS NOT TO BE USED FOR CONSTRUCTION. FOR REVIEW PURPOSES ONLY.

Ulteig

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

PROJECT NUMBER: 25.01369
DESIGN BY: L. MOFFITT
DRAWN BY: L. MOFFITT
APPROVED BY: KJK

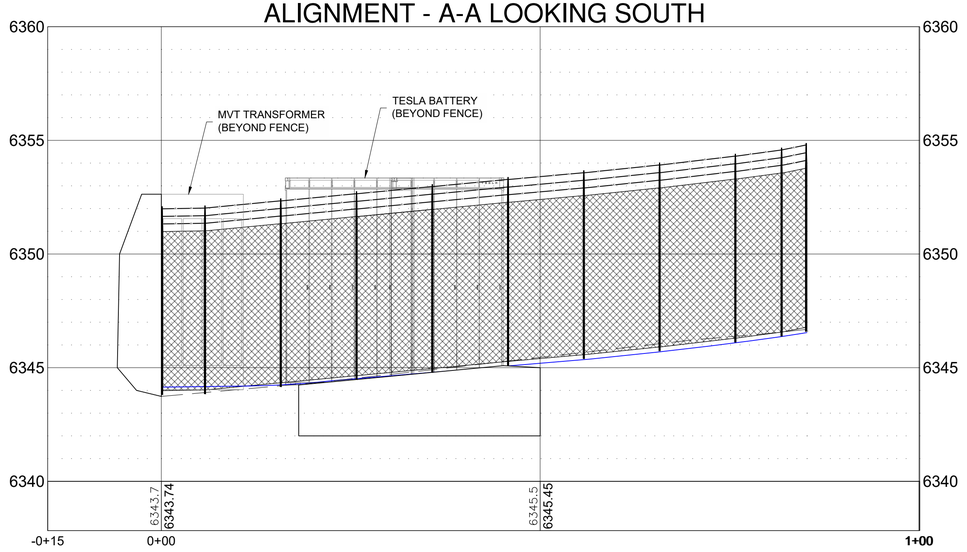
TESLA BATTERY PLAN VIEW

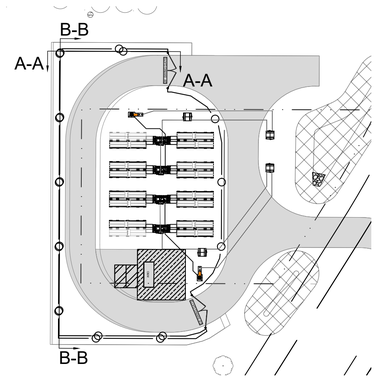
DRAWING NUMBER: CIT-C-300

REVISION: A

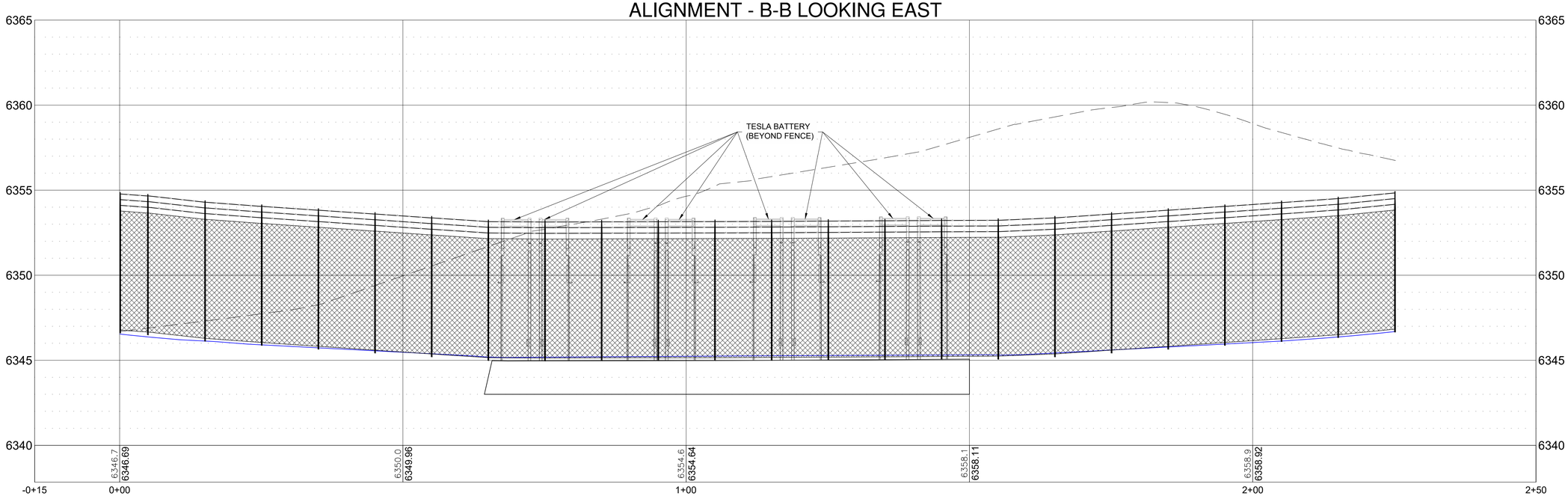
D:\2025\25.01369_CIVIL\01_DRAWINGS\PLAN PRODUCTION\PERMITTING PLANS\25.01369_CIT_TESLA BLOCK.DWG

ALIGNMENT - A-A LOOKING SOUTH





ALIGNMENT - B-B LOOKING EAST



CITADEL BESS PROJECT

DOUGLAS COUNTY, COLORADO

REV.	DATE	DESCRIPTION	BY
A	02/23/2026	ISSUE FOR COUNTY REVIEW	KJK

LEGEND

PROPOSED FINISHED GRADE AT FENCE ALIGNMENT

EXISTING GROUND

HORIZ. 0 5 10 20

VERT. 0 1.67 3.33 6.66

NAD83 COLORADO STATE PLANES, CENTRAL ZONE, US FOOT

THIS DRAWING IS PRELIMINARY AND IS NOT TO BE USED FOR CONSTRUCTION. FOR REVIEW PURPOSES ONLY.

Ulteig

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

PROJECT NUMBER: 25.01369
DESIGN BY: L. MOFFITT
DRAWN BY: L. MOFFITT
APPROVED BY: K. KNOTT

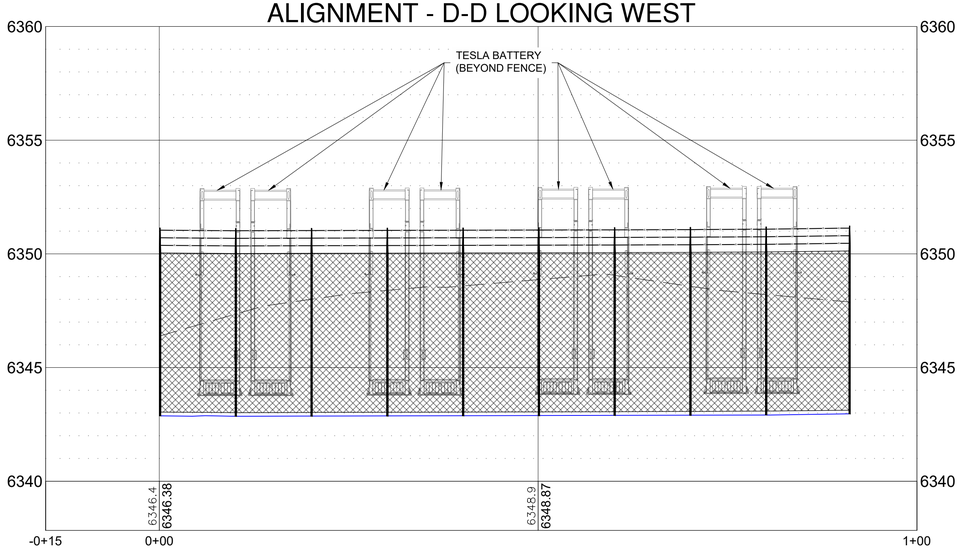
FENCE SECTIONS 1

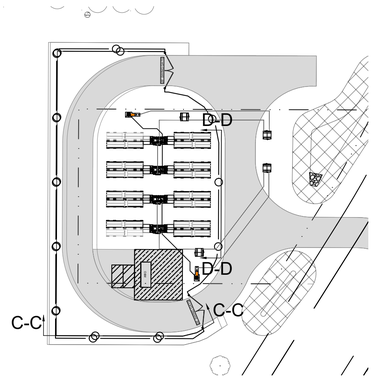
DRAWING NUMBER: CIT-C-400

REVISION: A

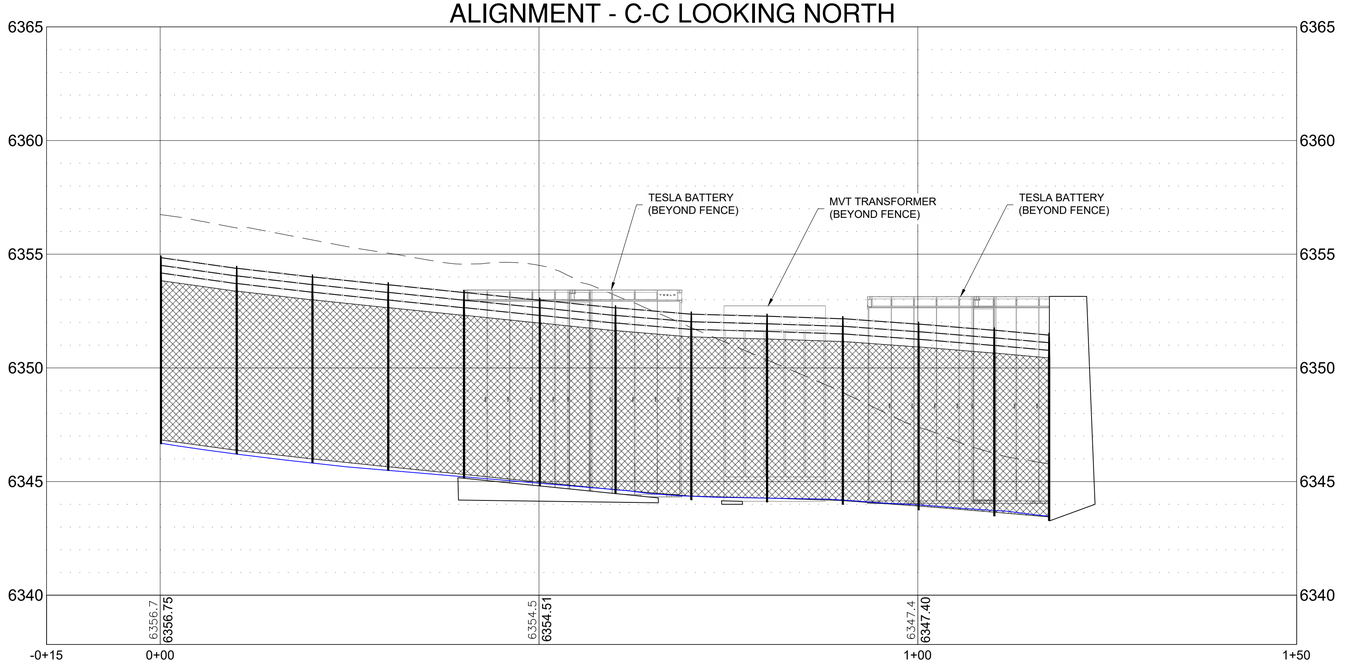
G:\2025\25.01369_CIVIL\01_DRAWINGS\PLAN PRODUCTION\PERMITTING PLANS\25.01369_GT_FENCE SECTION.DWG

ALIGNMENT - D-D LOOKING WEST





ALIGNMENT - C-C LOOKING NORTH



LEGEND

PROPOSED FINISHED GRADE AT FENCE ALIGNMENT

EXISTING GROUND

HORIZ.
0 5 10 20

VERT.
0 1.67 3.33 6.66

NAD83 COLORADO STATE PLANES, CENTRAL ZONE, US FOOT

THIS DRAWING IS PRELIMINARY AND IS NOT TO BE USED FOR CONSTRUCTION. FOR REVIEW PURPOSES ONLY.

Ulteig

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

PROJECT NUMBER: 25.01369
DESIGN BY: L. MOFFITT
DRAWN BY: L. MOFFITT
APPROVED BY: K. KNOTT

CITADEL BESS PROJECT

DOUGLAS COUNTY, COLORADO

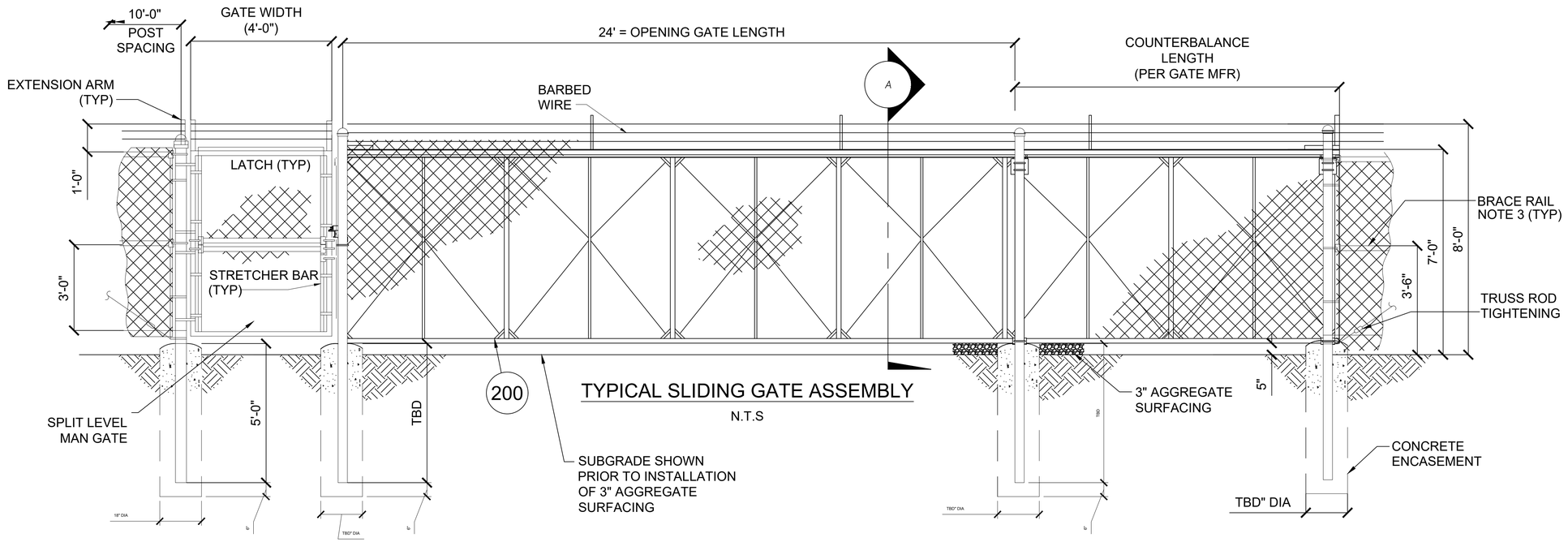
REV.	DATE	DESCRIPTION	BY
A	02/23/2026	ISSUE FOR COUNTY REVIEW	KJK

FENCE SECTIONS 2

DRAWING NUMBER: CIT-C-401

REVISION: A

D:\2025\25.01369_CITA\01 DRAWINGS\PLAN PRODUCTION\PERMITTING PLANS\25.01369_GT_FENCE SECTION.DWG

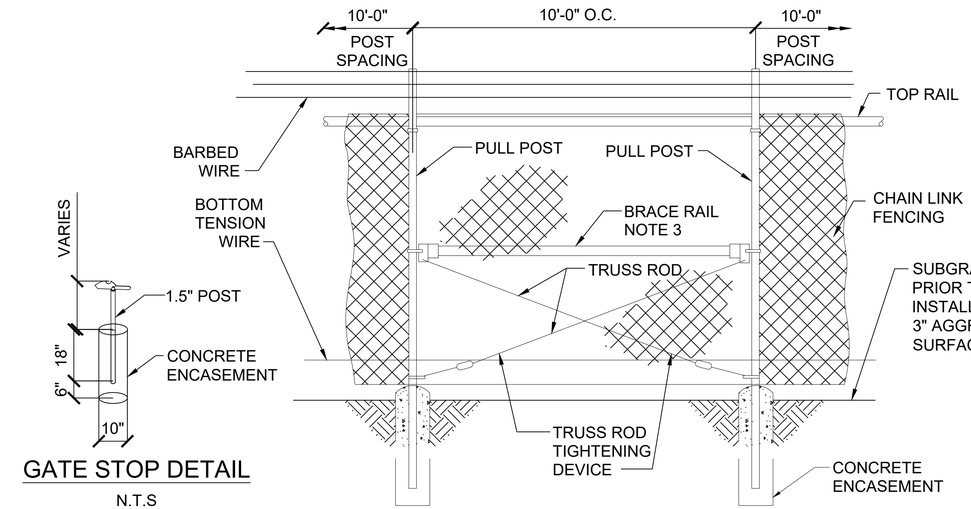


TYPICAL SLIDING GATE ASSEMBLY

N.T.S

SPLIT MAN GATE/PERSONNEL GATE

N.T.S



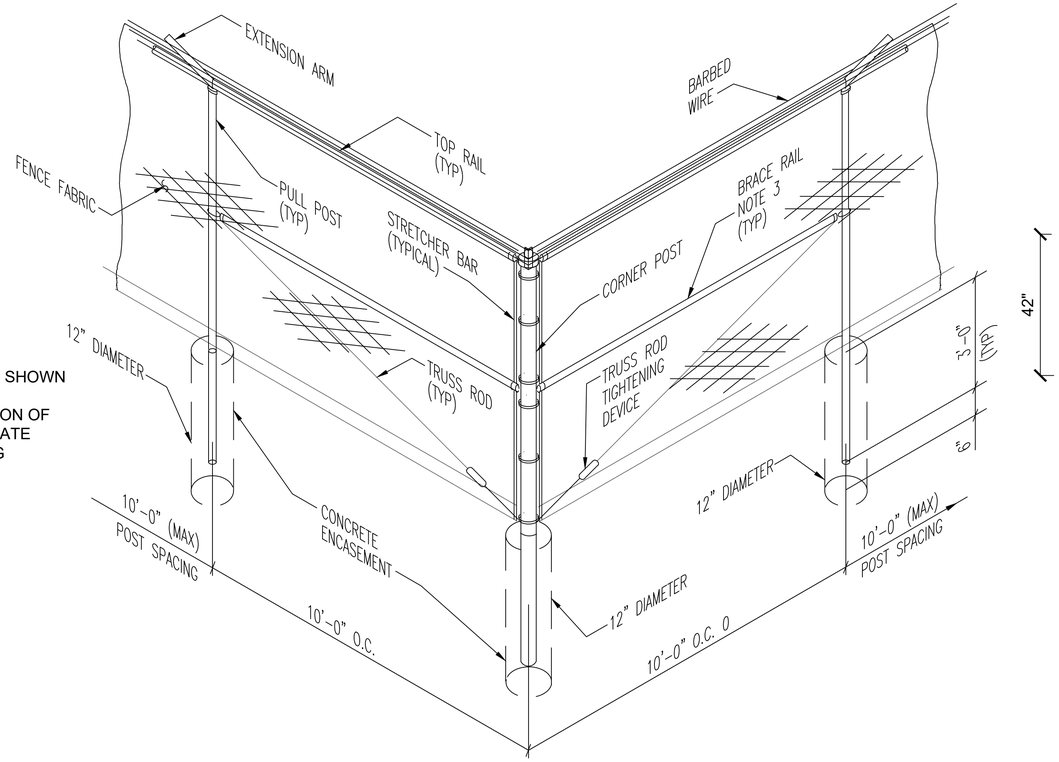
GATE STOP DETAIL

N.T.S

(TO BE USED WITH SWING GATE)

TYPICAL BRACE ASSEMBLY

N.T.S



TYPICAL CORNER ASSEMBLY

N.T.S

CITADEL BESS PROJECT

DOUGLAS COUNTY, COLORADO

REV.	DATE	DESCRIPTION	BY
A	02/23/2026	ISSUE FOR COUNTY REVIEW	KJK

NAD83 COLORADO STATE PLANES,
CENTRAL ZONE, US FOOT

THIS DRAWING IS
PRELIMINARY AND IS
NOT TO BE USED FOR
CONSTRUCTION.
FOR REVIEW
PURPOSES ONLY.

Ulteig

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

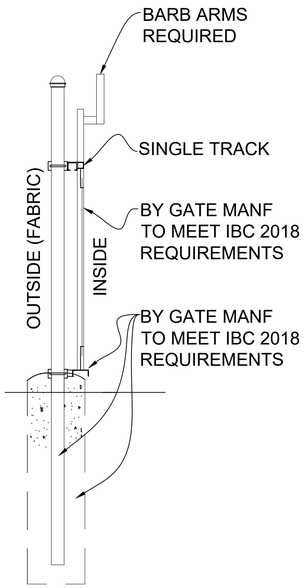
PROJECT NUMBER: 25.01369
DESIGN BY: L. MOFFITT
DRAWN BY: L. MOFFITT
APPROVED BY: K. KNOTT

FENCE DETAIL 1

DRAWING NUMBER: CIT-C-500

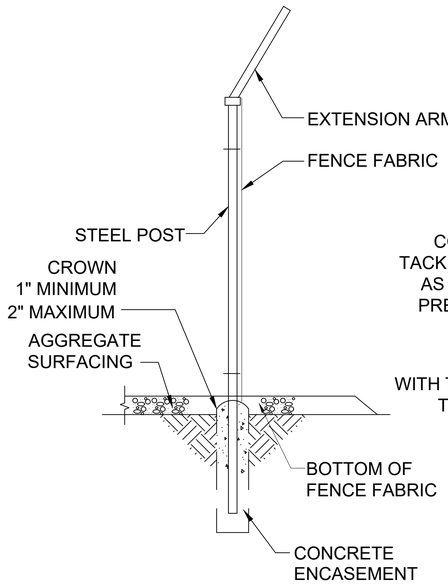
REVISION: A

G:\2025\25.01369_CVA\01_DRAWINGS\PLAN PRODUCTION\PERMITTING PLANS\FENCE DETAIL.DWG



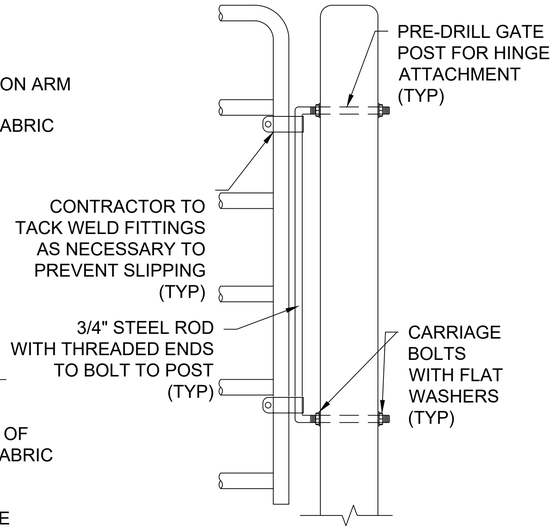
SECTION A-CT01

SCALE: NONE CT01



TYPICAL LINE POST DETAIL

N.T.S

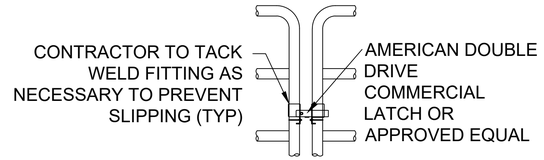


PIPE GATE HINGE DETAIL

N.T.S

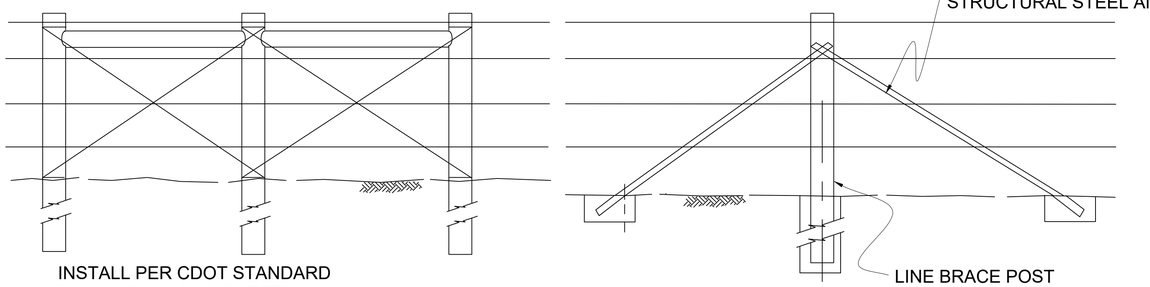
CHAIN LINK FENCE NOTES:

1. A TOTAL OF THREE 24' OPENING CANTILEVER GATES ARE REQUIRED. COUNTERBALANCE LENGTH IS TYPICALLY 50% BUT WILL BE DEPENDENT ON THE GATE MANUFACTURER DESIGN. FOUNDATIONS ARE TBD BASED ON RECOMMENDATIONS FROM THE SELECTED GATE MANUFACTURER.
2. ALL SWING GATES ARE TO SWING OUT ONLY.
3. REFER TO SPECIFICATION DIVISION 15.
4. GATES, GATE POSTS, AND GATE FOUNDATIONS TO BE DESIGNED BY GATE MANUF. GATE MANUF TO SUBMT DESIGN CALCULATIONS DEMONSTRATING COMPLIANCE WITH 2018 IBC. FOR GATE GROUNDING SEE DWG E04C.



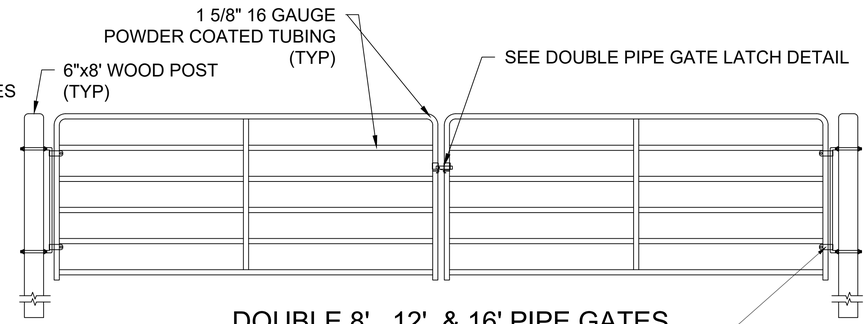
DOUBLE PIPE GATE LATCH DETAIL

N.T.S



SMOOTH WIRE FIELD FENCE DETAIL

N.T.S



DOUBLE 8' , 12', & 16' PIPE GATES

N.T.S

CITADEL BESS
PROJECT

DOUGLAS COUNTY, COLORADO

REV.	DATE	DESCRIPTION	BY
A	02/23/2026	ISSUE FOR COUNTY REVIEW	KJK

NAD83 COLORADO STATE PLANES,
CENTRAL ZONE, US FOOT

THIS DRAWING IS
PRELIMINARY AND IS
NOT TO BE USED FOR
CONSTRUCTION.
FOR REVIEW
PURPOSES ONLY.

Ulteig

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

PROJECT NUMBER: 25.01369
DESIGN BY: L. MOFFITT
DRAWN BY: L. MOFFITT
APPROVED BY: K. KNOTT

FENCE DETAIL 2

DRAWING NUMBER: CIT-C-501

REVISION: A

G:\2025\25.01369_CIVIL\01_DRAWINGS\PLAN PRODUCTION\PERMITTING PLANS\FENCE DETAIL.DWG

Citadel BESS Preliminary Drainage Report

Prepared for:

Madison Energy Infastructure
110 Greene St
New York, NY 10012

Prepared by:

Ulteig Engineers, Inc.
25.01369

Ulteig Denver Office
5575 DTC Parkway, Suite 200
Greenwood Village, CO 80111

TABLE OF CONTENTS

FIGURES

TABLES

REVISION HISTORY

REVISION	DATE	DESCRIPTION
Draft Report	10/03/2025	Draft Report for Client Review
Draft Report	2/18/2026	Draft Report for Client Review

ACRONYMS AND ABBREVIATIONS

%	percent
BESS	Battery Energy Storage System
CN	Curve Number
CONUS	Contiguous United States
CWA	Clean Water Act
DEM	Digital Elevation Map
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map
HEC-18	Hydraulic Engineering Circular No. 18
HEC-RAS	Hydraulic Engineering Center River Analysis System
HSG	Hydrologic Soil Group
LiDAR	Light Detection and Ranging
NFIP	National Flood Insurance Program
NLCD	National Land Cover Dataset
NOAA	National Oceanic and Atmospheric Administration
NRCS	Natural Resources Conservation Service
PFD	Precipitation Frequency Data
ROW	Right-of-way
SCS	Soil Conservations Service
SSA	Storm and Sanitary Analysis
TR-55	Technical Release No. 55
UDFCD	Urban Drainage and Flood Control District
Ulteig	Ulteig Engineers, Inc.
USACE	U.S. Army Corps of Engineers
WOUS	Waters of the United States

1. INTRODUCTION

Madison Energy Infastructure ("Client") has enlisted the services of Ulteig Engineering, Inc. ("Ulteig") to develop a stormwater management plan and design for the Citadel Battery Energy Storage System (BESS) Project in Douglas County, Colorado. This study includes hydrologic analysis of the runoff contributing to the project area and the hydraulic analysis of the proposed on-site stormwater management features. This report was submitted as part of the 30% design package. Revisions are anticipated as the project's design progresses.

1.1 Project Location and Description

The Citadel BESS project-leased property boundary ("property boundary") covers approximately 9.75 acres in Douglas County, Colorado. The project is located adjacent to the west of Interstate 25, south of West Plum Creek Parkway and located in unincorporated Douglas County, Colorado. The latitude and longitude of the site are approximately 39° 21' 19.97" N, 104° 52' 21.34" W, respectively. These coordinates represent the approximate center of the project area. The project limits are shown in **Figure A-1: Vicinity Map**.

Ground cover throughout the property is predominantly grassland herbaceous according to the National Land Cover Dataset (NLCD) 2021. Per aerial imagery, the existing vegetative cover of the project site appears sparse. Hydrologic Soil Group classifications for this area are predominantly Type B soils.

The existing topography of the project site generally consists of mild slopes, which typically range between 2.5% and 5%. The topography for the site was sourced from publicly available LiDAR data and client-provided LiDAR data. Existing site drainage flows from west to east.

The project is not located within a FEMA regulatory floodplain. Local or federal floodplain regulations do not apply to construction activities related to this project. A FEMA Zone AE flood hazard area is located 850 feet from the site, encompassing the East Plum Creek. The FEMA FIRM panel for the project area is 08035C0301G, effective March 16, 2016. **Figure A-2: FEMA Floodplain Map** shows the FEMA flood hazard area in proximity to the project area.

1.2 Proposed Development

The proposed project development includes the construction of a battery energy storage facility, associated access roads, and a stormwater management facility. The BESS pad and access roads will be gravel-surfaced. The project will result in approximately 2.04 acres of disturbance.

2. DRAINAGE BASINS AND SUB-BASINS

2.1 Existing Drainage Basins

In existing conditions, the project area is intersected by a natural ridgeline that runs from west to east. Three drainage basins have been delineated to reflect the natural flow patterns of runoff on-site. Offsite runoff from the west is naturally diverted around the project boundary and flows to the north and south of the project area. A map of the drainage areas, longest flow paths associated with the hydrologic calculations for the area, and the existing topographic contours is provided as **Figure B-1: Existing Drainage Areas Map**.

2.2 Proposed Drainage Basins

Proposed drainage basins have been delineated to reflect the changes to the project due to the proposed grading. The BESS pad has been graded to uniformly drain from west to east towards two stormwater storage facilities, splitting the existing drainage basins into three separate proposed basins. A map of the proposed drainage areas, longest flow paths, and proposed topographic contours is provided as **Figure B-2: Proposed Drainage Areas Map**.

3. DRAINAGE DESIGN CRITERIA

3.1 Regulations

The criteria detailed within the Douglas County Storm Drainage Design and Technical Criteria Manual governs the stormwater management regulations for the proposed project. These standards adhere to the criteria developed and presented within the UDFCD Manual.

The County requires that stormwater detention is provided for all new developments. The storage and release rate criteria are based on the 2-year and 100-year recurrence intervals. Best Management Practices (BMPs) must be implemented to enhance stormwater quality within all new developments in the County.

An extended detention basin design was selected as the stormwater storage best management practice for Citadel BESS. The basin is comprised of three zones; a water quality volume zone, excess urban runoff volume zone, and a flood control zone for extreme storm events (such as the 100-year storm). Additional details on the stormwater management facility design are provided in **Section 4**.

3.2 Hydrology

Hydrologic calculations for the proposed project were performed in compliance with Chapter 6: Hydrology of the Douglas County Storm Drainage Design and Technical Criteria Manual. The County Manual's procedures are based on the methodology presented in the UDFCD Manual, Volume 1. To complete the analysis, the Colorado Urban Hydrograph Procedure (CUHP) was utilized based on Snyder's unit hydrograph principle.

The 2-year and 100-year, 1-hour duration rainfall depths are 0.85 inches and 2.32 inches, respectively. As detailed in Section 2, there is approximately 1.52 total acres draining to the project area. In existing conditions, the total watershed imperviousness is 2.00% and in proposed conditions, the total watershed imperviousness is 57.84%. The total watershed length is approximately 300 feet. A printout that details the inputs and hydrologic calculations is provided in **Appendix B**.

Table 1. Percent Impervious and C-Values
Urban Storm Drainage Citeria Manual, Volume 1

Land Use or Surface Characteristics	Percentage Impervious (%)
Undeveloped Areas	
Historic Flow Analysis	2
Greenbelts, agricultural	2
Off-site flow analysis (when land use not defined)	45
Streets:	
Paved	100
Gravel (packed)	40

Runoff coefficients were determined by cross-referencing the percent impervious estimates with Table 6-7: Runoff Coefficients, "C", NRCS HSG B from Volume 1 of the UDFCD manual. The coefficients were selected based on the 100-year storm. A copy of Table 6-7 is included in **Appendix B**. **Figure B-5** and **Figure B-6** show the existing and proposed impervious values utilized for the site.

4. STORMWATER MANAGEMENT FACILITY DESIGN

4.1 Stormwater Conveyance Facilities

An 18" culvert has been designed in the eastern portion of the BESS area to convey runoff from the southern stormwater storage facility under the proposed access road before ultimately discharging into the stormwater storage facility in the northeastern corner of the project.

The hydraulic calculations for the culvert were completed utilizing HydroCAD version 10.20-c to reflect the dynamic condition of the culvert between the two basins. The culvert was sized to convey the 100-year storm

event and has a headwater to depth ratio of 0.68 during this storm event. The HydroCAD output report is included in **Appendix B.** Outlet erosion control measures and dimensions will be finalized during a future design phase. Rip-rap apron on the inlet and outlet sides of the culvert are anticipated.

4.2 Stormwater Storage Facilities

Chapter 13 of the Douglas County Technical Criteria Manual details the requirements for stormwater storage facilities within the County. The requirements within this chapter reference the storage chapter of Volume 2 of the UDFCD manual. As stated in Section 3.1, all new developments are subject to the storage and release rate criteria based on the 2-year and 100-year recurrence intervals. The detailed requirements for extended detention basins are as follows:

I. The Excess Urban Runoff Volume (EURV) must be captured and released slowly to reduce the discharge from the basin to a level that is less than or equal to pre-developed conditions for all storms greater than the 2-year storm.

II. The Water Quality Volume shall be attenuated with a target draw-down time of 40-hours. Calculations of the water quality control volume shall be completed in accordance with Equation 3-1 of Volume 3 of the USDCM Criteria Manual. This calculation considers the BMP type, draw-down time, and the imperviousness of the contributing drainage area.

III. The 100-year storm event must be released at a rate equal to 90 percent of the pre-developed discharge rate for the upstream watershed, in accordance with Volume 2 of the USDCM Criteria Manual.

IV. Freeboard for the detention facilities must be at least 1-foot above the computed water surface elevation.

The required EURV, water quality volume, and 100-year storm rate control volume were calculated within the MHFD Detention Spreadsheet. These calculations yielded results for Zone 1, Zone 2, and Zone 3 of 0.029, 0.066, and 0.051 acre-feet, respectively. A printout of the basin stage-storage table builder from the MHFD detention spreadsheet is attached in **Appendix B.**

Basin 2 was sized to provide all necessary treatment for the proposed site runoff, but Basin 1 is required to convey runoff from the southern half of the site to Basin 2. To analyze the dynamics of Basin 1 and Basin 2, a HydroCAD model was developed. This model utilizes the Rational Method and replicates the rainfall data utilized within the aforementioned CHUP runoff calculations within the MHFD detention spreadsheet. Output reports for the existing and proposed conditions HydroCAD models are included in **Appendix B**.

Table 2. Stormwater Storage Facilities Summary

Basin ID	Volume (cu. ft)	Water Quality Volume (ac-ft)	100-yr Water Surface Elevation (ft)	100-yr Runoff Rate (cfs)
Basin 1	4,514	0.01	6338.49	0.94
Basin 2	13,064	0.03	6338.49	1.09

As previously mentioned, Basin 1 discharges into Basin 2 through an 18” culvert. An outlet structure has been designed for Basin 2 that consists of three (3) 3/4-inch diameter orifices spaced at 6.7-inches vertically to draw-down the water quality volume and EURV, riser structure with a grate sloped at 4:1 and a Type C inlet, set with the leaning edge at a stage 1.85 feet above the basin bottom, and an ultimate outfall of an 18” culvert with a restrictor plate set 3.3 inches above the invert of the pipe. An emergency spillway has also been designed for extreme storm events, which is set at an elevation of 6339.00 ft. The 30% Civil Plans, which detail the basin and the location of the outlet structures, are included in **Appendix B**. A printout of the MHFD – Detention spreadsheet, which was utilized to complete the preliminary outlet control structure design, is also provided in **Appendix B.** Additional details on the outlet structures will be provided as the design progresses.

4.3 Water Quality Best Management Practices

Water quality capture volume is to be provided in the lower stage of the proposed stormwater storage facility. The basin will provide treatment for the proposed project site based on the design criteria for an extended detention basin, in compliance with the Urban Storm Drainage Criteria Manual, Volume 3.

Temporary erosion controls have been designed to mitigate sediment discharge and erosion on-site and off-site. The design of these measures is detailed within a separate report and the Erosion and Sediment Control Plan Sheet, which has been issued within the 30% civil design plans.

5. CONCLUSION

5.1 Compliance with Standards

All stormwater management facilities and their associated designs conform to the Douglas County standards and Mile High Flood District's Urban Storm Drainage Criteria. No variances are being requested for the project at this time.

5.2 Drainage Concept

The stormwater management design for the proposed Citadel BESS project was completed in compliance with the Douglas County, Colorado and UDFCD Drainage policies and standards. An extended detention basin has been designed for the project with three treatment zones; a water quality zone, an excess urban runoff volume zone, and a rate control zone for the 100-year storm. This basin is located on the northeastern side of the BESS pad. Runoff from the southern half of the BESS area is captured by a smaller basin (Basin 1) on the southeastern side of the pad, which is connected to the primary basin (Basin 2) through an 18" culvert. A preliminary outlet control structure and emergency spillway have been designed in compliance with the MHFD Detention Spreadsheet. Additional revisions to this report are anticipated as the project design progresses.

6. REFERENCES

Storm Drainage Design and Technical Criteria Manual. Douglas County, CA. 8 July, 2008.

Urban Storm Drainage Criteria Manual. MHFD. Volume 1-3. January 2016.

MHFD – Detention Technical Manual. Mile High Flood District, CO. March 2022.

Detention Design – MHFD – Detention v4.07. Mile High Flood District, CO. June 2025.

Environmental Systems Research Institute (ESRI). ArcGIS Release 10.7.1. Redlands, CA. 27 June 2019.

HydroCAD Software Solutions LLC, HydroCAD v. 10.20-6a. 2025.

Multi-Resolution Land Characteristics (MRLC) Consortium. National Land Cover Database (NLCD) 2021 Land Cover (CONUS). Date Accessed: December 2024.

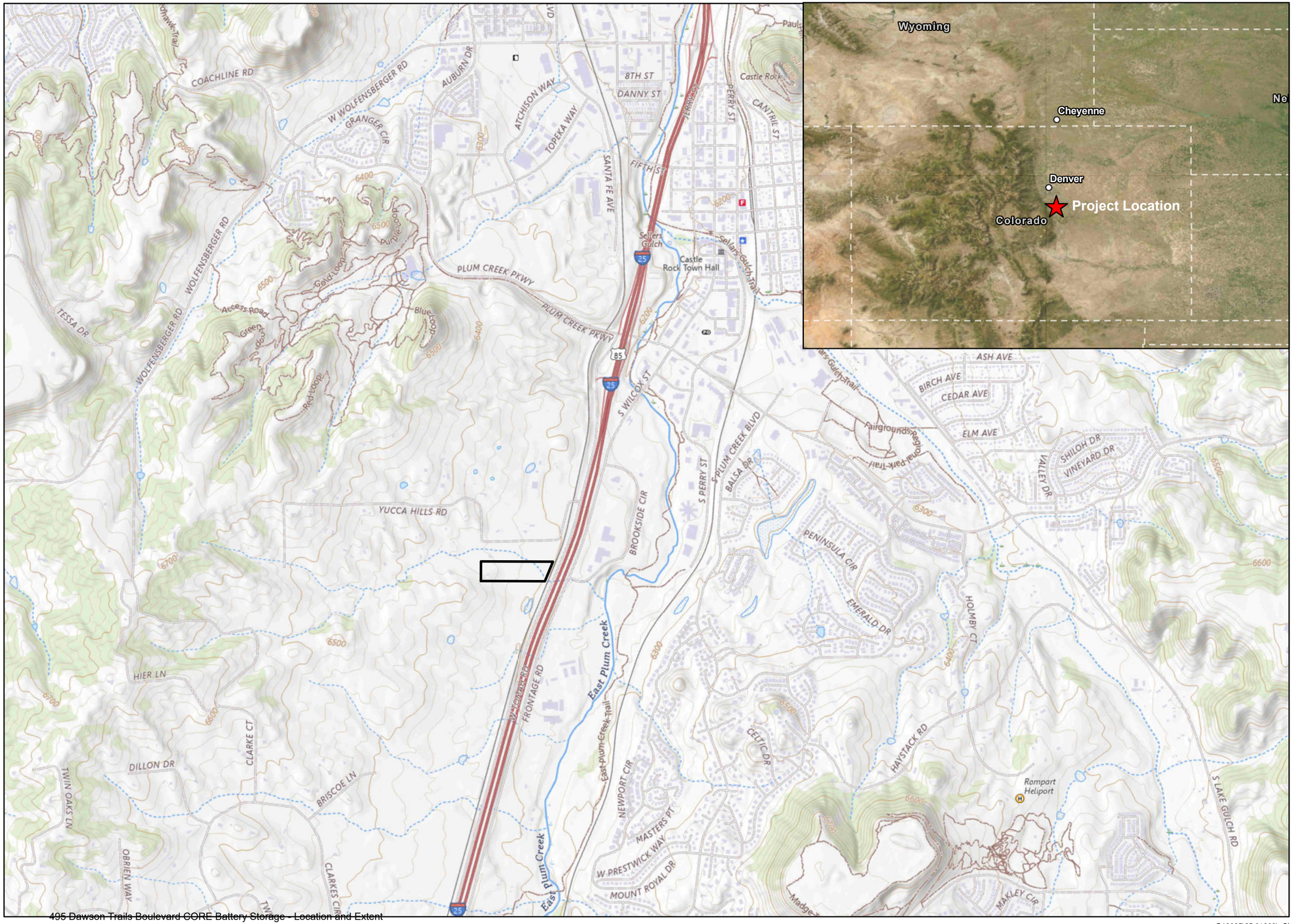
United States Geological Survey (USGS) 3DEP. Date Accessed: September 2025.

USDA Natural Resources Conservation Service (NRCS) Conservation Engineering Division, Urban Hydrology for Small Watersheds. Technical Release 55 (TR-55). USDASCS, Washington DC. 1986.

USDA Natural Resources Conservation Service (NRCS), Part 630 Hydrology National Engineering Handbook: Chapter 4 – Storm Rainfall Depth and Distribution. Amend Aug 2019.

USDA Natural Resources Conservation Service (NRCS) Web Soil Survey. Date Accessed: September 2025.

Appendix A. Project Location Maps



CITADEL BATTERY STORAGE PROJECT

DOUGLAS COUNTY, CO

Rev.	Date	Description	By
	10/03/2025	30% Submittal	UEI
	2/18/2026	30% Resubmittal	UEI

Legend

Project Boundary

N

0 1,000 2,000 Feet

NAD 1983 StatePlane Colorado Central
FIPS 0502, US Feet

PRELIMINARY
NOT FOR CONSTRUCTION

Ulteig
We listen. We solve.®

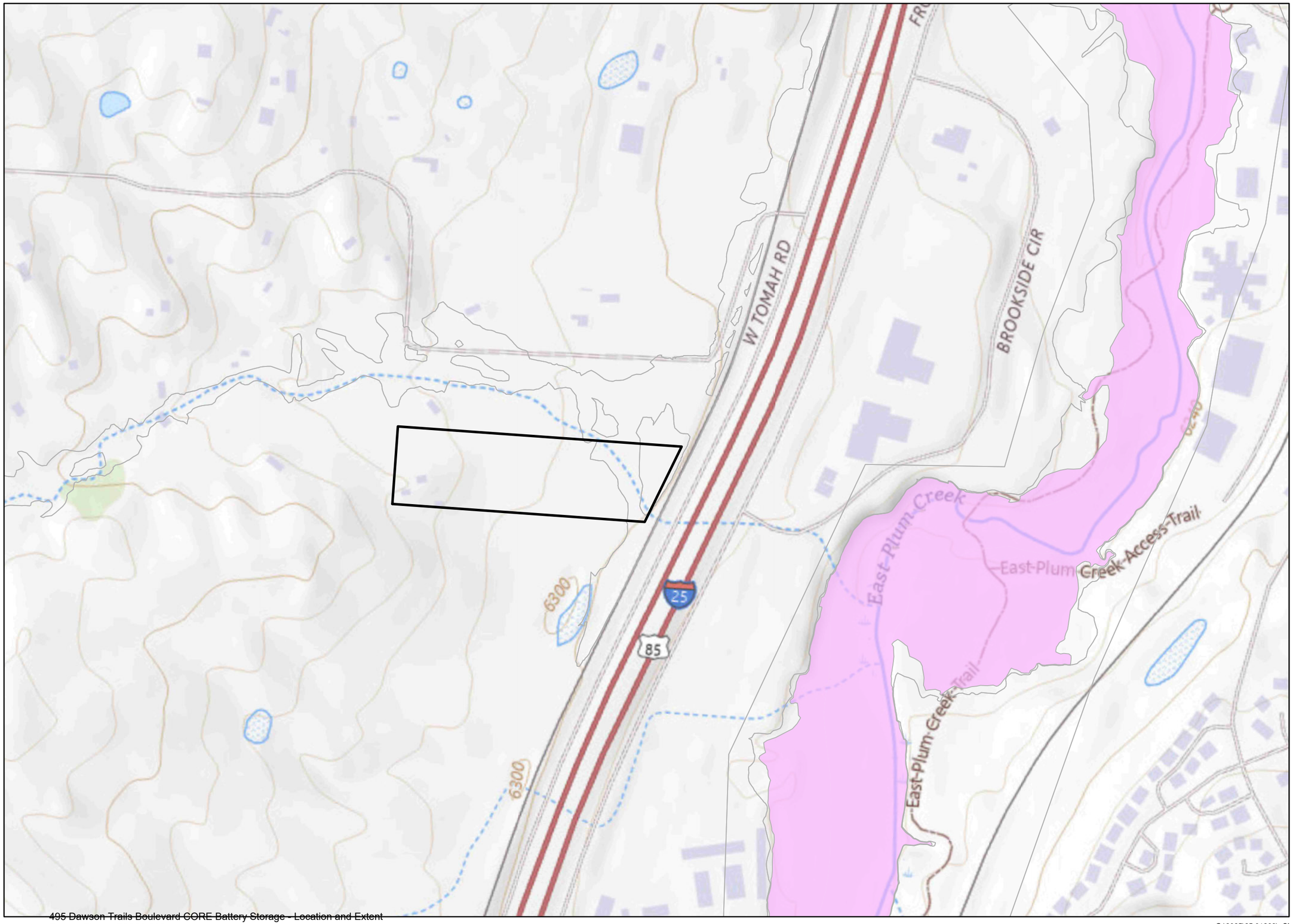
3350 38th Ave S
Fargo, North Dakota, 58104
Phone: 701.208.8500
Fax: 701.237.3191
www.ulteig.com

Drawn By:	L. LOKEN
Approved By:	C. PREST
Project Number:	25.01369

Figure A-1

VICINITY MAP

G:\2025\25.01369_Civil\03_Hydro Study\MXD\Citadel_Report_Figures.aprx



CITADEL BATTERY STORAGE PROJECT
DOUGLAS COUNTY, CO

Rev.	Date	Description	By
	10/03/2025	30% Submittal	UEI
	2/18/2026	30% Resubmittal	UEI

Legend

Project Boundary

FEMA Flood Hazard Area

AE

X

N

0 260 520 Feet

NAD 1983 StatePlane Colorado Central FIPS 0502, US Feet

PRELIMINARY
NOT FOR CONSTRUCTION

Ulteig
We listen. We solve.™
3350 38th Ave S
Fargo, North Dakota, 58104
Phone: 701.208.8500
Fax: 701.237.3191
www.ulteig.com

Drawn By:	L. LOKEN
Approved By:	C. PREST
Project Number:	25.01369

Figure A-2

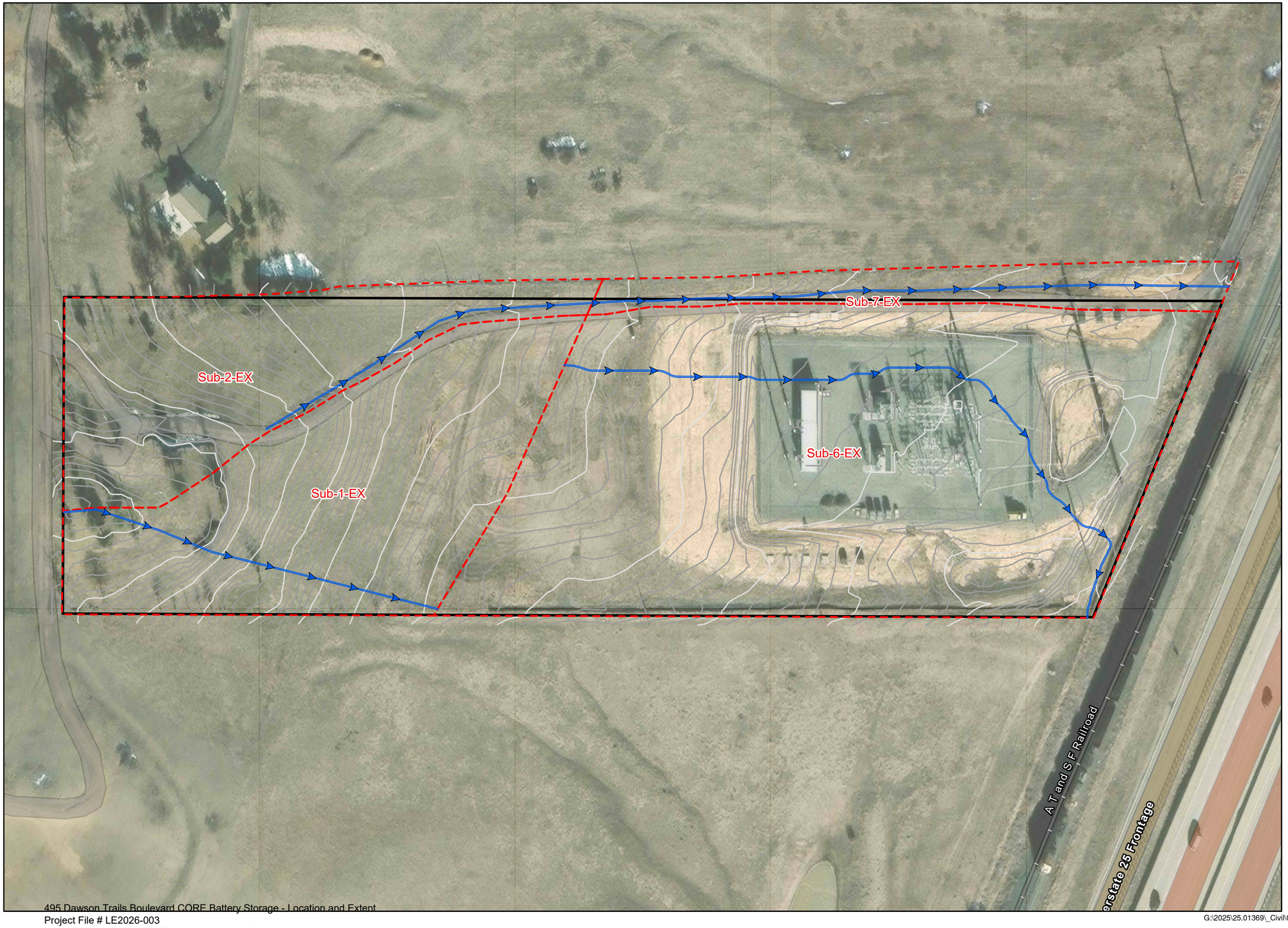
FEMA FLOODPLAIN MAP

G:\2025\25.01369_Civil\03_Hydro Study\MXD\Citadel_Report_Figures.aprx

Appendix B. Stormwater Calculations

Figure B-1 . Existing Drainage Areas Map
Figure B-2 . Proposed Drainage Areas Map
Figure B-3. Existing Conditions Land Cover Map
Figure B-4 . Hydrologic Soil Group Map
Figure B-5 . Existing Conditions Runoff Coefficients Map
Figure B-6 . Proposed Conditions Runoff Coefficients Map

NOAA Atlas 14 Point Precipitation Data Frequency Server Printout
Table 6-7: Runoff Coefficients, “c”, NRCS HSG B from UCFCD Manual Volume 1
MHFD Detention – CUHP Hydrologic Calculations Printout
Existing Conditions HydroCAD Output Report
Proposed Conditions HydroCAD Output Report
MHFD Detention – Outlet Control Structure Sizing Printout
Citadel BESS 30% Civil Design Plans



CITADEL BATTERY STORAGE PROJECT

DOUGLAS COUNTY, CO

Rev.	Date	Description	By
	10/03/2025	30% Submittal	UEI
	2/18/2026	30% Resubmittal	UEI

Legend

- Longest Flow Paths
- Existing Drainage Areas
- Project Boundary
- 5-ft Contours
- 1-ft Contours

N

0 50 100 Feet

NAD 1983 StatePlane Colorado Central FIPS 0502, US Feet

PRELIMINARY
NOT FOR CONSTRUCTION

Ulteig
We listen. We solve.®

3350 38th Ave S
Fargo, North Dakota, 58104
Phone: 701.208.8500
Fax: 701.237.3191
www.ulteig.com

Drawn By:	L. LOKEN
Approved By:	C. PREST
Project Number:	24.04082

Figure B-1

EXISTING DRAINAGE AREA MAP

495 Dawson Trails Boulevard CORE Battery Storage - Location and Extent

G:\2025\25.01369_Civil\03_Hydro Study\MXD\Citadel_Report_Figures.aprx

CITADEL BATTERY STORAGE PROJECT
DOUGLAS COUNTY, CO

Rev.	Date	Description	By
	10/03/2025	30% Submittal	UEI
	2/18/2026	30% Resubmittal	UEI

Legend

- Proposed Drainage Areas
- Longest Flow Paths
- Proposed Culverts
- Project Boundary
- 5-ft Contours
- 1-ft Contours
- Proposed Basin Footprints
- BESS Impervious Area

N

0 50 100 Feet

NAD 1983 StatePlane Colorado Central FIPS 0502, US Feet

PRELIMINARY
NOT FOR CONSTRUCTION

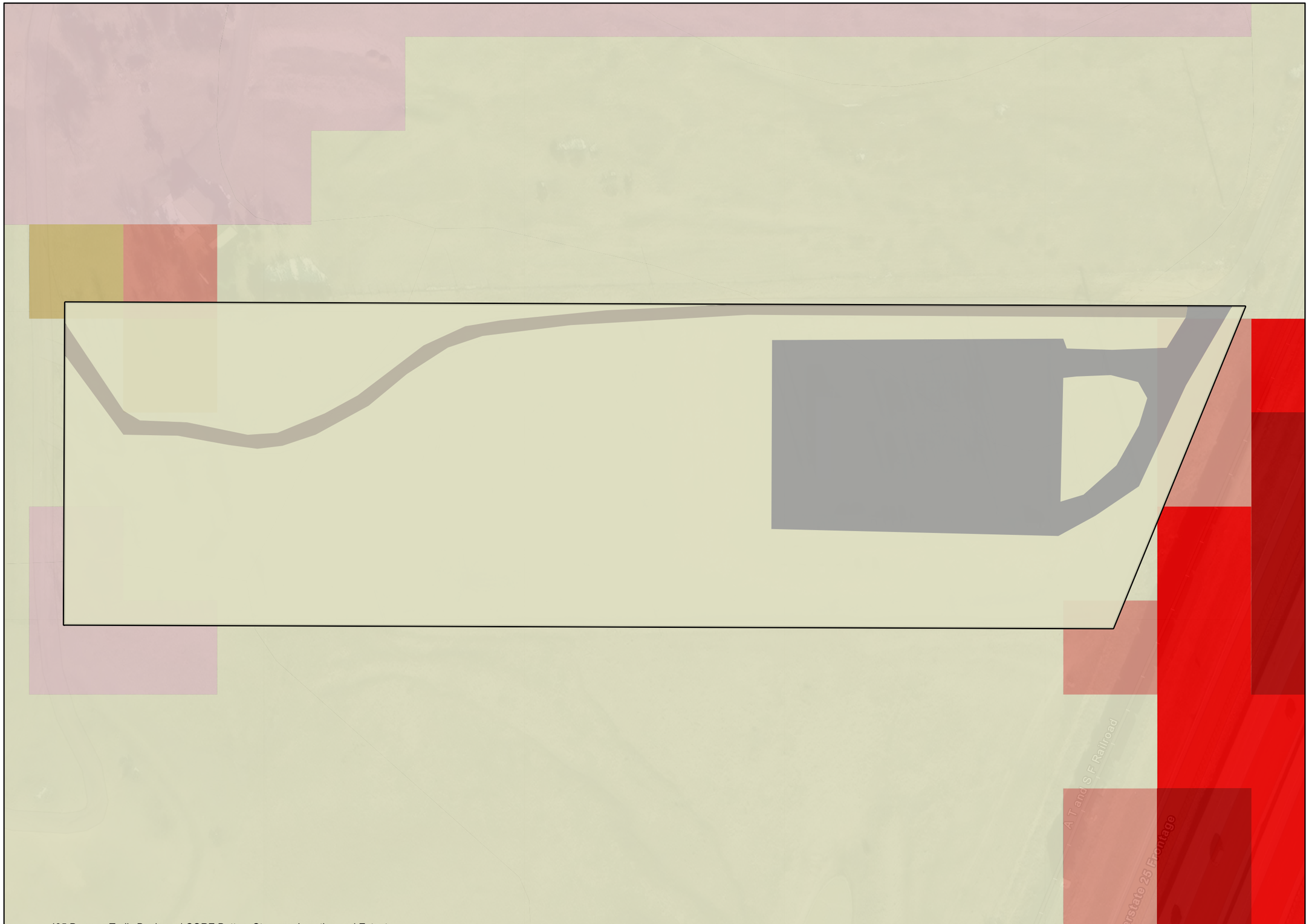
Ulteig
We listen. We solve.®
3350 38th Ave S
Fargo, North Dakota, 58104
Phone: 701.208.8500
Fax: 701.237.3191
www.ulteig.com

Drawn By:	L. LOKEN
Approved By:	C. PREST
Project Number:	24.04082

Figure B-2

PROPOSED DRAINAGE AREA MAP

G:\2025\25.01369_Civil\03_Hydro Study\MXD\Citadel_Report_Figures.aprx



CITADEL BATTERY STORAGE PROJECT
DOUGLAS COUNTY, CO

Rev.	Date	Description	By
	10/03/2025	30% Submittal	UEI
	2/18/2026	30% Resubmittal	UEI

Legend

Project Boundary

Existing Land Cover

- Developed, Open Space
- Developed, Low Intensity
- Developed, Medium Intensity
- Developed, High Intensity
- Shrub Scrub
- Grassland Herbaceous

N

0 75 150 Feet

NAD 1983 StatePlane Colorado Central FIPS 0502, US Feet

PRELIMINARY
NOT FOR CONSTRUCTION

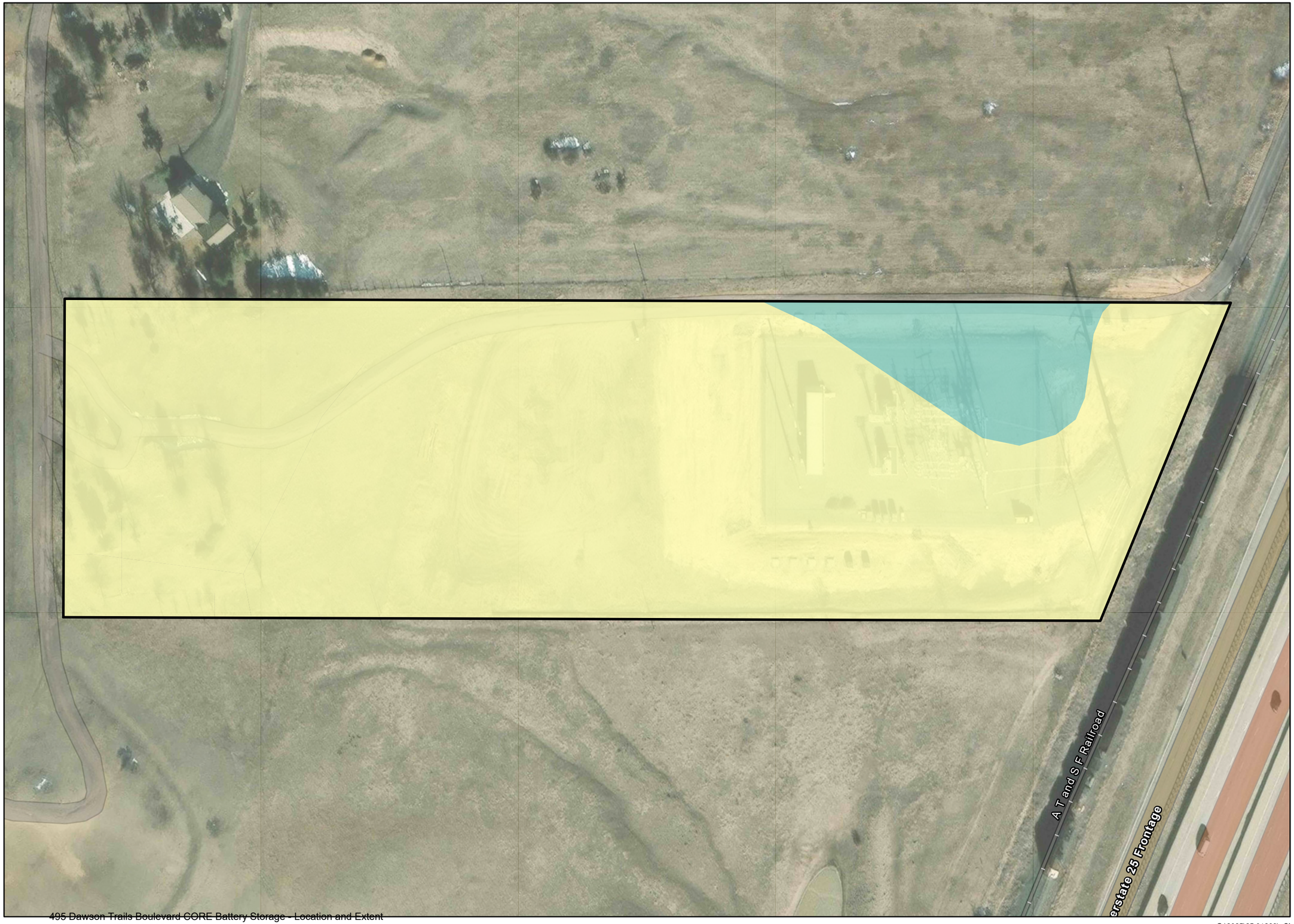
Ulteig
We listen. We solve.®
3350 38th Ave S
Fargo, North Dakota, 58104
Phone: 701.208.8500
Fax: 701.237.3191
www.ulteig.com

Drawn By:	L. LOKEN
Approved By:	C. PREST
Project Number:	24.04082

Figure C-2

EXISTING CONDITIONS
LAND COVER MAP

G:\2025\25.01369_Civil\03_Hydro Study\MXD\Citadel_Report_Figures.aprx



CITADEL BATTERY
STORAGE PROJECT
DOUGLAS COUNTY, CO

Rev.	Date	Description	By
	10/03/2025	30% Submittal	UEI
	2/18/2026	30% Resubmittal	UEI

Legend

Project Boundary

Hydrologic Soil Group

A

B

N

0 50 100 Feet

NAD 1983 StatePlane Colorado Central
FIPS 0502, US Feet

PRELIMINARY
NOT FOR CONSTRUCTION

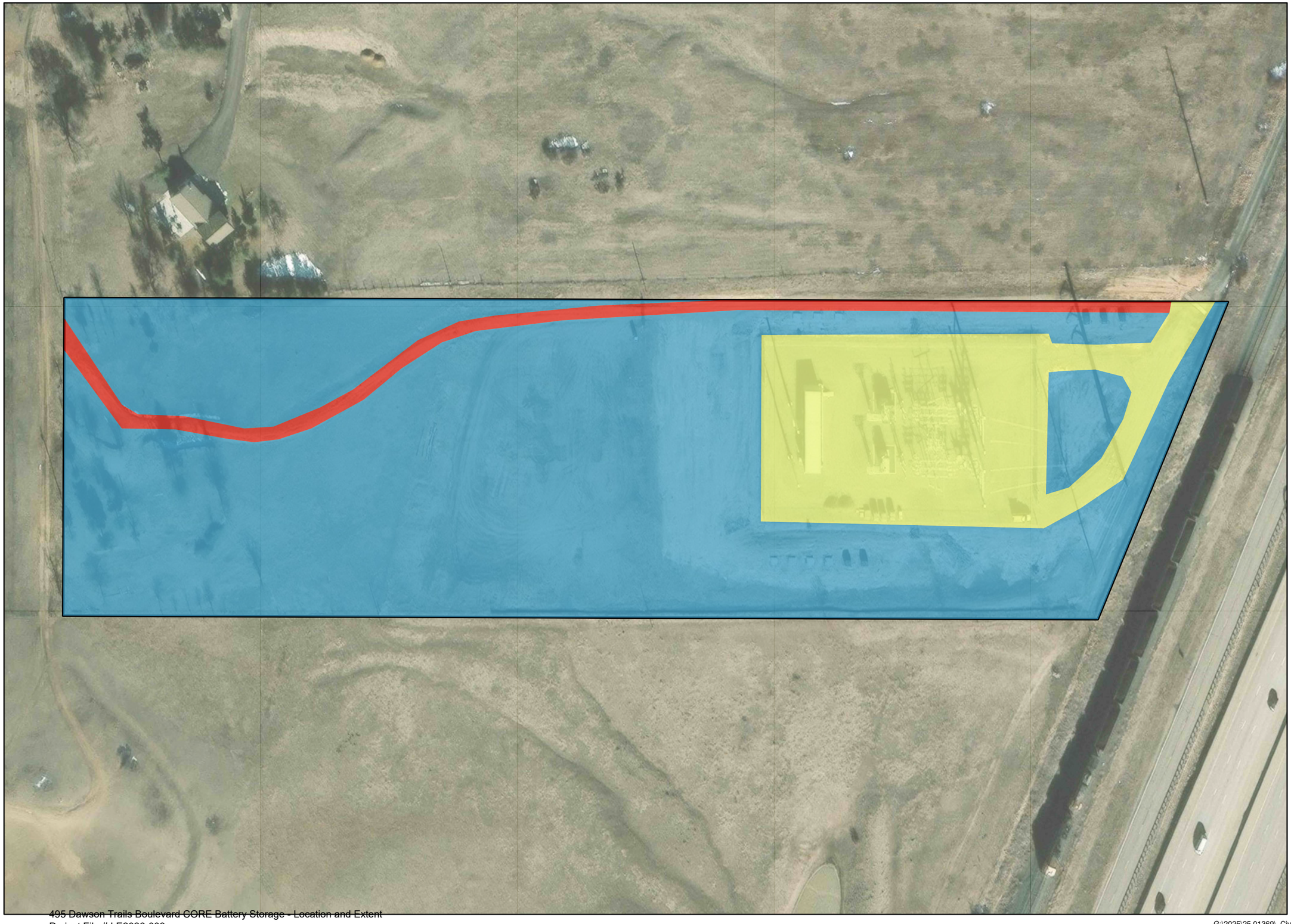
Ulteig
We listen. We solve.®
3350 38th Ave S
Fargo, North Dakota, 58104
Phone: 701.208.8500
Fax: 701.237.3191
www.ulteig.com

Drawn By:	L. LOKEN
Approved By:	C. PREST
Project Number:	24.04082

Figure B-4

HYDROLOGIC SOIL
GROUP MAP

G:\2025\25.01369_Civil\03_Hydro Study\MXD\Citadel_Report_Figures.aprx



CITADEL BATTERY
STORAGE PROJECT
DOUGLAS COUNTY, CO

Rev.	Date	Description	By
	10/03/2025	30% Submittal	UEI
	2/18/2026	30% Resubmittal	UEI

Legend

Percent Impervious

- Undeveloped Area - 2%
- Gravel (Packed) - 40%
- Paved - 100%
- Project Boundary

N

0 50 100 Feet

NAD 1983 StatePlane Colorado Central
FIPS 0502, US Feet

PRELIMINARY
NOT FOR CONSTRUCTION

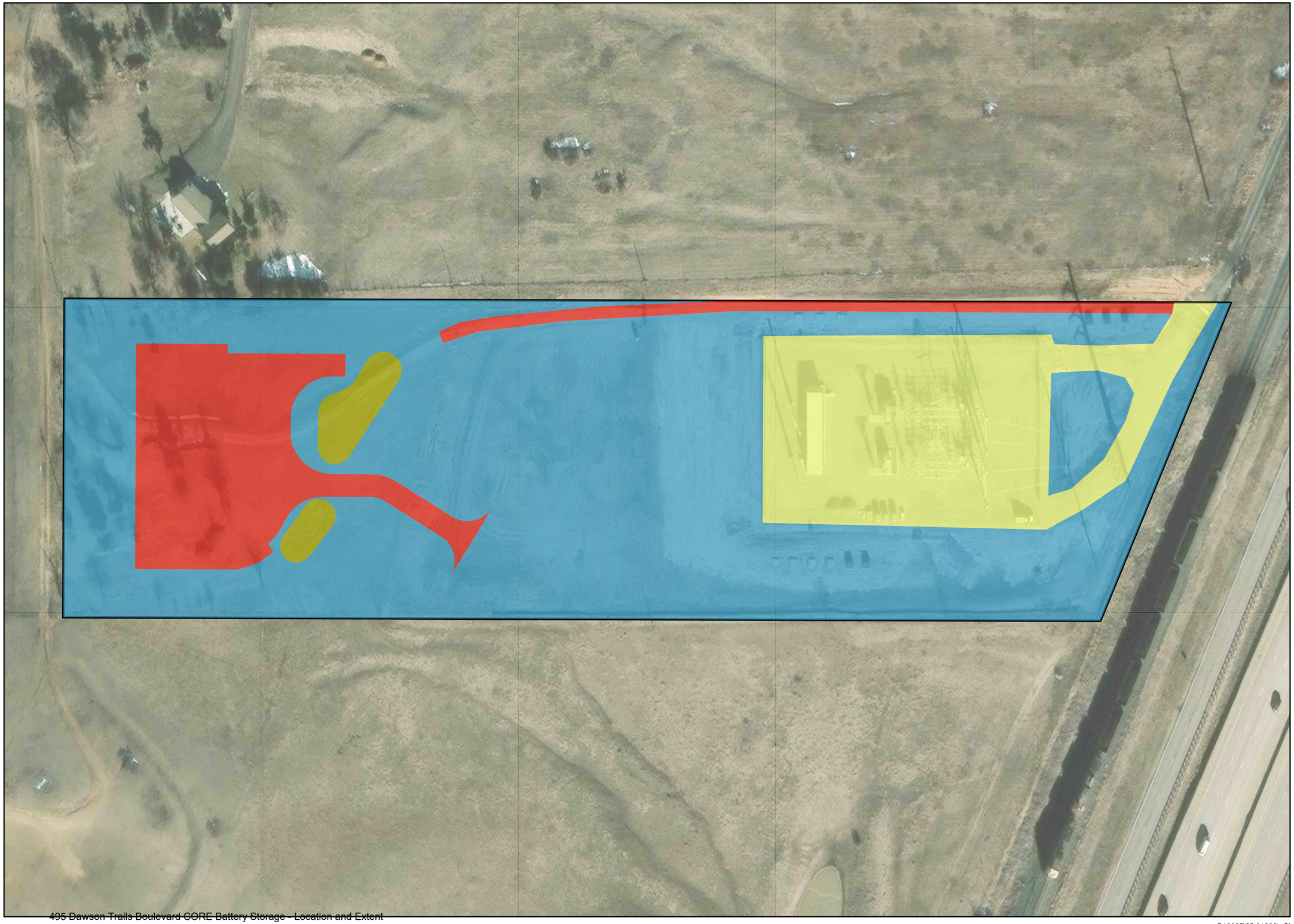
Ulteig
We listen. We solve.®
3350 38th Ave S
Fargo, North Dakota, 58104
Phone: 701.208.8500
Fax: 701.237.3191
www.ulteig.com

Drawn By:	L. LOKEN
Approved By:	C. PREST
Project Number:	24.04082

Figure B-5

EXISTING CONDITIONS
PERCENT IMPERVIOUS
MAP

G:\2025\25.01369_Civil\03_Hydro Study\MXD\Citadel_Report_Figures.aprx



CITADEL BATTERY STORAGE PROJECT
DOUGLAS COUNTY, CO

Rev.	Date	Description	By
	10/03/2025	30% Submittal	UEI
	2/18/2026	30% Resubmittal	UEI

Legend

Percent Impervious

- Undeveloped Area - 2%
- Gravel (Packed) - 40%
- Paved - 100%
- Other Impervious - 100%
- Project Boundary

N

0 50 100 Feet

NAD 1983 StatePlane Colorado Central
FIPS 0502, US Feet

PRELIMINARY
NOT FOR CONSTRUCTION

Ulteig
We listen. We solve.®
3350 38th Ave S
Fargo, North Dakota, 58104
Phone: 701.208.8500
Fax: 701.237.3191
www.ulteig.com

Drawn By:	L. LOKEN
Approved By:	C. PREST
Project Number:	24.04082

Figure B-6

PROPOSED CONDITIONS
PERCENT IMPERVIOUS
MAP

G:\2025\25.01369_Civil\03_Hydro Study\MXD\Citadel_Report_Figures.aprx

NOAA Atlas 14, Volume 8, Version 2
Location name: Castle Rock, Colorado, USA*
Latitude: 39.3591°, Longitude: -104.8699°
Elevation: 6290 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Deborah Martin, Sandra Pavlovic, Ishani Roy, Michael St. Laurent, Carl Trypaluk, Dale Unruh, Michael Yekta, Geoffery Bonnin

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	**0.228** (0.191-0.276)	**0.290** (0.242-0.352)	**0.393** (0.327-0.478)	**0.480** (0.397-0.587)	**0.604** (0.480-0.764)	**0.701** (0.543-0.899)	**0.801** (0.596-1.05)	**0.904** (0.641-1.22)	**1.04** (0.708-1.44)	**1.15** (0.759-1.62)
10-min	**0.334** (0.279-0.405)	**0.424** (0.354-0.515)	**0.575** (0.479-0.700)	**0.703** (0.581-0.859)	**0.884** (0.703-1.12)	**1.03** (0.794-1.32)	**1.17** (0.872-1.54)	**1.32** (0.939-1.78)	**1.53** (1.04-2.11)	**1.68** (1.11-2.36)
15-min	**0.407** (0.341-0.494)	**0.517** (0.432-0.628)	**0.701** (0.584-0.853)	**0.858** (0.709-1.05)	**1.08** (0.857-1.36)	**1.25** (0.969-1.60)	**1.43** (1.06-1.88)	**1.61** (1.14-2.18)	**1.86** (1.26-2.58)	**2.06** (1.36-2.88)
30-min	**0.538** (0.450-0.652)	**0.685** (0.572-0.831)	**0.930** (0.774-1.13)	**1.14** (0.940-1.39)	**1.43** (1.13-1.81)	**1.66** (1.28-2.12)	**1.89** (1.41-2.48)	**2.13** (1.51-2.87)	**2.46** (1.67-3.40)	**2.71** (1.78-3.80)
60-min	**0.683** (0.571-0.828)	**0.848** (0.709-1.03)	**1.13** (0.941-1.38)	**1.38** (1.14-1.68)	**1.73** (1.38-2.21)	**2.02** (1.57-2.60)	**2.32** (1.73-3.06)	**2.64** (1.88-3.57)	**3.08** (2.09-4.27)	**3.42** (2.26-4.80)
2-hr	**0.828** (0.697-0.998)	**1.01** (0.850-1.22)	**1.33** (1.12-1.61)	**1.62** (1.34-1.96)	**2.04** (1.64-2.59)	**2.39** (1.87-3.06)	**2.76** (2.07-3.62)	**3.15** (2.26-4.24)	**3.70** (2.54-5.11)	**4.14** (2.75-5.77)
3-hr	**0.934** (0.787-1.12)	**1.12** (0.942-1.34)	**1.45** (1.22-1.74)	**1.75** (1.46-2.12)	**2.21** (1.79-2.81)	**2.60** (2.04-3.33)	**3.02** (2.28-3.95)	**3.47** (2.50-4.66)	**4.11** (2.83-5.66)	**4.63** (3.08-6.42)
6-hr	**1.14** (0.964-1.36)	**1.34** (1.14-1.60)	**1.72** (1.45-2.05)	**2.06** (1.73-2.48)	**2.60** (2.12-3.28)	**3.05** (2.42-3.89)	**3.54** (2.70-4.62)	**4.08** (2.97-5.46)	**4.86** (3.37-6.66)	**5.48** (3.68-7.56)
12-hr	**1.38** (1.17-1.63)	**1.63** (1.39-1.93)	**2.09** (1.77-2.48)	**2.51** (2.11-2.99)	**3.13** (2.56-3.91)	**3.65** (2.90-4.60)	**4.21** (3.22-5.43)	**4.81** (3.51-6.36)	**5.66** (3.95-7.69)	**6.34** (4.29-8.69)
24-hr	**1.65** (1.42-1.94)	**1.97** (1.68-2.31)	**2.51** (2.14-2.96)	**2.99** (2.54-3.54)	**3.69** (3.03-4.55)	**4.27** (3.40-5.32)	**4.86** (3.74-6.21)	**5.50** (4.03-7.21)	**6.38** (4.48-8.59)	**7.09** (4.82-9.64)
2-day	**1.95** (1.68-2.27)	**2.31** (1.99-2.70)	**2.92** (2.51-3.42)	**3.45** (2.94-4.06)	**4.21** (3.46-5.13)	**4.81** (3.86-5.94)	**5.44** (4.20-6.88)	**6.09** (4.49-7.91)	**6.99** (4.94-9.32)	**7.69** (5.28-10.4)
3-day	**2.12** (1.83-2.46)	**2.51** (2.17-2.92)	**3.17** (2.73-3.70)	**3.74** (3.19-4.37)	**4.53** (3.74-5.49)	**5.17** (4.15-6.34)	**5.82** (4.50-7.31)	**6.49** (4.80-8.38)	**7.41** (5.25-9.83)	**8.12** (5.59-10.9)
4-day	**2.25** (1.95-2.60)	**2.66** (2.30-3.09)	**3.36** (2.89-3.90)	**3.94** (3.38-4.60)	**4.78** (3.95-5.76)	**5.43** (4.38-6.64)	**6.10** (4.74-7.65)	**6.80** (5.04-8.75)	**7.74** (5.50-10.2)	**8.47** (5.85-11.4)
7-day	**2.60** (2.26-3.00)	**3.04** (2.64-3.50)	**3.77** (3.26-4.35)	**4.39** (3.78-5.10)	**5.28** (4.39-6.34)	**5.98** (4.85-7.28)	**6.71** (5.24-8.36)	**7.46** (5.57-9.55)	**8.49** (6.07-11.2)	**9.28** (6.45-12.4)
10-day	**2.92** (2.55-3.35)	**3.38** (2.94-3.87)	**4.14** (3.59-4.76)	**4.79** (4.14-5.54)	**5.72** (4.77-6.84)	**6.46** (5.25-7.83)	**7.22** (5.65-8.96)	**8.01** (6.00-10.2)	**9.09** (6.53-11.9)	**9.93** (6.93-13.2)
20-day	**3.84** (3.37-4.37)	**4.38** (3.84-4.99)	**5.28** (4.61-6.03)	**6.04** (5.24-6.93)	**7.09** (5.94-8.40)	**7.92** (6.47-9.51)	**8.76** (6.90-10.8)	**9.62** (7.24-12.2)	**10.8** (7.78-14.0)	**11.7** (8.19-15.4)
30-day	**4.59** (4.04-5.20)	**5.23** (4.60-5.93)	**6.27** (5.50-7.14)	**7.13** (6.21-8.15)	**8.31** (6.97-9.76)	**9.21** (7.55-11.0)	**10.1** (7.98-12.4)	**11.0** (8.32-13.8)	**12.2** (8.85-15.8)	**13.1** (9.25-17.2)
45-day	**5.52** (4.88-6.23)	**6.30** (5.56-7.12)	**7.55** (6.64-8.55)	**8.56** (7.48-9.73)	**9.90** (8.32-11.5)	**10.9** (8.96-12.9)	**11.9** (9.41-14.4)	**12.9** (9.74-16.0)	**14.1** (10.2-18.1)	**15.0** (10.6-19.6)
60-day	**6.31** (5.58-7.10)	**7.21** (6.38-8.12)	**8.64** (7.62-9.76)	**9.78** (8.57-11.1)	**11.3** (9.49-13.1)	**12.4** (10.2-14.6)	**13.5** (10.7-16.2)	**14.5** (11.0-18.0)	**15.8** (11.5-20.1)	**16.7** (11.8-21.8)

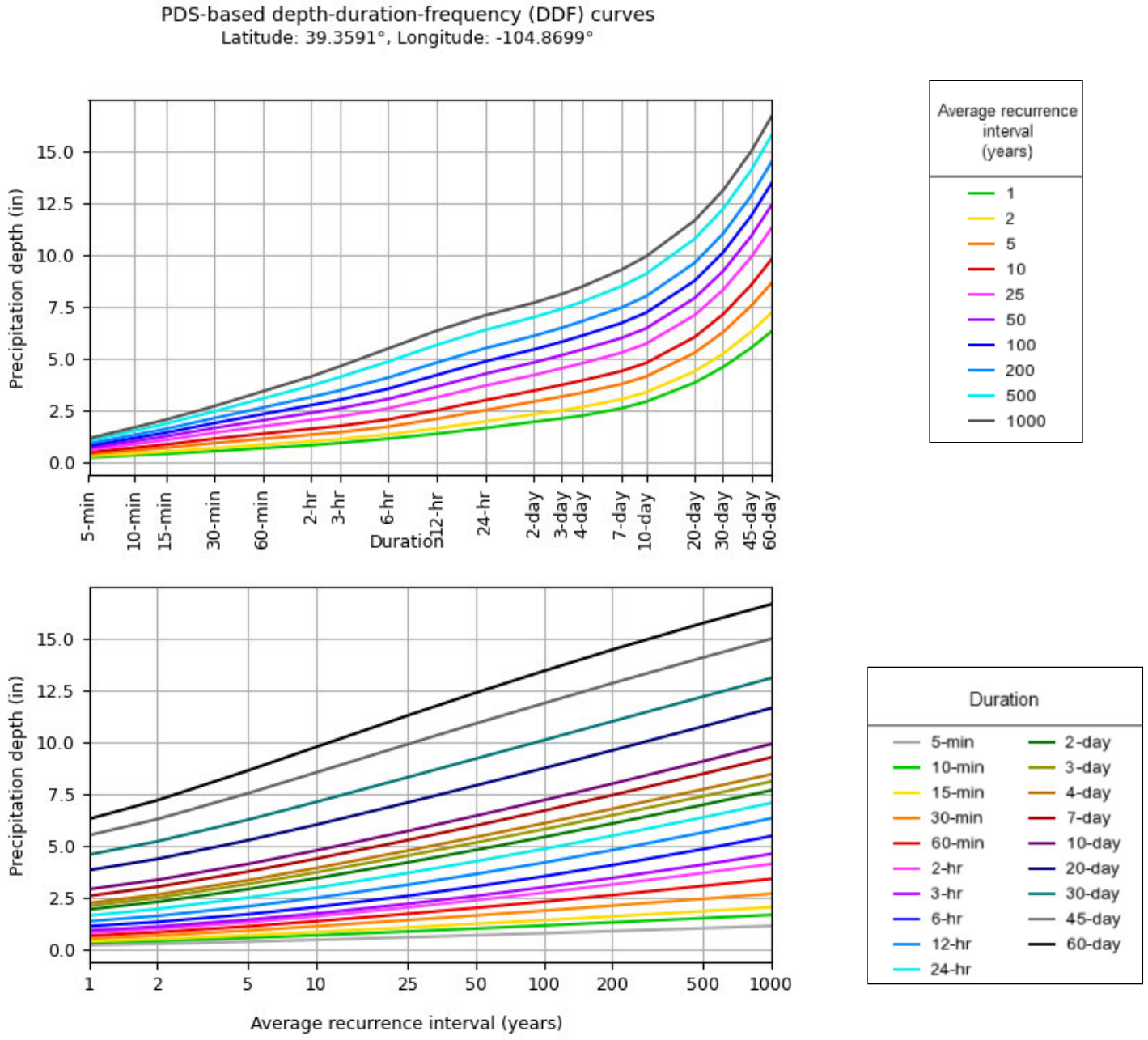
[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

Back to Top

PF graphical



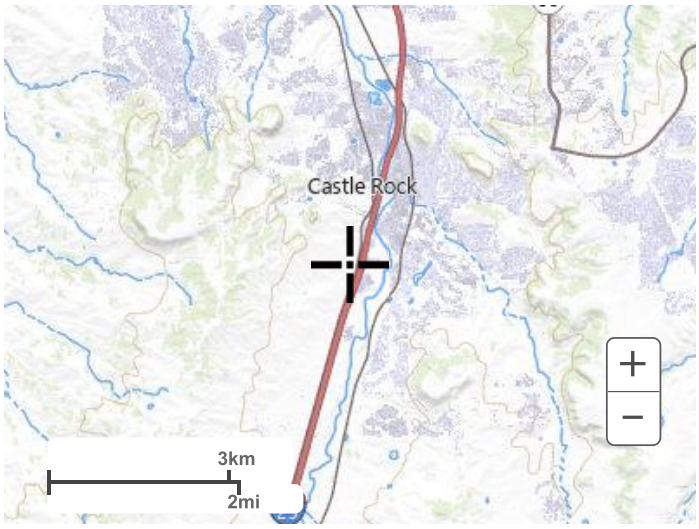
NOAA Atlas 14, Volume 8, Version 2

Created (GMT): Fri Oct 3 18:20:18 2025

Back to Top

Maps & aerials

Small scale terrain



Large scale terrain

Large scale map

Large scale aerial

Back to Top

US Department of Commerce
National Oceanic and Atmospheric Administration
National Weather Service
National Water Center
1325 East West Highway
Silver Spring, MD 20910
Questions?: HDSC.Questions@noaa.gov

TABLE 6-7. RUNOFF COEFFICIENTS, *C*, NRCS HSG B

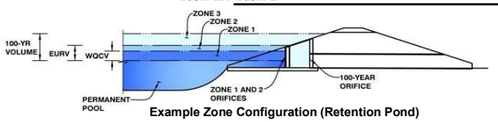
TOTAL OR EFFECTIVE % IMPERVIOUS	NRCS HSG B						
	WQE & 2-Year	5-Year	10-Year	25-Year	50-Year	100-Year	500-Year
2%	0.01	0.01	0.07	0.26	0.34	0.44	0.54
5%	0.03	0.03	0.10	0.28	0.36	0.45	0.55
10%	0.06	0.07	0.14	0.31	0.38	0.47	0.57
15%	0.09	0.11	0.18	0.34	0.41	0.50	0.59
20%	0.13	0.15	0.22	0.37	0.44	0.52	0.61
25%	0.17	0.19	0.26	0.41	0.47	0.54	0.63
30%	0.20	0.23	0.30	0.44	0.50	0.57	0.65
35%	0.24	0.27	0.34	0.47	0.52	0.59	0.66
40%	0.29	0.32	0.38	0.50	0.55	0.61	0.68
45%	0.33	0.36	0.42	0.53	0.58	0.64	0.70
50%	0.37	0.40	0.46	0.56	0.61	0.66	0.72
55%	0.42	0.45	0.50	0.59	0.63	0.68	0.74
60%	0.46	0.49	0.54	0.63	0.66	0.71	0.76
65%	0.50	0.54	0.58	0.66	0.69	0.73	0.77
70%	0.55	0.58	0.62	0.69	0.72	0.75	0.79
75%	0.60	0.63	0.66	0.72	0.75	0.77	0.81
80%	0.64	0.67	0.70	0.75	0.77	0.80	0.83
85%	0.69	0.72	0.74	0.78	0.80	0.82	0.85
90%	0.74	0.76	0.78	0.81	0.83	0.84	0.87
95%	0.79	0.81	0.82	0.85	0.86	0.87	0.88
100%	0.84	0.86	0.86	0.88	0.89	0.89	0.90

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

MHFD-Detention, Version 4.07 (June 2025)

Project: Citadel Battery Storage

Basin ID: Basin 2



Example Zone Configuration (Retention Pond)

Watershed Information

Selected SCM Type =	EDB	
Watershed Area =	1.55	acres
Watershed Length =	300	ft
Watershed Length to Centroid =	150	ft
Watershed Slope =	0.037	ft/ft
Watershed Imperviousness =	53.46%	percent
Percentage Hydrologic Soil Group A =	0.0%	percent
Percentage Hydrologic Soil Group B =	100.0%	percent
Percentage Hydrologic Soil Groups C/D =	0.0%	percent
Target WQCV Drain Time =	40.0	hours
Location for 1-hr Rainfall Depths =	Castle Pines - City Office	

After providing required inputs above including 1-hour rainfall depths, click 'Run CUHP' to generate runoff hydrographs using the embedded Colorado Urban Hydrograph Procedure.

		Optional User Overrides	
Water Quality Capture Volume (WQCV) =	0.028 acre-feet		acre-feet
Excess Urban Runoff Volume (EURV) =	0.089 acre-feet		acre-feet
2-yr Runoff Volume (P1 = 0.85 in.) =	0.049 acre-feet	0.85	inches
5-yr Runoff Volume (P1 = 1.14 in.) =	0.071 acre-feet	1.14	inches
10-yr Runoff Volume (P1 = 1.38 in.) =	0.096 acre-feet	1.38	inches
25-yr Runoff Volume (P1 = 1.74 in.) =	0.143 acre-feet	1.74	inches
50-yr Runoff Volume (P1 = 2.03 in.) =	0.178 acre-feet	2.03	inches
100-yr Runoff Volume (P1 = 2.33 in.) =	0.219 acre-feet	2.33	inches
500-yr Runoff Volume (P1 = 3.08 in.) =	0.312 acre-feet	3.08	inches
Approximate 2-yr Detention Volume =	0.048 acre-feet		
Approximate 5-yr Detention Volume =	0.070 acre-feet		
Approximate 10-yr Detention Volume =	0.095 acre-feet		
Approximate 25-yr Detention Volume =	0.114 acre-feet		
Approximate 50-yr Detention Volume =	0.124 acre-feet		
Approximate 100-yr Detention Volume =	0.140 acre-feet		

Define Zones and Basin Geometry

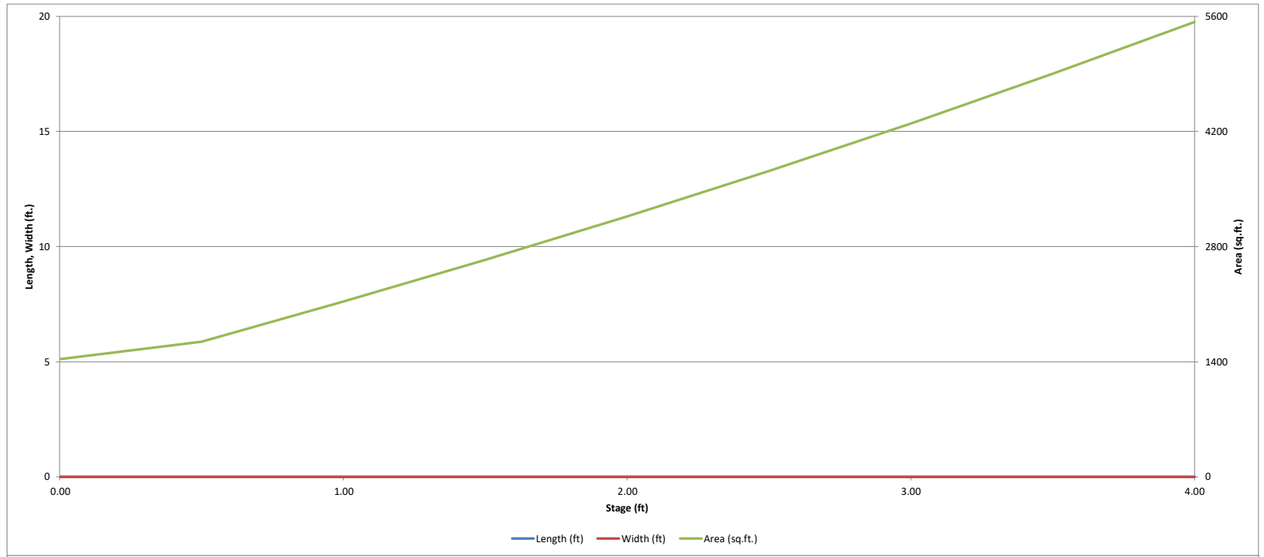
Zone 1 Volume (WQCV) =	0.028	acre-feet
Zone 2 Volume (EURV - Zone 1) =	0.061	acre-feet
Zone 3 Volume (100-year - Zones 1 & 2) =	0.052	acre-feet
Total Detention Basin Volume =	0.140	acre-feet
Initial Surcharge Volume (ISV) =	user	ft^3
Initial Surcharge Depth (ISD) =	user	ft
Total Available Detention Depth (H_{total}) =	user	ft
Depth of Trickle Channel (H_{TC}) =	user	ft
Slope of Trickle Channel (S_{TC}) =	user	ft/ft
Slopes of Main Basin Sides (S_{main}) =	user	H:V
Basin Length-to-Width Ratio ($R_{L/W}$) =	user	
Initial Surcharge Area (A_{ISV}) =	user	ft^2
Surcharge Volume Length (L_{ISV}) =	user	ft
Surcharge Volume Width (W_{ISV}) =	user	ft
Depth of Basin Floor (H_{FLOOR}) =	user	ft
Length of Basin Floor (L_{FLOOR}) =	user	ft
Width of Basin Floor (W_{FLOOR}) =	user	ft
Area of Basin Floor (A_{FLOOR}) =	user	ft^2
Volume of Basin Floor (V_{FLOOR}) =	user	ft^3
Depth of Main Basin (H_{MAIN}) =	user	ft
Length of Main Basin (L_{MAIN}) =	user	ft
Width of Main Basin (W_{MAIN}) =	user	ft
Area of Main Basin (A_{MAIN}) =	user	ft^2
Volume of Main Basin (V_{MAIN}) =	user	ft^3
Calculated Total Basin Volume (V_{total}) =	**user**	acre-feet

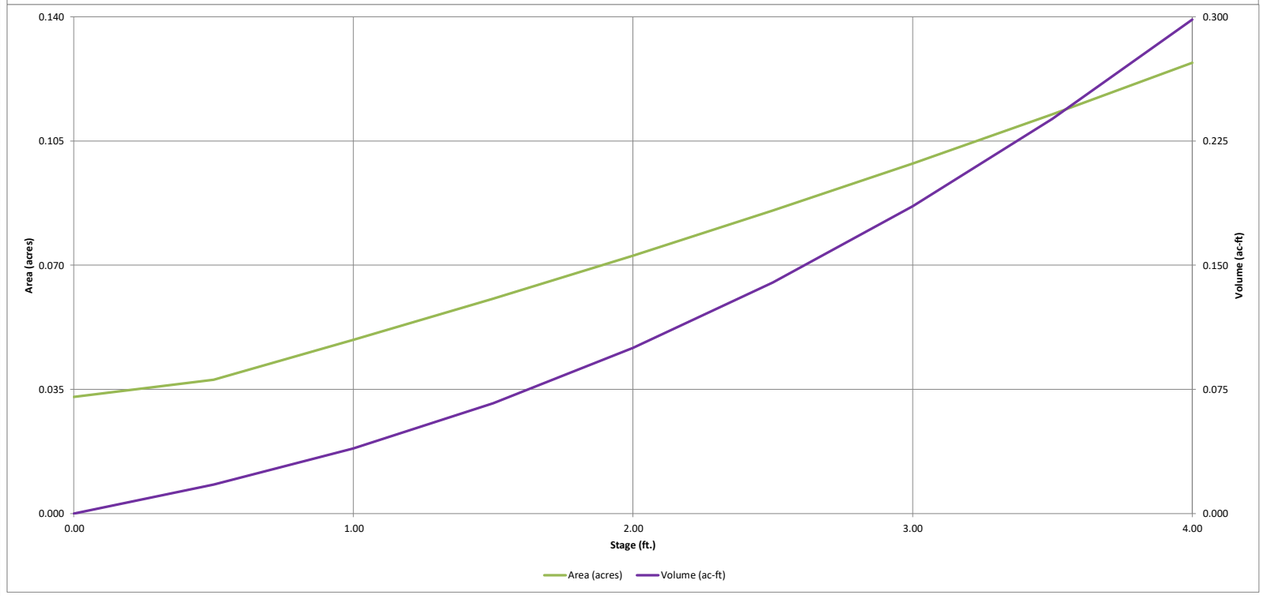
Depth Increment = 0.50 ft

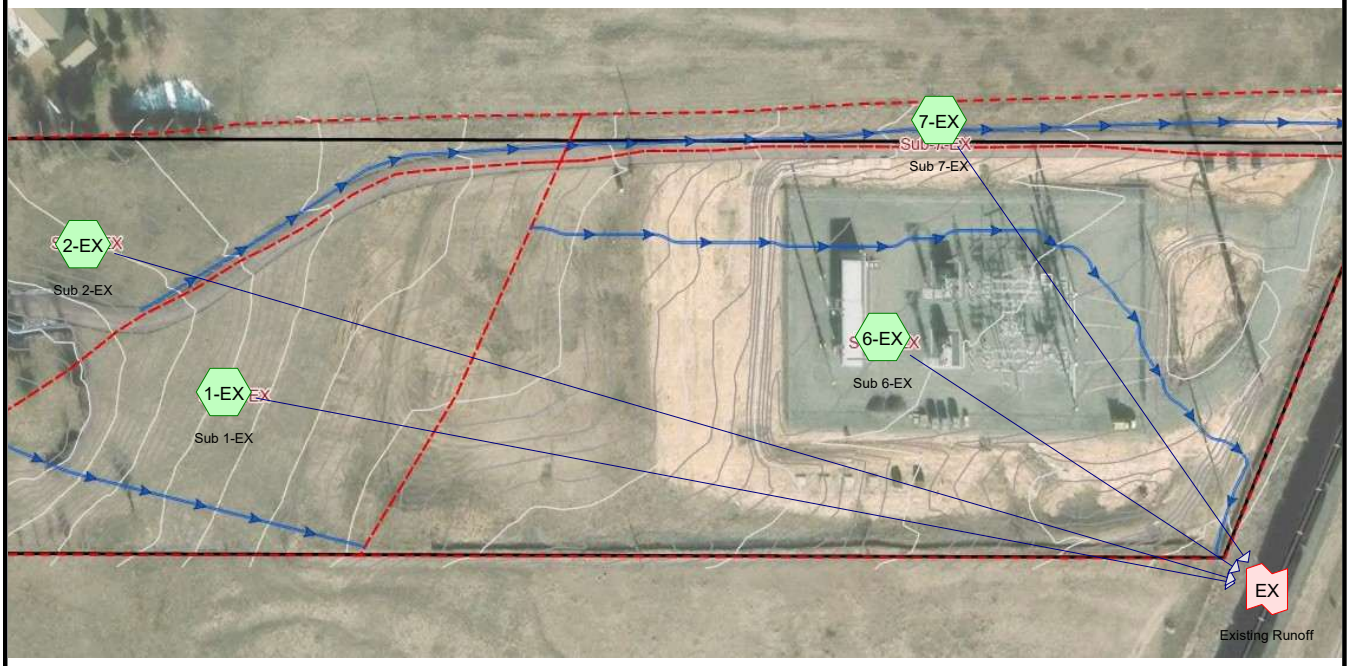
Stage - Storage Description	Stage (ft)	Optional Override Stage (ft)	Length (ft)	Width (ft)	Area (ft^2)	Optional Override Area (ft^2)	Area (acre)	Volume (ft^3)	Volume (ac-ft)
Top of Micropool	--	0.00	--	--	--	1,433	0.033		
6336.5	--	0.50	--	--	--	1,644	0.038	769	0.018
6337	--	1.00	--	--	--	2,134	0.049	1,714	0.039
6337.5	--	1.50	--	--	--	2,638	0.061	2,907	0.067
6338	--	2.00	--	--	--	3,166	0.073	4,358	0.100
6338.5	--	2.50	--	--	--	3,720	0.085	6,079	0.140
6339	--	3.00	--	--	--	4,298	0.099	8,084	0.186
6339.5	--	3.50	--	--	--	4,902	0.113	10,384	0.238
6340	--	4.00	--	--	--	5,533	0.127	12,992	0.298

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

MHFD-Detention, Version 4.07 (June 2025)







Subcat Reach Pond Link

Routing Diagram for Existing_Conditions_Basin_v3
Prepared by Ulteig Operations, LLC, Printed 2/10/2026
HydroCAD® 10.20-5c s/n 02198 © 2023 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (acres)	C	Description (subcatchment-numbers)
0.479	0.61	Gravel (Packed) - 40% (1-EX, 2-EX, 6-EX, 7-EX)
1.695	0.89	Paved - 100% (6-EX, 7-EX)
7.543	0.44	Undeveloped Area - 2% (1-EX, 2-EX, 6-EX, 7-EX)
9.716	**0.53**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
0.000	HSG C	
0.000	HSG D	
9.716	Other	1-EX, 2-EX, 6-EX, 7-EX
9.716		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	0.000	0.000	0.479	0.479	Gravel (Packed) - 40%	1-EX, 2-EX, 6-EX, 7-EX
0.000	0.000	0.000	0.000	1.695	1.695	Paved - 100%	6-EX, 7-EX
0.000	0.000	0.000	0.000	7.543	7.543	Undeveloped Area - 2%	1-EX, 2-EX, 6-EX, 7-EX
0.000	**0.000**	**0.000**	**0.000**	**9.716**	**9.716**	**TOTAL AREA**	

Time span=0.00-24.00 hrs, dt=0.01 hrs, 2401 points
Runoff by Rational method, Rise/Fall=1.0/1.0 xTc
Reach routing by Sim-Route method - Pond routing by Sim-Route method

Subcatchment 1-EX: Sub 1-EX Runoff Area=99,055 sf 0.00% Impervious Runoff Depth=0.38"
Flow Length=415' Tc=20.0 min C=0.45 Runoff=0.88 cfs 0.073 af

Subcatchment 2-EX: Sub 2-EX Runoff Area=70,787 sf 0.00% Impervious Runoff Depth=0.39"
Flow Length=613' Tc=20.0 min C=0.46 Runoff=0.64 cfs 0.053 af

Subcatchment 6-EX: Sub 6-EX Runoff Area=226,244 sf 0.00% Impervious Runoff Depth=0.50"
Flow Length=767' Tc=20.0 min C=0.59 Runoff=2.63 cfs 0.217 af

Subcatchment 7-EX: Sub 7-EX Runoff Area=27,151 sf 0.00% Impervious Runoff Depth=0.42"
Flow Length=672' Tc=20.0 min C=0.49 Runoff=0.26 cfs 0.022 af

Link EX: Existing Runoff Inflow=4.41 cfs 0.365 af
Primary=4.41 cfs 0.365 af

Total Runoff Area = 9.716 ac Runoff Volume = 0.365 af Average Runoff Depth = 0.45"
100.00% Pervious = 9.716 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment 1-EX: Sub 1-EX

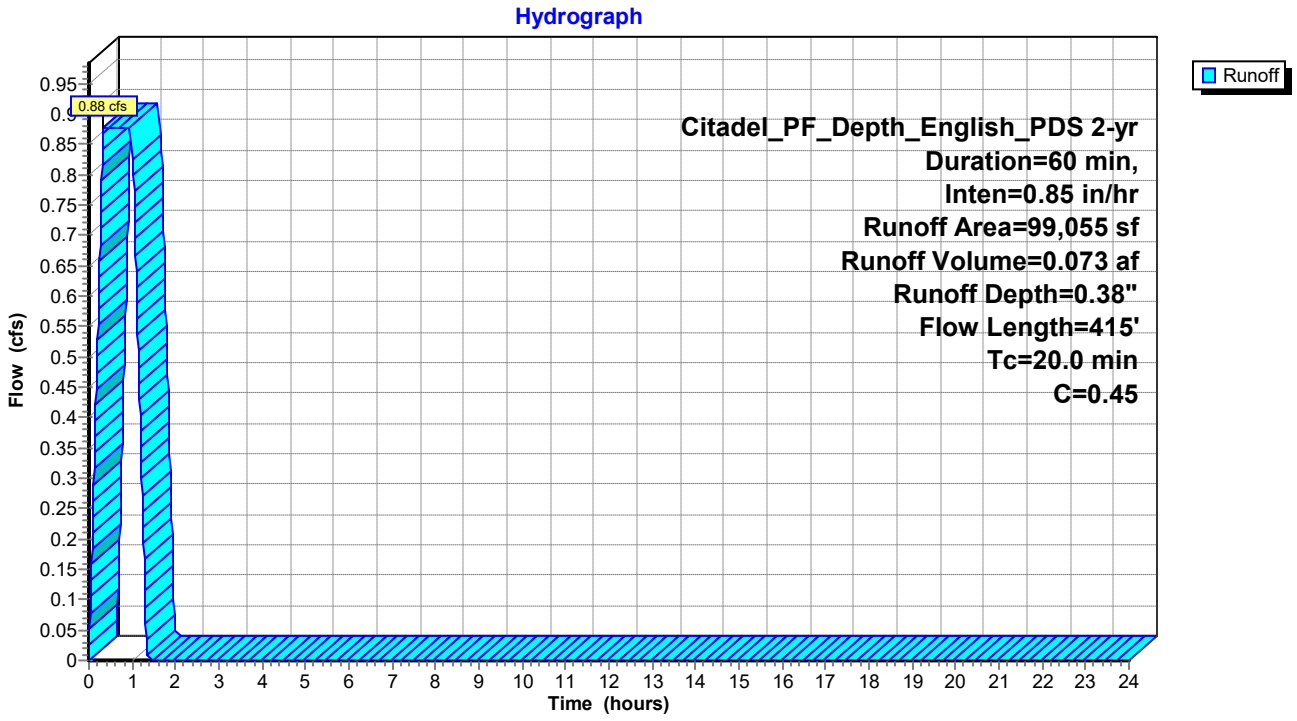
Runoff = 0.88 cfs @ 0.34 hrs, Volume= 0.073 af, Depth= 0.38"
Routed to Link EX : Existing Runoff

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Citadel_PF_Depth_English_PDS 2-yr Duration=60 min, Inten=0.85 in/hr

Area (sf)	C	Description
95,669	0.44	Undeveloped Area - 2%
3,386	0.61	Gravel (Packed) - 40%
0	0.89	Paved - 100%
99,055	0.45	Weighted Average
99,055		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.3	100	0.0415	0.18		**Sheet Flow,** Grass: Short n= 0.150 P2= 1.98"
2.3	315	0.1081	2.30		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
11.6	415	Total, Increased to minimum Tc = 20.0 min			

Subcatchment 1-EX: Sub 1-EX



Summary for Subcatchment 2-EX: Sub 2-EX

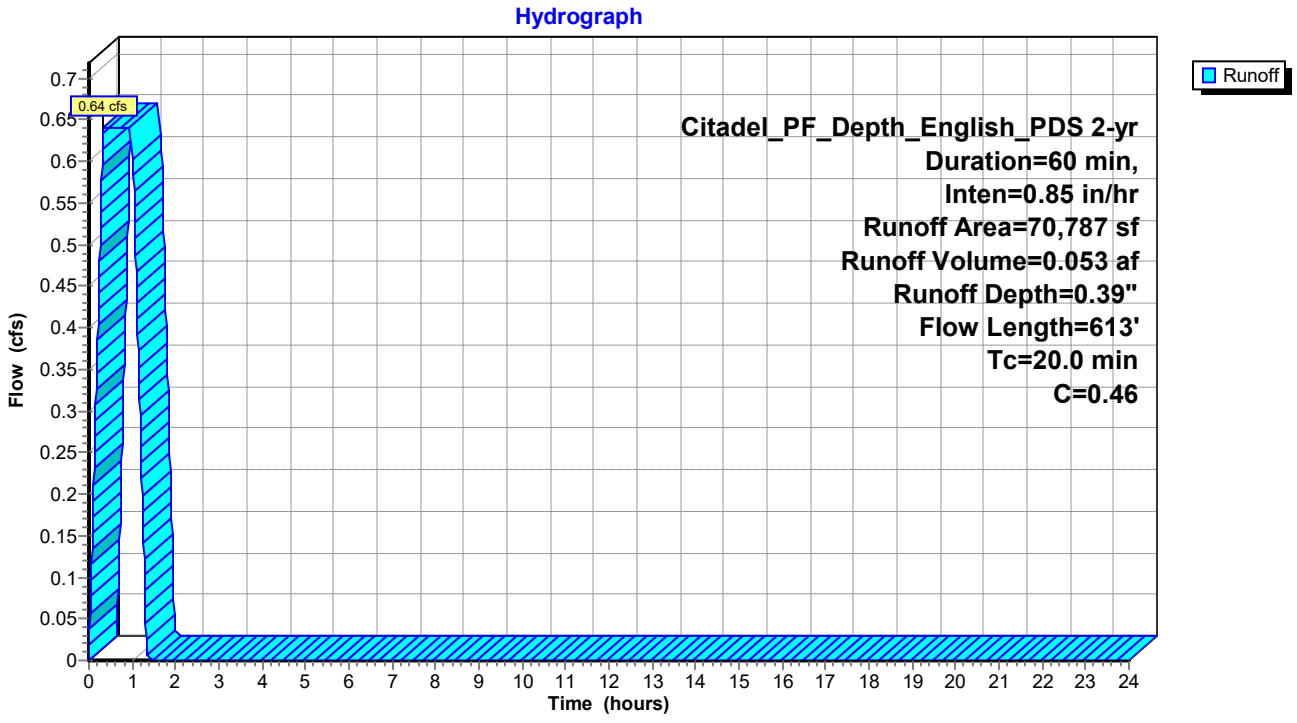
Runoff = 0.64 cfs @ 0.34 hrs, Volume= 0.053 af, Depth= 0.39"
Routed to Link EX : Existing Runoff

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Citadel_PF_Depth_English_PDS 2-yr Duration=60 min, Inten=0.85 in/hr

Area (sf)	C	Description
63,140	0.44	Undeveloped Area - 2%
0	0.89	Paved - 100%
7,647	0.61	Gravel (Packed) - 40%
70,787	0.46	Weighted Average
70,787		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.1	100	0.0266	0.15		**Sheet Flow,** Grass: Short n= 0.150 P2= 1.98"
6.4	513	0.0368	1.34		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
17.5	613	Total, Increased to minimum Tc = 20.0 min			

Subcatchment 2-EX: Sub 2-EX



Summary for Subcatchment 6-EX: Sub 6-EX

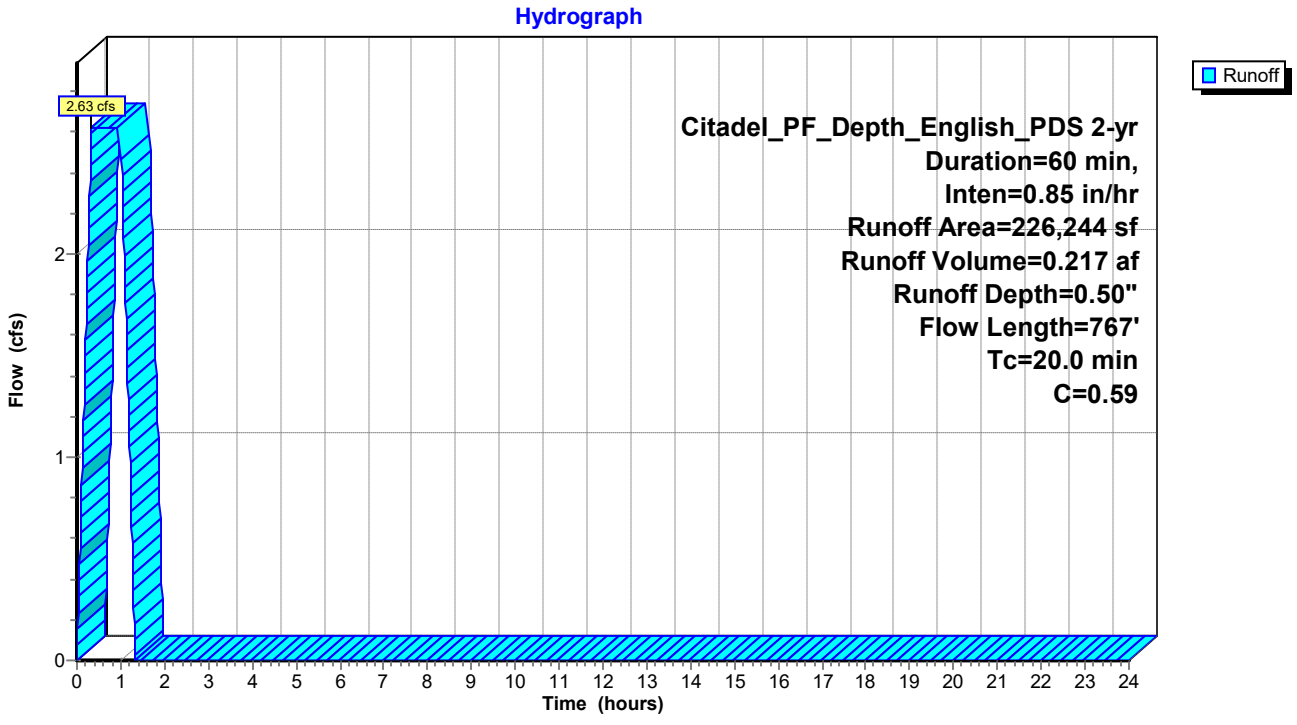
Runoff = 2.63 cfs @ 0.34 hrs, Volume= 0.217 af, Depth= 0.50"
Routed to Link EX : Existing Runoff

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Citadel_PF_Depth_English_PDS 2-yr Duration=60 min, Inten=0.85 in/hr

Area (sf)	C	Description
149,666	0.44	Undeveloped Area - 2%
3,234	0.61	Gravel (Packed) - 40%
73,344	0.89	Paved - 100%
226,244	0.59	Weighted Average
226,244		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.0	100	0.0448	0.18		**Sheet Flow,** Grass: Short n= 0.150 P2= 1.98"
2.9	667	0.0346	3.78		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
11.9	767	Total, Increased to minimum Tc = 20.0 min			

Subcatchment 6-EX: Sub 6-EX



Summary for Subcatchment 7-EX: Sub 7-EX

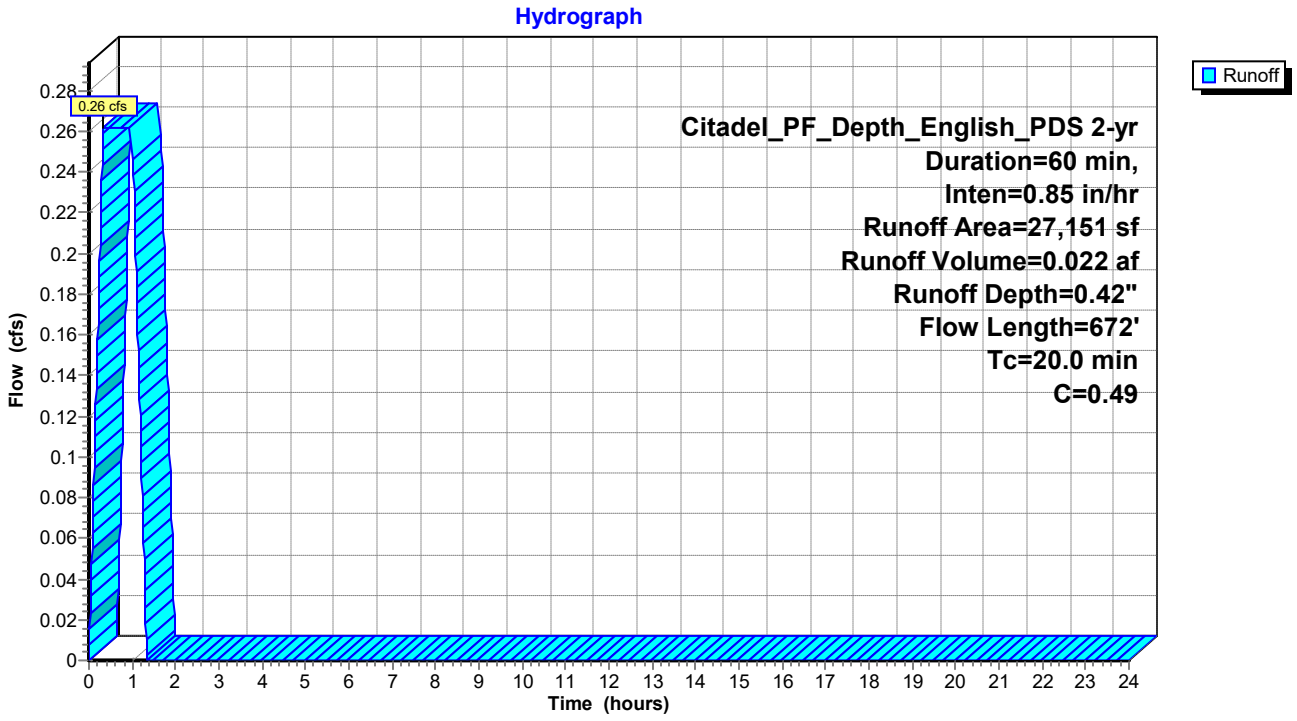
Runoff = 0.26 cfs @ 0.34 hrs, Volume= 0.022 af, Depth= 0.42"
Routed to Link EX : Existing Runoff

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Citadel_PF_Depth_English_PDS 2-yr Duration=60 min, Inten=0.85 in/hr

Area (sf)	C	Description
20,087	0.44	Undeveloped Area - 2%
474	0.89	Paved - 100%
6,590	0.61	Gravel (Packed) - 40%
27,151	0.49	Weighted Average
27,151		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.2	100	0.0422	0.18		**Sheet Flow,** Grass: Short n= 0.150 P2= 1.98"
7.7	572	0.0312	1.24		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
16.9	672	Total, Increased to minimum Tc = 20.0 min			

Subcatchment 7-EX: Sub 7-EX

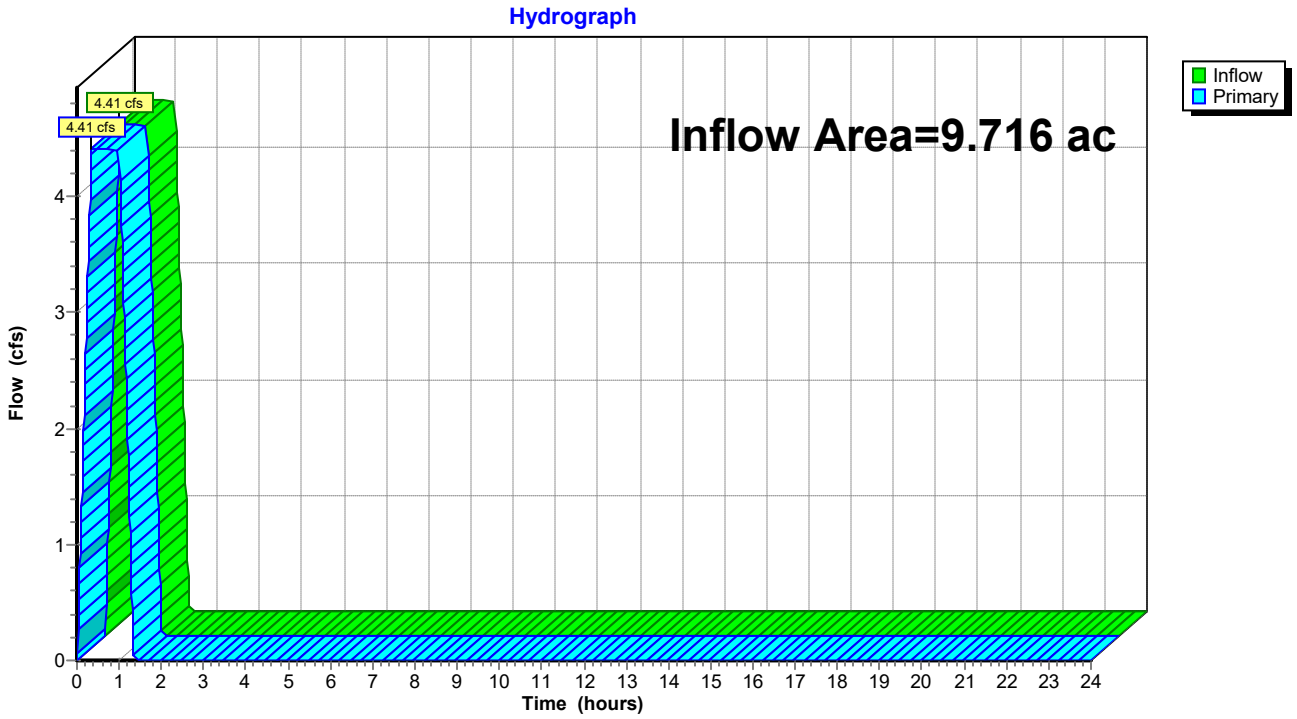


Summary for Link EX: Existing Runoff

Inflow Area = 9.716 ac, 0.00% Impervious, Inflow Depth = 0.45" for 2-yr event
Inflow = 4.41 cfs @ 0.34 hrs, Volume= 0.365 af
Primary = 4.41 cfs @ 0.35 hrs, Volume= 0.365 af, Atten= 0%, Lag= 0.6 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Link EX: Existing Runoff



Time span=0.00-24.00 hrs, dt=0.01 hrs, 2401 points
Runoff by Rational method, Rise/Fall=1.0/1.0 xTc
Reach routing by Sim-Route method - Pond routing by Sim-Route method

Subcatchment 1-EX: Sub 1-EX Runoff Area=99,055 sf 0.00% Impervious Runoff Depth=1.05"
Flow Length=415' Tc=20.0 min C=0.45 Runoff=2.40 cfs 0.199 af

Subcatchment 2-EX: Sub 2-EX Runoff Area=70,787 sf 0.00% Impervious Runoff Depth=1.07"
Flow Length=613' Tc=20.0 min C=0.46 Runoff=1.76 cfs 0.145 af

Subcatchment 6-EX: Sub 6-EX Runoff Area=226,244 sf 0.00% Impervious Runoff Depth=1.37"
Flow Length=767' Tc=20.0 min C=0.59 Runoff=7.20 cfs 0.595 af

Subcatchment 7-EX: Sub 7-EX Runoff Area=27,151 sf 0.00% Impervious Runoff Depth=1.14"
Flow Length=672' Tc=20.0 min C=0.49 Runoff=0.72 cfs 0.059 af

Link EX: Existing Runoff Inflow=12.08 cfs 0.998 af
Primary=12.08 cfs 0.998 af

Total Runoff Area = 9.716 ac Runoff Volume = 0.998 af Average Runoff Depth = 1.23"
100.00% Pervious = 9.716 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment 1-EX: Sub 1-EX

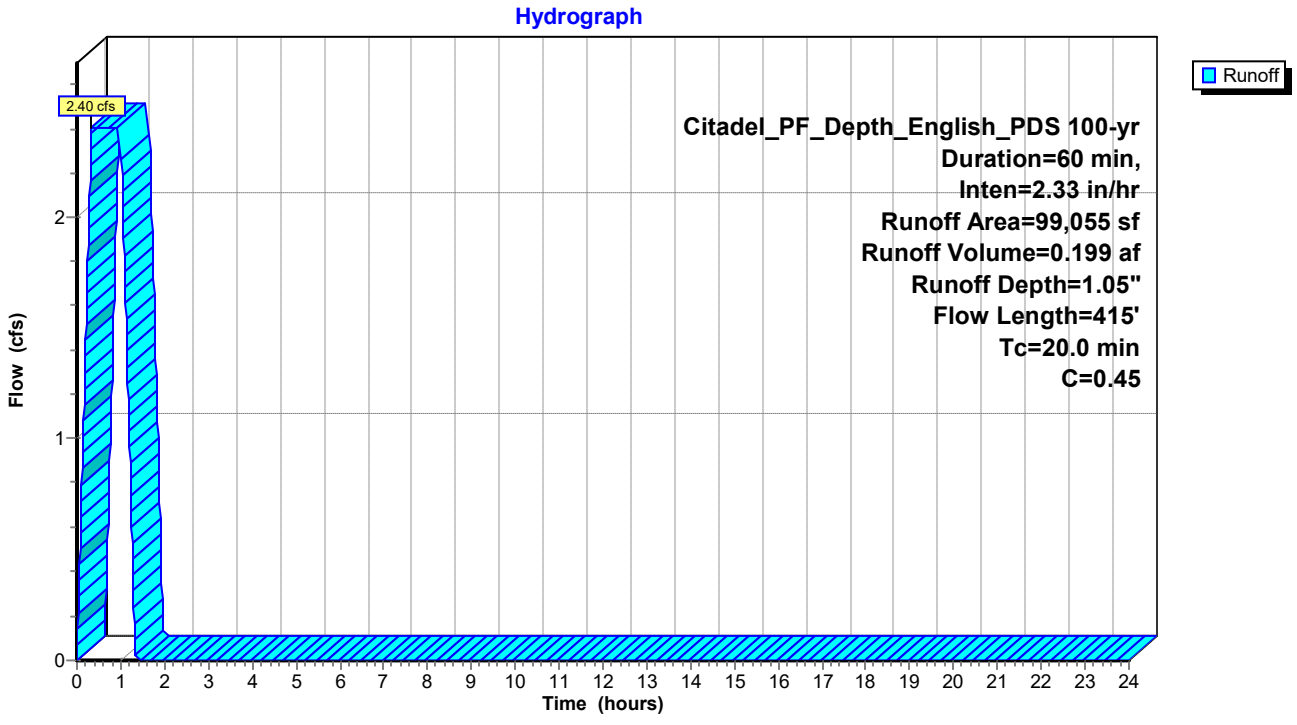
Runoff = 2.40 cfs @ 0.34 hrs, Volume= 0.199 af, Depth= 1.05"
Routed to Link EX : Existing Runoff

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Citadel_PF_Depth_English_PDS 100-yr Duration=60 min, Inten=2.33 in/hr

Area (sf)	C	Description
95,669	0.44	Undeveloped Area - 2%
3,386	0.61	Gravel (Packed) - 40%
0	0.89	Paved - 100%
99,055	0.45	Weighted Average
99,055		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.3	100	0.0415	0.18		**Sheet Flow,** Grass: Short n= 0.150 P2= 1.98"
2.3	315	0.1081	2.30		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
11.6	415	Total, Increased to minimum Tc = 20.0 min			

Subcatchment 1-EX: Sub 1-EX



Summary for Subcatchment 2-EX: Sub 2-EX

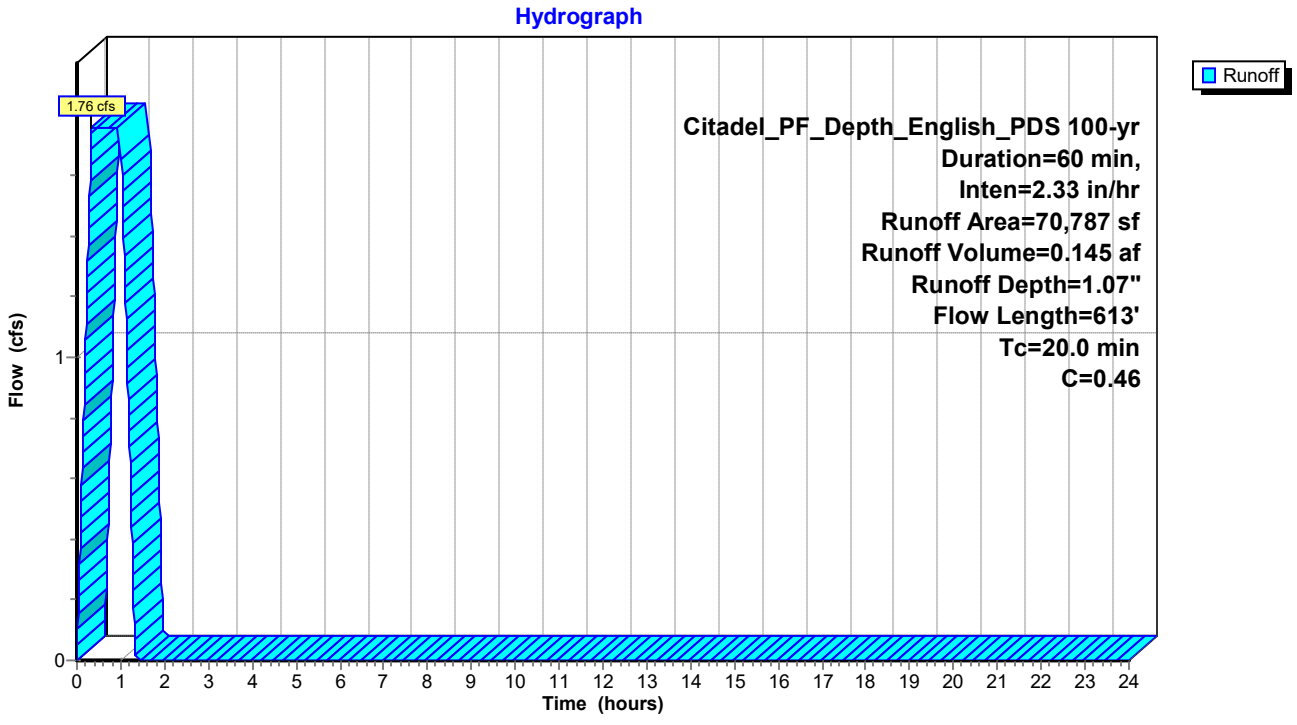
Runoff = 1.76 cfs @ 0.34 hrs, Volume= 0.145 af, Depth= 1.07"
Routed to Link EX : Existing Runoff

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Citadel_PF_Depth_English_PDS 100-yr Duration=60 min, Inten=2.33 in/hr

Area (sf)	C	Description
63,140	0.44	Undeveloped Area - 2%
0	0.89	Paved - 100%
7,647	0.61	Gravel (Packed) - 40%
70,787	0.46	Weighted Average
70,787		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.1	100	0.0266	0.15		**Sheet Flow,** Grass: Short n= 0.150 P2= 1.98"
6.4	513	0.0368	1.34		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
17.5	613	Total, Increased to minimum Tc = 20.0 min			

Subcatchment 2-EX: Sub 2-EX



Summary for Subcatchment 6-EX: Sub 6-EX

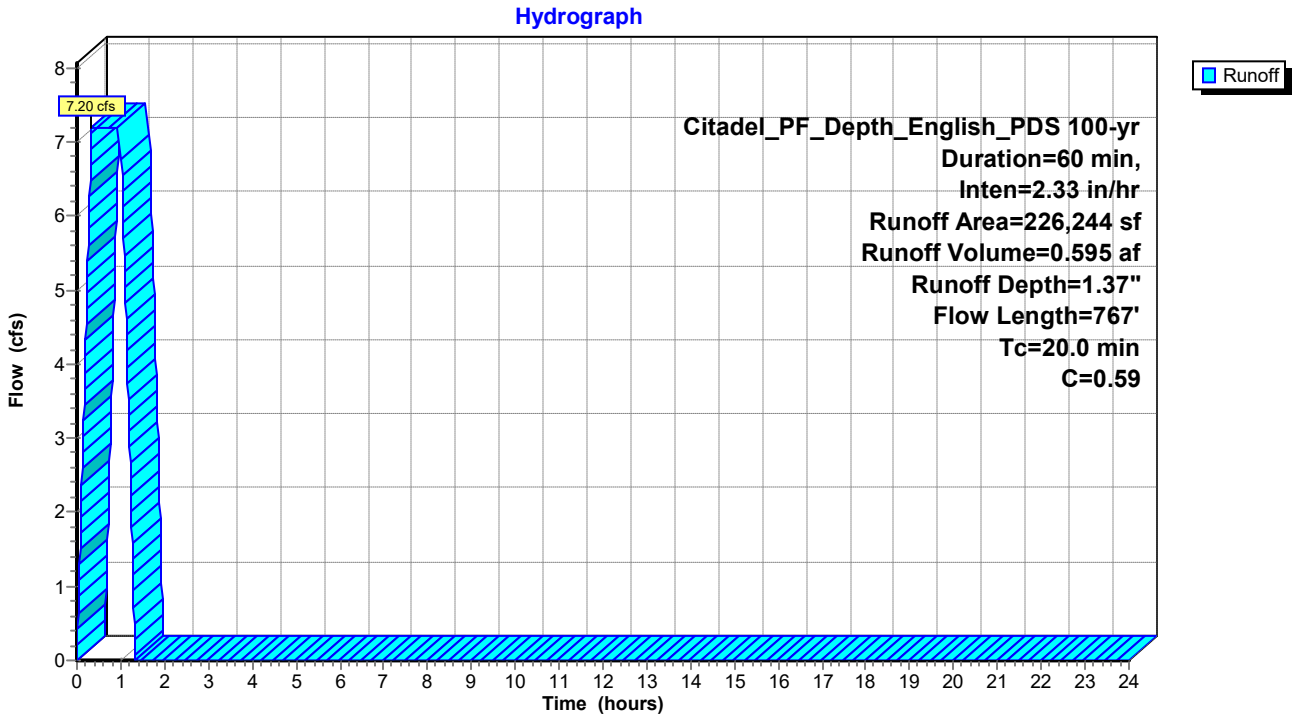
Runoff = 7.20 cfs @ 0.34 hrs, Volume= 0.595 af, Depth= 1.37"
Routed to Link EX : Existing Runoff

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Citadel_PF_Depth_English_PDS 100-yr Duration=60 min, Inten=2.33 in/hr

Area (sf)	C	Description
149,666	0.44	Undeveloped Area - 2%
3,234	0.61	Gravel (Packed) - 40%
73,344	0.89	Paved - 100%
226,244	0.59	Weighted Average
226,244		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.0	100	0.0448	0.18		**Sheet Flow,** Grass: Short n= 0.150 P2= 1.98"
2.9	667	0.0346	3.78		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
11.9	767	Total, Increased to minimum Tc = 20.0 min			

Subcatchment 6-EX: Sub 6-EX



Summary for Subcatchment 7-EX: Sub 7-EX

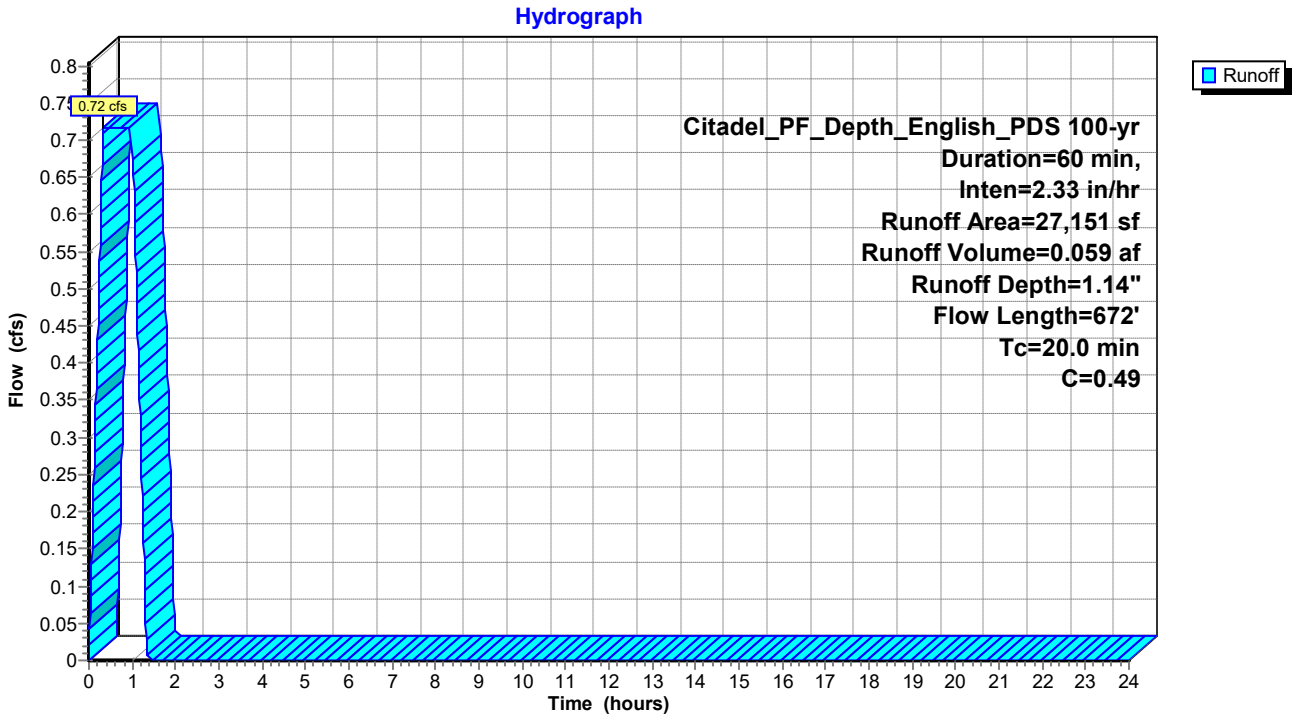
Runoff = 0.72 cfs @ 0.34 hrs, Volume= 0.059 af, Depth= 1.14"
Routed to Link EX : Existing Runoff

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Citadel_PF_Depth_English_PDS 100-yr Duration=60 min, Inten=2.33 in/hr

Area (sf)	C	Description
20,087	0.44	Undeveloped Area - 2%
474	0.89	Paved - 100%
6,590	0.61	Gravel (Packed) - 40%
27,151	0.49	Weighted Average
27,151		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.2	100	0.0422	0.18		**Sheet Flow,** Grass: Short n= 0.150 P2= 1.98"
7.7	572	0.0312	1.24		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
16.9	672	Total, Increased to minimum Tc = 20.0 min			

Subcatchment 7-EX: Sub 7-EX

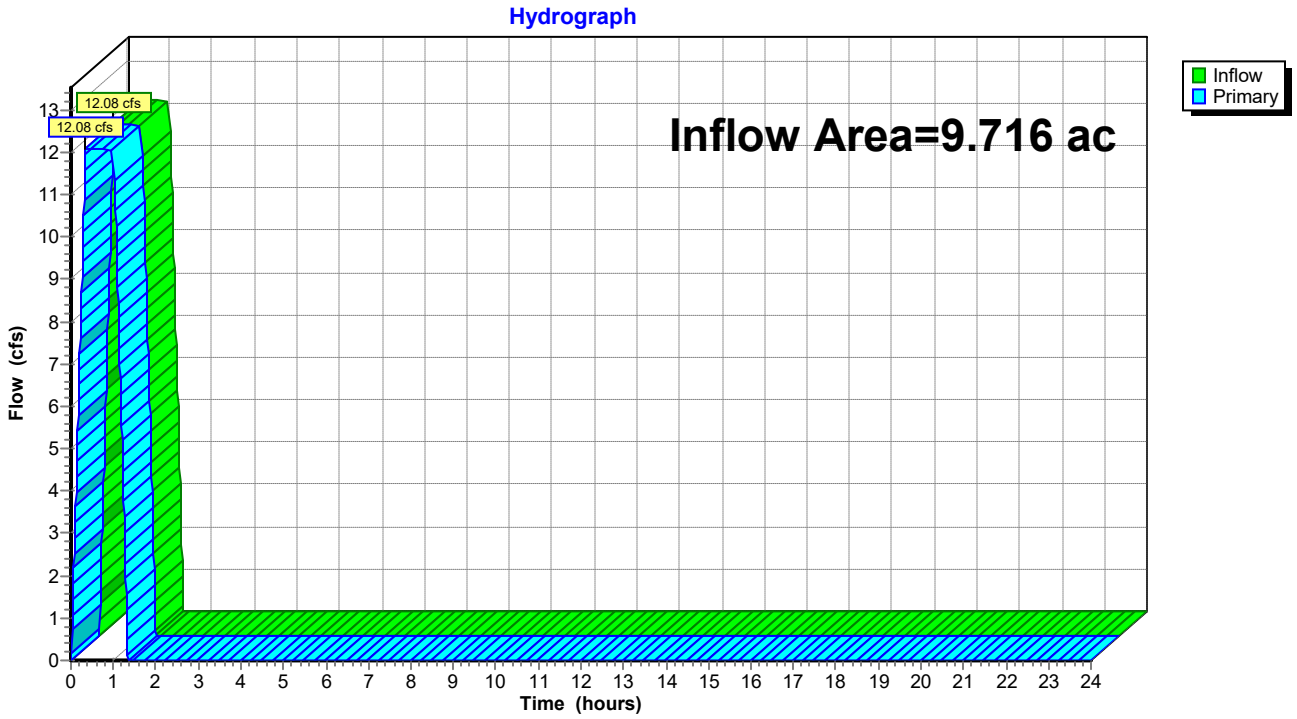


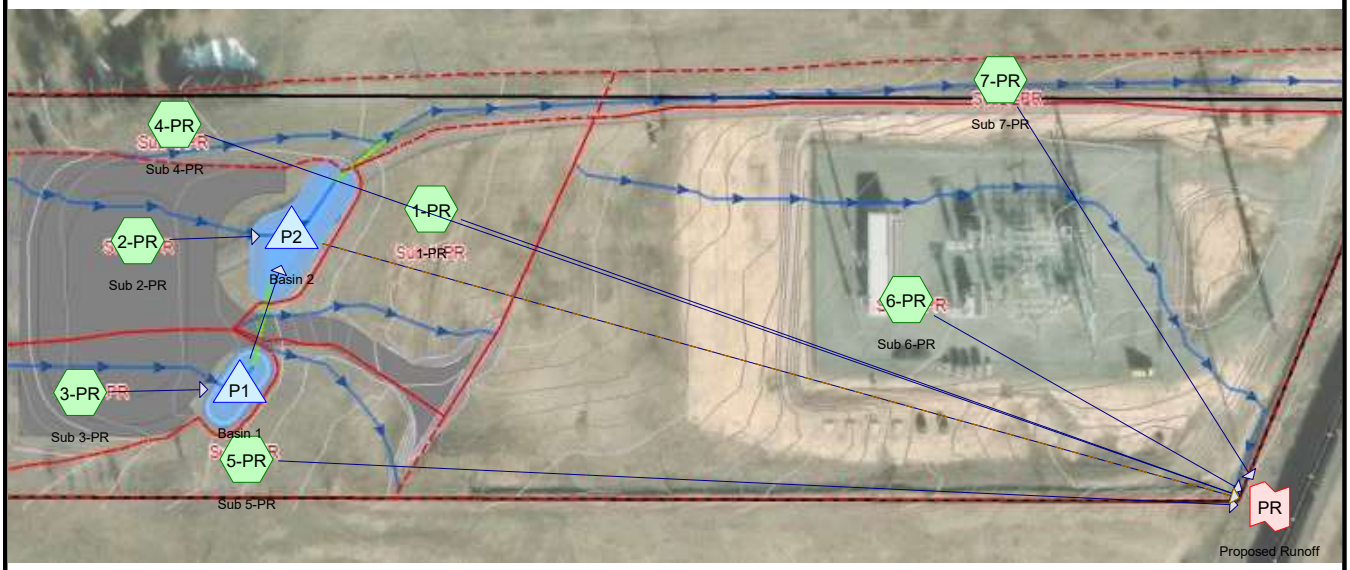
Summary for Link EX: Existing Runoff

Inflow Area = 9.716 ac, 0.00% Impervious, Inflow Depth = 1.23" for 100-yr event
Inflow = 12.08 cfs @ 0.34 hrs, Volume= 0.998 af
Primary = 12.08 cfs @ 0.35 hrs, Volume= 0.998 af, Atten= 0%, Lag= 0.6 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Link EX: Existing Runoff





Subcat Reach Pond Link

Routing Diagram for Proposed_Conditions_Basin_v3
Prepared by Ulteig Operations, LLC, Printed 2/10/2026
HydroCAD® 10.20-5c s/n 02198 © 2023 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (acres)	C	Description (subcatchment-numbers)
1.306	0.61	Gravel (Packed) - 40% (1-PR, 2-PR, 3-PR, 4-PR, 5-PR, 6-PR, 7-PR)
0.177	0.89	Other Impervious - 100% (2-PR, 3-PR)
1.695	0.89	Paved - 100% (6-PR, 7-PR)
6.539	0.44	Undeveloped Area - 2% (1-PR, 2-PR, 3-PR, 4-PR, 5-PR, 6-PR, 7-PR)
9.716	**0.55**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
0.000	HSG C	
0.000	HSG D	
9.716	Other	1-PR, 2-PR, 3-PR, 4-PR, 5-PR, 6-PR, 7-PR
9.716		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	0.000	0.000	1.306	1.306	Gravel (Packed) - 40%	1-PR, 2-PR, 3-PR, 4-PR, 5-PR, 6-PR, 7-PR
0.000	0.000	0.000	0.000	0.177	0.177	Other Impervious - 100%	2-PR, 3-PR
0.000	0.000	0.000	0.000	1.695	1.695	Paved - 100%	6-PR, 7-PR
0.000	0.000	0.000	0.000	6.539	6.539	Undeveloped Area - 2%	1-PR, 2-PR, 3-PR, 4-PR, 5-PR, 6-PR, 7-PR
0.000	**0.000**	**0.000**	**0.000**	**9.716**	**9.716**	**TOTAL AREA**	

Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Width (inches)	Diam/Height (inches)	Inside-Fill (inches)	Node Name
1	P1	6,337.00	6,336.50	69.3	0.0072	0.010	0.0	18.0	0.0	
2	P2	6,334.00	6,333.00	141.7	0.0071	0.010	0.0	18.0	2.7	

Time span=0.00-24.00 hrs, dt=0.01 hrs, 2401 points
Runoff by Rational method, Rise/Fall=1.0/1.0 xTc
Reach routing by Sim-Route method - Pond routing by Sim-Route method

Subcatchment 1-PR: 1-PR Runoff Area=37,522 sf 0.00% Impervious Runoff Depth=0.39"
Flow Length=228' Tc=20.0 min C=0.46 Runoff=0.34 cfs 0.028 af

Subcatchment 2-PR: Sub 2-PR Runoff Area=42,860 sf 0.00% Impervious Runoff Depth=0.51"
Flow Length=297' Tc=20.0 min C=0.60 Runoff=0.51 cfs 0.042 af

Subcatchment 3-PR: Sub 3-PR Runoff Area=24,082 sf 0.00% Impervious Runoff Depth=0.49"
Flow Length=300' Tc=20.0 min C=0.58 Runoff=0.28 cfs 0.023 af

Subcatchment 4-PR: Sub 4-PR Runoff Area=36,071 sf 0.00% Impervious Runoff Depth=0.38"
Flow Length=410' Tc=20.0 min C=0.45 Runoff=0.32 cfs 0.026 af

Subcatchment 5-PR: Sub 5-PR Runoff Area=29,300 sf 0.00% Impervious Runoff Depth=0.37"
Flow Length=207' Tc=20.0 min C=0.44 Runoff=0.25 cfs 0.021 af

Subcatchment 6-PR: Sub 6-PR Runoff Area=226,244 sf 0.00% Impervious Runoff Depth=0.50"
Flow Length=767' Tc=20.0 min C=0.59 Runoff=2.63 cfs 0.217 af

Subcatchment 7-PR: Sub 7-PR Runoff Area=27,151 sf 0.00% Impervious Runoff Depth=0.42"
Flow Length=672' Tc=20.0 min C=0.49 Runoff=0.26 cfs 0.022 af

Pond P1: Basin 1 Peak Elev=6,337.35' Storage=83 cf Inflow=0.28 cfs 0.023 af
Discarded=0.00 cfs 0.001 af Primary=0.27 cfs 0.022 af Outflow=0.28 cfs 0.023 af

Pond P2: Basin 2 Peak Elev=6,337.35' Storage=2,583 cf Inflow=0.78 cfs 0.064 af
Discarded=0.02 cfs 0.026 af Primary=0.03 cfs 0.030 af Outflow=0.05 cfs 0.056 af

Link PR: Proposed Runoff Inflow=3.83 cfs 0.344 af
Primary=3.83 cfs 0.344 af

Total Runoff Area = 9.716 ac Runoff Volume = 0.379 af Average Runoff Depth = 0.47"
100.00% Pervious = 9.716 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment 1-PR: 1-PR

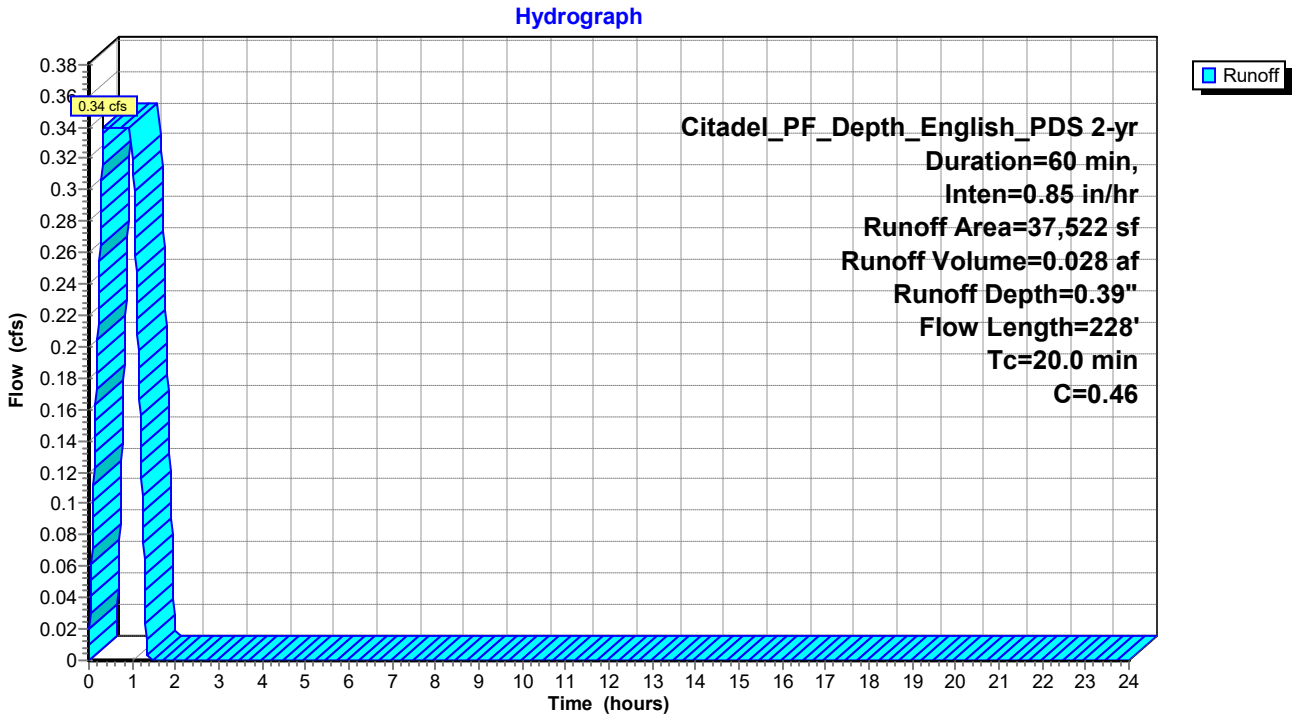
Runoff = 0.34 cfs @ 0.34 hrs, Volume= 0.028 af, Depth= 0.39"
Routed to Link PR : Proposed Runoff

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Citadel_PF_Depth_English_PDS 2-yr Duration=60 min, Inten=0.85 in/hr

Area (sf)	C	Description
32,465	0.44	Undeveloped Area - 2%
5,057	0.61	Gravel (Packed) - 40%
0	0.89	Paved - 100%
37,522	0.46	Weighted Average
37,522		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.9	100	0.0856	1.94		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 1.98"
1.2	128	0.0595	1.71		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
2.1	228	Total, Increased to minimum Tc = 20.0 min			

Subcatchment 1-PR: 1-PR



Summary for Subcatchment 2-PR: Sub 2-PR

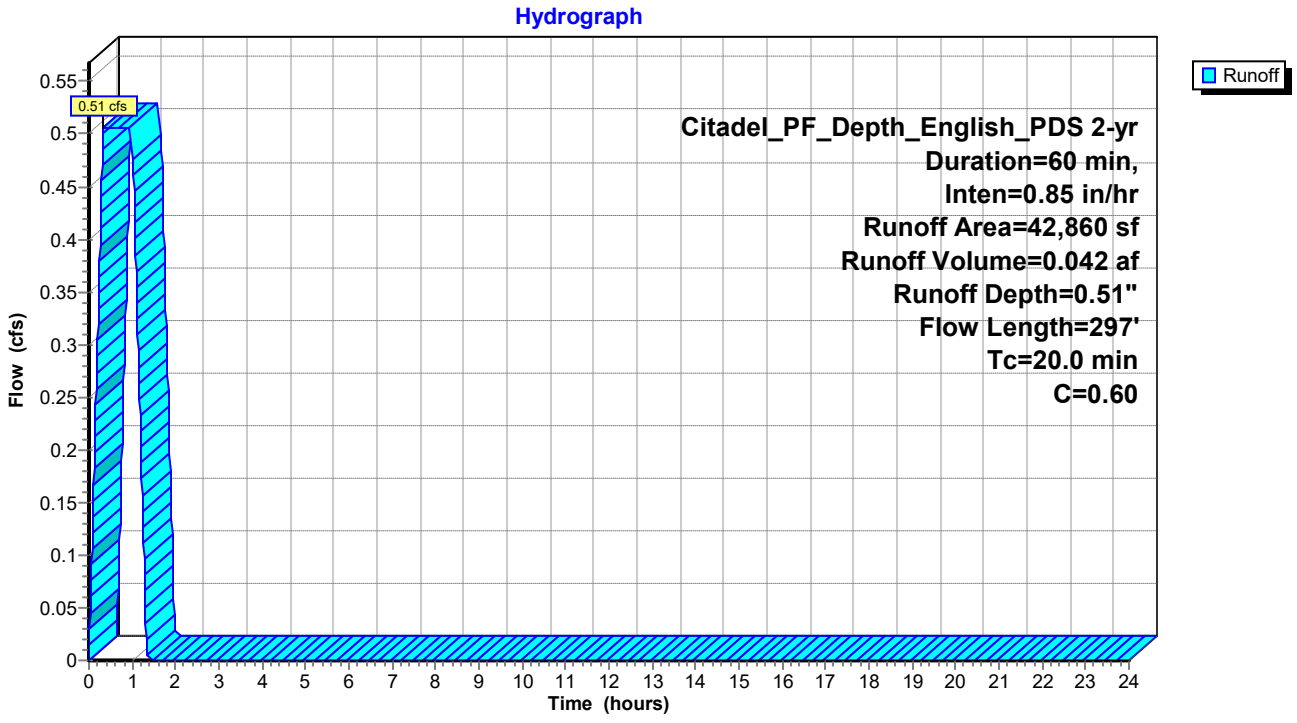
Runoff = 0.51 cfs @ 0.34 hrs, Volume= 0.042 af, Depth= 0.51"
Routed to Pond P2 : Basin 2

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Citadel_PF_Depth_English_PDS 2-yr Duration=60 min, Inten=0.85 in/hr

Area (sf)	C	Description
10,793	0.44	Undeveloped Area - 2%
26,730	0.61	Gravel (Packed) - 40%
5,337	0.89	Other Impervious - 100%
42,860	0.60	Weighted Average
42,860		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.2	100	0.0348	1.35		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 1.98"
1.0	197	0.0392	3.19		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
2.2	297	Total, Increased to minimum Tc = 20.0 min			

Subcatchment 2-PR: Sub 2-PR



Summary for Subcatchment 3-PR: Sub 3-PR

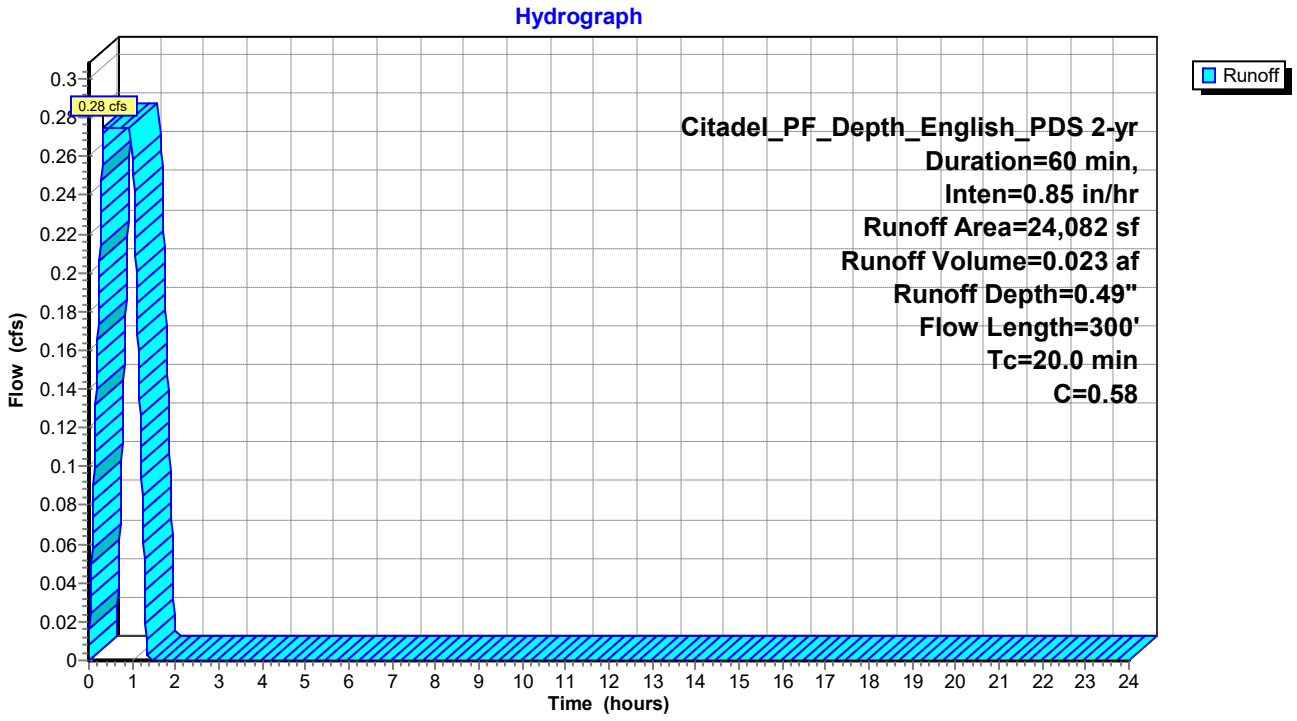
Runoff = 0.28 cfs @ 0.34 hrs, Volume= 0.023 af, Depth= 0.49"
Routed to Pond P1 : Basin 1

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Citadel_PF_Depth_English_PDS 2-yr Duration=60 min, Inten=0.85 in/hr

Area (sf)	C	Description
13,057	0.61	Gravel (Packed) - 40%
8,659	0.44	Undeveloped Area - 2%
2,366	0.89	Other Impervious - 100%
24,082	0.58	Weighted Average
24,082		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.5	100	0.1574	0.31		**Sheet Flow,** Grass: Short n= 0.150 P2= 1.98"
1.3	200	0.0243	2.51		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
6.8	300	Total, Increased to minimum Tc = 20.0 min			

Subcatchment 3-PR: Sub 3-PR



Summary for Subcatchment 4-PR: Sub 4-PR

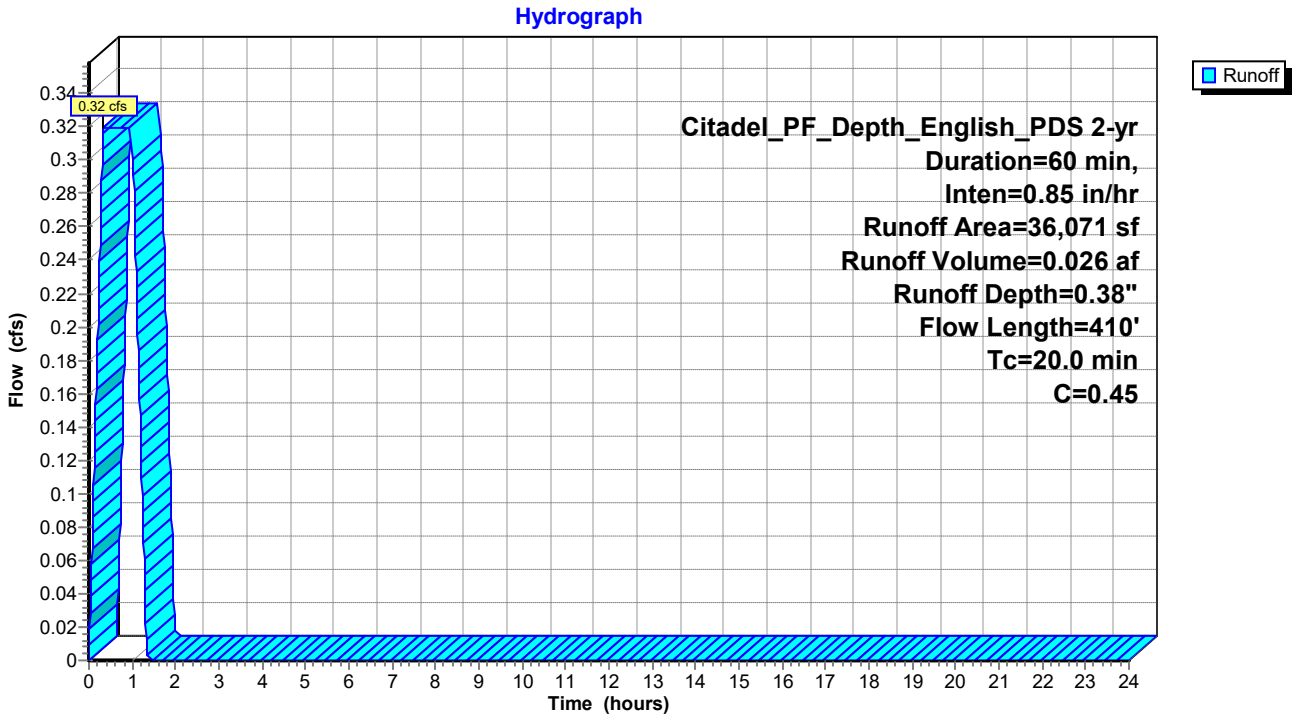
Runoff = 0.32 cfs @ 0.34 hrs, Volume= 0.026 af, Depth= 0.38"
Routed to Link PR : Proposed Runoff

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Citadel_PF_Depth_English_PDS 2-yr Duration=60 min, Inten=0.85 in/hr

Area (sf)	C	Description
34,680	0.44	Undeveloped Area - 2%
0	0.89	Paved - 100%
1,391	0.61	Gravel (Packed) - 40%
36,071	0.45	Weighted Average
36,071		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.2	100	0.0572	0.20		**Sheet Flow,** Grass: Short n= 0.150 P2= 1.98"
3.6	310	0.0421	1.44		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
11.8	410	Total, Increased to minimum Tc = 20.0 min			

Subcatchment 4-PR: Sub 4-PR



Summary for Subcatchment 5-PR: Sub 5-PR

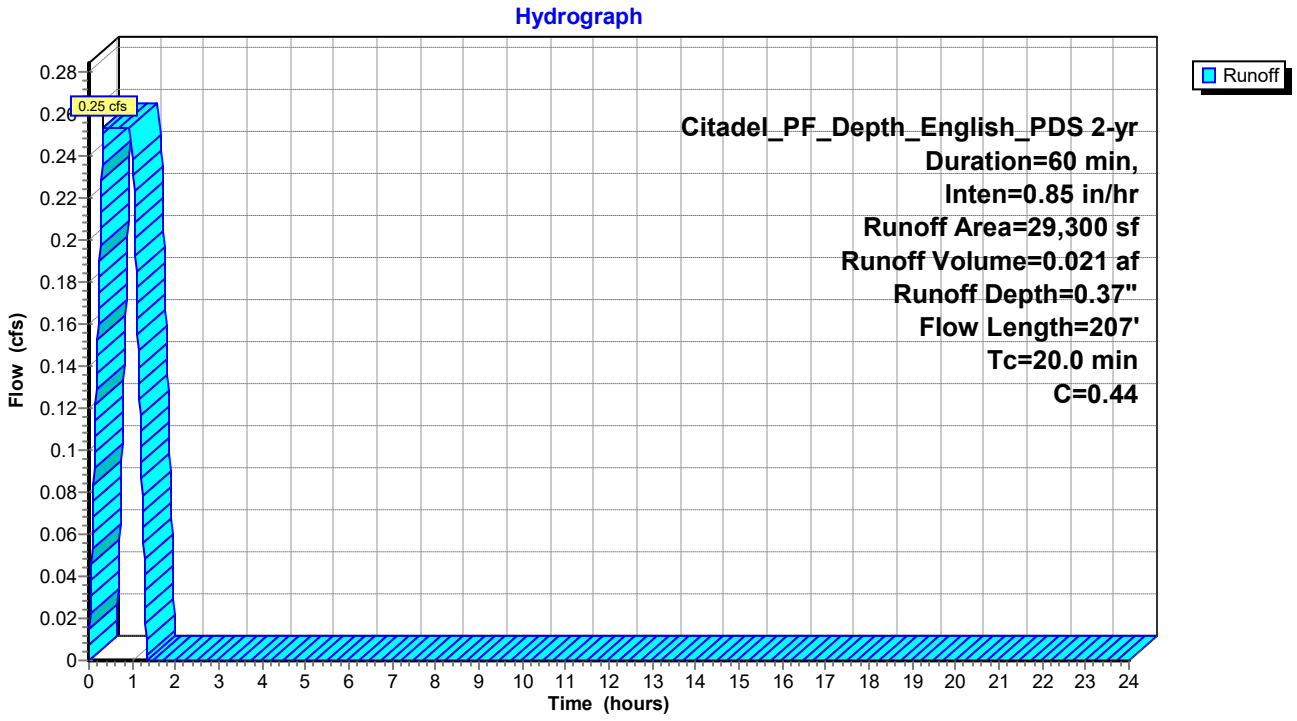
Runoff = 0.25 cfs @ 0.34 hrs, Volume= 0.021 af, Depth= 0.37"
Routed to Link PR : Proposed Runoff

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Citadel_PF_Depth_English_PDS 2-yr Duration=60 min, Inten=0.85 in/hr

Area (sf)	C	Description
28,482	0.44	Undeveloped Area - 2%
0	0.89	Paved - 100%
818	0.61	Gravel (Packed) - 40%
29,300	0.44	Weighted Average
29,300		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.5	100	0.1016	0.26		**Sheet Flow,** Grass: Short n= 0.150 P2= 1.98"
1.0	107	0.0664	1.80		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
7.5	207	Total, Increased to minimum Tc = 20.0 min			

Subcatchment 5-PR: Sub 5-PR



Summary for Subcatchment 6-PR: Sub 6-PR

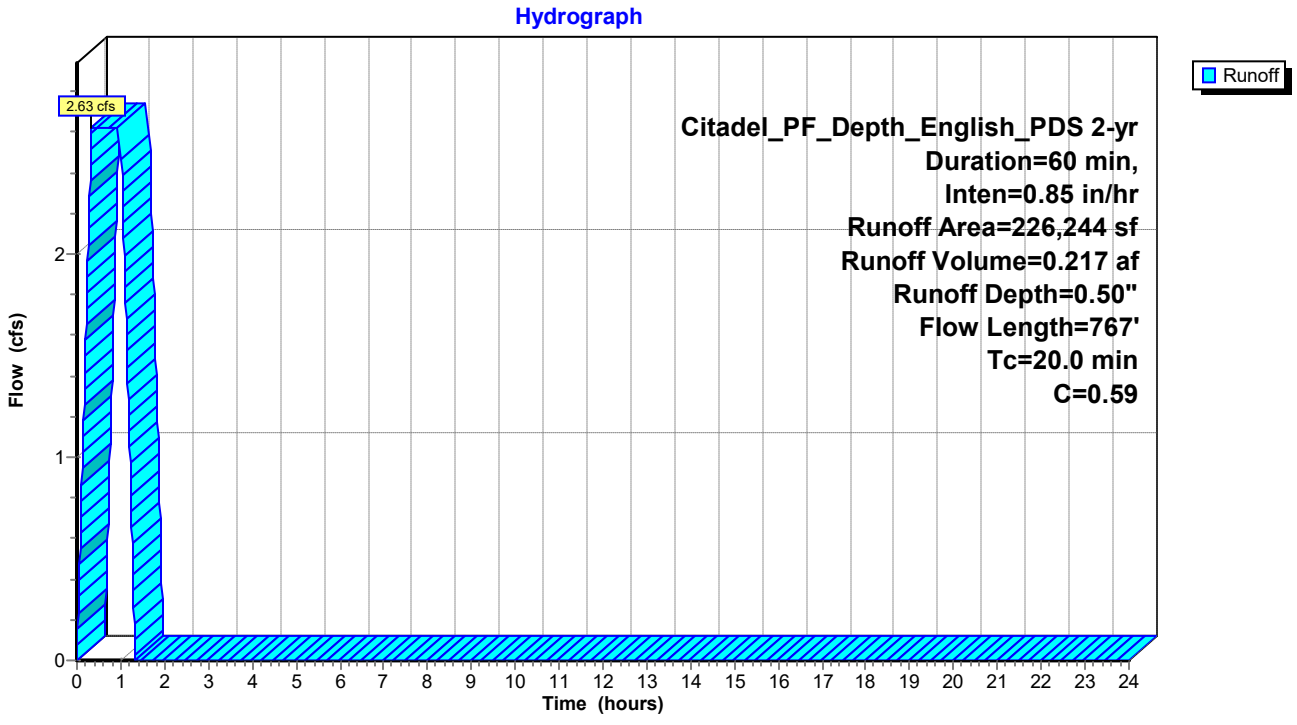
Runoff = 2.63 cfs @ 0.34 hrs, Volume= 0.217 af, Depth= 0.50"
Routed to Link PR : Proposed Runoff

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Citadel_PF_Depth_English_PDS 2-yr Duration=60 min, Inten=0.85 in/hr

Area (sf)	C	Description
149,666	0.44	Undeveloped Area - 2%
3,234	0.61	Gravel (Packed) - 40%
73,344	0.89	Paved - 100%
226,244	0.59	Weighted Average
226,244		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.0	100	0.0448	0.18		**Sheet Flow,** Grass: Short n= 0.150 P2= 1.98"
2.9	667	0.0346	3.78		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
11.9	767	Total, Increased to minimum Tc = 20.0 min			

Subcatchment 6-PR: Sub 6-PR



Summary for Subcatchment 7-PR: Sub 7-PR

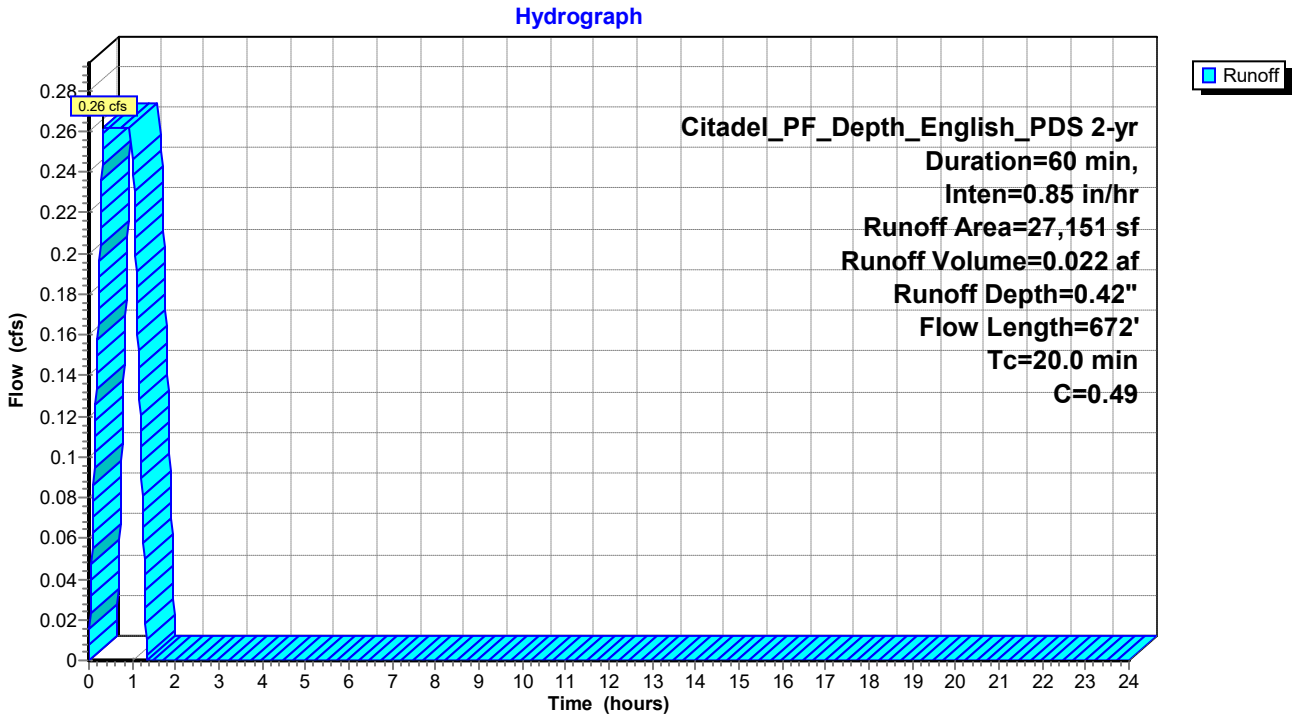
Runoff = 0.26 cfs @ 0.34 hrs, Volume= 0.022 af, Depth= 0.42"
Routed to Link PR : Proposed Runoff

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Citadel_PF_Depth_English_PDS 2-yr Duration=60 min, Inten=0.85 in/hr

Area (sf)	C	Description
20,087	0.44	Undeveloped Area - 2%
474	0.89	Paved - 100%
6,590	0.61	Gravel (Packed) - 40%
27,151	0.49	Weighted Average
27,151		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.2	100	0.0422	0.18		**Sheet Flow,** Grass: Short n= 0.150 P2= 1.98"
7.7	572	0.0312	1.24		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
16.9	672	Total, Increased to minimum Tc = 20.0 min			

Subcatchment 7-PR: Sub 7-PR



Summary for Pond P1: Basin 1

Inflow Area = 0.553 ac, 0.00% Impervious, Inflow Depth = 0.49" for 2-yr event
Inflow = 0.28 cfs @ 0.34 hrs, Volume= 0.023 af
Outflow = 0.28 cfs @ 0.63 hrs, Volume= 0.023 af, Atten= 0%, Lag= 17.4 min
Discarded = 0.00 cfs @ 1.32 hrs, Volume= 0.001 af
Primary = 0.27 cfs @ 0.63 hrs, Volume= 0.022 af
Routed to Pond P2 : Basin 2

Routing by Sim-Route method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 6,337.35' @ 1.32 hrs Surf.Area= 301 sf Storage= 83 cf

Plug-Flow detention time= 17.0 min calculated for 0.023 af (100% of inflow)
Center-of-Mass det. time= 17.1 min (57.1 - 40.0)

Volume	Invert	Avail.Storage	Storage Description
#1	6,337.00'	4,514 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

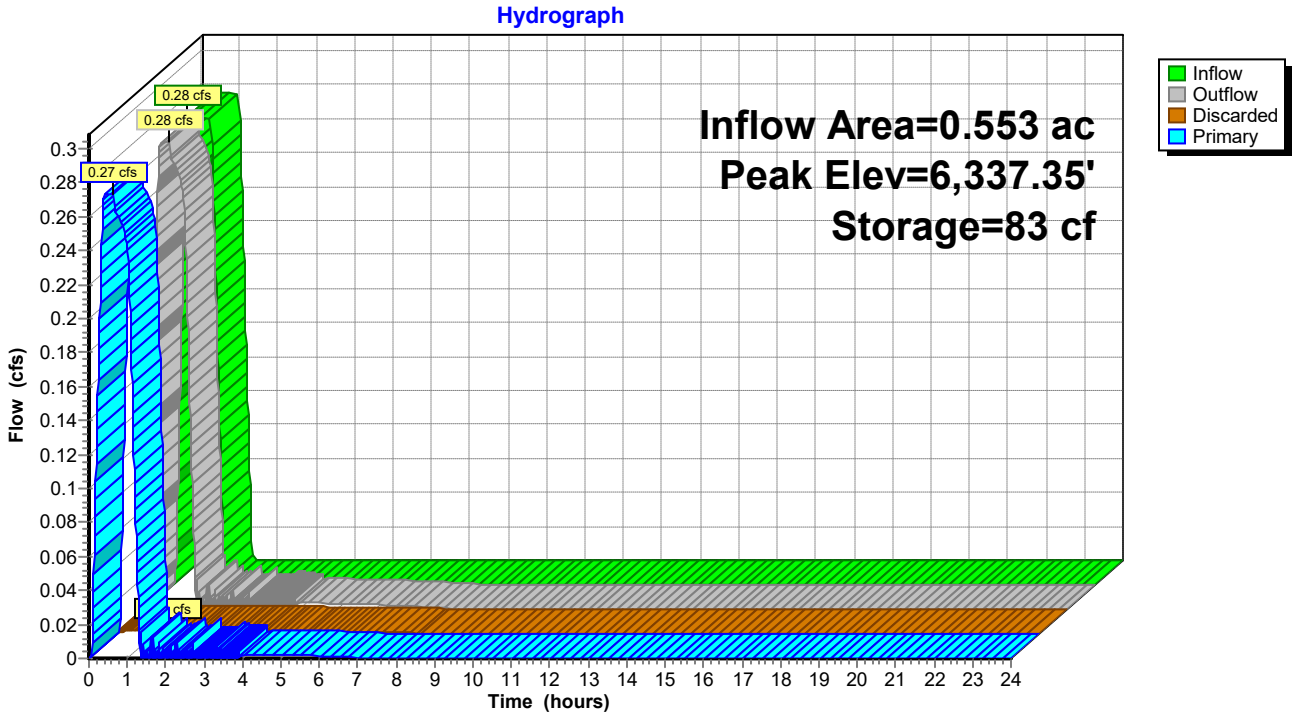
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
6,337.00	171	0	0
6,338.00	539	355	355
6,339.00	1,048	794	1,149
6,340.00	1,657	1,353	2,501
6,341.00	2,369	2,013	4,514

Device	Routing	Invert	Outlet Devices
#1	Primary	6,337.00'	**18.0" Round Culvert** L= 69.3' CPP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 6,337.00' / 6,336.50' S= 0.0072 '/' Cc= 0.900 n= 0.010, Flow Area= 1.77 sf
#2	Discarded	6,337.00'	**0.300 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.00 cfs @ 1.32 hrs HW=6,337.35' (Free Discharge)
↑**2=Exfiltration** (Exfiltration Controls 0.00 cfs)

Primary OutFlow Max=0.27 cfs @ 0.63 hrs HW=6,337.23' TW=6,336.72' (Dynamic Tailwater)
↑**1=Culvert** (Outlet Controls 0.27 cfs @ 2.45 fps)

Pond P1: Basin 1



Summary for Pond P2: Basin 2

Inflow Area = 1.537 ac, 0.00% Impervious, Inflow Depth = 0.50" for 2-yr event
Inflow = 0.78 cfs @ 0.63 hrs, Volume= 0.064 af
Outflow = 0.05 cfs @ 1.32 hrs, Volume= 0.056 af, Atten= 94%, Lag= 41.2 min
Discarded = 0.02 cfs @ 1.32 hrs, Volume= 0.026 af
Primary = 0.03 cfs @ 1.32 hrs, Volume= 0.030 af
Routed to Link PR : Proposed Runoff

Routing by Sim-Route method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 6,337.35' @ 1.32 hrs Surf.Area= 2,498 sf Storage= 2,583 cf

Plug-Flow detention time= 559.2 min calculated for 0.056 af (89% of inflow)
Center-of-Mass det. time= 553.4 min (596.7 - 43.3)

Volume	Invert	Avail.Storage	Storage Description
#1	6,336.00'	13,064 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

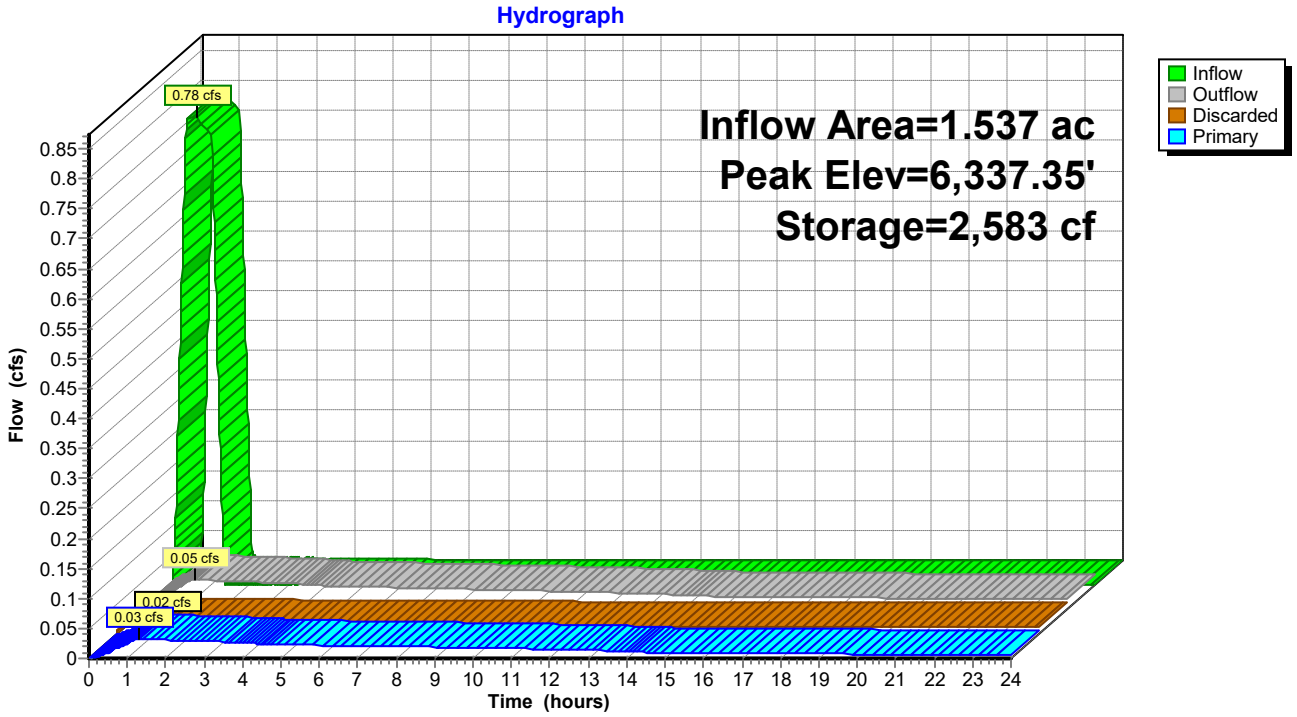
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
6,336.00	1,644	0	0
6,336.50	1,644	822	822
6,337.00	2,134	945	1,767
6,338.00	3,166	2,650	4,417
6,339.00	4,298	3,732	8,149
6,340.00	5,533	4,916	13,064

Device	Routing	Invert	Outlet Devices
#1	Discarded	6,336.00'	**0.300 in/hr Exfiltration over Surface area**
#2	Primary	6,334.23'	**18.0" Round Culvert w/ 2.7" inside fill** L= 141.7' CMP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 6,334.00' / 6,333.00' S= 0.0071 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 1.60 sf
#3	Device 2	6,336.00'	**0.7" Vert. Orifice/Grate** X 3 rows with 6.7" cc spacing C= 0.600 Limited to weir flow at low heads
#4	Primary	6,339.00'	**2.0' long + 4.0 '/' SideZ x 12.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.57 2.62 2.70 2.67 2.66 2.67 2.66 2.64
#5	Device 2	6,338.28'	**36.0" W x 12.0" H 14° Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.02 cfs @ 1.32 hrs HW=6,337.35' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=0.03 cfs @ 1.32 hrs HW=6,337.35' TW=0.00' (Dynamic Tailwater)
├**2=Culvert** (Passes 0.03 cfs of 12.15 cfs potential flow)
│ ├**3=Orifice/Grate** (Orifice Controls 0.03 cfs @ 3.98 fps)
│ └**5=Orifice/Grate** (Controls 0.00 cfs)
└**4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond P2: Basin 2

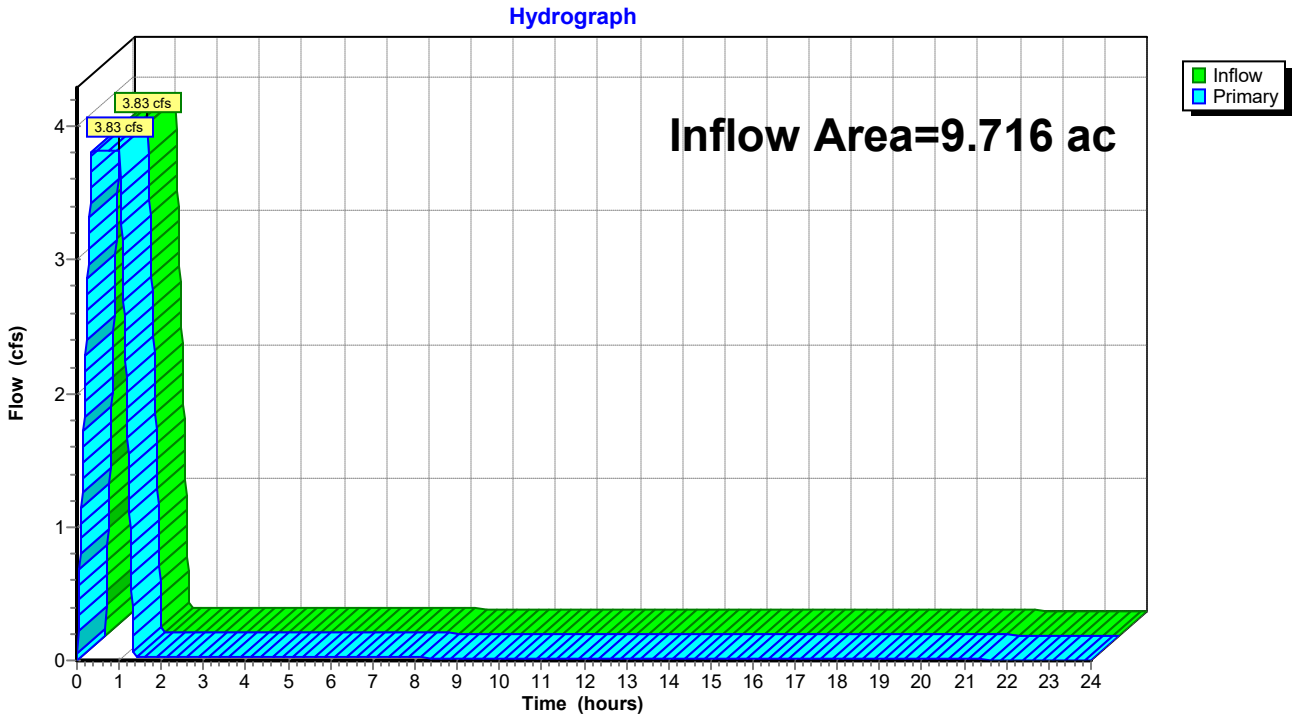


Summary for Link PR: Proposed Runoff

Inflow Area = 9.716 ac, 0.00% Impervious, Inflow Depth > 0.43" for 2-yr event
Inflow = 3.83 cfs @ 1.00 hrs, Volume= 0.344 af
Primary = 3.83 cfs @ 1.01 hrs, Volume= 0.344 af, Atten= 0%, Lag= 0.6 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Link PR: Proposed Runoff



Time span=0.00-24.00 hrs, dt=0.01 hrs, 2401 points
Runoff by Rational method, Rise/Fall=1.0/1.0 xTc
Reach routing by Sim-Route method - Pond routing by Sim-Route method

Subcatchment 1-PR: 1-PR Runoff Area=37,522 sf 0.00% Impervious Runoff Depth=1.07"
Flow Length=228' Tc=20.0 min C=0.46 Runoff=0.93 cfs 0.077 af

Subcatchment 2-PR: Sub 2-PR Runoff Area=42,860 sf 0.00% Impervious Runoff Depth=1.40"
Flow Length=297' Tc=20.0 min C=0.60 Runoff=1.39 cfs 0.115 af

Subcatchment 3-PR: Sub 3-PR Runoff Area=24,082 sf 0.00% Impervious Runoff Depth=1.35"
Flow Length=300' Tc=20.0 min C=0.58 Runoff=0.75 cfs 0.062 af

Subcatchment 4-PR: Sub 4-PR Runoff Area=36,071 sf 0.00% Impervious Runoff Depth=1.05"
Flow Length=410' Tc=20.0 min C=0.45 Runoff=0.88 cfs 0.072 af

Subcatchment 5-PR: Sub 5-PR Runoff Area=29,300 sf 0.00% Impervious Runoff Depth=1.03"
Flow Length=207' Tc=20.0 min C=0.44 Runoff=0.70 cfs 0.057 af

Subcatchment 6-PR: Sub 6-PR Runoff Area=226,244 sf 0.00% Impervious Runoff Depth=1.37"
Flow Length=767' Tc=20.0 min C=0.59 Runoff=7.20 cfs 0.595 af

Subcatchment 7-PR: Sub 7-PR Runoff Area=27,151 sf 0.00% Impervious Runoff Depth=1.14"
Flow Length=672' Tc=20.0 min C=0.49 Runoff=0.72 cfs 0.059 af

Pond P1: Basin 1 Peak Elev=6,338.48' Storage=676 cf Inflow=0.75 cfs 0.062 af
Discarded=0.01 cfs 0.005 af Primary=1.01 cfs 0.057 af Outflow=1.02 cfs 0.062 af

Pond P2: Basin 2 Peak Elev=6,338.48' Storage=6,052 cf Inflow=2.28 cfs 0.172 af
Discarded=0.03 cfs 0.038 af Primary=1.06 cfs 0.101 af Outflow=1.09 cfs 0.138 af

Link PR: Proposed Runoff Inflow=10.72 cfs 0.962 af
Primary=10.72 cfs 0.962 af

Total Runoff Area = 9.716 ac Runoff Volume = 1.038 af Average Runoff Depth = 1.28"
100.00% Pervious = 9.716 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment 1-PR: 1-PR

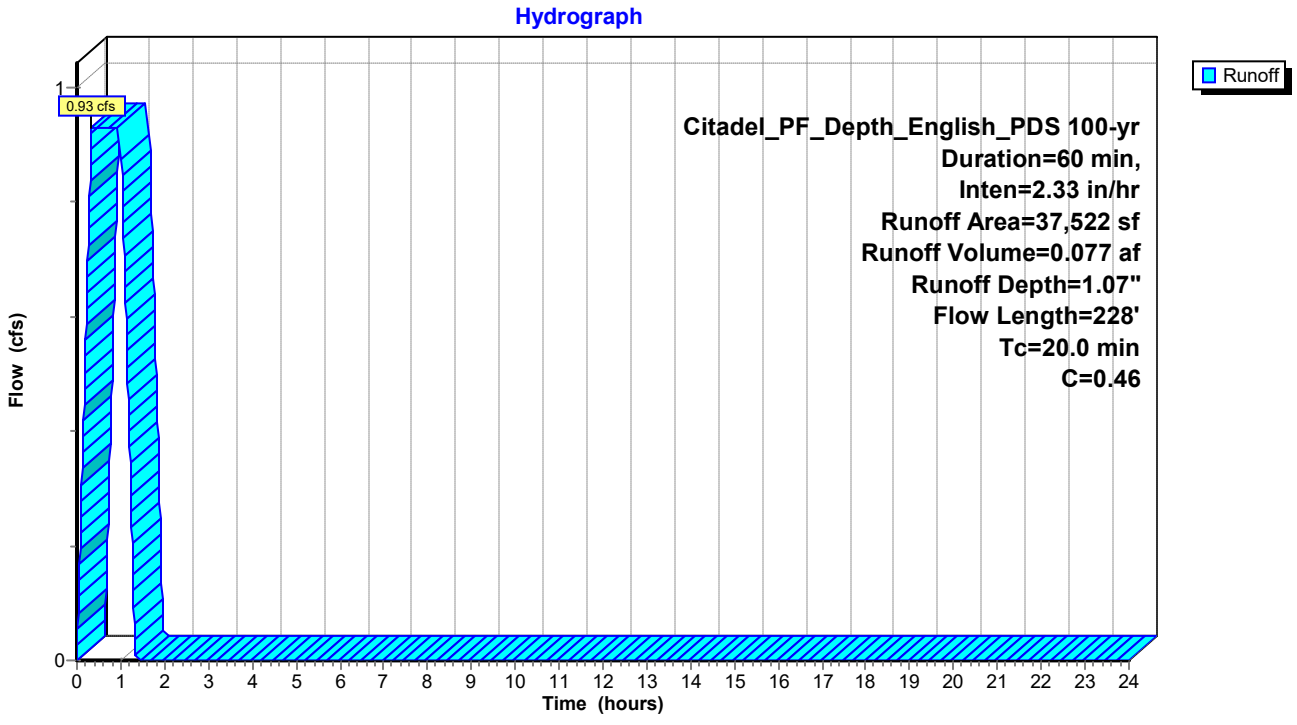
Runoff = 0.93 cfs @ 0.34 hrs, Volume= 0.077 af, Depth= 1.07"
Routed to Link PR : Proposed Runoff

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Citadel_PF_Depth_English_PDS 100-yr Duration=60 min, Inten=2.33 in/hr

Area (sf)	C	Description
32,465	0.44	Undeveloped Area - 2%
5,057	0.61	Gravel (Packed) - 40%
0	0.89	Paved - 100%
37,522	0.46	Weighted Average
37,522		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.9	100	0.0856	1.94		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 1.98"
1.2	128	0.0595	1.71		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
2.1	228	Total, Increased to minimum Tc = 20.0 min			

Subcatchment 1-PR: 1-PR



Summary for Subcatchment 2-PR: Sub 2-PR

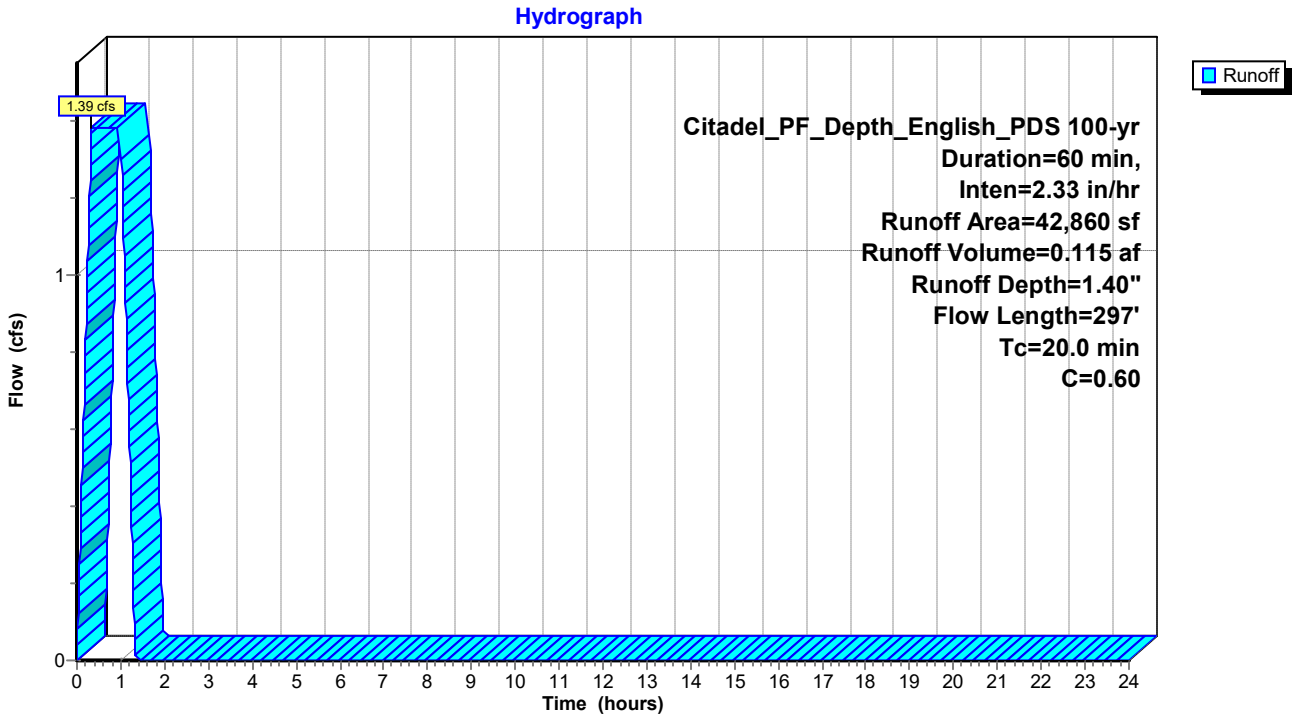
Runoff = 1.39 cfs @ 0.34 hrs, Volume= 0.115 af, Depth= 1.40"
Routed to Pond P2 : Basin 2

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Citadel_PF_Depth_English_PDS 100-yr Duration=60 min, Inten=2.33 in/hr

Area (sf)	C	Description
10,793	0.44	Undeveloped Area - 2%
26,730	0.61	Gravel (Packed) - 40%
5,337	0.89	Other Impervious - 100%
42,860	0.60	Weighted Average
42,860		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.2	100	0.0348	1.35		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 1.98"
1.0	197	0.0392	3.19		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
2.2	297	Total, Increased to minimum Tc = 20.0 min			

Subcatchment 2-PR: Sub 2-PR



Summary for Subcatchment 3-PR: Sub 3-PR

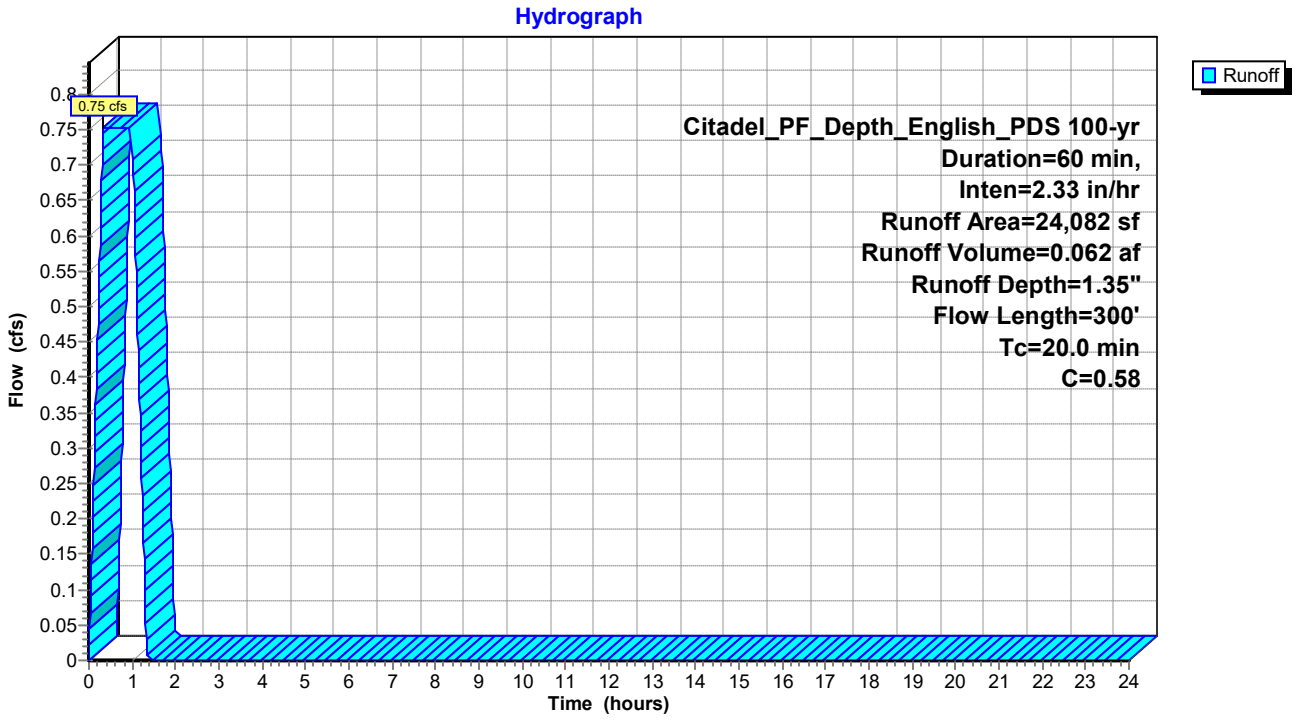
Runoff = 0.75 cfs @ 0.34 hrs, Volume= 0.062 af, Depth= 1.35"
Routed to Pond P1 : Basin 1

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Citadel_PF_Depth_English_PDS 100-yr Duration=60 min, Inten=2.33 in/hr

Area (sf)	C	Description
13,057	0.61	Gravel (Packed) - 40%
8,659	0.44	Undeveloped Area - 2%
2,366	0.89	Other Impervious - 100%
24,082	0.58	Weighted Average
24,082		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.5	100	0.1574	0.31		**Sheet Flow,** Grass: Short n= 0.150 P2= 1.98"
1.3	200	0.0243	2.51		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
6.8	300	Total, Increased to minimum Tc = 20.0 min			

Subcatchment 3-PR: Sub 3-PR



Summary for Subcatchment 4-PR: Sub 4-PR

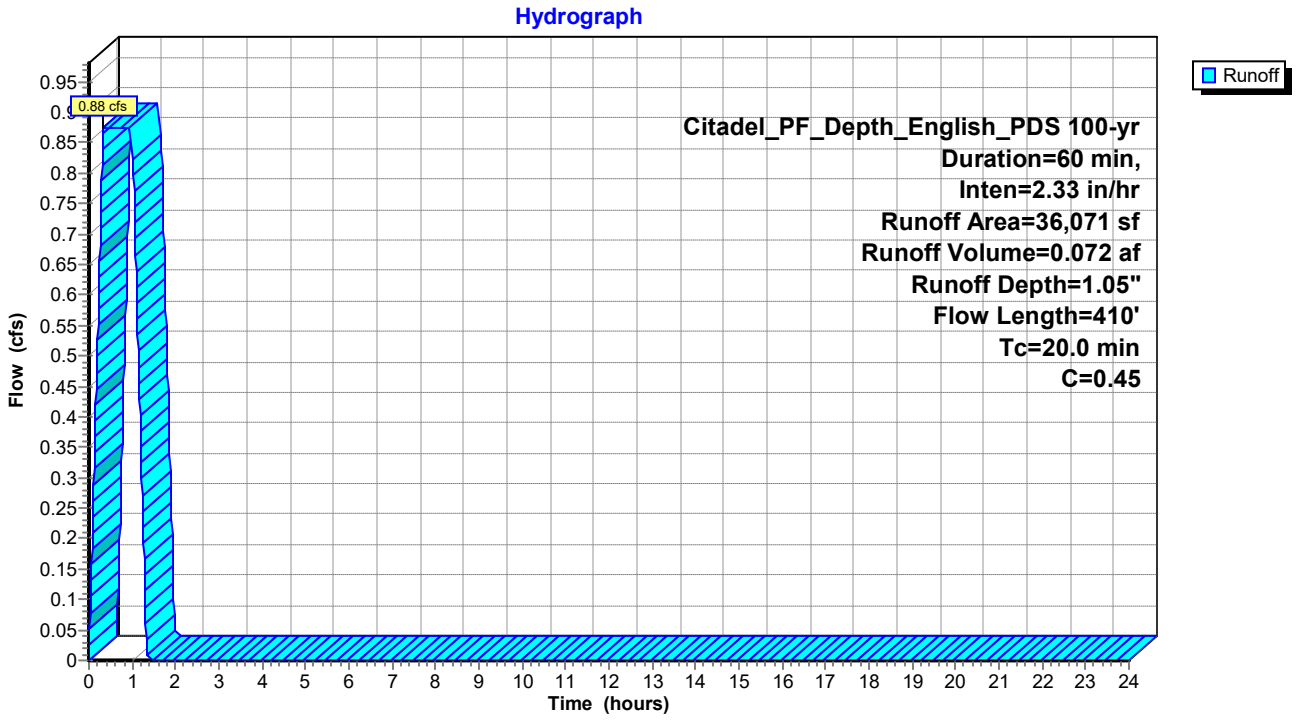
Runoff = 0.88 cfs @ 0.34 hrs, Volume= 0.072 af, Depth= 1.05"
Routed to Link PR : Proposed Runoff

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Citadel_PF_Depth_English_PDS 100-yr Duration=60 min, Inten=2.33 in/hr

Area (sf)	C	Description
34,680	0.44	Undeveloped Area - 2%
0	0.89	Paved - 100%
1,391	0.61	Gravel (Packed) - 40%
36,071	0.45	Weighted Average
36,071		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.2	100	0.0572	0.20		**Sheet Flow,** Grass: Short n= 0.150 P2= 1.98"
3.6	310	0.0421	1.44		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
11.8	410	Total, Increased to minimum Tc = 20.0 min			

Subcatchment 4-PR: Sub 4-PR



Summary for Subcatchment 5-PR: Sub 5-PR

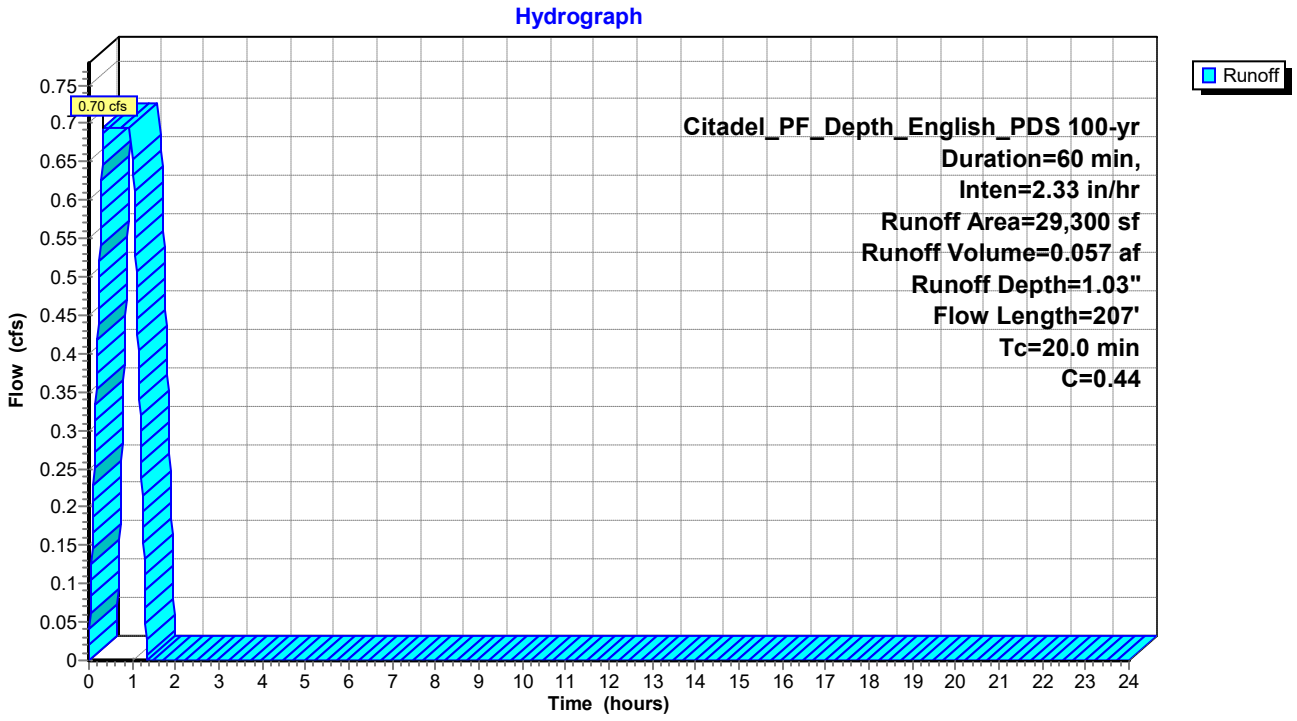
Runoff = 0.70 cfs @ 0.34 hrs, Volume= 0.057 af, Depth= 1.03"
Routed to Link PR : Proposed Runoff

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Citadel_PF_Depth_English_PDS 100-yr Duration=60 min, Inten=2.33 in/hr

Area (sf)	C	Description
28,482	0.44	Undeveloped Area - 2%
0	0.89	Paved - 100%
818	0.61	Gravel (Packed) - 40%
29,300	0.44	Weighted Average
29,300		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.5	100	0.1016	0.26		**Sheet Flow,** Grass: Short n= 0.150 P2= 1.98"
1.0	107	0.0664	1.80		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
7.5	207	Total, Increased to minimum Tc = 20.0 min			

Subcatchment 5-PR: Sub 5-PR



Summary for Subcatchment 6-PR: Sub 6-PR

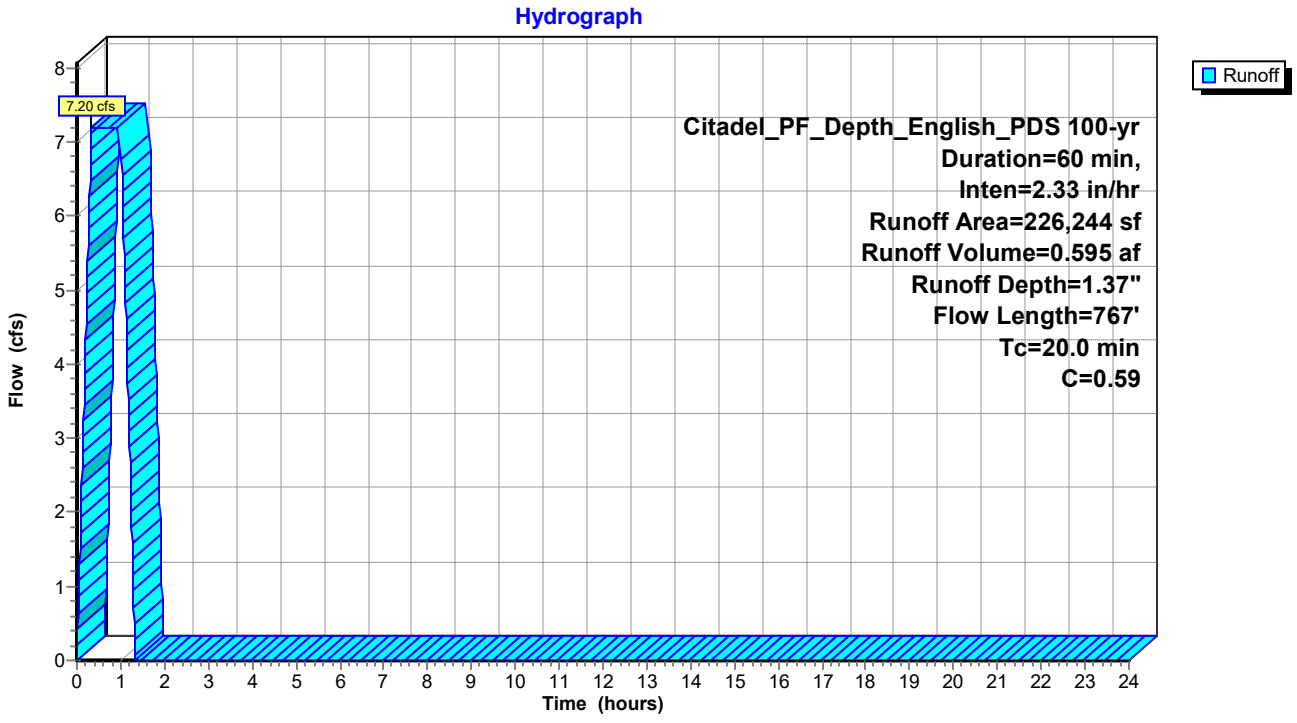
Runoff = 7.20 cfs @ 0.34 hrs, Volume= 0.595 af, Depth= 1.37"
Routed to Link PR : Proposed Runoff

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Citadel_PF_Depth_English_PDS 100-yr Duration=60 min, Inten=2.33 in/hr

Area (sf)	C	Description
149,666	0.44	Undeveloped Area - 2%
3,234	0.61	Gravel (Packed) - 40%
73,344	0.89	Paved - 100%
226,244	0.59	Weighted Average
226,244		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.0	100	0.0448	0.18		**Sheet Flow,** Grass: Short n= 0.150 P2= 1.98"
2.9	667	0.0346	3.78		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
11.9	767	Total, Increased to minimum Tc = 20.0 min			

Subcatchment 6-PR: Sub 6-PR



Summary for Subcatchment 7-PR: Sub 7-PR

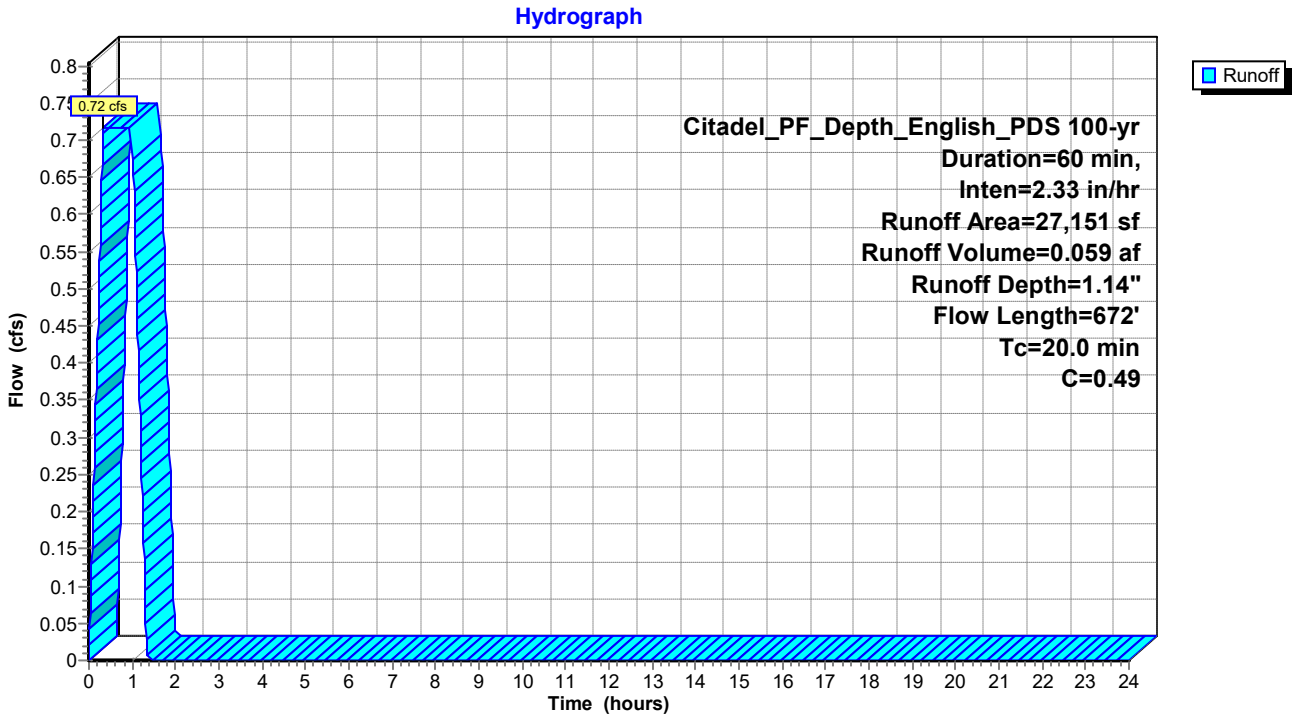
Runoff = 0.72 cfs @ 0.34 hrs, Volume= 0.059 af, Depth= 1.14"
Routed to Link PR : Proposed Runoff

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Citadel_PF_Depth_English_PDS 100-yr Duration=60 min, Inten=2.33 in/hr

Area (sf)	C	Description
20,087	0.44	Undeveloped Area - 2%
474	0.89	Paved - 100%
6,590	0.61	Gravel (Packed) - 40%
27,151	0.49	Weighted Average
27,151		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.2	100	0.0422	0.18		**Sheet Flow,** Grass: Short n= 0.150 P2= 1.98"
7.7	572	0.0312	1.24		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
16.9	672	Total, Increased to minimum Tc = 20.0 min			

Subcatchment 7-PR: Sub 7-PR



Summary for Pond P1: Basin 1

Inflow Area = 0.553 ac, 0.00% Impervious, Inflow Depth = 1.35" for 100-yr event
Inflow = 0.75 cfs @ 0.34 hrs, Volume= 0.062 af
Outflow = 1.02 cfs @ 1.03 hrs, Volume= 0.062 af, Atten= 0%, Lag= 41.4 min
Discarded = 0.01 cfs @ 1.19 hrs, Volume= 0.005 af
Primary = 1.01 cfs @ 1.03 hrs, Volume= 0.057 af
Routed to Pond P2 : Basin 2

Routing by Sim-Route method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 6,338.48' @ 1.19 hrs Surf.Area= 786 sf Storage= 676 cf

Plug-Flow detention time= 105.5 min calculated for 0.062 af (100% of inflow)
Center-of-Mass det. time= 106.0 min (146.0 - 40.0)

Volume	Invert	Avail.Storage	Storage Description
#1	6,337.00'	4,514 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

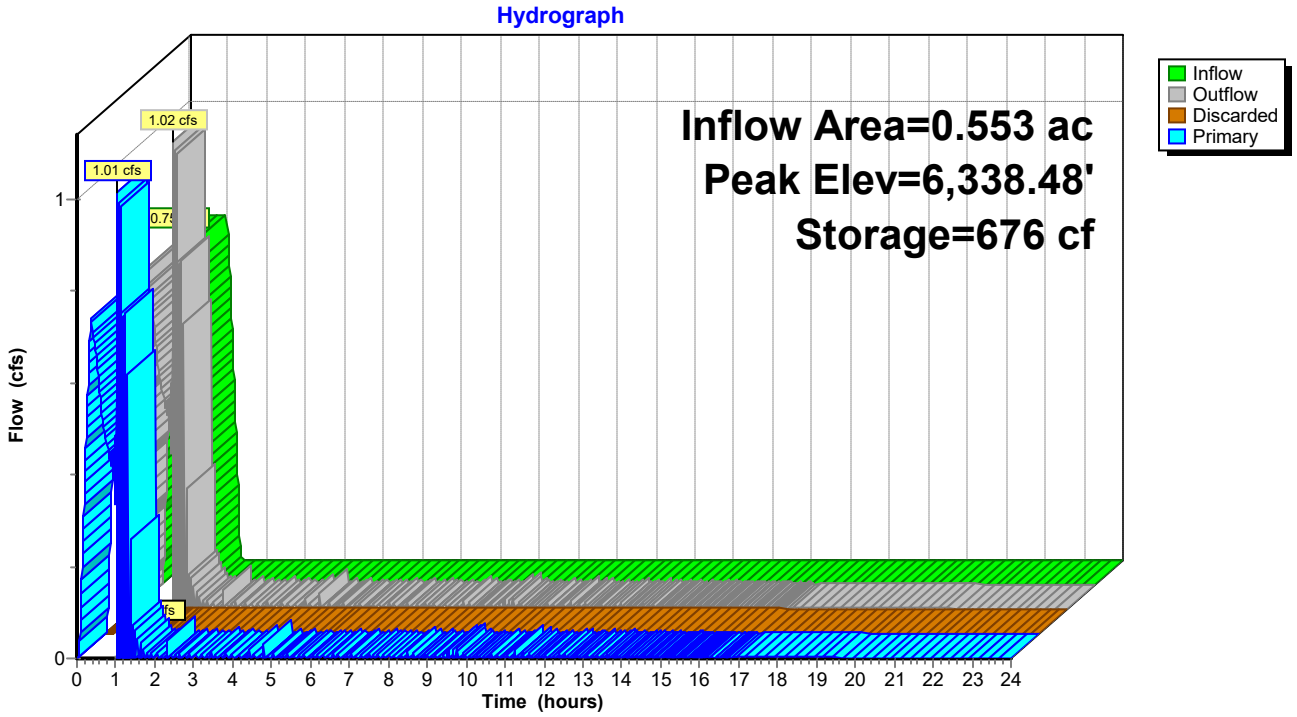
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
6,337.00	171	0	0
6,338.00	539	355	355
6,339.00	1,048	794	1,149
6,340.00	1,657	1,353	2,501
6,341.00	2,369	2,013	4,514

Device	Routing	Invert	Outlet Devices
#1	Primary	6,337.00'	**18.0" Round Culvert** L= 69.3' CPP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 6,337.00' / 6,336.50' S= 0.0072 '/' Cc= 0.900 n= 0.010, Flow Area= 1.77 sf
#2	Discarded	6,337.00'	**0.300 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.01 cfs @ 1.19 hrs HW=6,338.48' (Free Discharge)
↑**2=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.76 cfs @ 1.03 hrs HW=6,338.41' TW=6,338.40' (Dynamic Tailwater)
↑**1=Culvert** (Outlet Controls 0.76 cfs @ 0.57 fps)

Pond P1: Basin 1



Summary for Pond P2: Basin 2

Inflow Area = 1.537 ac, 0.00% Impervious, Inflow Depth = 1.34" for 100-yr event
Inflow = 2.28 cfs @ 1.03 hrs, Volume= 0.172 af
Outflow = 1.09 cfs @ 1.16 hrs, Volume= 0.138 af, Atten= 52%, Lag= 7.8 min
Discarded = 0.03 cfs @ 1.16 hrs, Volume= 0.038 af
Primary = 1.06 cfs @ 1.16 hrs, Volume= 0.101 af
Routed to Link PR : Proposed Runoff

Routing by Sim-Route method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 6,338.48' @ 1.16 hrs Surf.Area= 3,705 sf Storage= 6,052 cf

Plug-Flow detention time= 473.7 min calculated for 0.138 af (81% of inflow)
Center-of-Mass det. time= 445.3 min (508.7 - 63.4)

Volume	Invert	Avail.Storage	Storage Description
#1	6,336.00'	13,064 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

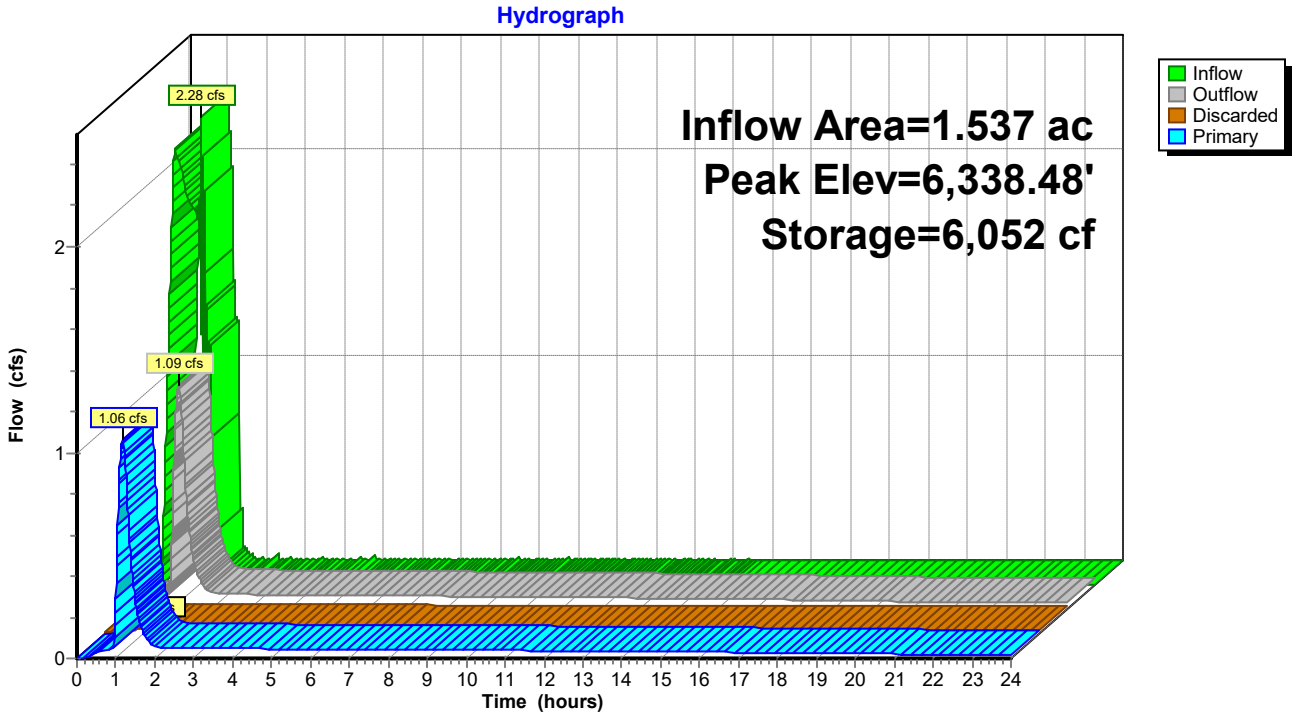
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
6,336.00	1,644	0	0
6,336.50	1,644	822	822
6,337.00	2,134	945	1,767
6,338.00	3,166	2,650	4,417
6,339.00	4,298	3,732	8,149
6,340.00	5,533	4,916	13,064

Device	Routing	Invert	Outlet Devices
#1	Discarded	6,336.00'	**0.300 in/hr Exfiltration over Surface area**
#2	Primary	6,334.23'	**18.0" Round Culvert w/ 2.7" inside fill** L= 141.7' CMP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 6,334.00' / 6,333.00' S= 0.0071 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 1.60 sf
#3	Device 2	6,336.00'	**0.7" Vert. Orifice/Grate** X 3 rows with 6.7" cc spacing C= 0.600 Limited to weir flow at low heads
#4	Primary	6,339.00'	**2.0' long + 4.0 '/' SideZ x 12.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.57 2.62 2.70 2.67 2.66 2.67 2.66 2.64
#5	Device 2	6,338.28'	**36.0" W x 12.0" H 14° Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.03 cfs @ 1.16 hrs HW=6,338.48' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.03 cfs)

Primary OutFlow Max=1.06 cfs @ 1.16 hrs HW=6,338.48' TW=0.00' (Dynamic Tailwater)
├**2=Culvert** (Passes 1.06 cfs of 14.34 cfs potential flow)
│ ├**3=Orifice/Grate** (Orifice Controls 0.05 cfs @ 6.57 fps)
│ └**5=Orifice/Grate** (Weir Controls 1.01 cfs @ 1.36 fps)
└**4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond P2: Basin 2

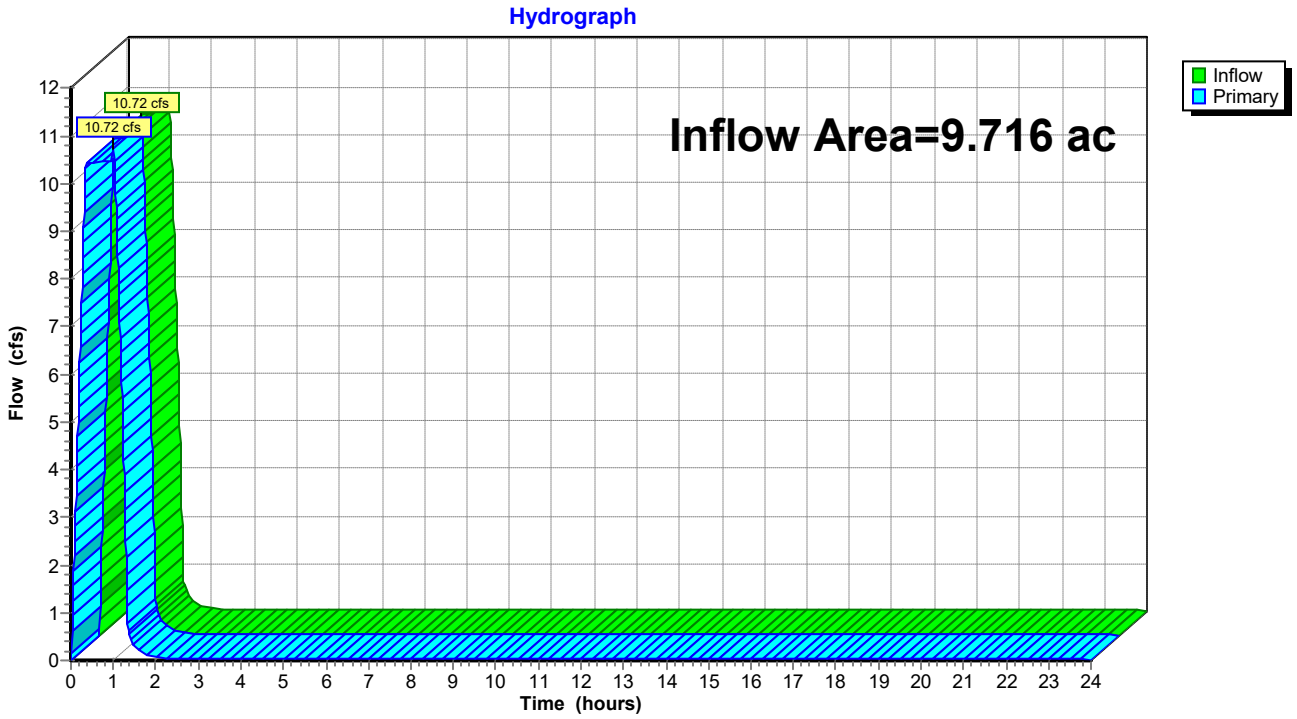


Summary for Link PR: Proposed Runoff

Inflow Area = 9.716 ac, 0.00% Impervious, Inflow Depth > 1.19" for 100-yr event
Inflow = 10.72 cfs @ 1.00 hrs, Volume= 0.962 af
Primary = 10.72 cfs @ 1.01 hrs, Volume= 0.962 af, Atten= 0%, Lag= 0.6 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Link PR: Proposed Runoff



DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.07 (June 2025)

Project: **Citadel Battery Storage**
Basin ID: **Basin 2**

Example Zone Configuration (Retention Pond)

	Estimated Stage (ft)	Estimated Volume (ac-ft)	Outlet Type
Zone 1 (WQCV)	0.76	0.028	Orifice Plate
Zone 2 (EURV)	1.85	0.061	Orifice Plate
Zone 3 (100-year)	2.52	0.052	Weir&Pipe (Restrict)
Total (all zones)		0.140	

User Input: Orifice at Underdrain Outlet (typically used to drain WQCV in a Filtration SCM)

Underdrain Orifice Invert Depth =	N/A	ft (distance below the filtration media surface)
Underdrain Orifice Diameter =	N/A	inches

Calculated Parameters for Underdrain

Underdrain Orifice Area =	N/A	ft^2
Underdrain Orifice Centroid =	N/A	feet

User Input: Orifice Plate with one or more orifices or Elliptical Slot Weir (typically used to drain WQCV and/or EURV in a sedimentation SCM)

Centroid of Lowest Orifice =	0.00	ft (relative to basin bottom at Stage = 0 ft)
Depth at top of Zone using Orifice Plate =	1.85	ft (relative to basin bottom at Stage = 0 ft)
Orifice Plate: Orifice Vertical Spacing =	6.70	inches
Orifice Plate: Orifice Area per Row =	0.49	sq. inches (diameter = 3/4 inch)

Calculated Parameters for Plate

WQ Orifice Area per Row =	3.403E-03	ft^2
Elliptical Half-Width =	N/A	feet
Elliptical Slot Centroid =	N/A	feet
Elliptical Slot Area =	N/A	ft^2

User Input: Stage and Total Area of Each Orifice Row (numbered from lowest to highest)

	Row 1 (required)	Row 2 (optional)	Row 3 (optional)	Row 4 (optional)	Row 5 (optional)	Row 6 (optional)	Row 7 (optional)	Row 8 (optional)
Stage of Orifice Centroid (ft)	0.00	0.62	1.23					
Orifice Area (sq. inches)	0.49	0.49	0.49					

	Row 9 (optional)	Row 10 (optional)	Row 11 (optional)	Row 12 (optional)	Row 13 (optional)	Row 14 (optional)	Row 15 (optional)	Row 16 (optional)
Stage of Orifice Centroid (ft)								
Orifice Area (sq. inches)								

User Input: Vertical Orifice (Circular or Rectangular)

	Not Selected	Not Selected	
Invert of Vertical Orifice =	N/A	N/A	ft (relative to basin bottom at Stage = 0 ft)
Depth at top of Zone using Vertical Orifice =	N/A	N/A	ft (relative to basin bottom at Stage = 0 ft)
Vertical Orifice Diameter =	N/A	N/A	inches

Calculated Parameters for Vertical Orifice

	Not Selected	Not Selected	
Vertical Orifice Area =	N/A	N/A	ft^2
Vertical Orifice Centroid =	N/A	N/A	feet

User Input: Overflow Weir (Dropbox with Flat or Sloped Grate and Outlet Pipe OR Rectangular/Trapezoidal Weir and No Outlet Pipe)

	Zone 3 Weir	Not Selected	
Overflow Weir Front Edge Height, Ho =	1.85	N/A	ft (relative to basin bottom at Stage = 0 ft)
Overflow Weir Front Edge Length =	3.00	N/A	feet
Overflow Weir Grate Slope =	4.00	N/A	H:V
Horiz. Length of Weir Sides =	1.00	N/A	feet
Overflow Grate Type =	Type C Grate	N/A	
Debris Clogging % =	0%	N/A	%

Calculated Parameters for Overflow Weir

	Zone 3 Weir	Not Selected	
Height of Grate Upper Edge, H_t =	2.10	N/A	feet
Overflow Weir Slope Length =	1.03	N/A	feet
Grate Open Area / 100-yr Orifice Area =	9.69	N/A	
Overflow Grate Open Area w/o Debris =	2.15	N/A	ft^2
Overflow Grate Open Area w/ Debris =	2.15	N/A	ft^2

User Input: Outlet Pipe w/ Flow Restriction Plate (Circular Orifice, Restrictor Plate, or Rectangular Orifice)

	Zone 3 Restrictor	Not Selected	
Depth to Invert of Outlet Pipe =	2.00	N/A	ft (distance below basin bottom at Stage = 0 ft)
Outlet Pipe Diameter =	18.00	N/A	inches
Restrictor Plate Height Above Pipe Invert =	3.30		inches

Calculated Parameters for Outlet Pipe w/ Flow Restriction Plate

	Zone 3 Restrictor	Not Selected	
Outlet Orifice Area =	0.22	N/A	ft^2
Outlet Orifice Centroid =	0.16	N/A	feet
Half-Central Angle of Restrictor Plate on Pipe =	0.88	N/A	radians

User Input: Emergency Spillway (Rectangular or Trapezoidal)

Spillway Invert Stage=	3.00	ft (relative to basin bottom at Stage = 0 ft)
Spillway Crest Length =	2.00	feet
Spillway End Slopes =	4.00	H:V
Freeboard above Max Water Surface =	1.00	feet

Calculated Parameters for Spillway

Spillway Design Flow Depth=	0.55	feet
Stage at Top of Freeboard =	4.55	feet
Basin Area at Top of Freeboard =	0.13	acres
Basin Volume at Top of Freeboard =	0.30	acre-ft

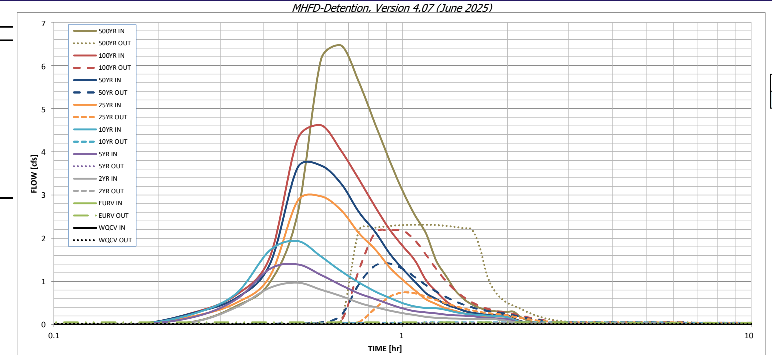
Routed Hydrograph Results

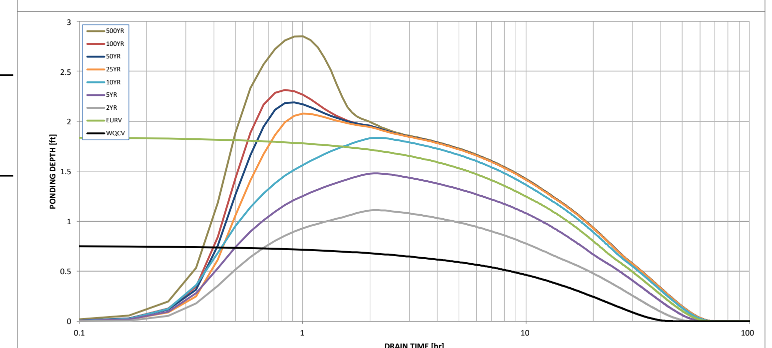
The user can override the default CUHP hydrographs and runoff volumes by entering new values in the Inflow Hydrographs table (Columns W through AF).

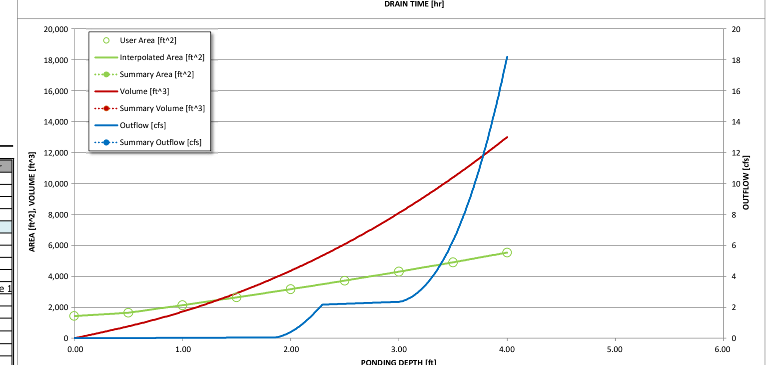
Design Storm Return Period =	WQCV	EURV	2 Year	5 Year	10 Year	25 Year	50 Year	100 Year	500 Year
One-Hour Rainfall Depth (in) =	N/A	N/A	0.85	1.14	1.38	1.74	2.03	2.33	3.08
CUHP Runoff Volume (acre-ft) =	0.028	0.089	0.049	0.071	0.096	0.143	0.178	0.219	0.312
Inflow Hydrograph Volume (acre-ft) =	N/A	N/A	0.049	0.071	0.096	0.143	0.178	0.219	0.312
CUHP Predevelopment Peak Q (cfs) =	N/A	N/A	0.0	0.1	0.5	1.3	1.8	2.3	3.5
OPTIONAL Override Predevelopment Peak Q (cfs) =	N/A	N/A							
Predevelopment Unit Peak Flow, q (cfs/acre) =	N/A	N/A	0.03	0.08	0.29	0.82	1.13	1.50	2.29
Peak Inflow Q (cfs) =	N/A	N/A	1.0	1.4	1.9	3.0	3.7	4.6	6.5
Peak Outflow Q (cfs) =	0.0	0.1	0.0	0.0	0.1	0.7	1.4	2.2	2.3
Ratio Peak Outflow to Predevelopment Q =	N/A	N/A	N/A	0.3	0.1	0.6	0.8	0.9	0.7
Structure Controlling Flow =	Plate	Overflow Weir 1	Plate	Plate	Plate	Overflow Weir 1	Overflow Weir 1	Outlet Plate 1	Outlet Plate 1
Max Velocity through Grate 1 (fps) =	N/A	N/A	N/A	N/A	N/A	0.3	0.6	1.0	1.0
Max Velocity through Grate 2 (fps) =	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Time to Drain 97% of Inflow Volume (hours) =	37	52	45	50	54	51	49	47	43
Time to Drain 99% of Inflow Volume (hours) =	**40**	58	49	55	60	59	58	56	54
Maximum Ponding Depth (ft) =	0.76	1.85	1.11	1.48	1.83	2.08	2.19	2.31	2.85
Area at Maximum Ponding Depth (acres) =	0.04	0.07	0.05	0.06	0.07	0.07	0.08	0.08	0.09
Maximum Volume Stored (acre-ft) =	0.028	0.089	0.045	0.065	0.088	0.105	0.114	0.124	0.170

DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.07 (June 2025)







S-A-V-D Chart Axis Override	X-axis	Left Y-Axis	Right Y-Axis
minimum bound			
maximum bound			

DETENTION BASIN OUTLET STRUCTURE DESIGN

Outflow Hydrograph Workbook Filename:

Inflow Hydrographs

The user can override the calculated inflow hydrographs from this workbook with inflow hydrographs developed in a separate program.

Time Interval
5.00 min

SOURCE	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP
TIME	WQCV [cfs]	EURV [cfs]	2 Year [cfs]	5 Year [cfs]	10 Year [cfs]	25 Year [cfs]	50 Year [cfs]	100 Year [cfs]	500 Year [cfs]
0:00:00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0:05:00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0:10:00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.06
0:15:00	0	0.00	0.06	0.17	0.25	0.19	0.27	0.27	0.43
0:20:00	0	0.00	0.40	0.58	0.72	0.50	0.62	0.69	0.98
0:25:00	0	0.00	0.85	1.29	1.72	1.12	1.40	1.56	2.58
0:30:00	0	0.00	0.97	1.40	1.93	2.87	3.64	4.30	6.14
0:35:00	0	0.00	0.81	1.15	1.58	2.97	3.69	4.62	6.46
0:40:00	0	0.00	0.66	0.91	1.24	2.65	3.26	4.02	5.60
0:45:00	0	0.00	0.50	0.72	0.97	2.11	2.60	3.36	4.66
0:50:00	0	0.00	0.40	0.60	0.77	1.75	2.16	2.74	3.82
0:55:00	0	0.00	0.33	0.47	0.62	1.34	1.66	2.21	3.10
1:00:00	0	0.00	0.26	0.37	0.50	1.04	1.29	1.82	2.55
1:05:00	0	0.00	0.22	0.31	0.42	0.80	1.00	1.50	2.11
1:10:00	0	0.00	0.18	0.28	0.39	0.58	0.73	1.03	1.47
1:15:00	0	0.00	0.16	0.26	0.38	0.47	0.59	0.77	1.12
1:20:00	0	0.00	0.15	0.23	0.34	0.37	0.47	0.54	0.79
1:25:00	0	0.00	0.14	0.22	0.29	0.32	0.39	0.41	0.59
1:30:00	0	0.00	0.14	0.21	0.26	0.26	0.32	0.32	0.47
1:35:00	0	0.00	0.13	0.20	0.23	0.23	0.28	0.27	0.38
1:40:00	0	0.00	0.13	0.17	0.22	0.21	0.25	0.24	0.33
1:45:00	0	0.00	0.13	0.16	0.21	0.20	0.23	0.22	0.31
1:50:00	0	0.00	0.13	0.15	0.20	0.19	0.22	0.21	0.30
1:55:00	0	0.00	0.11	0.14	0.19	0.19	0.22	0.21	0.30
2:00:00	0	0.00	0.09	0.13	0.17	0.19	0.22	0.21	0.30
2:05:00	0	0.00	0.06	0.08	0.11	0.12	0.14	0.14	0.19
2:10:00	0	0.00	0.04	0.05	0.07	0.08	0.09	0.09	0.12
2:15:00	0	0.00	0.02	0.03	0.04	0.05	0.05	0.05	0.07
2:20:00	0	0.00	0.01	0.02	0.03	0.03	0.03	0.03	0.04
2:25:00	0	0.00	0.01	0.01	0.01	0.02	0.02	0.02	0.02
2:30:00	0	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01
2:35:00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2:40:00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2:45:00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2:50:00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2:55:00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3:00:00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3:05:00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3:10:00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3:15:00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3:20:00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3:25:00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3:30:00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3:35:00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3:40:00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3:45:00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3:50:00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3:55:00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4:00:00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4:05:00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4:10:00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4:15:00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4:20:00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4:25:00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4:30:00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4:35:00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4:40:00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4:45:00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4:50:00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4:55:00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5:00:00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5:05:00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5:10:00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5:15:00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5:20:00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5:25:00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5:30:00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5:35:00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5:40:00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5:45:00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5:50:00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5:55:00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6:00:00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.07 (June 2025)

Summary Stage-Area-Volume-Discharge Relationships

The user can create a summary S-A-V-D by entering the desired stage increments and the remainder of the table will populate automatically.

The user should graphically compare the summary S-A-V-D table to the full S-A-V-D table in the chart to confirm it captures all key transition points.

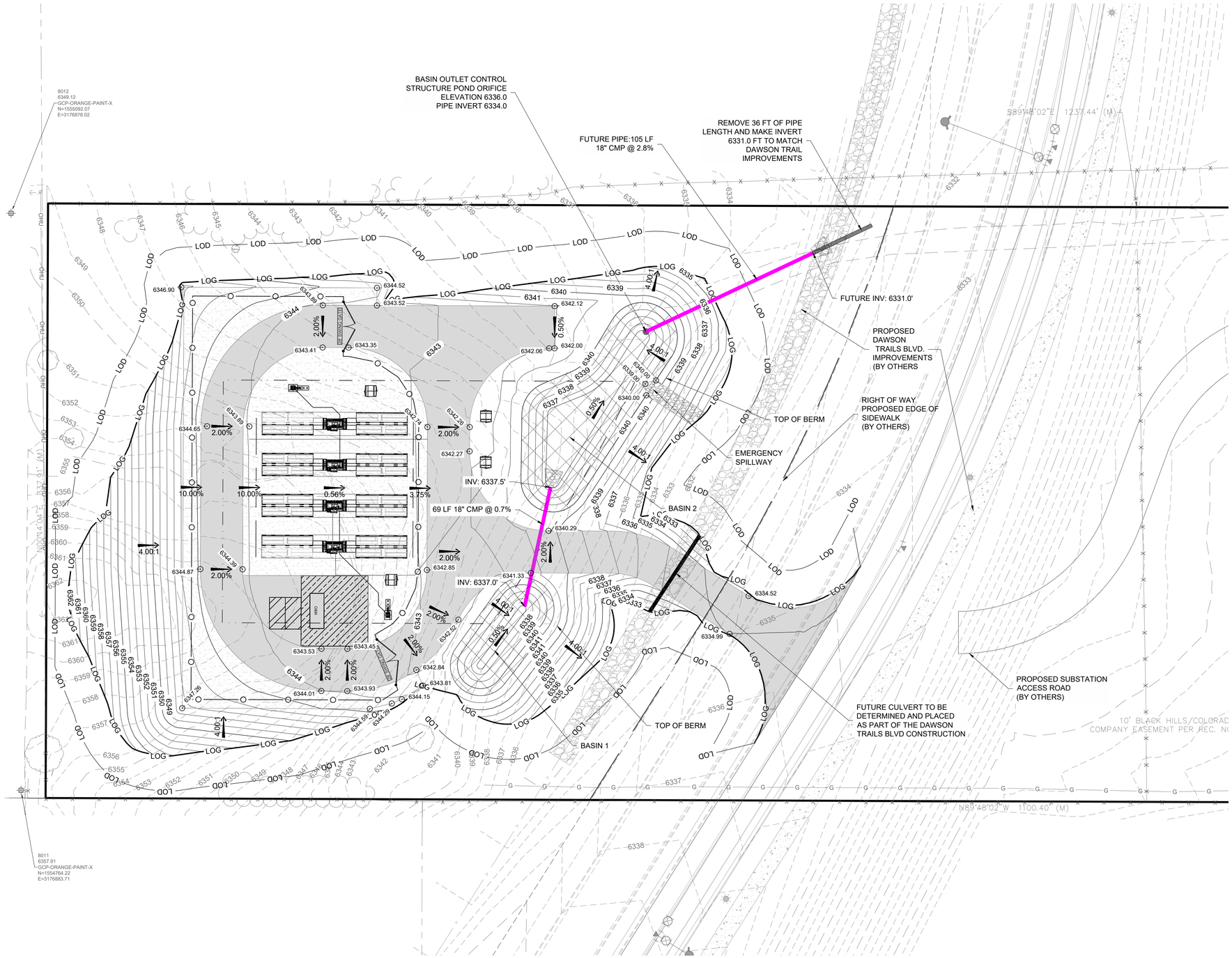
Stage - Storage Description	Stage [ft]	Elevation [ft]	Area [ft^2]	Area [acres]	Volume [ft^3]	Volume [ac-ft]	Total Outflow [cfs]

For best results, include the stages of all grade slope changes (e.g. ISV and Floor) from the S-A-V table on Sheet 'Basin'.

Also include the inverts of all outlets (e.g. vertical orifice, overflow grate, and spillway, where applicable).

Citadel_MHFD-Detention_v4.07_v3...

2/10/2026, 4:20 PM



LEGEND

- PROJECT BOUNDARY
- NFPA 855 SETBACK - 100'
- ADJACENT PROPERTY LINES
- EXISTING MINOR CONTOUR INTERVAL
- EXISTING MAJOR CONTOUR INTERVAL
- EXISTING TREELINE
- EXISTING DECIDUOUS TREE
- EXISTING BUSH
- GROUND CONTROL POINT
- EXISTING FENCE
- EXISTING UTILITY POLE
- EXISTING GUY WIRE
- EXISTING GAS LINE
- EXISTING ELECTRIC LINE
- EXISTING WATER LINE
- EXISTING SANITARY SEWER
- EXISTING FIBER OPTIC
- EXISTING OVERHEAD UTILITY LINE
- EXISTING GRAVEL ROAD
- PROPOSED RIPRAP
- PROPOSED BESS YARD ROCK
- PROPOSED ACCESS ROAD
- PROPOSED STORMWATER BASIN
- PROPOSED 18" CULVERT
- FUTURE CULVERT FOR DAWSON TRAILS BLVD
- PROPOSED DRAINAGE STRUCTURE
- PROPOSED CHAINLINK FENCE
- PROPOSED LIMIT OF GRADING
- PROPOSED LIMIT OF DISTURBANCE
- PROPOSED 28' SWING GATE
- PROPOSED GRADE BREAK
- PROPOSED MAJOR CONTOURS
- PROPOSED MINOR CONTOURS
- PROPOSED TESLA MEGAPACK
- PROPOSED AUX SWITCHBOARD
- PROPOSED METER & DISCONNECT CABINET
- PROPOSED TESLA REQUIRED O&M BUILDING, STORAGE CLEARANCE AREA, AND PARKING ZONE (TESLA LEVEL 2)

NOTES:

1. EQUIPMENT FOUNDATIONS, IF SHOWN, ARE SHOWN FOR REFERENCE ONLY. REFER TO THE STRUCTURAL DRAWINGS FOR SPECIFIC FOUNDATION LOCATIONS AND DETAILS.

N

W E

S

0 15 30 60

NAD83 COLORADO STATE PLANES, CENTRAL ZONE, US FOOT

EARTHWORK ESTIMATES

ITEM – LOCATION	MATERIAL	CUT (Cu. Yd.)	FILL (Cu. Yd.)	NET
BESS SITE AND ACCESS ROAD	NATIVE MATERIAL	11,500	2,000	9,500 (CUT)
TOPSOIL	NATIVE TOPSOIL	3,600	700	2,900 (CUT)

Fill Factor of 1.15 is used.

CITADEL BESS PROJECT

DOUGLAS COUNTY, COLORADO

REV.	DATE	DESCRIPTION	BY
A	10/03/2025	30% DESIGN SUBMITTAL	KJK
B	02/18/2026	30% REDESIGN SUBMITTAL	KJK

THIS DRAWING IS PRELIMINARY AND IS NOT TO BE USED FOR CONSTRUCTION. FOR REVIEW PURPOSES ONLY.

Ulteig

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

PROJECT NUMBER: 25.01369
DESIGN BY: L. MOFFITT
DRAWN BY: L. MOFFITT
APPROVED BY: K. KNOTT

GRADING SITE PLAN

DRAWING NUMBER: CIT-C-304

REVISION: B

G:\25\25.01369_CIVIL\01_DRAWINGS\PLAN PRODUCTION\25.01369_CIT_GRD.DWG


TESLA


TESLA

From: Kyle Doe, PE
To: Douglas County Engineering Department
100 Third Street
Castle Rock, CO 80104
Date: February 24, 2026

COLORADO LICENSED
KYLE J DOE
67097
PROFESSIONAL ENGINEER
02/24/2026

Re: Citadel Battery Energy Storage System Site – Trip Generation Analysis Memo

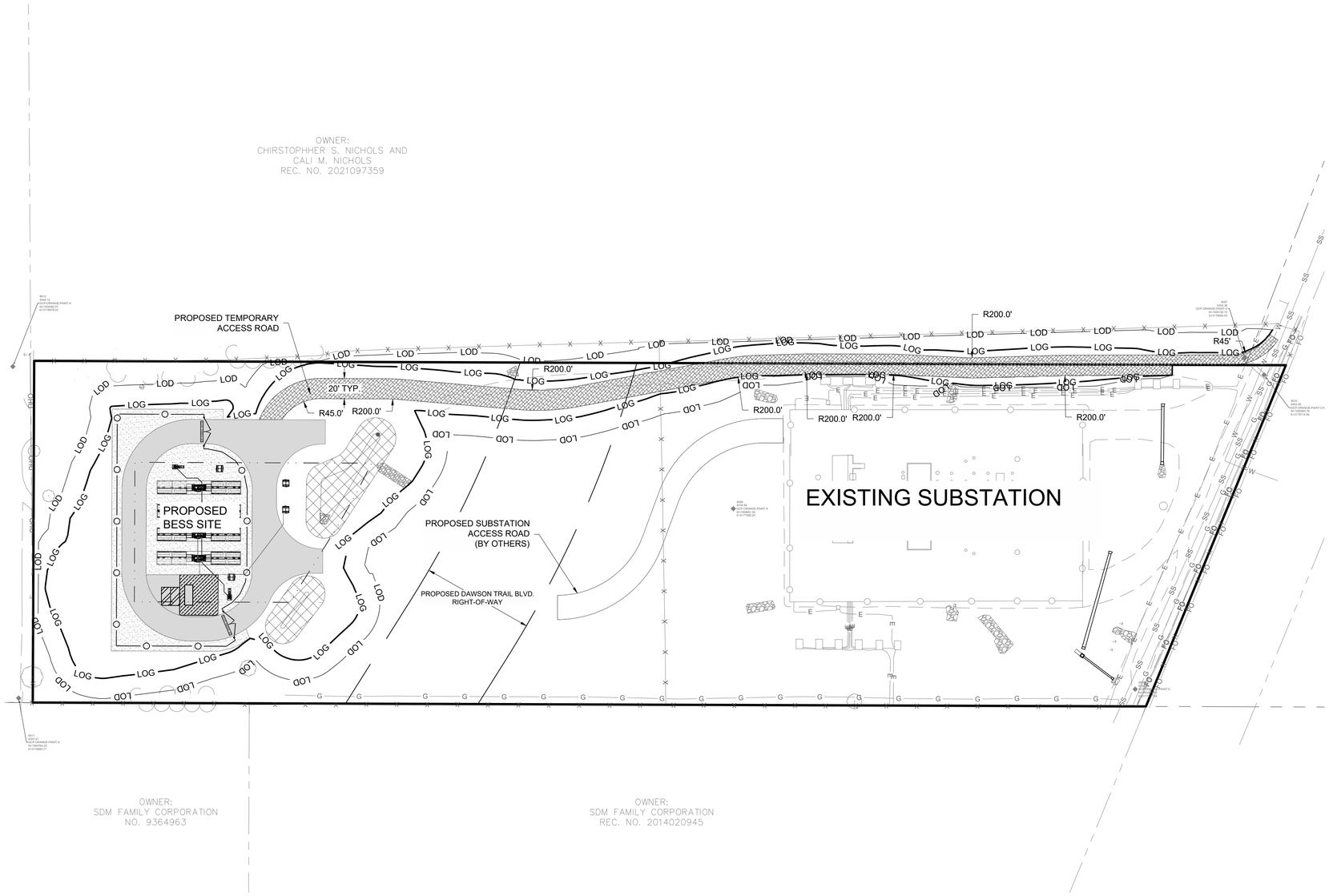
The proposed Citadel Battery Energy Storage System (BESS) project is located in Douglas County, Colorado. The site is located west of the I-25 frontage road, south of Yucca Hills Road. The project will be located west of the existing substation site and share the existing access.

The proposed Dawson Trail Boulevard will cross the proposed site in the future as it connects between Crystal Valley Parkway and East Plum Creek Parkway to the north. The proposed site will then have access along Dawson Trail Boulevard instead of access by the existing substation.

The Institute of Transportation Engineers (ITE) provides trip generation estimates for various land uses based on site observations. Based on the ITE Trip Generation, the closest land use would be Land Use 170, Utility site. The daily trips generated based on ITE land use is 12.29 vehicles per day per 1,000 square feet of gross floor area. However, this is higher than the expected trips of the proposed site. Estimates from the site owner were instead used to provide an accurate assessment of the traffic impacts. During operation, there would be one scheduled service trip per year, with occasional additional trips for corrective or long-term maintenance as needed.

Construction of the battery storage project would generate approximately 6–10 daily vehicle trips during typical construction activities, with short-term peaks of approximately 8–12 daily vehicle trips during equipment delivery and setting, and 3–6 daily vehicle trips during commissioning and closeout.

Based on the Douglas County Roadway Design and Construction Standards, Appendix B - Traffic Impact Study Criteria, a Traffic Impact Study (TIS) is required for developments that will exceed 50 vehicles during any peak hour. However, the proposed site is projected to generate less than the 50 vehicle per hour threshold and therefore does not require a TIS. The projected traffic for the site is not expected to significantly impact operations of the local roadway network adjacent to the development. Attached is the preliminary site plan and ITE traffic estimates during construction. If you have any further questions or concerns, please reach out to Kyle Doe at kyle.doe@ulteig,com or by phone at (512) 755-8210.

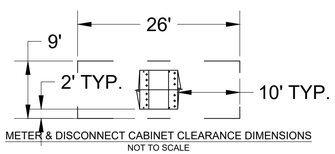


LEGEND

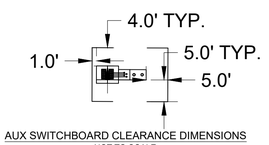
- PROJECT BOUNDARY
- 100' NFPA 855 SETBACK
- ADJACENT PROPERTY LINES
- EXISTING TREELINE
- EXISTING DECIDUOUS TREE
- EXISTING BUSH
- GROUND CONTROL POINT
- EXISTING FENCE
- EXISTING UTILITY POLE
- EXISTING GUY WIRE
- EXISTING GAS LINE
- EXISTING ELECTRIC LINE
- EXISTING WATER LINE
- EXISTING SANITARY SEWER
- EXISTING FIBER OPTIC
- EXISTING OVERHEAD UTILITY LINE
- EXISTING GRAVEL ROAD
- EXISTING RIPRAP
- PROPOSED RIPRAP
- PROPOSED BESS YARD ROCK
- PROPOSED ACCESS ROAD
- PROPOSED TEMPORARY ROAD
- PROPOSED STORMWATER BASIN
- PROPOSED DRAINAGE STRUCTURE
- PROPOSED CHAINLINK FENCE
- PROPOSED LIMIT OF GRADING
- PROPOSED LIMIT OF DISTURBANCE
- PROPOSED 28' SWING GATE
- PROPOSED TESLA MEGAPACK 2XL
- PROPOSED AUX SWITCHBOARD
- PROPOSED METER & DISCONNECT CABINET
- PROPOSED TESLA REQUIRED O&M BUILDING, STORAGE CLEARANCE AREA, AND PARKING ZONE (TESLA LEVEL 2)

NOTES:

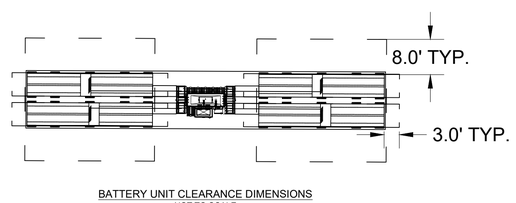
1. EQUIPMENT FOUNDATIONS ARE SHOWN FOR REFERENCE ONLY, REFER TO THE STRUCTURAL DRAWINGS FOR SPECIFIC FOUNDATION LOCATIONS AND DETAILS.



METER & DISCONNECT CABINET CLEARANCE DIMENSIONS
NOT TO SCALE



AUX SWITCHBOARD CLEARANCE DIMENSIONS
NOT TO SCALE

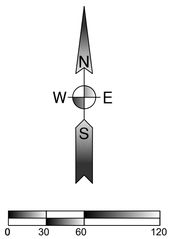


BATTERY UNIT CLEARANCE DIMENSIONS
NOT TO SCALE

CITADEL BESS PROJECT

DOUGLAS COUNTY, COLORADO

REV.	DATE	DESCRIPTION	BY
A	02/18/2026	30% REDESIGN SUBMITTAL	KJK



NAD83 COLORADO STATE PLANES,
CENTRAL ZONE, US FOOT

THIS DRAWING IS
PRELIMINARY AND IS
NOT TO BE USED FOR
CONSTRUCTION.
FOR REVIEW
PURPOSES ONLY.

Ulteig

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

PROJECT NUMBER: 25.01369
DESIGN BY: L. MOFFITT
DRAWN BY: L. MOFFITT
APPROVED BY: K. KNOTT

TEMPORARY ROAD OVERALL SITE PLAN

DRAWING NUMBER: CIT-C-200
REVISION: A

G:\2025\25.01369\...\DWG\01_DRAWINGS\PLAN PRODUCTION\25.01369_GT_OSP_TEMP ROAD.DWG

Land Use: 170
Utility

Description

A utility is a free-standing building that can house office space, a storage area, and electromechanical or industrial equipment that supports a local electrical, communication, water supply or control, or sewage treatment utility.

Additional Data

The sites were surveyed in the 1990s, the 2000s, and the 2010s in Delaware, Oregon, and Texas.

Source Numbers

443, 538, 876

Utility
(170)

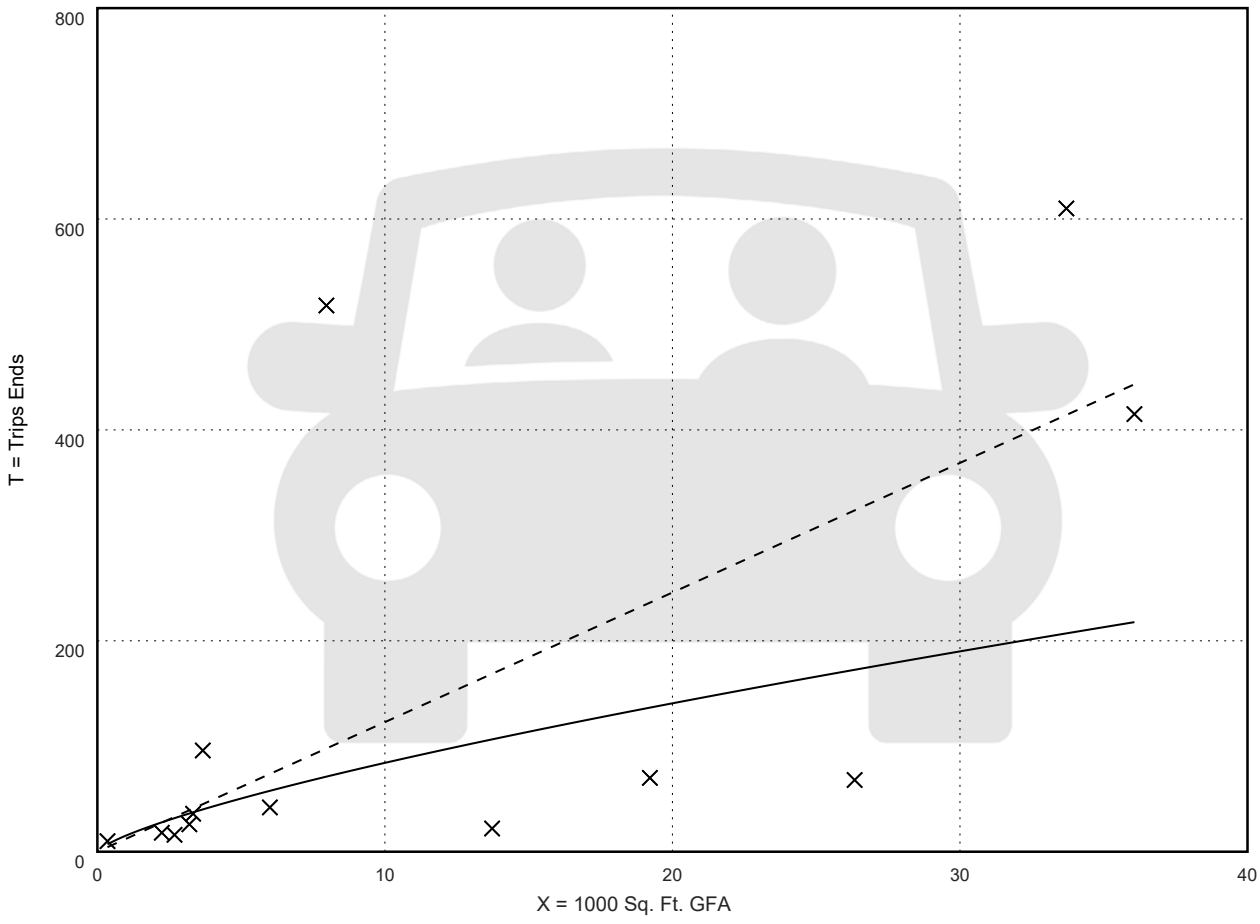
Vehicle Trip Ends vs: 1000 Sq. Ft. GFA
On a: Weekday

Setting/Location: General Urban/Suburban
Number of Studies: 13
Avg. 1000 Sq. Ft. GFA: 12
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
12.29	1.60 - 65.03	14.32

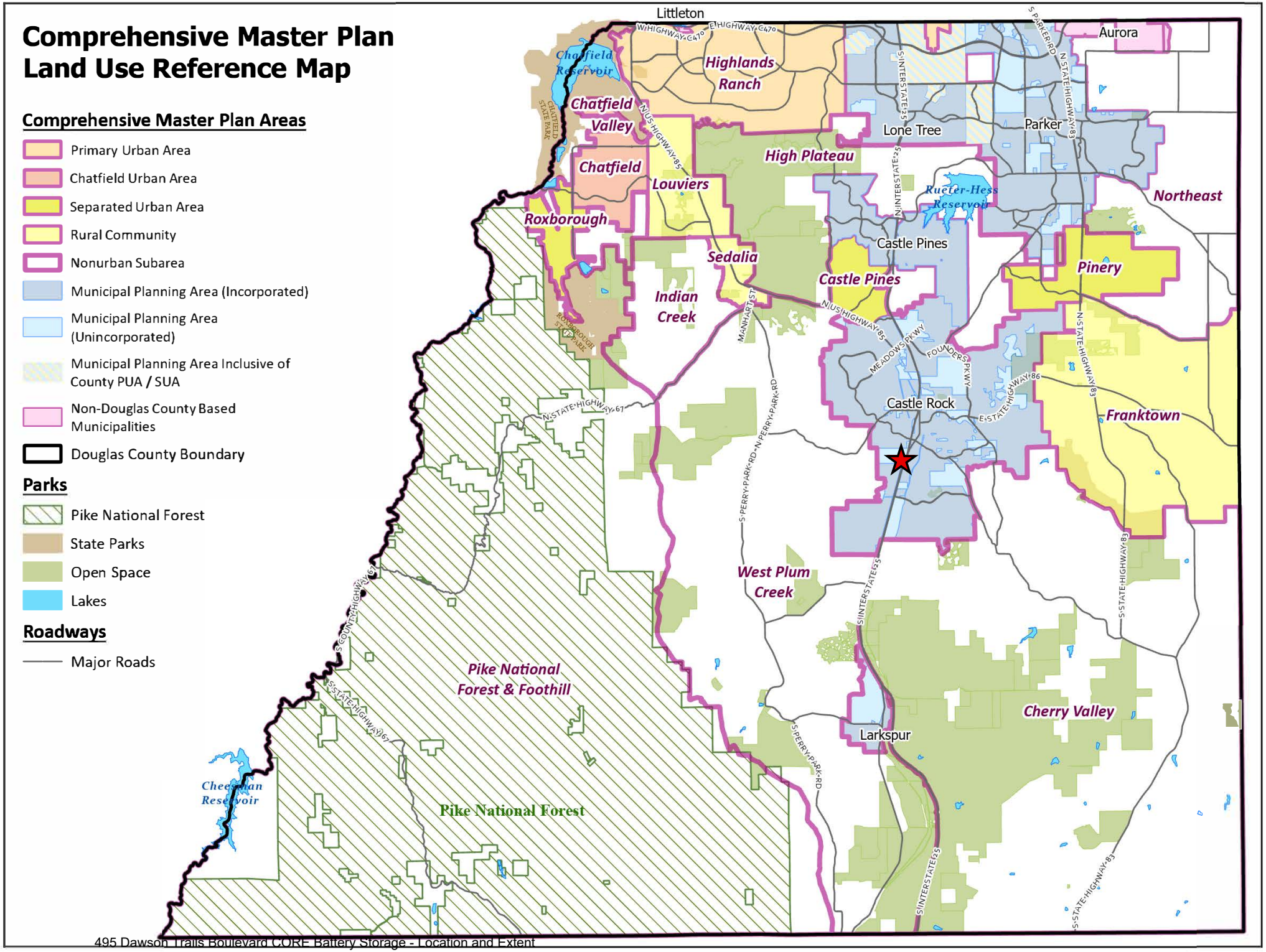
Data Plot and Equation



Fitted Curve Equation: Ln(T) = 0.74 Ln(X) + 2.73

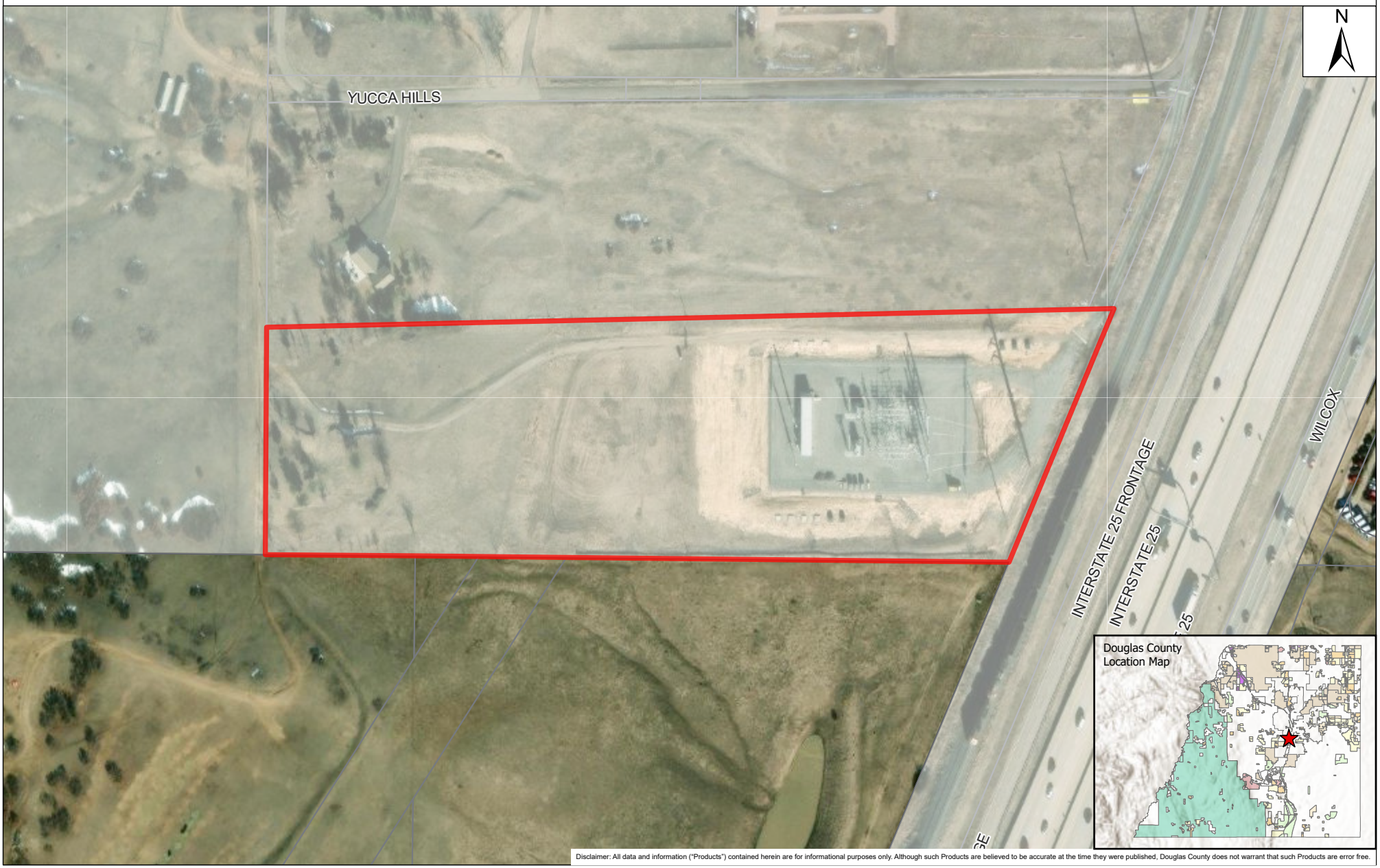
R^2= 0.51

Comprehensive Master Plan Land Use Reference Map



495 Dawson Trails Boulevard LE2026-003

DOUGLAS COUNTY COLORADO



Disclaimer: All data and information ("Products") contained herein are for informational purposes only. Although such Products are believed to be accurate at the time they were published, Douglas County does not warrant that such Products are error free.

Date Saved: 3/20/2026 1:07 PM

A1 - AGRICULTURAL ONE

495 Dawson Trails Boulevard LE2026-003

DOUGLAS COUNTY
COLORADO

Disclaimer: All data and information ("Products") contained herein are for informational purposes only. Although such Products are believed to be accurate at the time they were published, Douglas County does not warrant that such Products are error free.

Date Saved: 3/20/2026 1:09 PM

Project Name: 495 Dawson Trails Boulevard
Project File #: LE2026-003
Date Sent: 03/12/2026 **Date Due:** 03/26/2026

Agency	Date Received	Agency Response	Response Resolution
AT&T Long Distance - ROW		Awaiting referral response	Awaiting referral response
Addressing Analyst	03/12/2026	The proposed address for this facility is 495 Dawson Trails Blvd. This address is not to be used for any purpose other than for plan review until after this project is approved. Proposed addresses are subject to changes as necessary for 911 dispatch and life safety purposes. The address of 892 Yucca Hills Road for the existing substation on this same parcel will be changed to reflect the new proposed access once Dawson Trails Blvd is constructed and open for traffic. Addresses are recorded by Douglas County following all necessary approvals. Contact DCAddressing@douglas.co.us or 303.660.7411 with questions.	Information provided to applicant
Assessor	03/17/2026	please be aware of the following comments: None	No response necessary
Building Services		Awaiting referral response	Awaiting referral response
Comcast		Awaiting referral response	Awaiting referral response
Engineering Services		Awaiting referral response	Awaiting referral response
CORE Electric Cooperative	03/18/20265	No Comment	No response necessary
Castle Rock Fire and Rescue Department		Awaiting referral response	Awaiting referral response
Office of Emergency Management		Awaiting referral response	Awaiting referral response
Town of Castle Rock	03/23/2026	Please see attached TOCR document. Summary: Requested coordination with Dawson Trails Blvd construction and additional information regarding roadway and driveway designs.	Comments forwarded to applicant
CenturyLink		Awaiting referral response	Awaiting referral response
Sheriff's Office		Awaiting referral response	Awaiting referral response
Sheriff's Office E911		Awaiting referral response	Awaiting referral response
Wildfire Mitigation		Awaiting referral response	Awaiting referral response

Project Name: 495 Dawson Trails Boulevard
Project File #: LE2026-003
Date Sent: 03/12/2026 **Date Due:** 03/26/2026

Xcel Energy-Right of Way & Permits	03/16/2026	Public Service Company of Colorado's (PSCo) Right of Way & Permits Referral Desk has reviewed the above-mentioned application and currently has no apparent conflict. As a safety precaution, PSCo would like to remind the developer to call the Utility Notification Center by dialing 811 for utility locates prior to construction.	Information provided to applicant

Right of Way & Permits

1123 West 3rd Avenue
Denver, Colorado 80223
Telephone: 303.285.6612
violeta.ciocanu@xcelenergy.com

March 16, 2026

Douglas County Planning Services
100 Third Street
Castle Rock, CO 80104

Attn: Trevor Bedford

Re: 495 Dawson Trails Boulevard, Case # LE2026-003

Public Service Company of Colorado's (PSCo) Right of Way & Permits Referral Desk has reviewed the above-mentioned application and currently has **no apparent conflict**.

As a safety precaution, PSCo would like to remind the developer to call the Utility Notification Center by dialing 811 for utility locates prior to construction.

Violeta Ciocanu (Chokanu)
Right of Way and Permits
Public Service Company of Colorado dba Xcel Energy
Office: 303-285-6612 – Email: violeta.ciocanu@xcelenergy.com

Although "branded" as Xcel Energy, the legal owner and operator of the utility facilities in Colorado is Public Service Company of Colorado. All utility facilities and related land rights, including fee property, easements, permits, etc., are owned by, operated by and held in the name of Public Service Company of Colorado, a Colorado Corporation.

Project Written Comments
Town of Castle Rock

Project Number: COU26-0009

Description: **CORE Battery Energy Storage System Addition**

Applied: **3/12/2026**
Approved:
Closed:
Expired:

Site Address:
City, State Zip Code: **,**

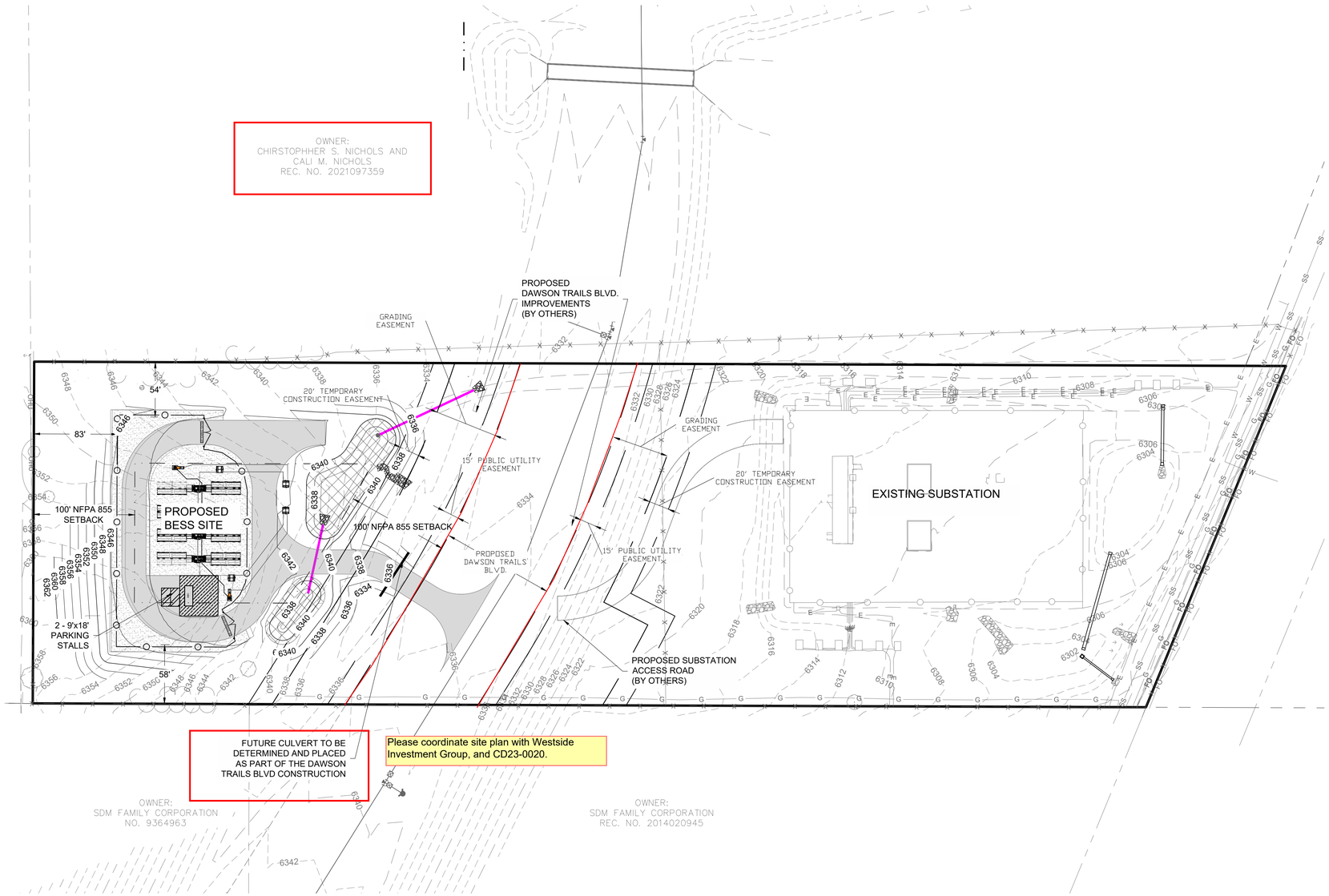
Status: **UNDER REVIEW**
Parent Project:

Applicant: **<NONE>**
Owner: **<NONE>**
Contractor: **<NONE>**

Details:

CORE requests to add a battery energy storage system to the Citadel Substation

LIST OF REVIEWS			
TYPE	**CONTACT**	**STATUS**	**REMARKS**
Review Group: 1ST REVIEW 18 DAY			
PL - SANDY	SANDY VOSSLER	GREEN APPROVED W/COND	See notes and attachments
Notes: PL1. Please contact Planning, Sandy Vossler with questions, 720-733-3556, svossler@crgov.com. PL2. The rating for this review is Green. Only minor comments remain. Note: This rating is specific to this discipline and may not be the overall rating for this review. PL3. Please see and address attached redline comments (PL-COU26-0009 L and E-Rev1).			
PW - BRYSON	BRYSON WILLIAMS	YELLOW - NEED REVISIONS	
Notes: PW1. Please contact Bryson Williams with questions, bwilliams2@crgov.com or (303) 435-0315. PW2. Verify Dawson Trails ROW width is consistent with with what is north and south of this location. The width shown is unclear from the site plan exhibit. PW3. Verify private drive meets criteria.			
CRW-DRAINAGE DAVID V	DAVID VAN DELLEN	NO COMMENT	
Notes:			



LEGEND

- PROJECT BOUNDARY
- 100' NFPA 855 SETBACK
- ADJACENT PROPERTY LINES
- EXISTING TREELINE
- EXISTING DECIDUOUS TREE
- EXISTING BUSH
- EXISTING FENCE
- EXISTING UTILITY POLE
- EXISTING GUY WIRE
- EXISTING GAS LINE
- EXISTING ELECTRIC LINE
- EXISTING WATER LINE
- EXISTING SANITARY SEWER
- EXISTING FIBER OPTIC
- EXISTING OVERHEAD UTILITY LINE
- EXISTING GRAVEL ROAD
- EXISTING RIPRAP
- PROPOSED RIPRAP
- PROPOSED BESS YARD ROCK
- PROPOSED ACCESS ROAD
- PROPOSED STORMWATER BASIN
- PROPOSED 18" CULVERT
- FUTURE CULVERT FOR DAWSON TRAILS BLVD
- PROPOSED DRAINAGE STRUCTURE
- PROPOSED CHAINLINK FENCE
- PROPOSED 28' SWING GATE
- PROPOSED TESLA MEGAPACK 2XL
- PROPOSED AUX SWITCHBOARD
- PROPOSED METER & DISCONNECT CABINET
- PROPOSED TESLA REQUIRED O&M BUILDING, STORAGE CLEARANCE AREA, AND PARKING ZONE

NOTES:

1. EQUIPMENT FOUNDATIONS ARE SHOWN FOR REFERENCE ONLY, REFER TO THE STRUCTURAL DRAWINGS FOR SPECIFIC FOUNDATION LOCATIONS AND DETAILS.
2. CONTOURS SHOWN ARE TO FINISHED GRADE.

CITADEL BESS PROJECT

DOUGLAS COUNTY, COLORADO

REV.	DATE	DESCRIPTION	BY
A	02/23/2026	ISSUE FOR COUNTY REVIEW	KJK
----	----	----	----
----	----	----	----
----	----	----	----

N
W E
S

0 30 60 120

NAD83 COLORADO STATE PLANES,
CENTRAL ZONE, US FOOT

THIS DRAWING IS
PRELIMINARY AND IS
NOT TO BE USED FOR
CONSTRUCTION.
FOR REVIEW
PURPOSES ONLY.

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

PROJECT NUMBER: 25.01369
DESIGN BY: L. MOFFITT
DRAWN BY: L. MOFFITT
APPROVED BY: K. KNOTT

OVERALL SITE PLAN

DRAWING NUMBER: CIT-C-200
REVISION: A

G:\25\25.01369_CIVIL\01_DRAWINGS\PLAN PRODUCTION\PERMITTING PLANS\25.01369_CIT_OSP.DWG

CORE ELECTRIC COOPERATIVE

LOCATION AND EXTENT

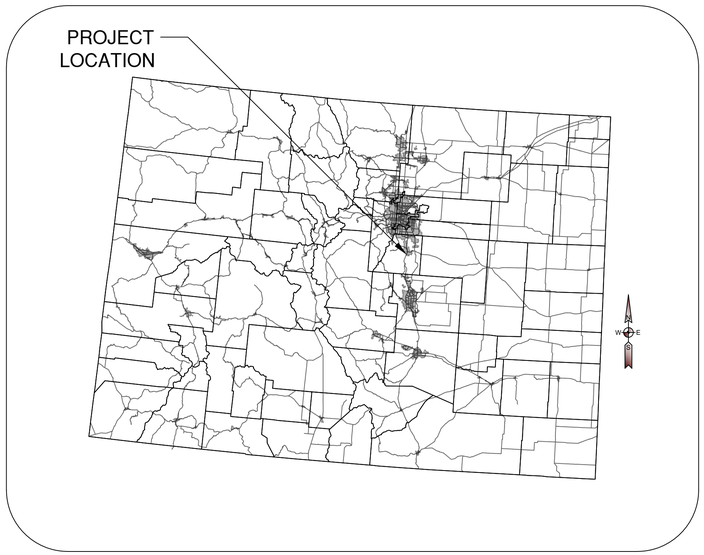
CITADEL BATTERY ENERGY STORAGE SYSTEM (BESS)

890 YUCCA HILLS ROAD, CASTLE ROCK, CO 80109

NE 1/4 SECTION 15, TOWNSHIP 8 SOUTH, RANGE 67 WEST,

OF THE SIXTH PRINCIPAL MERIDIAN, TOWN OF CASTLE ROCK,

COUNTY OF DOUGLAS, STATE OF COLORADO



STATE MAP

VICINITY MAP

0 750 1500 3000

DRAWING INDEX:

DRAWING NO	DRAWING TITLE	REVISION
CIT-G-100	COVER SHEET AND INDEX	A
CIT-C-200	OVERALL SITE PLAN	A
CIT-C-201	TEMPORARY ROAD OVERALL SITE PLAN	A
CIT-C-300	TESLA PLAN VIEW	A
CIT-C-400	FENCE SECTIONS 1	A
CIT-C-401	FENCE SECTIONS 2	A
CIT-C-500	FENCE DETAIL 1	A
CIT-C-501	FENCE DETAIL 2	A

PROJECT OWNER/DEVELOPER

CORE ELECTRIC COOPERATIVE

5496 N. US HWY 85

SEDALIA, CO 80123

BROOKS KAUFMAN

LANDS & RIGHTS OF WAY DIRECTOR

(720) 733-5493

CIVIL ENGINEER

ULTEIG ENGINEERS, INC.

3350 38TH AVE S

FARGO, NORTH DAKOTA 58104

KEVIN KNOTT

(701) 280-8540

ELECTRICAL ENGINEER

ULTEIG ENGINEERS, INC.

3350 38TH AVE SOUTH

FARGO, NORTH DAKOTA 58104

CHUCK MATHSON

(701) 280-8500

GEOTECHNICAL ENGINEER

ANS GEO

4405 SOUTH CLINTON AVENUE

SOUTH PLAINFIELD, NEW JERSEY 07080

VATSAL A. SHAH P.E., PH. D

(908) 754-8383

SURVEYOR

PRECISION SURVEY & MAPPING, INC.

9025 E. KENYON AVE., SUITE 150

DENVER, CO 80237

CHRISTOPHER P. JULIANA, P.L.S

(303) 753-9799

CITADEL BESS
PROJECT

DOUGLAS COUNTY, COLORADO

REV.	DATE	DESCRIPTION	BY
A	02/23/2026	ISSUE FOR COUNTY REVIEW	KJK
----	----	----	----
----	----	----	----
----	----	----	----

NAD83 COLORADO STATE PLANES,
CENTRAL ZONE, US FOOT

THIS DRAWING IS
PRELIMINARY AND IS
NOT TO BE USED FOR
CONSTRUCTION.
FOR REVIEW
PURPOSES ONLY.

Ulteig

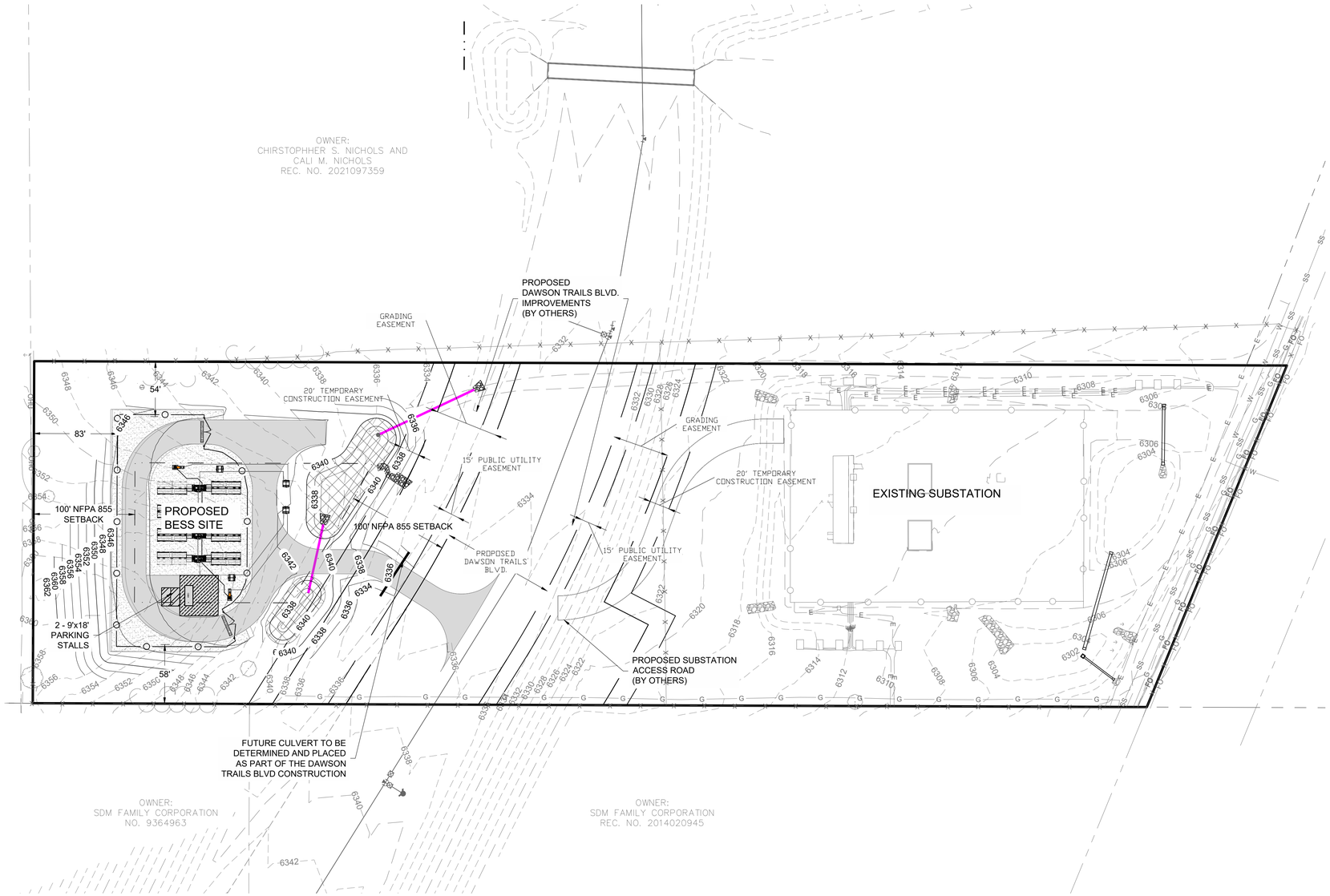
3350 38TH AVE S
FARGO, ND 58104
PHONE: (701) 280-8500
ULTEIG.COM

PROJECT NUMBER: 25.01369
DESIGN BY: L. MOFFITT
DRAWN BY: L. MOFFITT
APPROVED BY: K. KNOTT

COVER SHEET

DRAWING NUMBER: CIT-C-100

REVISION: A



LEGEND

- PROJECT BOUNDARY
- 100' NFPA 855 SETBACK
- ADJACENT PROPERTY LINES
- EXISTING TREELINE
- EXISTING DECIDUOUS TREE
- EXISTING BUSH
- EXISTING FENCE
- EXISTING UTILITY POLE
- EXISTING GUY WIRE
- EXISTING GAS LINE
- EXISTING ELECTRIC LINE
- EXISTING WATER LINE
- EXISTING SANITARY SEWER
- EXISTING FIBER OPTIC
- EXISTING OVERHEAD UTILITY LINE
- EXISTING GRAVEL ROAD
- EXISTING RIPRAP
- PROPOSED RIPRAP
- PROPOSED BESS YARD ROCK
- PROPOSED ACCESS ROAD
- PROPOSED STORMWATER BASIN
- PROPOSED 18" CULVERT
- FUTURE CULVERT FOR DAWSON TRAILS BLVD
- PROPOSED DRAINAGE STRUCTURE
- PROPOSED CHAINLINK FENCE
- PROPOSED 28' SWING GATE
- PROPOSED TESLA MEGAPACK 2XL
- PROPOSED AUX SWITCHBOARD
- PROPOSED METER & DISCONNECT CABINET
- PROPOSED TESLA REQUIRED O&M BUILDING, STORAGE CLEARANCE AREA, AND PARKING ZONE

NOTES:

1. EQUIPMENT FOUNDATIONS ARE SHOWN FOR REFERENCE ONLY, REFER TO THE STRUCTURAL DRAWINGS FOR SPECIFIC FOUNDATION LOCATIONS AND DETAILS.
2. CONTOURS SHOWN ARE TO FINISHED GRADE.

N
W E
S

0 30 60 120

NAD83 COLORADO STATE PLANES,
CENTRAL ZONE, US FOOT

CITADEL BESS PROJECT

DOUGLAS COUNTY, COLORADO

REV.	DATE	DESCRIPTION	BY
A	02/23/2026	ISSUE FOR COUNTY REVIEW	KJK
----	----	----	----
----	----	----	----
----	----	----	----

THIS DRAWING IS
PRELIMINARY AND IS
NOT TO BE USED FOR
CONSTRUCTION.
FOR REVIEW
PURPOSES ONLY.

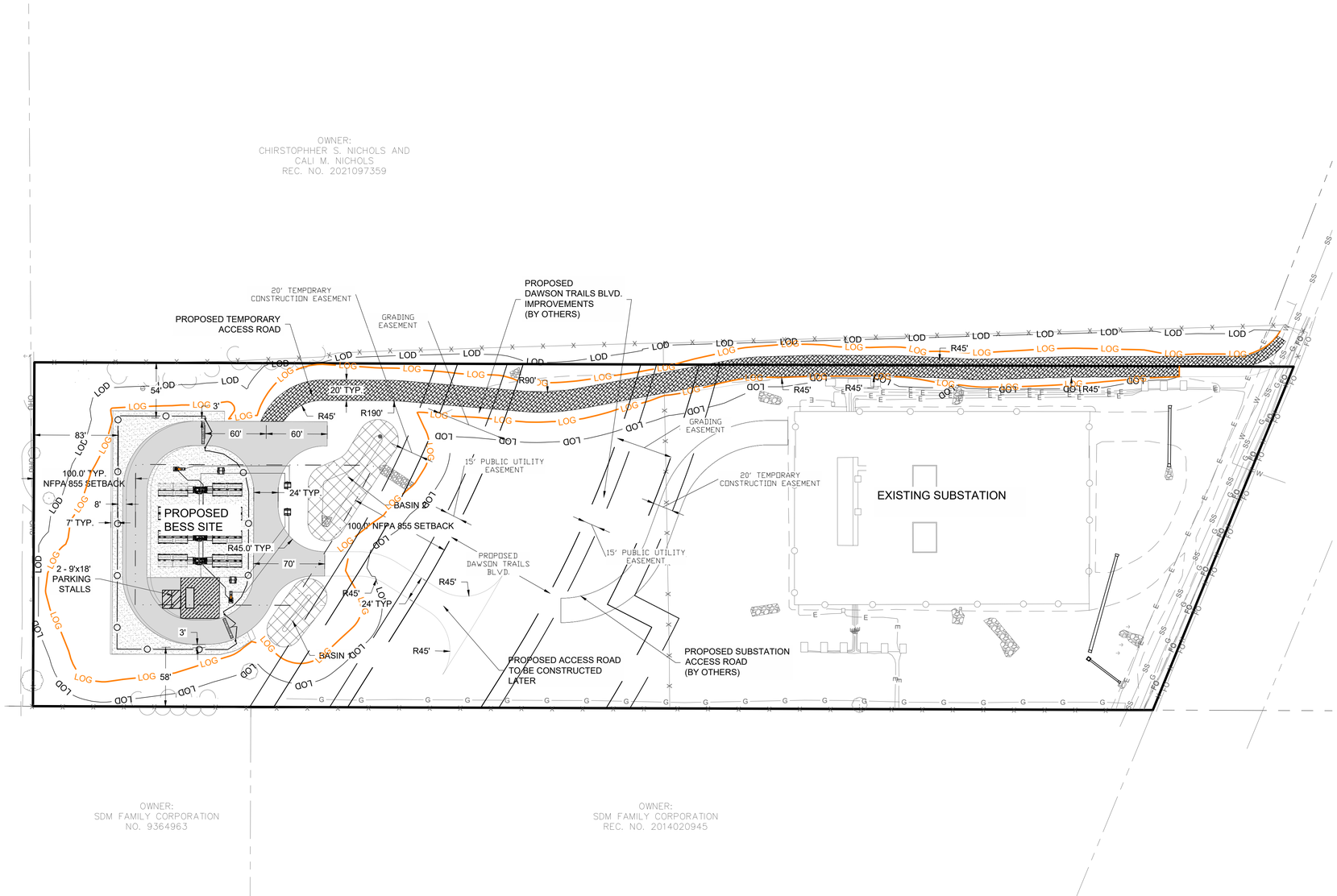
Ulteig
3350 38TH AVE S
FARGO, ND 58104
PHONE: (701) 280-8500
ULTEIG.COM

PROJECT NUMBER: 25.01369
DESIGN BY: L. MOFFITT
DRAWN BY: L. MOFFITT
APPROVED BY: K. KNOTT

OVERALL SITE PLAN

DRAWING NUMBER: CIT-C-200
REVISION: A

G:\2025\25.01369_CIVIL\01_DRAWINGS\PLAN PRODUCTION\PERMITTING PLANS\25.01369_CIT_OSP.DWG



LEGEND

- PROJECT BOUNDARY
- 100' NFPA 855 SETBACK
- ADJACENT PROPERTY LINES
- EXISTING TREELINE
- EXISTING DECIDUOUS TREE
- EXISTING BUSH
- EXISTING FENCE
- EXISTING UTILITY POLE
- EXISTING GUY WIRE
- EXISTING GAS LINE
- EXISTING ELECTRIC LINE
- EXISTING WATER LINE
- EXISTING SANITARY SEWER
- EXISTING FIBER OPTIC
- EXISTING OVERHEAD UTILITY LINE
- EXISTING GRAVEL ROAD
- EXISTING RIPRAP
- PROPOSED RIPRAP
- PROPOSED BESS YARD ROCK
- PROPOSED ACCESS ROAD
- PROPOSED TEMPORARY ROAD
- PROPOSED FUTURE ACCESS ROAD
- PROPOSED STORMWATER BASIN
- PROPOSED DRAINAGE STRUCTURE
- PROPOSED CHAINLINK FENCE
- PROPOSED 28' SWING GATE
- PROPOSED TESLA MEGAPACK 2XL
- PROPOSED AUX SWITCHBOARD
- PROPOSED METER & DISCONNECT CABINET
- PROPOSED TESLA REQUIRED O&M BUILDING, STORAGE CLEARANCE AREA, AND PARKING ZONE

NOTES:

1. EQUIPMENT FOUNDATIONS ARE SHOWN FOR REFERENCE ONLY, REFER TO THE STRUCTURAL DRAWINGS FOR SPECIFIC FOUNDATION LOCATIONS AND DETAILS.

N
W E
S

0 30 60 120

NAD83 COLORADO STATE PLANES, CENTRAL ZONE, US FOOT

CITADEL BESS PROJECT

DOUGLAS COUNTY, COLORADO

REV.	DATE	DESCRIPTION	BY
A	02/23/2026	ISSUE FOR COUNTY REVIEW	KJK

THIS DRAWING IS PRELIMINARY AND IS NOT TO BE USED FOR CONSTRUCTION. FOR REVIEW PURPOSES ONLY.

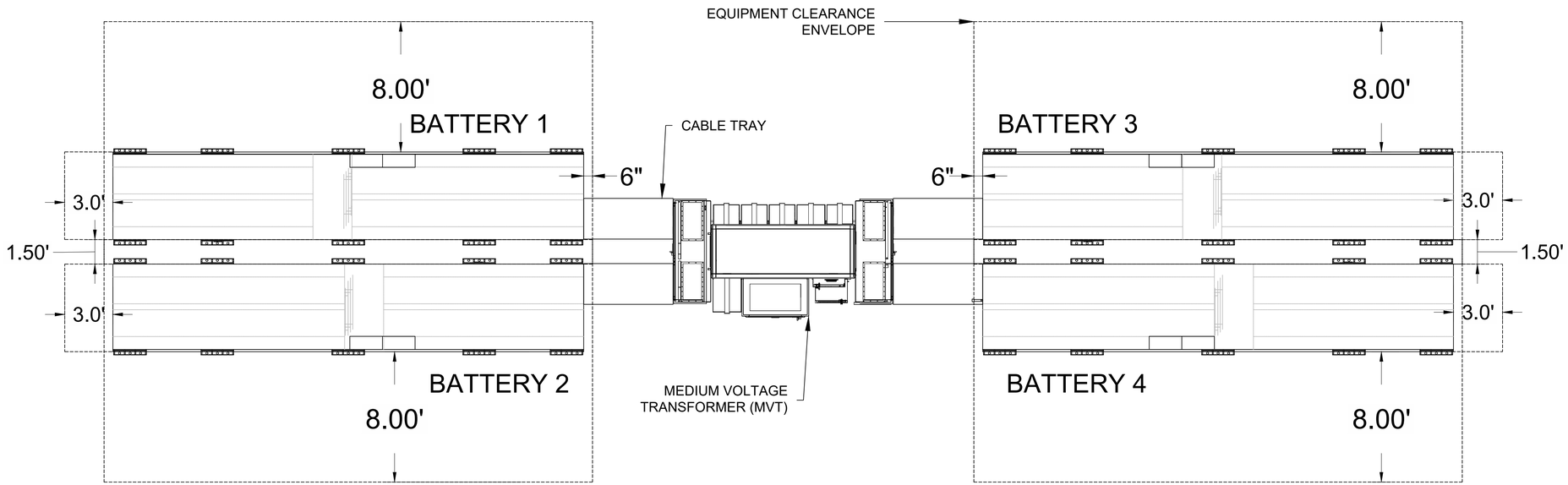
Ulteig
3350 38TH AVE S
FARGO, ND 58104
PHONE: (701) 280-8500
ULTEIG.COM

PROJECT NUMBER: 25.01369
DESIGN BY: L. MOFFITT
DRAWN BY: L. MOFFITT
APPROVED BY: K. KNOTT

TEMPORARY ROAD OVERALL SITE PLAN

DRAWING NUMBER: CIT-C-201
REVISION: A

D:\2025\25.01369_CITADEL\01 DRAWINGS\PLAN PRODUCTION\PERMITTING PLANS\25.01369_GT_DSP_TEMP ROAD.DWG



1 TYPICAL EQUIPMENT BLOCK - PLAN VIEW

NOT TO SCALE

LAYOUT NOTES:

1. CABLE TRAY ASSUMED AS 24" OPEN CABLE TRAY - PART NUMBER 24A09-24-240. THE 20FT CABLE TRAY SHALL BE CUT INTO FOUR EQUAL SECTIONS OF 5FT EACH.
2. FOR CABLE TRAY DETAILS SEE DRAWING 20260116-US-WA-GREE-IFC-BESSL-E4-101-R0.
3. FOR DETAILED COMMUNICATION INFORMATION SEE PLANT SCADA SET (BY OTHERS).
4. CONDUITS TO BE 12" AWAY FROM GEOPIERS. SEE STRUCTURAL PACKAGE FOR DETAILS. DUE TO ROUTING CONTRAINTS, MAINTAINING A FULL 12" OFFSET FOR SOME OF THE OUTGOING 8" CONDUITS MAY NOT BE FEASIBLE. A 4" OFFSET WILL BE APPLIED TO WHERE REQUIRED TO PROVIDE THE MAXIMUM PRACTICAL CLEARANCE. CONTRACTOR SHALL VERIFY FINAL ROUTING IN THE FIELD AND COORDINATE AS NEEDED TO AVOID INTERFERENCES WITH ADJACENT SYSTEMS AND EQUIPMENT.

D:\2025\25.01369_CIVIL\01_DRAWINGS\01_PLAN PRODUCTION\PERMITTING PLANS\25.01369_01_TESLA BLOCK.DWG

CITADEL BESS PROJECT

DOUGLAS COUNTY, COLORADO

REV.	DATE	DESCRIPTION	BY
A	02/23/2026	ISSUE FOR COUNTY REVIEW	KJK

LEGEND

- EQUIPMENT CLEARANCE ENVELOPE
- TESLA WIRE-WAY
- EQUIPMENT FOUNDATION PAD

NAD83 COLORADO STATE PLANES, CENTRAL ZONE, US FOOT

THIS DRAWING IS PRELIMINARY AND IS NOT TO BE USED FOR CONSTRUCTION. FOR REVIEW PURPOSES ONLY.

Ulteig

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

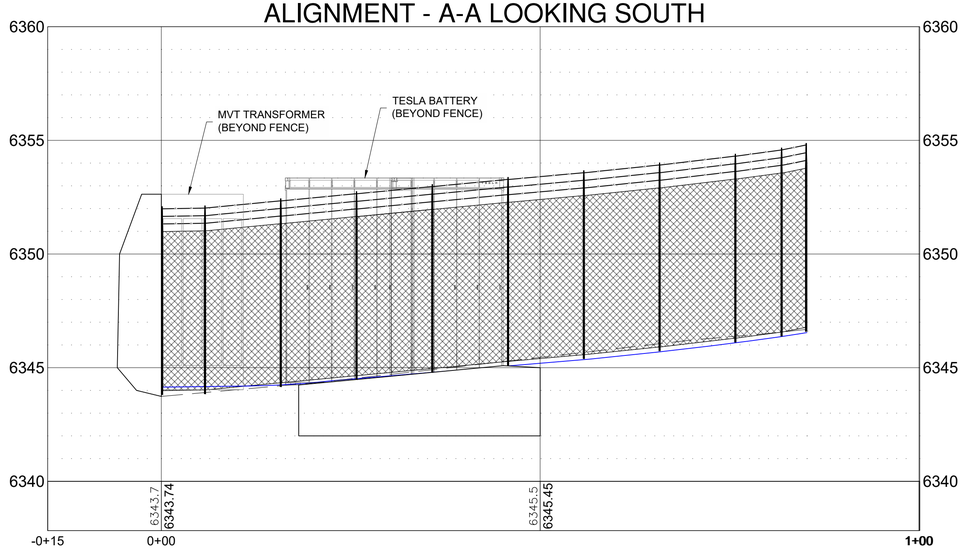
PROJECT NUMBER: 25.01369
DESIGN BY: L. MOFFITT
DRAWN BY: L. MOFFITT
APPROVED BY: KJK

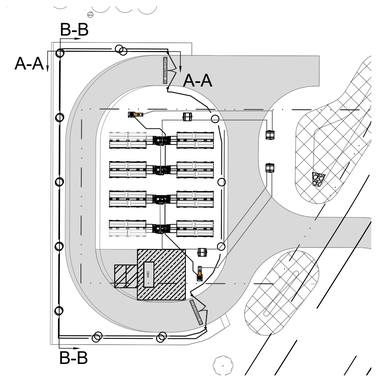
TESLA BATTERY PLAN VIEW

DRAWING NUMBER: CIT-C-300

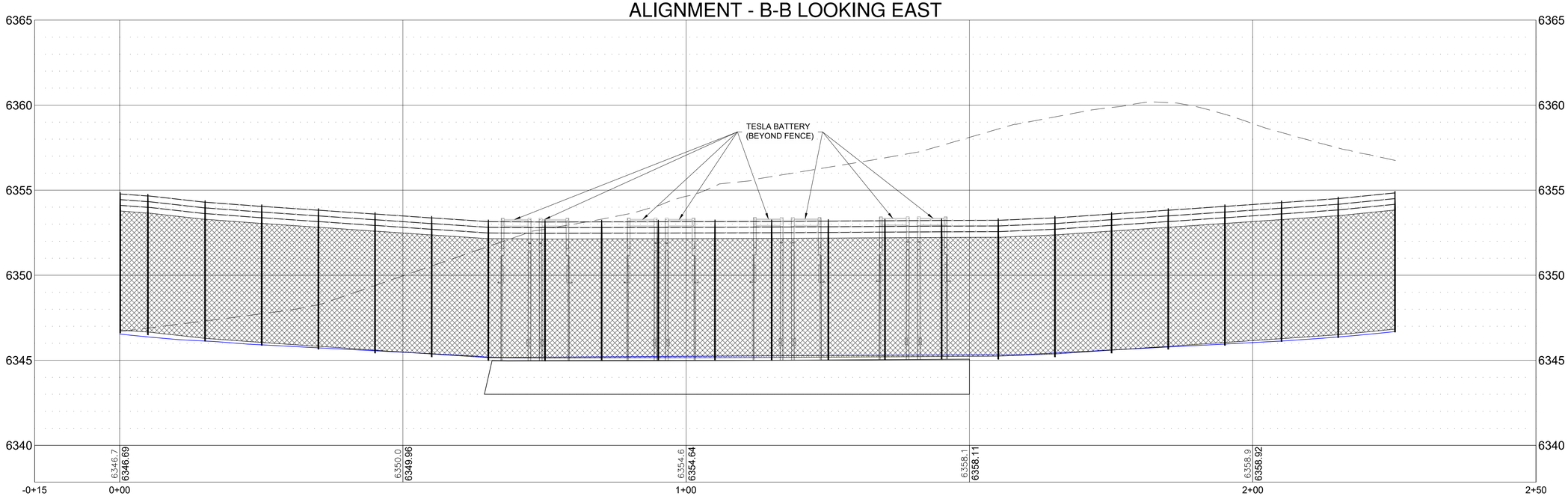
REVISION: A

ALIGNMENT - A-A LOOKING SOUTH





ALIGNMENT - B-B LOOKING EAST



LEGEND

PROPOSED FINISHED GRADE AT FENCE ALIGNMENT

EXISTING GROUND

HORIZ. 0 5 10 20

VERT. 0 1.67 3.33 6.66

NAD83 COLORADO STATE PLANES, CENTRAL ZONE, US FOOT

THIS DRAWING IS PRELIMINARY AND IS NOT TO BE USED FOR CONSTRUCTION. FOR REVIEW PURPOSES ONLY.

Ulteig

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

PROJECT NUMBER: 25.01369
DESIGN BY: L. MOFFITT
DRAWN BY: L. MOFFITT
APPROVED BY: K. KNOTT

CITADEL BESS PROJECT

DOUGLAS COUNTY, COLORADO

REV.	DATE	DESCRIPTION	BY
A	02/23/2026	ISSUE FOR COUNTY REVIEW	KJK

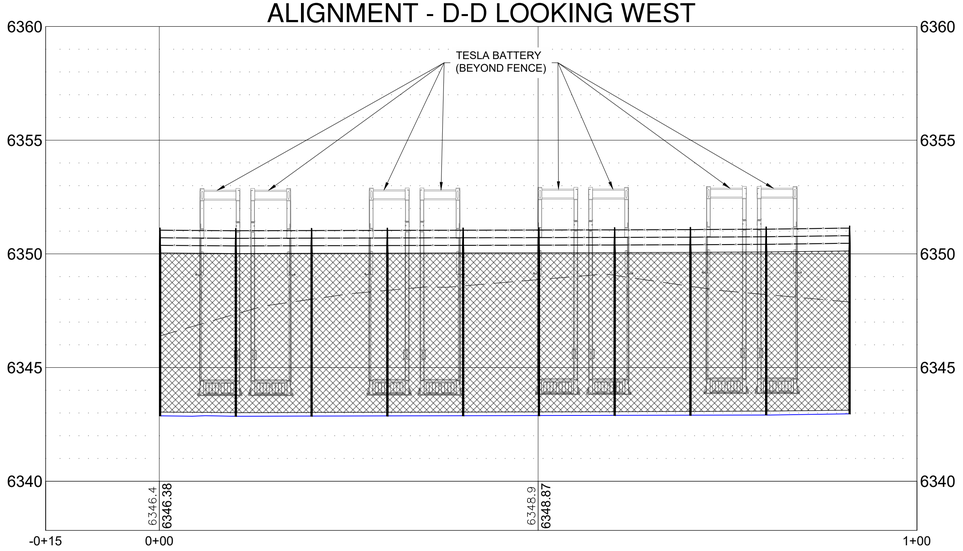
FENCE SECTIONS 1

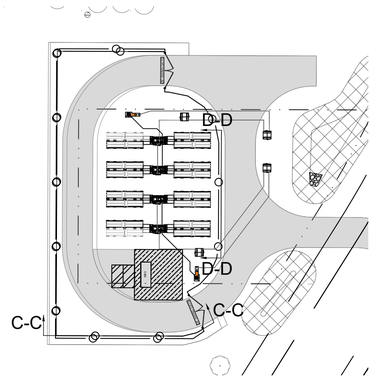
DRAWING NUMBER: CIT-C-400

REVISION: A

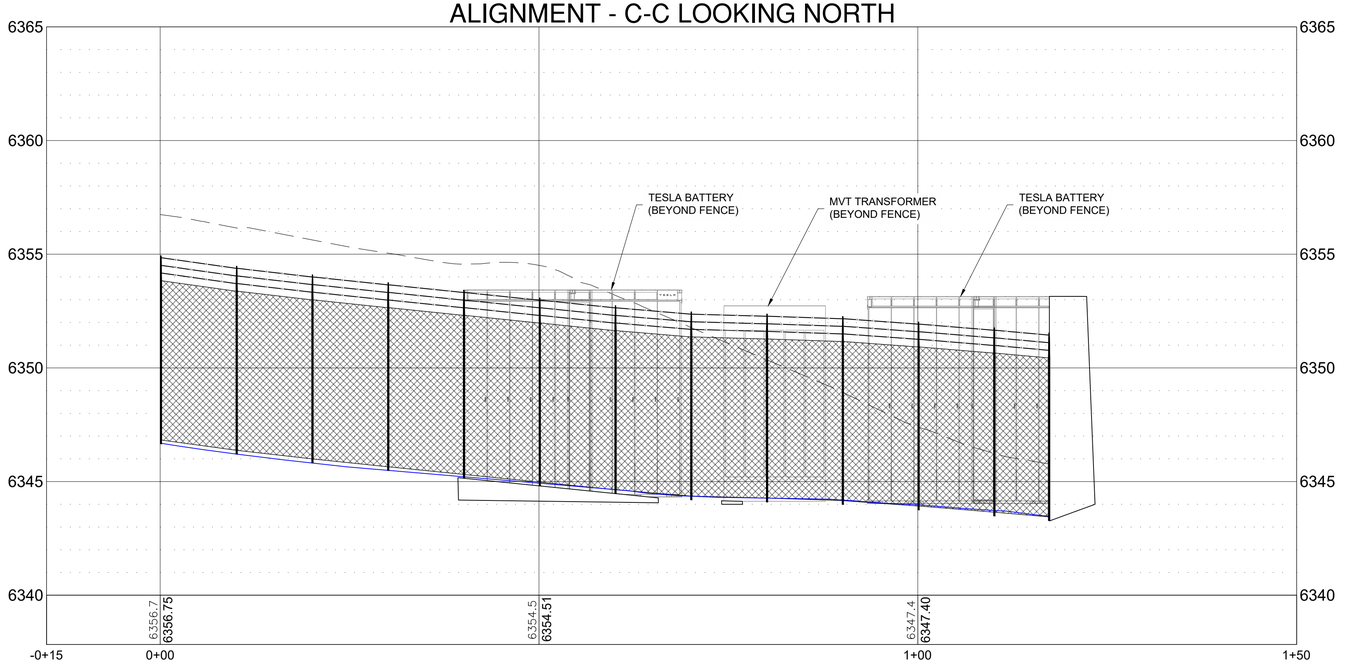
G:\25\25.01369_CRA\01 DRAWINGS\PLAN PRODUCTION\PERMITTING PLANS\25.01369_GT_FENCE SECTION.DWG

ALIGNMENT - D-D LOOKING WEST





ALIGNMENT - C-C LOOKING NORTH



LEGEND

PROPOSED FINISHED GRADE AT FENCE ALIGNMENT

EXISTING GROUND

HORIZ. 0 5 10 20

VERT. 0 1.67 3.33 6.66

NAD83 COLORADO STATE PLANES, CENTRAL ZONE, US FOOT

THIS DRAWING IS PRELIMINARY AND IS NOT TO BE USED FOR CONSTRUCTION. FOR REVIEW PURPOSES ONLY.

CITADEL BESS PROJECT

DOUGLAS COUNTY, COLORADO

REV.	DATE	DESCRIPTION	BY
A	02/23/2026	ISSUE FOR COUNTY REVIEW	KJK

Ulteig

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

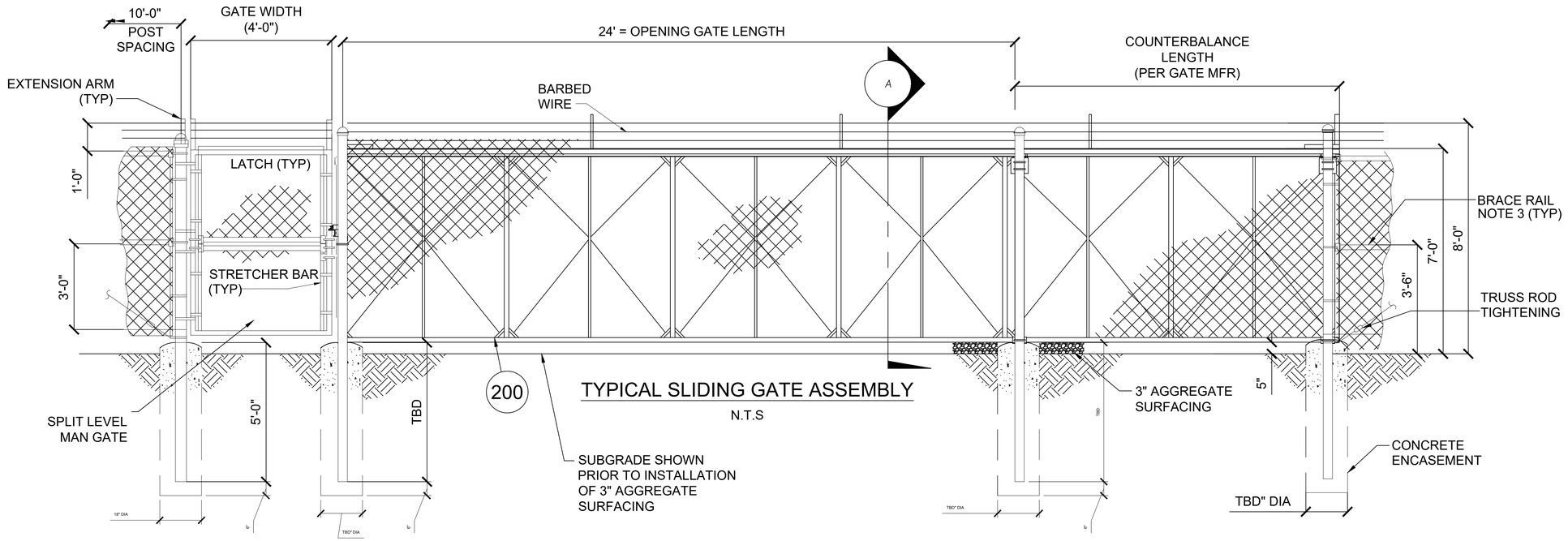
PROJECT NUMBER: 25.01369
DESIGN BY: L. MOFFITT
DRAWN BY: L. MOFFITT
APPROVED BY: K. KNOTT

FENCE SECTIONS 2

DRAWING NUMBER: CIT-C-401

REVISION: A

D:\2025\25.01369_CITA\01 DRAWINGS\PLAN PRODUCTION\PERMITTING PLANS\25.01369_CIT_FENCE SECTION.DWG

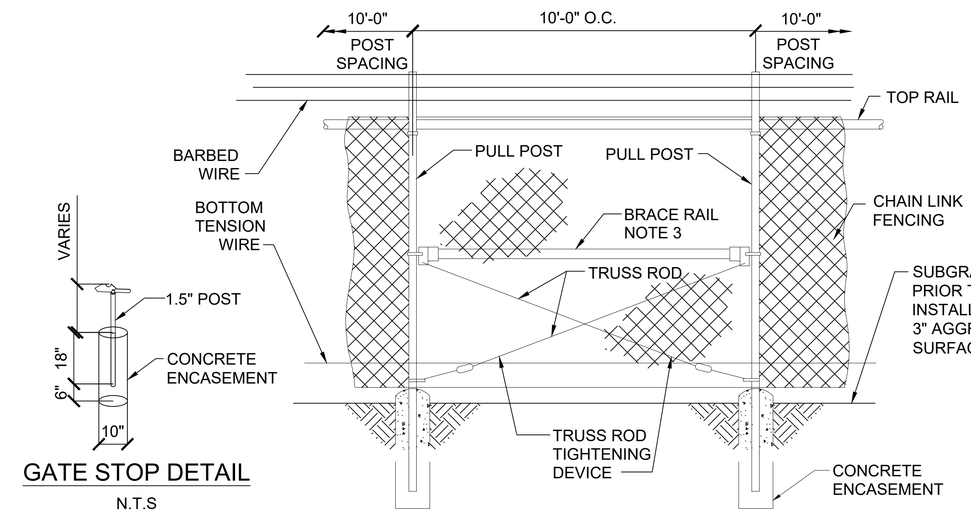


TYPICAL SLIDING GATE ASSEMBLY

N.T.S

SPLIT MAN GATE/PERSONNEL GATE

N.T.S



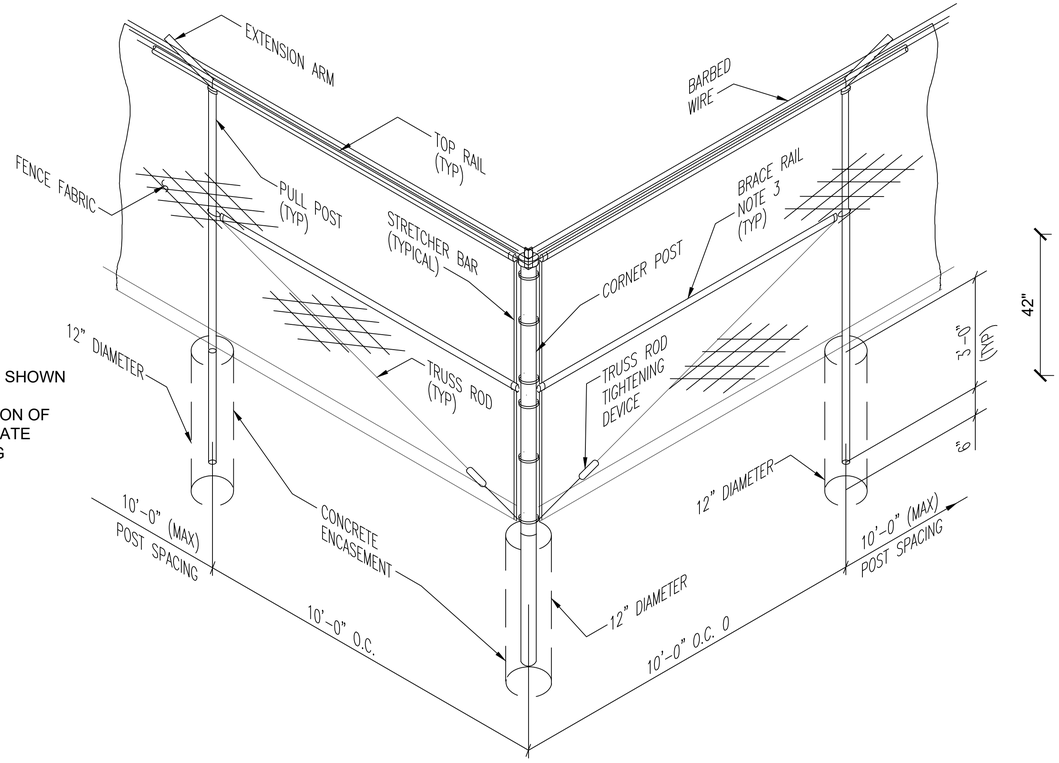
GATE STOP DETAIL

N.T.S

(TO BE USED WITH SWING GATE)

TYPICAL BRACE ASSEMBLY

N.T.S



TYPICAL CORNER ASSEMBLY

N.T.S

CITADEL BESS PROJECT

DOUGLAS COUNTY, COLORADO

REV.	DATE	DESCRIPTION	BY
A	02/23/2026	ISSUE FOR COUNTY REVIEW	KJK

NAD83 COLORADO STATE PLANES, CENTRAL ZONE, US FOOT

THIS DRAWING IS PRELIMINARY AND IS NOT TO BE USED FOR CONSTRUCTION. FOR REVIEW PURPOSES ONLY.

Ulteig

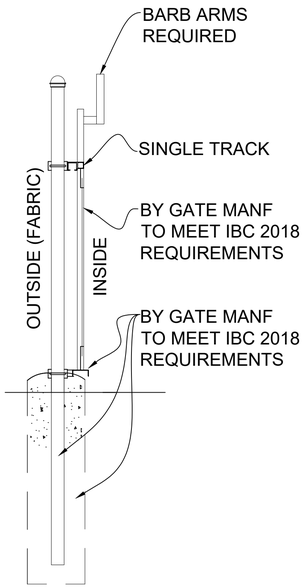
3350 38TH AVE S
FARGO, ND 58104
PHONE: (701) 280-8500
ULTEIG.COM

PROJECT NUMBER: 25.01369
DESIGN BY: L. MOFFITT
DRAWN BY: L. MOFFITT
APPROVED BY: K. KNOTT

FENCE DETAIL 1

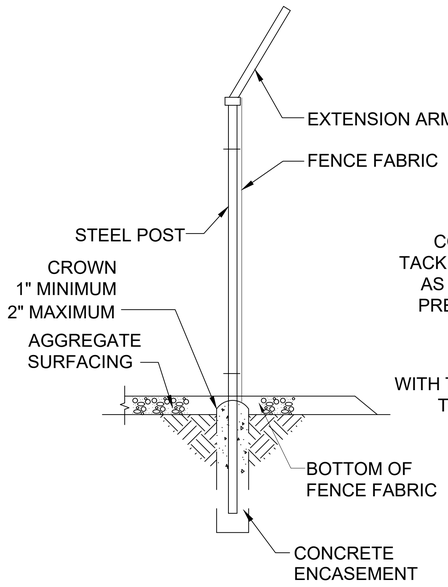
DRAWING NUMBER: CIT-C-500

REVISION: A



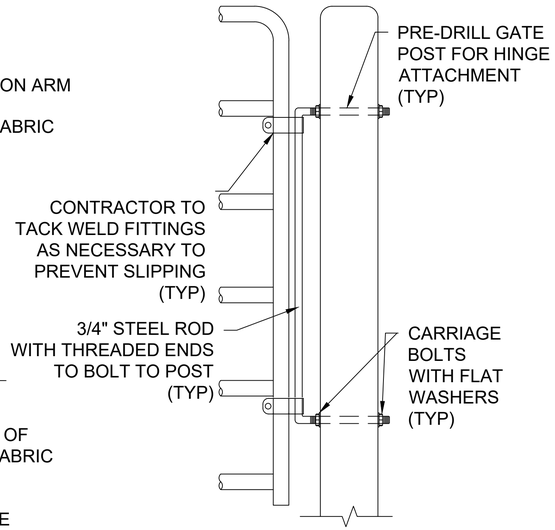
SECTION A-CT01

SCALE: NONE CT01



TYPICAL LINE POST DETAIL

N.T.S

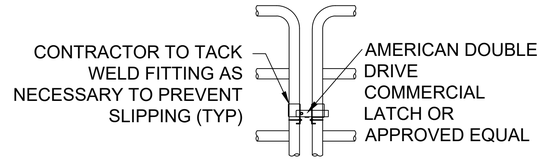


PIPE GATE HINGE DETAIL

N.T.S

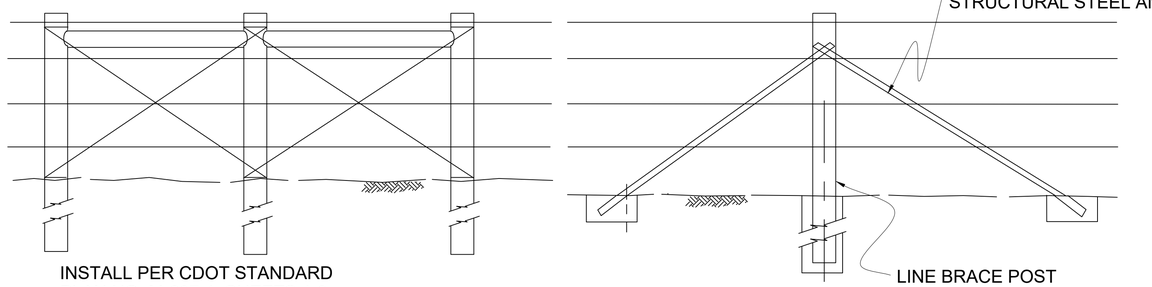
CHAIN LINK FENCE NOTES:

1. A TOTAL OF THREE 24' OPENING CANTILEVER GATES ARE REQUIRED. COUNTERBALANCE LENGTH IS TYPICALLY 50% BUT WILL BE DEPENDENT ON THE GATE MANUFACTURER DESIGN. FOUNDATIONS ARE TBD BASED ON RECOMMENDATIONS FROM THE SELECTED GATE MANUFACTURER.
2. ALL SWING GATES ARE TO SWING OUT ONLY.
3. REFER TO SPECIFICATION DIVISION 15.
4. GATES, GATE POSTS, AND GATE FOUNDATIONS TO BE DESIGNED BY GATE MANUF. GATE MANUF TO SUBMT DESIGN CALCULATIONS DEMONSTRATING COMPLIANCE WITH 2018 IBC. FOR GATE GROUNDING SEE DWG E04C.



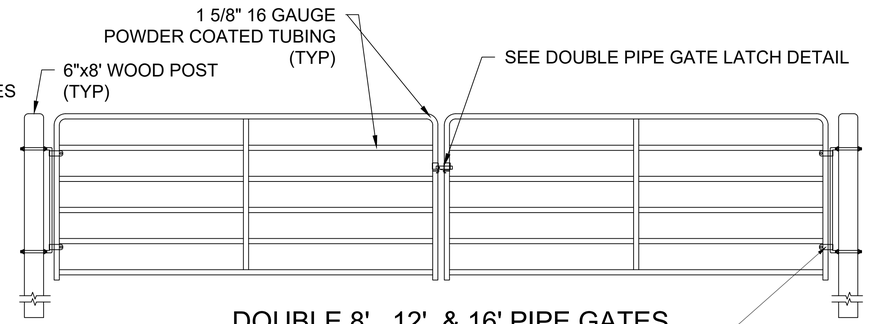
DOUBLE PIPE GATE LATCH DETAIL

N.T.S



SMOOTH WIRE FIELD FENCE DETAIL

N.T.S



DOUBLE 8' , 12', & 16' PIPE GATES

N.T.S

CITADEL BESS PROJECT

DOUGLAS COUNTY, COLORADO

REV.	DATE	DESCRIPTION	BY
A	02/23/2026	ISSUE FOR COUNTY REVIEW	KJK

NAD83 COLORADO STATE PLANES, CENTRAL ZONE, US FOOT

THIS DRAWING IS PRELIMINARY AND IS NOT TO BE USED FOR CONSTRUCTION. FOR REVIEW PURPOSES ONLY.

Ulteig

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

PROJECT NUMBER: 25.01369
DESIGN BY: L. MOFFITT
DRAWN BY: L. MOFFITT
APPROVED BY: K. KNOTT

FENCE DETAIL 2

DRAWING NUMBER: CIT-C-501

REVISION: A

G:\2025\25.01369...\CAD\...\DRAWINGS\PLAN PRODUCTION\PERMITTING PLANS\FENCE DETAIL.DWG


TESLA


TESLA